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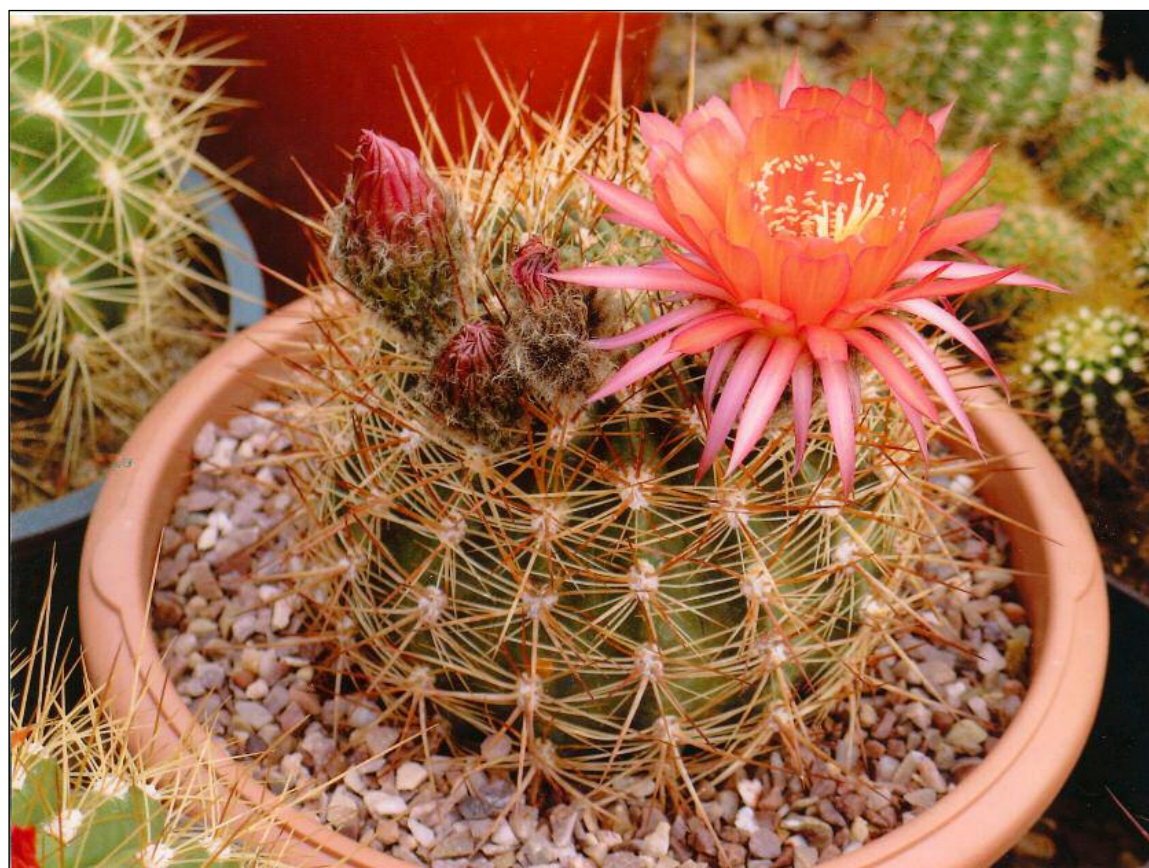
Soehrensia uebelmanniana
Toconce, Prov. Antofagasta, Chile

Photo: - M. Kroenlein



Soehrensia uebelmanniana
Toconce

Photo: F. Vandenbroeck



Soehrensia korethroides

Photo: J. Arnold

HAVE WE FOUND SOEHRENSIA? From C & M. Sherrah

We had got as far as Cachi (in northern Argentina) and we wanted to head for the slopes of the Nevado Cachi. But we were not really sure in which direction we should set off as we did not have a detailed map. After asking how to get to Nevado Cachi we caught a school bus which followed a winding, narrow, dirt road passing through several groups of 3-5 houses - none of them enough to call a village - and got off at a point near Las Pailas where we could see all the way to the top of Nevado Cachi. We looked up at a scree slope of about 1-2 kms wide (from memory) at the base which slowly narrowed towards the top. At either side of this scree slope were steep sided eroded hills. The surface of the scree had many rocks which were filled between them with eroded dust from the surrounding hills. Walking up this scree slope was not easy; there were clumps of *Tephrocactus* everywhere all of the way up, as well as low spiky bushes and Yareta.

The right hand side of this scree slope was covered with a forest of *Trichocereus pasacana* which covered an area which must have been of the order of square kilometres. These tall plants grew more densely in some places and less so in others but the total number of *Trichocereus* must have been in the high hundreds. However, a large snow melt fed stream had carved its path down the middle of the scree slope so that we could not venture to the right hand side. The stream gully was about 10m wide and about 5m deep. Across the slope the underlying strata seemed to have been tilted in places, resulting in vertical drops of 3-5m across the full width of the slope. Boulders had accumulated at these steps and it was a bit of a climb to get over them. We stopped at the second step, having hiked uphill from 12.30 p.m. to 4.00 p.m. at a brisk pace.

There was a shepherd's hut on the left hand edge of the scree slope where it met the steeply eroded hillside. Here we found a population of globular cacti which at the time we thought were *Soehrensia*, but we are not so sure now! The individual heads were 30-40 cm in diameter with hairy bristly dead flower tubes. Multi-headed plants were not uncommon. We were feeling definite signs of the effect of altitude - based upon previous experience we may have been at 15,000 ft. As we had run out of time we had to head back towards Las Pailas, actually jogging most of the way. We reached the dirt road at 7.10 p.m. where we were able to hitch a ride to one of the houses further down the road. Here we sheltered from a severe dust storm and waited for the bus. On the way down we took a slightly different route passing down a gully between two steeply eroded hills and along a ridge, before turning left down a gully to rejoin the main scree slope. In these gullies there were more *Trichocereus pasacana* growing, one with white flowers which faced in various directions. By this time it was getting quite dark so it was not possible to take any photographs at this stage.

.....from H.Middleditch

It has earlier been noted by C.R.Pugh (Chileans No.53 p.67) that *Soehrensia* had been found some 20 km to the north of La Poma, in the upper reaches of the Rio Calchaquies. The altitude of La Poma is given as 3015m on my map of this area. Some 20 or so further upstream is Saladillo lying at 3500m. which could be the altitude at which *Soehrensia* was seen by C.R.Pugh.

The town of Cachi lies somewhat lower down the valley of the Rio Calchaquies at 2280m altitude, with Las Pailas possibly 15 km to the northwest. To judge by the spot heights surrounding Las Pailas, this place could be at 2400m altitude. The Nevado Cachi itself is 6380m, so that on the ascent of its slopes C.Sherrah may well have got as far as 3000m. From the recorded altitudes at which *Soehrensia* is to be found (Chileans No.53), the altitude at which C.& M. Sherrah found this plant is not inappropriate for *Soehrensia*. In addition, this location in the north-west of Argentina is geographically no great distance from where *Soehrensias* are to be found in the area near to San Pedro de Atacama, comparable to the occurrence of *Trichocereus pasacana* and *T. atacamensis*.

On the opposite side of the Calchaquies valley to Las Pailas there is a road which climbs up to the Cachi Pampa, where *Soehrensia* have also been found.

.....from K.Gilmer

On our first field trip to Argentina we made an ascent of the Cuesta del Obispo. Once over the crown of the pass, the road dropped slightly, down to the relatively level Cachipampa, which was surrounded on three sides by higher ground. Part way across the Cachipampa, we came across a solitary plant of *Soehrensia korethroides*, which had a rather unexpected appearance as there were over half a dozen offsets from around the base, two or three of them as stout as the main head, which could have been 30cm high. There were about a dozen flowers standing upright around the crown, not fully open, red in colour.

.....from J.Lambert

Plants of *Soehrensia korethroides* were encountered at various places all along the road from Piedra del Molino to Cachi - perhaps not as far as Cachi itself, because the altitude is rather less there. Some of these plants were in flower, with red flowers. They were found in the same area as *Lobivia kuenrichii* and a small segmented *Tephrocactus*. More *S.korethroides* were seen on the ascent from the Quebrada Humahuaca to the Abra de Potrerillo, again in flower with red flowers. The length of the flowers seems to be rather variable and dependant upon both their exposure to the sun and the prevailing weather. The flowers can be so short that they are prevented from opening fully by the surrounding spines or they can be long enough to open their petals without being hindered by the spines.

.....from G.Charles

When we were travelling south over the Pampa Tintin, well before we reached the road coming from Cachi, we took a track leading us across the Pampa, through the tall *Trichocereus*, towards the ridge of the Cordillera which proved to be about 20km away. We were heading for the far side of these mountains where *Lobivia walteri* had been found by some of Roberto Kiesling's students at Cerro Negro de Tiroa. But at the start of the hairpin bends taking the track over the Abra de Pozo Bravo we found *Soehrensia korethroides*

growing in company with *Tephrocactus bolivianus*. Some of these clumps of *Tephrocactus* carried yellow flowers, some of them with red flowers.

.....from C.Hunkeler

Travelling up the Quebrada del Toro we were beyond Santa Rosa de Tastil when we came across *Soehrensia korethroides* growing in company with *Lobivia ferox*, *Parodia stuemeri*, *Tephrocactus bolivianus*, *Tunilla soehrensia* and *Trichocereus pasacana*. Near Las Cuevas we saw some of the *Soehrensia* in flower, the orange flowers having pink outermost petals. There were also some of these *Soehrensia* to be seen on the San Antonio de los Cobres side of the pass, some of them about 2km to the south of the church by the ghost town above San Antonio de los Cobres.

.....from R.Hillmann

Coming north up the valley from Cachi we were beyond La Poma when we first found *Soehrensia korethroides*, which continued as we approached the Abra de Acay. They displayed different flower colours, in orange, rose, and red. On the northern side of the Abra de Acay, there were more of these *Soehrensia* to be seen but none of them were in flower.

.....from M.Muse

My *S.korethroides* had three flowers close to the crown, which were very short and stout - there was no suggestion of a tube, just a corolla stuck on an ovary. The tips of the petals were flushed orange on their inner surfaces and the flowers did not open out but remained cup-shaped and the vivid green style was held erect.

The flowers on my *Soehrensia rosarioana* R.129 were completely different from those on *S.korethroides*. If they had opened fully I suspect that they would have resembled those of *Lobivia formosa* v. *Amaicha* illustrated on p.47 of Rausch's *Lobivia* '85.

.....from J.Arnold

I have two plants of *S.korethroides* which were grown from seed obtained from R.Kiesling about ten years ago. They are now about 6 inches in diameter. I had expected that they would need to grow a great deal larger before they would flower, but now they both flower, the slightly larger plant of the two having flowered for the last four years. The flowers are orange-red and they are long enough to grow above the spines so that their petals can open fully, to about 3.5 inches across. They set fruit if crossed between each other or with other flowering *Lobivias* or *Soehrensias*. The fruit ripens to a pinkish-red colour of about one inch in diameter, before they split vertically - usually with one split. The seed can be seen in the dense white pulp.

.....from R.Ferryman

In the north of Chile, as we were travelling along a road to the north of San Pedro de Atacama, we saw some distance from the road a number of plants which looked like young specimens of *Trichocereus atacamensis*. We trekked across the open ground and when we had come quite close to them we realised that they were in fact plants of *Soehrensia uebelmanniana*. Apart from a few widely scattered dwarf shrubs, and an occasional ground-hugging herb, there was very little else in the way of other vegetation growing at this site. In particular, there were no *Trichocereus atacamensis* in view. Further on, to the east of Caspana, we came across a second population of these same plants and here we also found one or two specimens of *Tephrocactus conoideus*, but again no sign of *Trichocereus atacamensis*.

.....from W.Maechler

In the February of 1995 we were travelling from the Tatio Geyser via Caspana in the direction of Calama, when we came across *Soehrensia uebelmanniana* in the area of Caspana. According to F.Ritter it must also occur in the Toconce valley. In addition, I had acquired a fist-sized *S.uebelmanniana* in 1975/76 from the Ritter collection in Chile which has stood in my own collection since then. Today it has a height of 40cm and a diameter of 20cm. However I doubt if I will see a flower on this particular plant.

.....from R.Ferryman

The picture from W.Maechler of his *Soehrensia uebelmanniana* growing in cultivation, which is about twice as high as it is wide, is not obviously similar to the specimens of these plants which I have seen in their habitat. Whilst these plants in habitat reach quite large proportions, they are flattish globular at the size seen in the photograph. Of course that is under habitat conditions, and it is quite likely they will become more columnar in cultivation - be that cultivation in Europe or in Chile!

.....from R.Moreton

I would say that the plant pictured by W.Maechler could well be the *Soehrensia uebelmanniana* that we found, only in habitat the spines are denser and the plants are not as neat and tidy - for obvious reasons.

.....from G.Charles

The plants of *Soehrensia uebelmanniana* that I have seen in the wild have much longer spines and a much denser spination than the cultivated plant in the picture from W.Maechler. But the spine colours are similar, much like the spine colour of my seedling plant raised from seed collected by F.Vandenbroeck.

.....from B.Burke

I am looking at the photograph of the *Soehrensia uebelmanniana* in the collection of W.Maechler, with the advantage of having been standing over some of these plants in habitat just a few weeks ago. This particular plant does not look like any of the larger plants we have seen in the field, but it does look much more like one of the younger offsets at the base of an older plant.

.....from R.Hillmann

In my field notes I have one precise record for *Soehrensia uebelmanniana*, to the north-east of Calama, at Toconce, at about 3400 m altitude. We saw some plants which attained a height of up to 1.2m; a number of these were offsetting sparsely from ground level. Some of them were in fruit. This plant has quite a wide distribution, being found further to the south of Caspana. This particular *Soehrensia* is to be found in the same area as *Trichocereus pasacana*, but in more humid places, often together with *Oreocereus celsianus*. It is to be

found in the mountainous parts of this area, so that it is not to be seen around Ayquina and Cupo which is flat ground with a sandy surface or a covering of volcanic material. This also applies to the *Oreocereus* and the *Trichocereus*.

.....from N.Rebmann

On the Cuesta de Chita, not far from Toconce, we saw many *Soehrensia uebelmanniana* on a hillside, which would be about 35cm in diameter and growing up to 80cm tall. Many of them were in full flower with lots of yellow flowers. We saw both adult plants and young plants so there was regeneration. They were growing in company with *Tephrocactus conoideus* and a form of *Maihueniopsis glomerata*. I have some young plants of this *Soehrensia* which were grown from seed - it is a short columnar form, only the young plants are globular.

.....from G.Hole

From San Pedro de Atacama one can see a mountain peak to the north, which looks even closer when seen from Banos de Puritama. Walking round the lower slopes of this mountain we came across a population of *Soehrensia uebelmanniana*. There were a number of plants around one foot in height or higher, a few of them were up to about two feet tall, but we did not see any plants of this species above that height at this location. There were buds on a number of plants and just as many others had finished flowering, but there was only one single flower to be seen open; two plants were carrying fruit. It looked as if the flowering season was spread over a period, in just the same way that the *Tephrocactus* seen at altitude seldom have more than a few open flowers at one time, but often plenty of buds as well as withered flowers.

.....from R.Moreton

On our 1999 trip to northern Chile we stopped at a location visited previously by R.Ferryman where *Soehrensia uebelmanniana* grew, not far from Toconce. The plants grew fairly close to the road, on a slope formed of a rather peculiar rock which seemed to be of a chalky nature. As far as it was possible to see, these *Soehrensia* grew in a limited area and only on this particular rock. In this particular location the angle of the strata seemed to more or less follow the gradient of the slope, so that the ground was composed of patches of flat solid rock, on which lay flat flakes of rock up to roughly table top size together with rocks from brick to boulder size, plus some occasional gravel. Apart from cracks in the rock and crevices between rocks there was little to encourage any form of vegetation and there were only a few low-growing, scattered shrubs and bushes in addition to the *Soehrensia*. All these *Soehrensias* were solitary, none of them offsetting from the base. The majority of the plants we saw there were more or less globular, but there were some displaying elongated growth, and a few which were as tall as 4 ft 6 inches high. There were no buds, flowers, or fruit on any of the plants which I saw.

.....from G.Charles

Travelling from San Pedro de Atacama, we found the *Soehrensia uebelmanniana* at GC 290, before we reached Caspana from El Tatio. The rock here was rather unusual, it sounded metallic when you stepped on it; I would not have said that it was chalky. The plants were not abundant, although we did see quite a number; some of these were offsetting although most were solitary. They grew up to about one metre high. The tops sometimes inclined but I do not recollect this being a consistent character.

.....from B.Burke

After climbing up from San Pedro de Atacama to El Tatio, we took the road which goes westwards in the direction of Caspana. This passes through an area lying at an altitude of between 3500 and 4000m, which could be described as mountainous. There were a few odd *Trichocereus atacamensis* to be seen here and there; a little later we passed just the one group of *Oreocereus*, scattered over an area of sloping ground. At a slightly lower level we passed a scattered group of globular cacti, growing on more or less level ground. The crowns of these plants were not facing upwards, but had adopted a sloping attitude, just like an *Eriocactus*. Were these a form of *Soehrensia uebelmanniana*? Then we travelled another 4 or 5 kms, losing height fairly rapidly, arriving at a spot where we found a group of *Soehrensia uebelmanniana* which were of different sizes and apparently of different ages. Some of the taller plants did now have basal offsets. The immediate surroundings were exactly as described by R.Moreton, being on a slope as opposed to the plants seen shortly beforehand, which were on flat ground.

.....from K.Knize, A trip to the Cordillera (Chileans No.40)

[Between Pachica and Paroma, inland from Iquique] "Shaggy and isolated grew *Trichocereus* Kz 83 with its long white spines and golden brown tops, which has not been given a botanical name. Another *Trichocereus* Kz 83 was to be found there with yellow flowers and shiny white spines. This form was growing in clumps, but the individual stems were not longer than one metre."

.....from R.Wagenknecht, Some Chilean Cacti (Chileans No.40)

In the andean region of Chuzmisa, close to the surroundings of Mocha, at an altitude of 2500m, almost alongside *Browningia candelaris*, was found a plant of a height of 1.5 m. with its stems decidedly upright with long, slender, white spines whose form presents a robust thickening towards its top.

.....from H.Middleditch

In the absence of any positive identification for either of these last two observations, one is obliged to wonder if they may possibly represent a further occurrence of *Soehrensia uebelmanniana*. A yellow flowering *Corryocactus* would hardly be described as having a "shaggy" spination. The yellow flower reported by Knize would fit *Soehrensia uebelmanniana*, but if one considers the other cacti which are to be found in this part of Chile, there does not seem to be anything else that would fit both the short columnar body form and the flower colour. In addition, the upright stems growing in clumps would match the photograph of *Soehrensia uebelmanniana* shown by F.Vandenbroeck to our Chileans' Weekend.

There is a not inconsiderable distance between Mocha on the road going north-east from Iquique, to

Toconce which lies to the east of Calama. The intervening distance seems to have hardly been touched by anyone interested in cacti but this may be due to it having a barren and desert like character with very little in the way of any sort of vegetation.

.....from R.Hillmann

We decided to explore some of this area so we set off from the oasis of Pica, which lies well inland from Iquique. The road took us into the Cordillera and then turned to the south, going in the direction of Ollague. We were roughly half way to Ollague when we decided to return to Pica, taking an alternative track across the Cordillera. For the whole of this distance we were travelling across barren ground, sandy or stony, with virtually no sign of any vegetation.

.....from H.Middleditch

Which might now suggest that this area - see Chileans' maps of northern Chile and Altiplano - may well hold nothing of interest in the way of cacti.

.....from R.Hillmann

Closer to the border with Bolivia we found some smaller examples of this same plant, as well as some interesting forms of *Neowerdermannia chilensis* and many forms of the hummock-forming *Tephrocactus bolivianus* with white, red, brown or yellow spines and orange, red, or yellow flowers. These *Tephrocactus* hummocks grow up to 1.5 m in diameter and about 80 cm high. I think that all these forms, together with those I have seen in Argentina and Bolivia, form one group with a very wide distribution. In Argentina at the pass of Abra del Acay they reach as high as 4800m altitude. In Chile we saw some at up to 4700m above sea level. At the Abra de Acay, the greater the altitude, the flatter grows the hummock. This effect will probably be brought about by the extreme weather conditions at this elevated altitude, with strong winds and winter snow, for in these circumstances the plants will need to form mats for a better defence against the environment.

.....from R.Ferryman

When travelling south from San Pedro de Atacama, we saw hummocks of *Tephrocactus* of various sizes and proportions. Occasionally we might see a hummock which could have been three quarters of its diameter in height, but more commonly the hummocks were about half their diameter in height. But in the Quebrada del Toro, shortly after we first became aware of the *Tephrocactus bolivianus* growing there, we did see the occasional hummock which might have been nearly as tall as it was across. But the further we travelled up the Quebrada del Toro, there seemed to be little or no sign of hummocks of this proportion. Eventually we climbed out of the Quebrada del Toro to where the mountains sloped gently down towards San Antonio de los Cobres and here the impression was that the hummocks were preponderantly of a height which was barely half their diameter.

.....from J.Ring

Here in New Zealand we have eight plants of *Soehrensia* growing outside. By Rausch in his *Lobivia*, these would be *S.formosa* or ssp. *bruchii*. Most of our outdoor cacti are covered with plastic in winter to keep off the rain. However, we discovered that this was not necessary for the *Soehrensia* and some of these are now bedded out, fully exposed. We will allow these to grow large because they are in a clump by themselves and are not competing with other cacti. These plants are now broader than they are high, the largest is about 29cm across and 24cm high. They can flower when they are about 12cm across, the flower colour varies from bright yellow to bright red, or occasionally red with a violet flush.

Their flowers are enthusiastically pollinated by bumble bees and usually we get fruit formed. Cross pollination seems to be essential otherwise the whole floral apparatus, including the ovary, drops off as soon as it dries. The size of the fruit can vary greatly - it probably depends upon how well the bees do their job. Some fruits have been barely a cm long and held only a few seeds. The large ones hold several hundred seeds - they are slightly longer than broad and up to 4cm long. Their colour is always dingy, from khaki to bronze. Splitting of the fruit does not seem to follow a regular pattern, in fact some fruit drops off without even splitting. The unripe fruit is naturally full of liquid or pulp, but a ripe fruit is usually dry with some powdery white material around the seeds - the dried-up pulp, perhaps? - but occasionally there is a little sticky pulp that has not completely dried up. Sometimes I have removed fertile fruits at an early stage from small plants to help them to grow, rather than expend energy on reproduction. However, this marks the areoles so I no longer do it.

We also have three other *Soehrensia* which we grew from seed labelled *S.randallii* and these have not yet flowered, although the largest is about 85cm tall and growing rapidly. They are columns and look like the picture in the Rausch *Lobivia* titled *tarijensis*, which he states is a synonym for *randallii*.

.....from H.Middleditch

According to Rausch *Lobivia* '85, the flowers on *S. formosa* is yellow and on *S.bruchii* it is red. Perhaps these particular plants of *Soehrensia* may have originated from seed set by bees who visited both sorts of *Soehrensia* in cultivation?

.....from M.Muse

It is now proposed that the genus *Soehrensia* be merged into the combination of *Echinopsis*, *Trichocereus* and *Lobivia*. Let us follow the approach of Augustin and Tyrasseck and look at the question of the fruits and the manner in which they dehisce. My own experience with *Soehrensia* R.129 is that the flowers and fruit are always borne in the crown of the plant, the fruits are purple, spherical in shape, with a very thick wall, about 2mm thick. The mode of dehiscence was most unusual: three vertical splits appeared simultaneously around the broadest part of the fruit, which initially did not extend upwards and downwards the full depth of the fruit as in *Echinopsis* - which in any case dehisces along a single split. I have never observed this in *Echinopsis* or *Lobivia*. In some *Echinopsis* and *Lobivia* the fruits do not effect dehiscence by swelling, but by shrinkage, and I have observed species of both genera where the fruit appears not to dehisce, but to dry up and shrivel before

falling off. If the nature of dehiscence is to be accorded any measure of importance as a generic determinant, then I cannot see how a combined *Soehrensia* and *Helianthocereus* can be merged with *Echinopsis* and *Lobivia*.

.....from R.Allcock

I must say that I regard *Soehrensia* as a convenient term for use in the language, to denote a certain group of plants of cactoid type, such as *S.formosa*. Similarly the very closely related tall plants such as *Helianthocereus tarijensis* or *H.poco* are conveniently referred to as *Helianthocereus*. There are also plants which refuse to sit easily in either category, such as *H. crassicaulis*, with a far more compact body, and *Trichocereus escayachensis*, which seems to be of *Helianthocereus poco* affinity but with the long white flower.

My attitude to calling them all *Lobivia* would be that we would lose information content thereby. Because nature refuses to be categorised there are problem plants at the border-lines, and you can call them what you please. But to call everything *Lobivia* just because of these problem plants would seem to me to be an unprofitable procedure indeed. We all know that *Lobivia*, *Echinopsis*, *Trichocereus*, and so on are all inter-related and we do not need to be told to call them all *Lobivia*, or *Echinopsis*, or whatever, in order to appreciate this obvious situation. Names which convey zero information are not names at all! Certainly I shall not be changing my labels.

.....from H.Middleditch

My acquaintance with the flowers of *Soehrensia* is unfortunately very limited, being restricted to a *Soehrensia korethroides*. But I am inclined to accept that all those names listed under *Soehrensia formosa* by Rausch in his *Lobivia 3* are of plants which bear flowers of similar length and stoutness to the few with which I am familiar. There seems to be a distinction between these stoutish flowers and the generally somewhat more slender flowers of *Lobivia*, but I am far from certain as to what degree of distinction exists.

WHAT IS A GENUS? from G.J.Swales

Even in the time of the ancient Greeks, writers and historians required to identify a plant, for medicinal or other purposes. The traditional method was to provide a short written description of the plant and it became common practice to start the description with a general name, followed by two or three lines of description. This was not greatly unlike the "Boots, black, soldiers for the use of" method of description. Any compendium of names would group together those plants with the same general name which had a generally similar appearance. Over the centuries the general name became known as the genus.

It was observed by John Ray in 1670 that some traditional descriptions did make reference to flower parts, but only in very general terms. Ray suggested that descriptions should include details of flowers and seeds. It greatly heartened me to find an author suggesting that seeds were worthy of attention, and so many years ago too, as I was personally convinced that the study of seeds could make a useful contribution to classification and identification.

In 1694 Tournefort listed a total of 698 genera and explained the features on which each of them was based. In correspondence or conversation, the only method of identifying any plant continued to be that of quoting the two or three line description verbatim. This traditional system, which had been in use for two thousand years or more, was changed by Linnaeus in 1737. For each individual sort of plant (or as we would say, species) he adopted one word, often a character already in the description, and used this, together with the generic name, to identify the species. Names were now binomials.

Examples of Linnaeus' new binomials are: *Ranunculus auricomus*, the meadow buttercup; *Bellis perennis*, the meadow daisy; *Urtica dioica*, the stinging nettle. Instead of two or three lines of description, only the binomial had to be quoted to identify a plant. This made it much easier for natural historians and others to converse and communicate, so the whole subject became more easily manageable. Linnaeus' binomial system has continued as standard usage up to the present time and many of his generic and specific names continue to apply to plants today. Many of the species in Keble-Martin's "Concise British Flora" still acknowledge Linnaeus as author. His binomial system has survived because it is convenient and effective for communication i.e. it makes the subject more manageable.

Linnaeus also changed a lot of generic names, replacing very long or awkward names which he considered placed an unnecessary burden on memory, by shorter or more convenient names, in order to make it easier to memorise names of genera. In this way he made it easier to communicate and converse about genera. In this way too, he helped to make the subject more easily manageable.

Thirdly, Linnaeus introduced a classification based upon floral characters - specifically upon a combination of the number of stamens and the number of pistils in each flower, starting with one stamen plus one pistil, one stamen plus two pistils, and so on. It will be borne in mind that until the end of the 17th century there was no attention given at all to flower parts: flowers were simply described as "large, yellow" for example, if they were described at all. Also there was no knowledge or understanding of pollination. Attention started to be paid to flower parts from the end of the 17th century onwards, so a fair amount of information on this had been accumulated by the early 18th century. Linnaeus' classification was centred on this new information, but it was not a natural classification in that it did not show relationships. This classification has not survived, because it did not make an acceptable contribution to understanding of the subject. In other words, it did not help to make the subject more easily manageable.

In the first half of the 19th century there was a peak in new plant discoveries, especially from overseas. At the same time a great deal of study went into flower details. Bentham and Hooker put forward in 1862 a

system of classification making use of this abundance of data, which has basically continued in use until today, because it constituted a manageable system. Of itself, it had no impact on Linnaeus' binomial system nor on established genera.

Until the middle of the 19th century the accepted philosophy was that plants and animals had been created in their existing form. The publication of Darwin's *Origin of species* in 1859 aroused great interest in the question of how plants evolved. It led to ideas that plants whose appearance suggested they were closely related had developed from a common ancestor, as they probably had. From 1886 onwards Engler produced a classification based on supposed evolutionary development, from simple to more complex forms. Just as Linnaeus had produced a classification based on new ideas of his day, Engler did the same, based on the new ideas of his time.

Neither the classification of Bentham & Hooker nor that of Engler affected Linnaeus' binomial system, nor did it impinge upon the then currently accepted genera. However, whenever new data came to light which did put previously accepted genera into question, there were changes in both generic names and in species attribution to genera. Nevertheless, in general terms we still have today genera in which there are grouped together plants of similar appearance, so that the subject remains capable of comprehension without undue difficulty and continues to facilitate discussion and communication i.e. it is a readily manageable arrangement.

Current attitudes to what constitutes a genus have been indicated in *Chileans No.45*. Two examples may be quoted;

Acer - (Maples) Although close examination of this genus reveals appreciable floral differences, all maples tend to "look alike". There is not an excessive number of species, so it is not difficult or cumbersome to understand, converse, or communicate about them i.e. it is a manageable group.

Umbelliferae, Compositae - both families contain a great many species, so the genera have to be separated on the grounds of fairly trivial features, such as the presence or absence of striations on fruit. This yields a number of genera each of which contain a manageable number of species so that the number of species does not impede ease of comprehension of the genus or facility of communication i.e. each genus is a manageable unit.

A genus is not something devised by nature. It is a man-made idea, designed to assist his understanding, his study, and his discussion, of this branch of natural history. Basically a genus is a manageable number of species which have similarities in their appearance. The objections of the taxonomists to the splitting and erection of new genera by Backeberg are based upon pre-Backeberg collective genera being of a manageable size and having species with an overall similarity of appearance, which did not require further splitting to be more easily understood.

.....from C.Jeffrey, *An introduction to plant taxonomy*, 1968

Modern classification attempts to be natural because a natural classification is one that will best serve the overall needs of botanical science. In constructing a natural classification we make simultaneous use of as many characters as we possibly can. Being based on total overall similarity, it reflects similarity in a very great number of characters.

The diversity of plant life in all its aspects is the raw material of taxonomic botany. The plant collector, the botanist in the herbarium, the plant chemist studying amino-acids by chromatography, the cytologist studying chromosomes, the botanical artist, the electron microscope, all contribute to the progress of plant taxonomy. Vast is the quantity of information thus produced. It is the task of the professional taxonomist to collate our knowledge of plants, organise it into a taxonomic system, and make it readily available to others. The taxonomist has a responsibility to the users of his work - to be precise in his presentation, accurate in his naming, and readily understandable in what he writes. Such barriers to communication as needlessly difficult terminology and unnecessary name-changes he must avoid.

.....from W.Greenaway

I must let off steam about the current trends in cactus classification. The original intention of the Linnean binomial classification system was to provide descriptions of plants and animals, which would enable the various "species" named to be clearly distinguished. The trend towards lumping is destroying the effectiveness of the binomial system and a trinomial (or even tetranomial) system has already started to emerge - you have only to look at some of the names proposed by the Austrian *Gymnocalycium* group to see this!

Many years ago I faced a similar taxonomic problem in the classification of fungi. The group with which I worked had been requested to look at the taxonomy of mercury resistant penicillia that contaminated cereal seeds. I will quote our conclusion:

"From the observations we made of numerous colonies of *P.cyclopium* and *P.expansum* it is clear that these species form a a single series into which other members of the *Fasiculata*, e.g. *P.palitans*, merge. Although Raper & Thom (1949) recognised that these species merge, they considered that a series containing such extensive variation would necessitate a description so inclusive as to be almost meaningless and we support this view"

Insofar as I am concerned, this is the direction in which Cactus taxonomy is now heading - descriptions so inclusive as to be almost meaningless! I do not believe that the involvement of new laboratory techniques in taxonomy, such as DNA analysis, is helpful. Again I faced this situation some years ago. At the Oxford Botany School, we were funded to investigate the role of Chaemotaxonomy in the classification of poplars - a confusing and much hybridised genus. We used computer-controlled GC-MS systems which cost hundreds of thousands of pounds and from our results could nicely resolve the inter-relationship of tri-hybrid poplar

swarms based on their chemical composition. One eminent field botanist asked me how our work was of practical assistance to him in recognising species and their inter-relationships in the field - and of course our findings were of no practical help to him whatsoever as the chemical differences were not necessarily accompanied by clear morphological differences.

By now you will have gathered that I am no lumper!

.....from R.Ferryman

In recent years there has been a great deal of literature published on the flora of Chile in general and with it has appeared a whole new raft of names. Take *Alstromeria*, for example, which now has 49 species names attributed to it, 40 of them endemic to Chile. A long way from Bertero's two species! Even Philippi only recognised five. So what does all this mean to the non-specialist? I have a good working knowledge of *Alstromeria* and have been interested in them since my early trips to Chile, but I find it extremely difficult to recognise the differences between some species or subspecies. When these differences are pointed out you can see the distinctions, but weighting the differences is again difficult. Surely here lies the problem. Specialists can see differences that the non-specialist often overlooks - or simply takes to be "natural" variation.

The book on the *Alstromeria* of Chile by Schick & Munz, inspired by Bayer, lists the various species in detail together with superb photographs. However there is no key for the species and when I spoke with Bayer, she said that this group did not lend itself to traditional keys due to the plasticity of the distinctions. Flower colour, for instance, was usually not a distinction as it is often down to variations within a population - now where have we heard that before? If you think that colour in flowers is variable, you should look at *Alstromerias*!

Recent attempts to "bring order" by reducing species or genera have, in my opinion, often gone too far. We have gone from looking for differences to looking for similarities. Nobody doubts that the former went too far but we are in danger of doing the same thing at the opposite end of the scale.

This came home to me when leading a CSSA group through Chile. We started by using the Kattermann guide - *Eriosyce* and the reduced species names. The group had knowledge of cactus but little knowledge of Chilean plants, but soon challenged the names being given to them. In the field they saw differences at both species and generic levels. Included in this group of cactophiles were professional entomologists and plant curators so they were not without some formal background knowledge of nomenclature. We soon adjusted to what I term population names for them to interpret as they saw fit. *Thelocephala* never got called *Eriosyce* and a new combination will be needed for a number of populations of *Thelocephala*.

I find myself very much in the middle ground because names do not greatly concern me, whereas relationships certainly do. For example, I know that RMF 123 - *Pyrrhocactus eriosycoides* from near Huanta - is very closely related to RMF 352 - *P.transitensis* from Transito - but there is a considerable distance between the two. If they are individual populations that can be separated by numbers, then why not by a name? It is the way the plants adapt to their local environment that is the fascination and maybe the key to how they could be named.

Thelocephala, for example, have evolved a quite unique way of surviving in their surroundings. Certain *Copiapoa* have done the same - and why? Both grow with other members of the same genus that are far from identical to one another. Why has *Thelocephala fulva* developed as it has when it shares a habitat with *Neoporteria carrizalensis* and *Copiapoa dealbata*? What makes this particular form of *Thelocephala* become subterranean? Despite the similarities between *Thelocephala* and *Neoporteria*, I cannot for the life of me feel comfortable calling them *Eriosyce*.

Turning to *Copiapoa columna-alba* viz-a-viz *Copiapoa cinerea*, the enduring Pip Smart term of "British Standard" needs to apply. Thus *Copiapoa alba* "B.S. so-and-so" would, I suspect, be more meaningful to most cactophiles as it represents an instant image. Although I do not accept it as a distinct taxon, all the populations of *C.columna-alba* remain totally uniform, except of course for size. This is not a single population, but a number of individual populations that stop and start at various points in its distribution. Branching does not occur, as with *C.cinerea*. Is it simply a distinctive population? *Copiapoa* is a very difficult genus because nothing other than body morphology separates one species from another - try making keys and it becomes quite arbitrary, with a few exceptions, of course.

.....from M.Muse

My main interest is in *Echinopsis*, which has suffered over the last decade or more from the attention of taxonomists. First there was the treatment by Rowley & Friedrich, then the revision by Friedrich & Glaetzle, and now a wholesale lumping by Hunt & Taylor. In the 15th edition of Lawson's "Botany" 1973 p.404 we find the following: "people are apt to submit too tamely to sweeping changes, not always well considered, and often not supported by any new discovery about the plants there is no need to follow slavishly the whims of the man who wrote the last book".

Apropos the article in *Chileans* No.45 by Augustin & Tyrasseck, it is not my intention to express any views about *Sulcorebutia* versus *Weingartia*. What did strike me was the importance attached by the authors and by J.Donald to characters of a seemingly trivial sort at the level of generic differentiation. This seems to contradict his comment (*Chileans* No.40 p.8) on the question of relationships between *Soehrensia*, *Helianthocereus* and *Echinopsis*, etc. "any facile separation of these genera is difficult unless one resorts to trivia". The weighting accorded to various characters of taxonomic significance seems to me to be a matter of caprice, rather like that of fashion, so that this or that feature is what anyone says it is on the scale of importance. On the other hand, when one refers to Strassburger, to Lawson, or to Clapham Tutin & Warburg, elements such as the structure and features of the stem are either taken as generic determinants or are at least accorded significant taxonomic weighting.

.....from H.Middleditch

Having been treated to some very fine collections of photographs of *Trichocereus* in flower in habitat at various Chilean Weekends, it has become clear that the flowers display quite a range of variation in attitude, length, and stoutness between one species and another. Or possibly, to some extent, even within the one species? All the *Trichocereus* from Argentina and Bolivia appear to display flowers in which the majority of the stamens form a bunch which droops on to the petals in the lower part of the flower, although this may not always occur immediately after the flower first opens. Within the genus *Echinopsis* Zuccarini 1837, the great majority of flowers tend to be quite lengthy and relatively slender, more so than for most *Trichocereus*, although there is an interesting variation in flower lengths in *E.ancistrophora* and closely related names. The majority of these *Echinopsis* flowers display a bunch of stamens drooping to the lower part of the flower, but the *Echinopsis* of the *leucantha-melanopotamica* group display flowers with the stamens arranged in a symmetrical, rotate manner.

However, if some *Trichocereus* flowers and some *Echinopsis* flowers were laid out, unsegregated, it is quite possible that I might be able to separate them into the two genera. Although it is quite evident that the dividing line is largely one of convenience and familiarity between the generally more compact bodies of *Echinopsis* and the generally larger and often columnar *Trichocereus*.

.....from R.Mottram

And of course the flowers on the *Trichocereus* which are native to Chile all display a rotate flower with the stamens disposed in a symmetrical manner, from opening until they start to wither.

.....from H.Middleditch

It is understandable that Fric found himself in a quandary when faced with a selection of these plants from the areas he visited near Catamarca, La Rioja, and Famatina. "It would be very difficult to decide whether *Cereus huascha*, *andalgalensis*, *strigosus*, and so forth with their short, hairy, and red flowers belong to the *Lobivia* or the *Trichocerei*" and, in regard to *Lobivia grandiflora* (*Trichocereus rowleyi*) "I do not know into which genus I ought to allocate this plant. The flower tube is too short for *Echinopsis*, the plant is too small for *Trichocereus*, and for *Lobivia* the 10 cm diameter flower is immensely large". These simple observations are as valid today as when they were first made, completely unaffected by the various generic names to which they have been allocated by different authors. What is required is a set of generic names which are practical and convenient to use i.e. they form a manageable concept. The current academic ideas for various all-embracing genera would appear to fail this simple requirement in a number of instances.

.....from Checklist of *Gymnocalycium*, by D.Metzing, M.Meregalli, & R.Kiesling.

Recently the controversial topic of generic classification was examined by a working group of the I.O.S. leading to the publication of some preliminary reports and of the CITES Cactaceae check list where the specific names in current usage are listed. The latter list was compiled for the purpose of CITES and is not a nomenclatural check list; the species list for the majority of genera was based simply upon preliminary evaluations, nomenclatural checklists or taxonomic monographs being available for only a few of them.

.....from G.J.Swales

To quote an example of another approach, in his *Flora Anglicum* (1759) Linnaeus lists five species of *Rubus* (Brambles). In the handbook of the British Flora, 7th Ed., 1924, two authors are quoted, one distinguishing 45 species, the other recognising "fourteen groups containing a large number of species and varieties". Admittedly, this is an extreme example, but surely what is required is a compromise.

.....from H.Middleditch

And when it is a question of cactus genera, most growers would now recognise that the Backeberg ideas such as *Pseudolobivia* or *Helianthocereus* went too far in the direction of splitting. But are we now faced with the opposite extreme? Does lumping no small number of well-recognisable genera into such as *Echinopsis* result in a generic name that fails to convey a clear impression of the plants involved which is convenient and meaningful for use by cactus collectors in general?

MEMOIRS OF A NATURALIST By M.Cardenas 1972

Between the 4th and 26th of March 1962, I embarked on a long and interesting trip to the south and southeast of Bolivia. Leaving Cochabamba by train we reached Potosi the following day. At the Agriculture Ministry's office in Potosi there was one of my former students from the agriculture faculty at Cochabamba University, F.Armaza, who loaned us the Ministry vehicle for our trip from Potosi to Tarija. on 8th March we left Camargo, reaching Tarija after nightfall. On the 11th we left with the intention of getting to Entre Rios that day even though the road over this section is almost level with a difference of altitude of only 60m. We stopped shortly after leaving Tarija in order to collect a new columnar cactus, *Cleistocactus strausii*, and a number of specimens of the small *Aylostera fiebrigii*. On this very spot we photographed and collected another relatively low-growing columnar cactus of pasacanoid aspect which was described later with the name *Trichocereus narvaecensis*. Narvaez lies at 1700m and is characteristic for its flora.

TRICHOCEREUS NARVAECENSIS M.Cardenas Fuaux Herbarium Bulletin November 1953

Columnar, branched from the base, about 1m tall. Branches somewhat club shape at the apex or tapering, slightly curved, dark green, shiny, about 20cm thick. Ribs 18, low, obtuse, 10mm high, 15 mm wide. Areoles

10mm apart, circular, 4mm diameter, light grey felted. Radial spines about 12, acicular, thin, very pale grey, 1 to 2cm long; centrals about 3, spreading as radials, 25 to 30mm long, acicular. Flowers seen only in the dried state, about 12cm long, white. Fruit ovoid, 45mm high, 50mm broad, covered by very acutely mucronate dark green scales, 15mm long 8mm broad, bearing long blackish to brown and white hairs in their axils. Seeds minute, 1mm long, reniform, shining black and finely pitted.

Habitat: Bolivia, Province O'Connor, Department of Tarija, near Narvaez, on the way from Tarija to Entre Rios at 2700m. Type No.4828 in the Cardenas herbarium. This rare and curious *Trichocereus* has no near relatives in the other species of the pasacanoïd group. It is distinguished by its low habit, small areoles, and very short spines.

.....from H.Middleditch

The description which appeared in the Fuaux Herbarium Bulletin actually stated that the stems were "dull green, shiny", - rather a contradiction in terms. The original description as written by Cardenas is unlikely to have been in English, but most probably in Spanish. In that case the original probably read "verde oscuro", the "oscuro" being rendered as dull if the context is weather etc. but, according to my Spanish dictionary, as dark when the context is a colour. It has therefore been so rendered above.

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

Near Narvaez we came across some short columnar *Trichocereus*, growing on a steep slope which was covered in green grassy tussocks. It was so steep that it was almost impossible to climb, but near the bottom of this cliff-like slope there was fortunately a plant in flower which we could photograph. The stems were vertical, up to about 30cm tall, appearing out of a grassy clump. Just below this plant a similar looking stem projected only 5cm or so out of the grass, with a short bud near the growing point, standing upright. But the open flowers which also arose from close to the growing point had the full length of the tube pointing sideways, so that the flower opening faced completely sideways.

.....from W.Clarke

It will be some twelve to fifteen years ago that I sowed some seed from Mesa Garden, of *Trichocereus narvaecensis*, and I have kept one of these plants. Although it is growing in only a 9 inch pot, the solitary stem will now be almost six feet tall and some 5 inches in diameter. The areoles on each rib are only a short distance apart from one another, with quite short spines. It first flowered a year or two ago, the flowers appearing from just below the shoulder, pointing somewhat upwards from the horizontal, displaying a sort of swan neck shape.

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

The Type location for *T.narvaecensis* Card. was given as "near Narvaez, on the road from Tarija to Entre Rios". There grows the *T. tenuispinus* v.pajonalensis which was described by me. The Cardenas' description is inadequate and in no way corresponds to *T.tenuispinus*, which species is the only one that I could find near Narvaez and likewise in the mountains near Narvaez. and in particular "on the road" between the two places concerned. For *T.narvaecensis* Card. 18 ribs were quoted, whilst in the area of Narvaez I found only up to 16 ribs. A habitat location of 2700m was given whilst Narvaez lies at only about 1600m altitude. On the other hand no mention was made of *T.tenuispinus* which is not very well known but abundant near Narvaez. Either there must be numerous mistakes present in the description or the species described by Cardenas grows in another area. In any event the name *T.narvaecensis* Card. is to be regarded as a nomen dubium delendum.

.....from H.Middleditch

The *T.tenuispinus* was described by Ritter in "Cactus" of 1967, whilst *T.narvaecensis* was described by Cardenas in 1953 and hence has priority. It appears to be not untypical for Ritter to discredit any pre-established name which conflicts with a preference for his own name.

.....from R.K.Hughes

During the visit to Bolivia made in company with B.Bates and P.Down, we left Iscayachi at 3500m in the morning, crossed the Cuesta Sama at 4100 m, before dropping down to Tarija at 1922m altitude. We arrived at Tarija about midday and first filled up with fuel. We then left Tarija travelling more or less eastwards, along the road which leads to the Condor pass and Entre Rios. We seemed to drive for a considerable distance along this road without going through any villages or even hamlets, passing only the occasional hut or farmstead. The first stretch of this road was level, dry and dusty with a thin cover of scrub in the surroundings. Among this scrub were lots of *Cleistocacti* which we resolved to visit on our return to Tarija. Having seen a flash of pink from the moving vehicle we made a stop at BDH 15. Here we were close to some farms. To our left it was more or less flat land which, to judge by the animal dung here and there, was a grazing area where it was not parched bare. The ground to our right was a gentle upward slope strewn with rocks, which we searched, with cultivated land beyond. The pink proved to be an *Echinopsis*, possibly *E.cardenasianum*, and we also found *Lobivia tiegeliana*.

My recollection of the countryside between stopping places is fading a little with time, but I think we had left the undulating farmland behind us by the time we stopped at BDH 16. We all had the feeling of rising steadily in altitude the further we went along this road and altitude records support this; Tarija at 1922m, BDH 15 at 398m higher, BDH 16 at another 320m higher still, or a climb of 718m all told, from Tarija to BDH 16 at 2642m.

The road was following a fairly easy climb across a hillside, as we rounded a right-handed curve in the road. A high, steep cliff came into view on our right. We stopped as we came alongside it as we had seen the grey columns of *Cleistocactus* clinging to the cliff face. Any sun would have been behind the cliff and therefore of no help in illuminating these plants. As might be expected, these cliffs were of solid bedrock if somewhat cut and carved by time and the weather. Any so called soil was what had been blown on to or washed down into the cracks and crevices or lodged on the ledges of this cliff. The *Cleistocactus strausii* were



At Narvaez

Photo: L.v.d.Hoeven



At Palca Grande

Photo: R. Hillmann



At Junacas

Photos:
R.K.Hughes

Trichocereus narvaecensis



growing along the steepest parts of this cliff, almost impossible to photograph as one would wish. But there was an escapee at the base of the cliff which I was able to photograph. Most of the stems would be 3 or 4 ft tall, maybe some even 5 ft high.

At the left-hand end the cliff peters out and the hillside loses its extreme slope. Here we found *Lobivia tiegeliana* v. *ruberrima* and an *Echinopsis* species. At the right hand end, the cliff ended abruptly in a rocky crag, beyond which was a gently sloping hillside. It was at the bottom of this slope that there was a natural staircase of rock on which the *Echinopsis mamilliosa* grew in profusion. A little higher up I found the largest clumps of *Austrocylindropuntia vestita* that we saw growing anywhere on this trip.

At the foot of the cliff the ground sloped at about 45°, made up of patches of bedrock as well as boulders which had fallen down from the cliff face, overlain with smaller rocks and stones down to gravel and fine sand. This carried some dwarf shrubs, herbs, and occasional tufts of grass, but was mostly bare ground. Here was one short *Cleistocactus*, an escapee from the cliff face, and a few short columnar *Trichocereus*. There was even one of these *Trichocereus* growing literally on the edge of the road. Below the road much of the ground was covered in scrub plants, the bushes growing up to 4 or 5 feet high, possibly even taller. There was no time to search more than twenty or thirty feet from the road. There were *Rebutias*, which were considered to be *R. spegazziniana*, growing in cracks in the bedrock or between rocks at the base of these leafless bushes. The few *Trichocereus* growing at the base of the cliff were easy to spot, due to their relatively large size and the open-ness of the site. On the other hand we only saw two taller multi-stemmed plants in the scrub on the opposite side of the road. Without them being in flower they would have been difficult to spot among the quite dense bare-stemmed bushes. It can only be speculation as to whether there were many more amongst the scrub that stretched away into the distance.

These *Trichocereus* had fairly thick stems, about 5 or 6 inches in diameter and branched from the base. Mature plants had about three or four stems, rising more or less parallel to each other, mostly between two to four feet high. The tallest plant was standing out above the bushes on the easy slope below the road, the top of the two tall stems being at about eye level - perhaps 5ft 6inches tall? - with five other stems ranging from 9 inches to 2ft 6inches high. My attempts at rib counts seemed to be consistent at 16 or 18 to 20. The deep cut ribs bear a weak spination, with perhaps ten radials hardly meeting between the ribs and one longer central spine at each areole. The yellow to brown spines, fading to white or horn colour, formed a comb-like ridge along the ribs in no way hiding the underlying green stem. Apart from a young plant only a foot tall, but still six inches in diameter, almost all the other plants we saw carried buds or flowers, so we were too early for seed. The flowers were close to the crown of the plants and they were either horizontal, or inclined slightly up from the horizontal. Where there were several flowers on one stem, they formed a ring round the stem. Except for the rib count, these plants do not seem to match the description of *T. manguinii* in Backeberg's *Lexikon*, which was the name suggested for them.

It was bright sunshine in a cloudless sky when we left Tarija on that morning. By the time we had reached BDH 15 the sky had begun to cloud over; at BDH 16 the sky was completely overcast with grey cloud. On our return run we were back into sunshine when we stopped at BDH 17 & 18, although the light faded from thereon and it was dark when we got back to Tarija. It was bright sunshine again when we left Tarija on the following morning, to continue our travels to the west.

.....from P.Down

It does seem to me that our stop at BDH 16 was made when we were still climbing - I am sure we did not top the pass. I do not remember seeing any trees that day, except in Tarija. Of bushes, there was nothing taller at BDH 16 than low shrubs and not many of them, mostly bare ground. By my own recollections I did not see any *C. strausii* taller than 4 ft high at this spot, whereas I have grown them to 6 ft tall here.

.....from H.Middleditch

From the above accounts it would appear that the BDH party were still climbing up the mountain range which is crossed by the Condor pass when they turned at BDH 16 to retrace their steps. However, my 1:250,000 scale Instituto Geografico Militar La Paz map of the Tarija area does not extend to where site BDH 16 may be.

.....from W.Gertel

Yes, indeed, I do have a copy of the 1:250,000 Instituto Geografico Militar La Paz map which covers the area adjacent and to the east of the Tarija map. A copy of the adjoining patch is enclosed.

.....from R.K.Hughes

It had seemed obvious to me that we had not reached the vicinity of the Condor pass, and we had no way of knowing how close or distant it was. Now that I have been able to see the map from W.Gertel of the area between Tarija and Narvaez, this seems to be correct. However, the distances based on those between starred points on this map are less than those we recorded as actually travelled. The right hand edge of the Tarija sheet appears to give 15 km from Santa Anna to Juncanas and the left hand edge of the Entre Rios sheet seems to give 20 km for the same stretch!

.....from P.Down

Although the map I have suggests that the road we used goes through Santa Anna, I have no recollection of any habitation on that road.

.....from H.Middleditch

Looking at the map of the area between Tarija and Entre Rios, the road to Entre Rios turns out of the Tarija basin and travels an appreciable distance across the broad valley of the R.Santa Ana. This could well be the "fairly level section" of Cardenas' account of his trip along this same road. On the map, the road then appears to climb over a ridge before descending once again into the valley in which Entre Rios lies. Where this road crosses the mountain range there is the Abra Condor and a little further on is Narvaez. Taking BDH 16 to

be a short way to the west of the Abra Condor, then it does not lie a great distance from Narvaez. Comparing the altitude of 2642m for BDH 16 and 2700m for the habitat location of *T.narvaecensis*, it would appear possible to suggest this name for the *Trichocereus* seen at BDH 16. It is observed by R.K.Hughes that few habitations and no villages were seen on the stretch of road between Tarija and BDH 16, so that Narvaez may well be the nearest recognisable location to BDH 16. Ritter states that he found no plants near Narvaez with a rib count in excess of 16, which may be compared with the rib count of 16 to 20 observed by R.K.Hughes. On the stems of four different plants photographed at BDH 16 there are 8, 9, and 11 ribs to be seen facing the camera, so there must be in excess of 16 ribs in total on some of these plants.

Comparing the above descriptions of these various sorts of short columnar *Trichocereus*, one cannot help being struck by their apparent overall similarity.

.....from J.Arnold

In the area to the east and the west of the Abra Condor we commonly saw some *Trichocereus* at quite a number of places whilst we were on the move, but only at a few of the places where we stopped. This was often because they grew in places difficult of access, on steep slopes above rivers. Many of these plants were in the early bud stage but we did not see any in flower. At about 10km to the east of Juncanas, at 2426m., we saw some of these *Trichocereus* which looked just like those on the pictures taken by R.K.Hughes in this vicinity. The plants here were often free standing up to about 3 feet high, after which they slumped, many hanging down rocks or cliffs. The stems would be about 3 to 4 inches in diameter.

.....from T.Marshall

It was December when we were travelling from Tarija towards the Abra Condor, the road running across a wide plain. As we approached the mountain range we saw a few *Cleistocactus* here and there and also the odd *Trichocereus*. Some of these *Trichocereus* had formed quite large clumps (of perhaps up to dozen stems) and the longer stems were often sprawling to the side. As we rose up to the Abra Condor, there was a small outcrop of rock on the right hand side of the road, with *Cleistocactus strausii* growing on the steep faces. There were also quite a number of *Trichocereus*, mainly growing towards the base of the outcrop, with stems that could be 7 to 9 inches thick. Some of them were in bud, some in flower. Further on, we saw more *Trichocereus* on a steep rock face, mostly growing upright, many with flowers that stood almost horizontally sideways, like the picture of the plant from Narvaez. There were some buds to be seen growing upright from the crown, but more at about 45°, then as the buds became longer they dropped down to the horizontal.

.....from M.Lowry

In the course of our visits to Bolivia both in 1996/97 and in 1997/98, we set out from Tarija along the road which goes eastwards in the direction of Narvaez and Entre Rios via the Abra Condor. The road took us across a fairly level (but not entirely flat) countryside, and although we were climbing very gradually in the process, it was not obvious that we were gaining altitude. As we came nearer to the Abra Condor, the landscape gradually became more hilly and the road became rather more undulating. There were still more hills to be seen well in front of us to the east, but nothing whatsoever in the way of a high mountain ridge or a line of jagged peaks.

It was only when we had reached a point where the road ran along a fairly broad gap between two hills, with easy gradients at either side, that we realised that this was the Abra Condor. From there, the road then started to descend, at a modest gradient which differed little, if at all, to that followed by the road on the ascent to the pass from the west. Here, the valley continued to be quite broad with easy slopes leading to rounded hills at either side. But over the course of the next few kms a very marked change came over the surroundings, until they were entirely different to the landscape on the west side of the Abra Condor. At the pass (or saddle) and at the start of the descent, there were a few rocky outcrops with a vertical or near-vertical face overlooking the valley, similar to those we had seen on the west side of the pass; but these rocky outcrops steadily increased in number and extent as we continued our descent. At the same time there was a steady quickening of the gradient followed by the road along which we travelling, very slight at first, but more so the further we descended. As the road became steeper, so did the sides of the valley, until the patches of vertical rock at either side of the road gradually became steep cliffs, hemming us in at either side of the road.

By this time we were travelling down a narrow, vertical sided gorge. We went as far as Canaletas, where we had to turn about and retrace our steps in order to keep to our timetable. It was in the upper part of the valley, where it was wider with less steeply sloping sides, where we found what was taken to be *Trichocereus tenuispinus*. There were not a great many of these plants to be seen and they were always growing on the near-vertical patches of rock, at both sides of the road. Several of them had one or two stems which hung down from the plant, resting up against the rock face.

On our subsequent trip, we turned off the road going to Canaletas at a point close to the Condor pass, going a short way to the north to Alto Espana. We trekked up a narrow gorge leading away from the road, this time with cliffs about 20 ft high, but otherwise rather similar to the gorge on the descent to Canaletas. Here again we saw what we took to be *Trichocereus tenuispinus*, once again growing in company with *Cleistocactus strausii*, fairly well up on the sides of the cliff.

Another excursion took us north from Tarija, through San Lorenzo, and along the eastern side of the mountain range which separates the altiplano-like terrain around Iscayache from the moister slopes descending into the Tarija basin. We had been shown something of this route by R.Hillmann at a previous Chileans' Weekend. Near Camaron we stopped (at BLMT 151) and in a side valley we again found a thick-stemmed *Trichocereus* which could be an upright form of the same species. This time the stems were 7 or 8 feet tall, once again growing in company with *Cleistocactus strausii*. The photograph taken by P.Down of the *Trichocereus* seen at BDH 16 is very representative of the plants we saw immediately to the east of the Abra Condor and near Alto Espana, but quite different to the *Trichocereus* at BLMT 151. My impression of the

latter - aside from their upright habit - was of more ribs and stiffer spination.

We never saw any of these *Trichocereus* plants growing on flat and level ground, nor did we see any in flower or fruit.

.....from R.Hillmann

The photographs from R.K.Hughes which you have sent to me, of a *Trichocereus*, I think have been taken to the west of the Abra Condor. The plants on these pictures grow with some stems lying down but the top of the stems facing upwards, and in the company of bromeliads. The same type of habitat occurs where these plants are found at Palca Grande, Tarija, at the east side of the Abra Condor. By comparison, the pictures made at BDH 16 are growing in stony, open surroundings with less humidity and mostly standing upright. They are, I think, *Trichocereus tenuispinus*, which I photographed at Narvaez.

.....from H.Middleditch

The location at Palca Grande is roughly half way between Abra Condor and Canaleto and so falls in the upper part of the valley as described above by M.Lowry.

.....from P.Down

The photograph taken by R.Hillmann immediately on the east side of the Abra Condor is of a plant sprawling over the rocks and herbs without an upright stem at all. I feel sure that it is the same sort of plant we saw at BDH 16, where I took a picture of a *Trichocereus* with some of its stems sprawling over the ground in just the same way, the rest growing outwards along the ground and then upwards.

TRICHCEREUS TENUISPINUS By F.Ritter Translated by H.Middleditch from Cactus France 22(88);1967

Body solitary or offsetting at the base, upright, green, flowering only at 7-14 cm thick and 1 to 2 metre in height. Ribs 15-21, obtuse, 7-12 mm high, triangular in cross section, scarcely tuberculate. Areoles brownish, becoming grey, 4-7 mm long, 4-5 mm broad, extending down to the cross grooves, 3-8 mm apart from one another. Spines needle-like, slender, straight, golden yellow to brownish yellow; radial spines 8-15, 10-20 mm long, pointing half outwards; central spines 2-6, the lowermost slightly stronger pointing downwards and 15-35 mm long, the others diverging and similar to the radial spines in thickness and length. Flowers with a hint of red, brownish-red, and green. around the crown, standing almost horizontally away from the body, open day and night. [details of flower, fruit, and seed follow]. Type location: mountains north-east of Tarija.

var. *pajonalensis* Ritter.

Differs from *v.tenuispinus* by: Body 6-10 cm thick; Ribs 12-16; areoles white-woolly, 3-4 mm diameter; spines pale brown, radial spines 8-10, central spines 1-3. Type location. valley of R.Pajonal, province O'Connor.

.....from H.Middleditch

This description was repeated in *Kakteen in Südamerika* with one or two additional pieces of data, which have been included here for convenience of reference. Unfortunately the "high mountains north-east of Tarija" is quite unspecific as a location. It could easily be the vicinity of Abra Condor i.e. at or near BDH 16; it could just as easily be along the trail to Yesera and Cajas. However, in *Englera 16* we find three different locations for FR 616 *T.tenuispinus*, viz: north-east of Tarija, mountains north of San Lorenzo, and the pass between Junacas and Tambo. The BDH 16 location appears to have been quite close to this last Ritter location. The location in the "mountains north of San Lorenzo" might well include the sighting reported above by M.Lowry.

The description of *T.manguinii* was reproduced in *Chileans No.39* p.66 and was accompanied by a short commentary written in *Cactus France* by C.Backeberg. This referred to a photograph taken by Marsoner which was used as the basis for establishing *T.manguinii*. At the time *Chileans No.36* was published, no information was to hand concerning Marsoner's travels in South America, but we now know that Marsoner and Blossfeld made a trip through NW Argentina, up to the border with Bolivia, then continued northwards into Bolivia from where they turned eastwards to return through Paraguay. In Bolivia, they may have had two routes to choose from - taking the road from Cochabamba to Santa Cruz, or going via Tarija and Entre Rios to Angosto de Villa Montes. Along the latter, they could hardly have missed the *Trichocerei* at the roadside near Abra Condor at BDH 16, so that it is not impossible that it was these plants which appear on the photograph used by Backeberg to raise the name *T.manguinii*. However, this is pure speculation.

Considering the possible alternative names for the *Trichocereus* seen at BDH 16, neither of the foregoing species descriptions suggest a plant growing any taller than 1.5m, but 59 inches is not a vast difference from the estimated 66 inches height quoted above by R.K.Hughes for the tallest plant seen at BDH 16.

A DRY STORY or A DRIER STORY? From F.Vandenbroeck

There are of course lots of phenomena with which I met during my travels to Chile that are rather puzzling to me. One of the most intriguing is certainly the starvation of the northern-most coastal species. I remember well the appalling experience of coming across hundreds of shrivelled *Islaya krainziana* not far from the northern border of Chile, and also large fields of *Eulychnia* skeletons near El Cobre. Not a single specimen of *Copiapoa solaris* was to be found in good condition. All the enormous heaps were starving. Is this an irreversible process?

.....from R.Schultz

In his book on "Eriosyce" I note that Kattermann states that in northern Chile it has rained much less than normal for the last 25-50 years, but he says this without giving any statistics to back up his statement. It is not that I doubt his statement as we ourselves saw plenty of evidence for this, such as the dying of masses of *Eriosyce rodentiophila*. We do have rainfall statistics for Copiapo from 1971 to 1991 but I would like to go back as far as possible so that I can present some facts regarding the supposed long-term drought.

.....from R.Ferryman

Weather details for certain stations in Chile can be sought from our own world weather research centre in Bracknell, Berks. There also exists an office in Santiago, Chile, that can provide some data, but I would not be too hopeful about making enquiries there. No response has ever arrived to anything I have written and I have had to rely on visits there. However, I would make the point that the information that can be provided in this way is of very little value to us as the majority of their records are for central and southern Chile. The Chilean weather reports are dominated by hours of sunshine, not by rainfall as here in the UK. Wherever you are north of Coquimbo, you ask them about rain and the standard answer is "one or two days a year". Thus on my previous trip to Chile, I was told in Elqui that only the high mountains see rain; Vicuña had one day of rain in May and then only a few hours. In Caldera there had been no rain for three years as April 1992 was the last rain there; this was positively corroborated by my contact at Bahia Iglesia who made the point that that when it does rain you have to stay in the house for one week or maybe even two, as the entire area of coastal sand is impassable. At Pan de Azucar the cacti were very dry to the extent that the National Park there looked a relic of past times; blackened *Copiapoa* and *Thelocephala* withdrawn below soil level. At Bahia Iglesia the *Thelocephala odierii* was well down below ground, similarly *T.krausii* at Caldera was very difficult to find. Both at Chañaral and Flamenco as well as up to Cifuncho, *Thelocephala malleolata* was a shadow of its former self. It was commented by K.Preston-Mafham and his party that in 1994 they gave up looking for *Thelocephala* as it would take too much from their schedule.

Bear in mind that the *Copiapoa* live in the fog belts, areas which are generally outside the interest of anything other than mining. In this area there are no weather stations, for example in Carrizal Bajo or Trapiche. The mining industry would have no interest in fog; the miners at Esmeralda will tell you that it never rains there, but nevertheless it still supports a surprising amount of flora and fauna. At the same time it is important to remember that the weather pattern for Taltal is not likely to be the same as for Paposo which is only 35 km further to the north. Thus my previous trip took in Esmeralda which was gripped by cool weather for the best part of two weeks whilst Cifuncho was in brilliant sunshine, two places on the coast about twenty miles apart as the crow flies.

Returning to the original question, is Chile getting drier, it is a question which is impossible to answer with the limited data at our disposal. Having said that, I do believe that north of Antofagasta it most certainly is. The ancient stands of *Eulychnia* are mummies and such drying out of plants - which I would suggest are several hundred years old - does not happen overnight. These plants are adapted for dry conditions and therefore their demise must be a result of long term changes in climate. To the south of Antofagasta, however, I do not believe that the conditions are very different from those centuries ago. Weather patterns may have changed somewhat in recent years, but not significantly so. Healthy populations of *Copiapoa* can be found almost throughout their distribution, that is healthy and with reproduction.

It is also as well to bear in mind that the time of a visit can have a profound influence on the impressions given by the state of the flora. Notably in 1983 and 1985 I visited Chile after the onset of the winter rains and the plants were than in much better condition.

.....from H.Middleditch

There are a few comments on the mummified *Eulychnia* seen by Philippi in northern Chile in Chileans No.48 p.114.

.....from P.Hoxey

Near the turn-off to Mejillones we found some *Copiapoa solaris* which were all dead with the exception of one small seedling. These dead plants carried spines of some 6cm long and we also found some other dead *Copiapoa* here with spines of from 1 to 3cm long, which we thought may have been *C.atacamensis*. Also at Caleta Hornos we found many of the *Copiapoa solaris* there were dead.

We had seen *Eulychnia* on the high slopes at the turn-off to Mejillones and also on the slopes behind Caleta Hornos but it was not possible to get close to them to find out what condition they were in - alive or dead. But among the *E.iquiquensis* which we were able to look at closely near Mantos de la Luna there were many dead and dying plants.

.....from R.Schulz

One of the most interesting questions for me is how *Copiapoa* obtain water from fog and perhaps from dew. I feel there must be another method other than absorption through the soil and now that spines have been shown not to absorb water it leaves only the areoles, stomata, and wool as possible selective absorbing tissue.

.....from H.Middleditch

In Chileans No.41 an outline explanation was given of the basic metabolism by which plants take in raw material and convert it to living tissue. It was noted that whereas plants which grew by the C3 or C4 method took in carbon dioxide through the stomata in the hours of daylight, plants which grew by the CAM process had their stomata open at night for absorption of carbon dioxide, then closed by day to avoid moisture loss. In the same way that moisture can transpire via stomata, there is the possibility that cacti, which operate on the CAM process, may take in moisture which is present in the air at night, via the stomata.

But in addition to the alternatives put forward above, it is possible that the cacti may adopt yet another method of obtaining moisture from the coastal fogs. During night time, when temperatures are lower than in

daylight hours, the plant as a whole will lose heat. The body of the plant, having a relatively large volume in comparison with its surface area, will tend to conserve its heat. On the other hand the spines, having a comparatively large surface area for their volume, will lose heat rapidly at night time. In consequence the spine temperature will fall rapidly at night time; once the air immediately adjacent to the spine has fallen below its dew point, minute droplets of water will be deposited on the surface of the spine. As these minute droplets coalesce into larger droplets, the weight of the droplet will eventually exceed the surface tension securing it in place and in consequence the droplet will either run down the spine or fall freely. Some proportion of these droplets will find their way down to the surface of the ground where they will moisten the surface layers; if the ground is very porous, this moisture may even find its way a few inches into the ground. This could, then, be the source of moisture for the roots, where rainfall is almost non-existent but high humidity and early morning fogs are prevalent.

.....from R.Ferryman

You may recollect the slide which I showed some years ago at a Chileans' Weekend of a *Eulychnia* on the coast between Pan de Azucar and Paposo, with dew droplets clearly visible on the spines. Similar shots were taken at Paposo, El Tofo, and Carrizal. Also of interest here are the *Copiapoa columna-alba* seen on the high coastal plain at Esmeralda. The coastal side of all these plants is covered by moss, similar to the spanish moss one sees draped over the telephone lines in Argentina.

.....Drinking water from fog. New Scientist 16 Oct. 1993

75 large sheets of plastic mesh suspended along a remote hilltop in the Atacama desert of northern Chile. These plastic sheets are there to capture the moisture in fogs that roll in off the Pacific Ocean. The Atacama desert is reputedly the driest place on earth. It does not rain there for years on end. But there are fogs which drift in off the ocean and over the ridge where researchers have been perfecting their technique for harvesting the moisture. The double layered polypropylene nets, each 12 m by 4 m, are hung about 2 m off the ground and face into the wind high above the village of Chungungo. Fog droplets are tiny; about ten million of them have to accumulate on the mesh to make a single large water drop, which then runs down the mesh into a trough, and eventually flows downhill to the village. The nets provide an average daily output of between three and four litres of water per square metre of mesh.

.....from A.W Craig

At the time of our visit in November-December 1995 the sky was almost completely overcast with cloud along much of the coast of Chile. This cloud impinges on to the coastal range of hills and within this cloud belt visibility can be extremely limited. At one point, above Esmeralda, I had left the vehicle to walk round to see what it might be possible to find. Having left the wheel marks in the ground, which passed for a track here, I very shortly found myself enveloped in the cloud. After taking quite a number of paces I rapidly realised that I had nothing at all to guide me as to direction and further progress could, at worst, have resulted in failure to get back to the vehicle, so I turned back on my own tracks. We had the clear impression that vegetation such as the taller *Eulychnia*, the bushes and shrubs, were more in evidence in this cloud belt than below it. The assumption would be that these plants obtain their water by condensation of the moisture in these clouds. But there were a lot of cacti growing below the cloud zone.

.....from R.Ferryman

Clearly *Copiapoa* found below the cloud zone are able to make use of the coastal fogs, whereas the *Theloccephala* are not likely to benefit. However, it is important not to confuse the coastal fog with overcast clouds as this does not condense, simply providing cool conditions. The coastal fogs generally miss ground close to sea level and only start to condense at around 100m altitude. This implies that the *Copiapoa* and *Theloccephala* found close to sea level must obtain their moisture by other means - and what would that be?

.....from R.Schultz

Do you know anything about the black pigmentation which can often be seen on *Copiapoa*? I believe that this is a blue-green algae or a fungus, growing among the scales and wax flakes on the surface of the plant. Checking with some photographs we took, I notice that the *C.cinerea* v. *gigantea* growing just above the high tide zone had no black coating at all, whilst plants about a km further inland were heavily coated with black. Could it be the salt spray which is killing the algae? Also I notice that habitat collected plants gradually lose their black coat - perhaps as a result of the algae dying slowly?

What is the rime, or wax or "bloom" that occurs on forms of *C.cinerea*? This does not seem to be discussed in the literature. What advantage is it to the plant, if any? I feel it has nothing to do with reflection of heat or light, not in such a cool, foggy environment.

FROM VALLE GRANDE TO HUMAHUACA From M.Winberg

My arrival in Salta marked the start of a ten-week visit to northern Argentina, from October to December of 1990. My first aim was to revisit the area to the east of Tilcara and Humahuaca, starting from the town of Libertador General San Martin (Estancia Ledesma). This is the last town before taking the muddy road up to Valle Grande. I had to wait two days for a vehicle, which took me about 40km towards Valle Grande, to a small place called San Francisco. With four men, one dog, and a bicycle on a bare truck, the ride was not very comfortable! But I finally arrived, and it was sure better than walking. Two years previously I found a most interesting *Parodia*, MN 137, growing between Valle Grande and San Francisco. At that time I had only collected three specimens, but I now have seedlings. Anyway, I wanted to collect some more and also to investigate the habitat a bit more closely. Even though I climbed the hills to the north and to the north-east of the village, I could not relocate these plants. I was very disappointed. I even failed to reach Cerro Amarillo, to

the north, because of the dense vegetation and the foggy weather. In a way, I was relieved when I took the truck further north towards Valle Grande.

The truck driver had made the journey between Ledesma and Valle Grande for over twenty years. He recognised me from my previous trip along that route, and I told him about the small *Parodias* which grow in the neighbourhood. I was lucky! He knew the place, and after an hour or more, he stopped the truck to let me get out and collect a few of the jewels which were growing along the roadside! One was flowering yellow. The other passengers looked strangely at me, whilst I quickly dug up some with my bare hands!. Unfortunately, I could not photograph them, nor investigate the habitat any closer. But we now have more plants to examine in cultivation.

I bought some groceries in Valle Grande and walked the 8km to Valle Colorado. From Valle Grande there is only a narrow path leading to the next village, but you often meet people coming from the mountains with cattle. I did not stop to look for any cacti because, two years previously, I had spent several hours in the hills to the east and found *Rebutia fabrisii* v.aureiflora and varieties of *R.jujuyana*. A flat, quite large *Echinopsis* from the obrepanda or ancistrophora complex, had buds. The vegetation in this area is bushy grassland with some bare outcrops. To the west there was a river in a deep valley.

After having spent a night in the tent in Valle Colorado, I continued to walk along the path towards Santa Ana. It is a very heavy stretch, starting at an altitude of approx. 2100 metres and finally reaching ca. 3600 metres after some 16 kms. It takes a full day, and you are very exhausted, but pleased, when you reach the sleepy village. Between these two small villages, I found *Rebutia fabrisii* MN126, and a bit further on, at Cortaderas, also the tiny form called "v.nana" MN135. My own impression is that this is nothing more than a form of *R.fabrisii*, growing in a drier area close to the forest limit. The flower is extremely short, with a tube measuring only a few mm in length, with a flower diameter of 15-20mm, and of an orange-red colour.

On the same hills one can find *Lobivia chrysochete* MN 144 hiding among the grass, with beautiful orange-red flowers. The variety *subtilis* Rausch is only a synonym of *L.chrysochete*. According to the first description by Rausch, these plants should reach only 8cm in diameter. I found many plants reaching 15cm - some even 20cm across. The flower colour varies from orange to deep red with a paler, yellowish throat. Together with the *L.chrysochete* there is also to be found a *Rebutia haagei* v. MN 136, which I now believe is the var.nazarenoensis. The spination is a little bit longer than on *R.haagei*; it also has up to two central spines and a broader, greyish-green body. The flower is pale orange - I found only the one specimen in flower. At the base of a *Lobivia chrysochete* I found four or five plants of a *Rebutia* sp. MN 142 with large tubercles and weak spination. It could have been some MN 136 which had been growing in a shaded place.

I stayed in Santa Ana for two nights, but could not climb so high into the mountains because of the foggy weather. The village of Santa Ana lies in a hollow surrounded by mountain slopes on all sides - not mountains with sharp peaks, but with well rounded tops. All the mountainsides gave the impression that they were covered with dwarf shrubs, tussocks of grass, and herbs, with bare and often stony ground between them. Neither this vegetation nor the moderate slopes posed any real obstacle to walking up and down the mountainsides. Only at the bottom of a few sheltered gulleys near the village was there a thin line of taller bushes, perhaps a metre (or more) in height.

On closer acquaintance, the vegetation on the mountain slopes was found to be not entirely uniform - on the more exposed parts the grass tussocks are sparser, the dwarf shrubs rather fewer in number and perhaps a little shorter. Occasionally there are some almost vertical rocky outcrops, up to a metre or more in height and extending for several metres in length, where *Rebutia* can often be found growing in the cracks and crevices.

Among the grass, herbs, shrubs, and stones on these slopes there are occasionally *Lobivia chrysochete* MN 133 to be found, of various sizes ranging from some 5cm to 30cm across, with yellowish to black spines. There were only a few plants in flower, with red flowers, but I was able to collect some ripe fruit. The individual plants of this *Lobivia* are seldom to be found growing closer than a metre or two away from each other, and over a range of 3650 to 4100m in altitude. But over by far the greater part of the mountainsides that I walked over, there were none of these plants to be seen.

The next morning, I started at sunrise - it was beautiful weather, the sky was clear blue and the temperature around zero. I filled my water cans and set off towards the next destination - Caspala, about 24kms distant. Before reaching Caspala, there are two high passes to climb and cross. From the top of the second pass you can see the small village of Caspala with its white church and school, where I also found three interesting cacti. The first was a *Rebutia nigricans* v.carmeniana, with stiff and yellowish spines. Later on, in Salta, they flowered with an orange-red flower, just when Rausch visited me. Then on the same hill a *Rebutia haagei*. Also at this place a *Trichocereus* with rather dense spination, which Rausch had found, too, and said it was a new species. The plants were too big to dig up or even take a cutting.

The path led down the hills and you could see Caspala far away - the path seemed endless. There was no water until I reached the bottom of the valley at Las Lajitas where there was a clear, fresh spring. Here I saw the first specimens of *Lobivia jajoiana* v.caspalasensis and *Lobivia ferox* v.longispina. Later on, I saw more specimens close to Caspala. After ten hours trekking I reached Caspala at six in the evening. The next day I was very tired and only made a short excursion out of the village. The *Lobivia jajoiana* v.caspalasensis MN 153 grew with their long taproots deep in the dry soil and were very difficult to dig up. Rausch told me later that they were very numerous around Caspala. There were also *Parodia maassii* in the neighbourhood.

The next day we rose at 2 a.m. in order to start the trek of about 50kms to Udquia in Quebrada Humahuaca. We had some tea, packed our things, and set off in a caravan of five persons, three horses, and some mules. It was pitch dark and it was some hours before I could see any plants. We climbed higher and higher towards Abra Colorada, the highest point on this route. Finally we reached Udquia and took the bus to Humahuaca. We had been travelling for sixteen hours with only two short breaks.

(Ledesma, Valle Grande, Santa Ana, Caspala, and Uquia are located on The Chileans Humahuaca map)

.....from K.Preston-Mafham

It was in late December that I took the road out of La Quiaca, on the border of Argentina and Bolivia, heading in the direction of Santa Victoria. The road is steep and winding as it climbs up to the pass over the Sierra Santa Victoria and at rocky places there were thousands of *Rebutia atrovirens* to be seen. Once over the high altitude pass of the Abra Lizoite the road goes down for some way and on this stretch I began to catch sight of some cacti which proved to be *Lobivia chrysochete* v. *chrysochete*, plants of 6 or 7 inches across, close to the side of the road. The road then goes up and down as it winds round the mountainside. On another climb not far from seeing the *L.chrysochete*, there were *Lobivia chrysochete* v. *minutiflora* to be seen in flower, again plants of 6 or 7 inches in diameter.

About half way towards Santa Victoria I could see a great number of plants on the high side of the road, which were about a foot in diameter and two feet in height. Walking round among them, they could be seen to have a concave crown like *L.chrysochete* and many of these plants were carrying a ring of unripe fruit. All of these plants were growing on the mountain slopes along with tussocks of grass and other dwarf vegetation, with a lot of bare ground with stones and rocks - just the sort of surroundings that you see everywhere in the Andes.

Then the road started a long descent and as it made a small zig-zag down past some high cliffs, the vegetation became somewhat greener, although still sparse and low growing, with a tiny violet *Viola pygmaea* in flower and the tiny *Calceolaria umbellata* together with *Astragalus peruvianus*. Here I came across *Rebutia margarethae* in flower among the rocks, which were very wet in places, as well as a few *Lobivia sanguiniflora*. It was not possible to look right down to Santa Victoria as the valley was filled with clouds and I was in cloud when I turned round to go back over the Abra Lizoite.

The collected seed of *L.chrysochete* germinated well, but the resultant plants raised from the same batch of seed varied in appearance from one to the next. The spination varies from shortish to longer, from red-brown to creamy white, from slightly curved to obviously curved. There is also variation in the body, from having tubercles offset to those above and below to having tubercles in line forming a continuous rib. These plants flowered when they were about four or five years old, those of v.*minutiflora* having flowers which are barely one inch tall, those from lower down the pass having flowers of about twice that height.

.....from J.Lambert

The plants of *Lobivia chrysochete* which I saw at the Abra Lizoite when I was crossing the Sierra Santa Victoria were certainly flattened globular, that is, wider than high. At this particular spot, at 4350m altitude, my attention was focussed on *Lobivia sanguiniflora*, which was in flower, but no flowers were seen on the *L.chrysochete*. There are forms of *L.chrysochete* with straight spines and other forms with recurved spines. In his *Lobivia* '85, Rausch does indeed show a picture of a plant with straight spines (subtitled *L.chrysochete*), but on the same page is another picture (which is subtitled *L.chrysochete* v.*minutiflora*) which definitely displays more or less curved spines. From memory, the spination on the *L.chrysochete* which I saw on the Sierra Santa Victoria was straight, looking like that illustrated by Rausch under this name of *L.chrysochete*. I was not able to gain any real impression of the surroundings at that spot as it was not only cold but also very foggy at the time of my visit, so that the field of vision was very restricted. However, I did make a note that these plants grew on stony slopes with some grass.

.....from M.Lowry

After an overnight stop at La Quiaca near the border with Bolivia, our next objective was to travel to Santa Victoria. This involves crossing the ridge of the Sierra Santa Victoria by the Abra Lizoite pass and then going through the mountains to a second high pass, the Abra Patahuasi, before making the descent to Santa Victoria. Just before we reached the very top of this second pass, at BLMT 335 at 4394m altitude, we came across some plants of *Lobivia chrysochete*. They were growing amongst rocks on a gentle slope, which was almost bare of any other vegetation - just an odd *Cumulopuntia boliviana* and *Rebutia padcayaensis*. There were a few seedling *Lobivias*, however, the majority of the plants were up to 4 inches across and some 9 to 10 inches high. Many of them were in flower, with flowers just over one inch across and just over one inch long. There were also many plants with fruit, perhaps 20 to 30 pods per plant.

Returning the next day from our overnight stop at Santa Victoria, not far from where we had seen these *L.chrysochete*, we took the road which turned off northwards towards Viscachani. Just at this turn-off, BLMT 337 at 4380m, we now saw some much larger plants of *Lobivia chrysochete* growing on a steep rocky hillside. They were up to 18 - 20 inches across and up to two feet tall, looking like golden barrels, with spines ranging from yellow to deep brown. In overall appearance they were very similar to the smaller plants which we had seen the previous day at BLMT 335. Going along the road to Viscachani, some 2km or so before reaching that village, we saw a few - very few - plants of *L.chrysochete* which were about 8 inches high and some 10 inches wide, with large, wide flowers, larger than the flowers seen at BLMT 335.

The *L.chrysochete* in my greenhouse which were grown from the seed collected by L.v.d.Hoeven along this same route to Santa Victoria, have produced large red flowers. These flowers are similar to those produced on *Lobivia hystrix* BLMT 155, but perhaps a little paler, more orange than deep red. The *L.chunchillensis* BLMT 67 has similar flowers. The flowers on the cultivated BLMT 335 are much smaller. This has puzzled me in that both large and small flowers have been produced in the greenhouse on plants supposedly of the same provenance.

.....from L.van de Hoeven

Travelling from La Quiaca, at about 10km before reaching Santa Victoria, there were some *Lobivia chrysochete* to be seen on the hillside near to the road, but only over a very small area of about 1km. The

largest would be about 35cm across but only about half as high. However, walking north from that location for about 5 or 6 km, I came across much bigger plants up to 2 feet wide and about one foot high, where they were more plentiful. There were buds but no flowers, and some plants had fruit.

.....from R.M.Ferryman

We set off from La Quiaca in order to climb the Abra Lizoite, where we intended to search for *Rebutia margarethae*. At two or three places on the ascent, on the western side of the Sierra Santa Victoria, we saw some plants of *Lobivia chrysochete*.

.....from H.Middleditch

The Sierra Santa Victoria forms one section of a very extensive mountain range running from northern Argentina well into Bolivia. To the east of Volcan in the Quebrada Humahuaca, the variety of *L.chrysochete* known as *L.markusii* is found on the same mountain range. Then going into Bolivia, the same range is crossed by the Sama pass where again *L.chrysochete* occurs, which Ritter called *Lobivia hystrix*. To the north of the Rio Pilaya valley, this *Lobivia* is to be found north of Culpina and north of Inca Huasi and most recently much further to the north on the Cerro Mandinga between Tarabuco and Zudañez.

.....from J.Lambert

My own plants raised from seed of MN 133 from Santa Anna do have more or less curved spines, which Rausch describes as long, thin, and "fuhlerartig", meaning looking like the feelers of an insect. The seed came from M.Nilsson in 1990 and the seedlings flowered for the first time in 2000 and so far, all these plants have been red flowered.

.....from M.Winberg

The plants of *Lobivia chrysochete* that I have grown from the seed collected from near Santa Ana are in a 3 inch pot and have now reached flowering size. They have produced flowers which vary from white, to orange and red - two of them gave me a surprise by flowering white. These flower are about 60-70mm across when fully open. The *Lobivia chrysochete* raised from seed collected nearer to Cortaderos at about 3100m altitude, has also flowered, but the flowers are roughly only half the size of those on the plants originating from Santa Ana. I have also raised a plant from seed of Joschko 94 from Santa Victoria at 4200m which is in a 4 inch pot and has much shorter red flowers - about 20mm across and 30mm long - variety *minutiflora*.

....from M.Lowry

You will see in the February 2006 issue of K.u.a.S that *Lobivia chrysochete* has been found near Zudañez in southern Bolivia, in the form of very large plants.

.....from H.Middleditch

That is a very considerable distance from other reported sightings of *L.chrysochete* It appears to be in the area where Rausch in his *Lobivia 1* states that he found especially large plants of *Lobivia cinnabarina*. Other sightings of *L.cinnabarina* have been made in that area.

.....from J.de Vries.

These *Lobivia* on the Cerro Mandinga and Cerro Cantar Gallo, near Zudañez, were not to be seen in any great numbers. They grew up to about 50cm tall and offset, the larger plants with half a dozen or more offsets. Higher up on the Cerro Mandinga, even approaching 3900m, we found some more of these large plants of *Lobivia chrysochete*, which are somewhat smaller there, but even then up to the size of a bucket. They were mostly to be found on stony hillsides virtually devoid of any other vegetation. The identification as *L.chrysochete* was confirmed by Prof. Diers. But we saw little or nothing in the way of flowers so that I am not sure if they are the variety *minutiflora*. My own plant of VZ 323 from Cerro Mandinga flowered early in May at the same time as all the *L.chryochete* that I have from other collectors. There were no *L.cinnabarina* in flower at that time, they come into flower later in the Spring, into summer. Which shows that these *Lobivia* from Cerro Mandinga are *chrysochete* and not *cinnabarina*.

.....from L.Diers

When I was first informed about these discoveries of some *Lobivia* plants in the Cord. Mandinga, I did not believe that they could belong to *Lobivia chrysochete*. But my questions with regard to the size and habit of the plant, as well as their flowers, fruit and seed, have led me to the opinion that these plants really do belong to the group of *Lobivia chrysochete*. At somewhat lower altitudes, even down to 2600m, in more or less drier places, the plants are smaller; they never show the giant dimensions but in all other features they are identical.

They all have no tap roots whereas *Lobivia cinnabarina* and its relatives do have tap root, as well as having rather broad flowers up to three inches in diameter. On *L.cinnabarina* the fruit is rather small, when ripe it is dry to nearly dry internally, but never with a viscous filling. The larger plants may have a diameter of 15cm, rarely a little bit more.

.....from M.Muse

My own *L.cinnabarina* has flowered twice this year, at the end of May and early in June, whilst my WR 173 *L.chrysochete* has yet to flower.

.....from R.Hillmann

Going north from Culpina, towards Inca Huasi, we came across solitary plants of *Lobivia chrysochete* with larger flowers, some 6 to 7cm tall, orange or yellow in colour. Much further to the north, at the southern end of the Cerro Mandinga, we found more of these *Lobivia* near Ocuri where they were growing in company with only *Tephrocactus bolivianus*. These *Lobivia* grow up to 40cm across and have the appearance of the *v.minutiflora*, but have extremely small flowers, only 1-2cm tall. Around Mariscal Braun these *Lobivia* are smaller - only up to 30cm across - but elongated, up to 40-50cm tall. Both sorts have the same small flower, like a *L.maximilliana*. At both places, plants which have had their centre destroyed by animals or stones can produce offsets.

The plants found on Cerro Mandinga by J.d.Vries which grow there without the company of any other cacti, were first called *Lobivia cinnabarina* v. *gigantea* by Rausch, but the fact is that these plants have *L. chrysochete* seeds. Again the clustering plants seen here will have had their centre damaged

FINDING LOBIVIA CHRYSOCHETE IN BOLIVIA. From T.Marshall

Our travels through the southern part of Bolivia were made on four separate occasions, with timing ranging from September through to mid-January. In the course of these visits, we saw *Lobivia chrysochete* at a dozen different places, at altitudes ranging from 2950m near Inca Huasi, to 3950m at a rocky spot to the south of Iscayache. In general, these *Lobivias* seem to grow on moderate slopes, with fairly stony ground, but I have found them occasionally on flat hill top sites as well, such as when crossing the Sama pass near Tarija and also en route from Culpina to Inca Huasi, again with a plentiful collection of stones and not much in the way of vegetation. Those slopes which had a better vegetation, such as *Salvias* and *Baccharis*, usually seem to be almost devoid of *Lobivia chrysochete*, even though other factors were ideal. The vegetation at the habitats of this *Lobivia* was usually fairly sparse and low growing, so that in consequence we could spot this *Lobivia* fairly easily at a distance, especially as the adult plants can be up to a foot across. At only a few of our stopping places did we see these *Lobivia* after we left our vehicle at the roadside and started to walk around.

Depending upon the proximity of the hillside, there were several places where we could see these *Lobivia* from the road. such as when we were crossing the Cuesta de Sama, between Iscayache and Tarija. The road is very sinuous as it climbs the fairly steep ascent to the pass, so here we could readily see these *Lobivia* from our vehicle. It was quite unusual to find that no other cacti grew at the places where we came across *Lobivia chrysochete* - only near the top of the Cuesta Sama at 3850m altitude. And then when descending from this pass towards Tarija, at 3400m altitude, we found only a *Sulcorebutia* growing with this *Lobivia*. We have never come across a cloud or mist layer on any occasion when on this Tarija side of the Sama pass.

It was quite different at our stop where the ground was rising up from the flattish area around Curque - west of Iscayache, among the mountains. This was the only place where we saw tall columnar cacti growing in company with *Lobivia chrysochete* - both *Trichocereus werdermannianus* and *Oreocereus celsianus* which were at the end of their flowering season. These tall columnar cacti were to be seen in relative abundance over the surrounding mountain slopes. Unlike most of our other stopping places, no *Rebutia* were found here growing in the same habitat as *Lobivia chrysochete*, but on the other hand it was the only place where we found these *Lobivia* growing along with *Parodia maassii* which was very abundant here, some of them in flower. Between Iscayache and Curque, we saw more *Lobivia chrysochete* near Cieneguillas and again this was one of the few places where we did not see any *Rebutia* - but here again we saw some *Parodia*, this time *Parodia suprema* which were fairly abundant and in flower. It was at Charcas, near Inca Huasi, that we found this *Lobivia* growing in company with *Parodia subterranea*. Generally, the *Lobivia* did not seem to be specific as to where they grew, as they could be seen on various substrates.

At several places we found *Tephrocactus bolivianus* growing with *Lobivia chrysochete*, such as on the foothills not far to the north of Iscayache, where we stopped on a flat area and walked about 2km from the road across to the first hill. As well as *L. chrysochete*, we found growing here in sheltered spots plants of *Austrocylindropuntia verschaffeltii* making loose clumps of up to a foot across, with stems some 8 to 12 inches in height. The only other place where we found both this *Austrocylindropuntia*, again growing in a similar manner, and *Lobivia chrysochete* was at a stop a short distance to the east of Iscayache, where the road starts to rise into the mountain range, towards the Sama pass.

In general, the *Lobivia chrysochete* that I have seen in habitat are squat plants, wider than they are tall and with a fairly dense covering of short, reflexed spines. These spines tend to partially obscure the body of the plant, but this varies from site to site - presumably dependant upon the degree of exposure or the genetic pool. This *Lobivia* virtually always grows as a singular plant, only seeming to offset when damaged. They never seem to be plentiful at any of the habitat locations where we saw them, being always (nearly) a stone's throw or more away from each other. Regeneration of the *Lobivia chrysochete* populations is not immediately obvious - but on closer inspection smaller and younger plants are to be clearly seen around the bases of rocks and at the base of more mature plants.

Flowering and fruiting were observed on all varieties of *Lobivia chrysochete*, the first flowers being seen from about the end of November onwards, up to January, although flowering may take place even later still, with fruit being seen from December onwards. The var. *chrysochete* that I have seen, have attractive flame coloured flowers of various orange and red shades. The main identification of the var. *chunchillensis* when not in flower is its distribution i.e. near Culpina and Chunchilli - but usually it would have been flowering for us to identify it as var. *chunchillensis*. This variety does tend to have shorter flower which are still long enough to project out beyond the ends of the spines.

The fruit seen on *Lobivia chrysochete* is more or less globular - it can be anything up to 2cm across and of a reddish-brown hue when ripe. I have often harvested the fruit just before they split, as the ants are always keen to enter the seed pod as soon as the pod breaks - when the pods do split, they seem to have one vertical split. The interior of the fruit is filled with a sticky semi-solid, of the texture of slightly runny jam. Fruit was seen on *Lobivia chrysochete* as early as December, but this was on a different trip to when we saw flowers on these plants in December, probably a reflection of the different timing of the changes in the weather during these two seasons.

.....from R.Martin

We left Tarija early in the morning and climbed the Sama pass. The prevailing winds come from the east,

bringing frequent or semi-permanent clouds to this face of the cordillera. Once we had passed through this cloud layer we found ourselves in blue sky at 3600m. Well up on the mountain, but before crossing the pass, we stopped to look at some plants of *Lobivia chrysochete*, growing in the midst of low grasses - with ice from the previous night still partially covering the plants and the leaves of the grass! They were in a fairly flat, open, grassy site by the road. Some of these plants were carrying fruit, which was a little taller than wide. From my picture, my impression is that the fruit was nearer 2cm than 1cm tall. They were purple towards the top, and somewhat greener below. Nearer the pass we came across some more *L.chrysochete*, and here some of them were in flower. The flowers were a good strong red, tending a little towards orange rather than pink.

On the following day we were travelling from Culpina to Inca Huasi and once again we came across some more *L.chrysochete*. Further specimens were seen to the north of Inca Huasi, not long before Pucara, again in flower. And further plants north of Pucara. Some of the plants we saw had bodies of 8 or 9 inches across, which would probably be almost a foot across if you include the spines.

.....from H.Middleditch

In Englera 16 there is an entry for FR 80a *Lobivia tenuispina*, found by Ritter near San Antonio, which is not far to the north of Iscayache. One specimen originated from "the hills to the west" which would be the same range of hills to which T.Marshall walked across the flat puna. Was this particular trek made on the basis of knowing the FR80a location?

.....from T.Marshall

No, it was undertaken as we had hoped to find some *Digitorebutia* on those hill slopes.

.....from J.Lambert

In 1987 I acquired some plants of *L.chrysochete* from Andreae, which flowered in 1992. One of these is a yellow-flowered Bolivian form, labelled *L.chrysochete v.tenuispina*. This plant was first described by Ritter in 1966 as *L.tenuispina*, but in 1975 it was transferred by Rausch to *L.chrysochete* as a variety.

.....from T.Marshall

The form *v.tenuispina* has flowers of similar colour and size to *v.chrysochete*, but the spines, which are of a similar golden brown colour to the *v.chrysochete*, are narrower and finer. We recorded this variety from five places, all at various distances and directions out from Iscayache.

.....from H.Middleditch

In the BDH field list there is a record of finding *Lobivia tenuispina* at both BDH.18 and BDH.19 to the north of Iscayache.

.....from R.K.Hughes

We left Iscayache and some 19km along the road we reached BDH.19 on a bright sunny morning, quite unlike when we had passed that way a few days before on the opposite direction in the late afternoon when there were heavy clouds around the nearest mountain peaks and everywhere was dull. We stopped to see the very obvious *Oreocereus trollii* which we had last seen just to the north of Cuchu Ingenio. Here, they were quite short-stemmed, of no great height, the longer stems were all horizontal at their base. I was pleased to find a couple of ripe fruits on them, full of seed, to bring home. The other plant that became obvious as we walked round was *Tephrocactus rossianus*, with many small clumps flat to the ground. However, there were some larger clumps and some of these formed mounds. I photographed these to show the different flower colours which varied from yellow, to orange, and red. I even managed to find a yellow and a red flowered pair of clumps only a couple of feet apart. I also partially uncovered the root of one plant to find that it was parsnip shaped. The segments on these plants were ovoid rather than the usual spherical shape. I brought home a few groups of segments from plants with different flower colours. Unfortunately they fell apart on the way and most of them dried up. Those that survived have struggled to produce just two plants, one of which has flowered yellow, the same as all the other *T.rossianus* that have flowered in my collection.

Having passed through some mountains, we stopped again at BDH.20, some 16 km from Iscayache, where the surroundings looked similar to our previous stop. Here the land slopes slightly upwards, with no mountains and only sky behind. It appears that we have reached undulating hills and are out of the mountains, ready to start the descent to El Puente. This site seemed to be a more arid place than BDH.19, but perhaps only dustier. The *O.trollii* were similar, but grew a little taller and were in flower. Also alongside them were a couple of *O.celsianus*, which grew a little taller and they, too, were in flower. The *T.rossianus* were few and far between compared with those at our previous stop. We also came across some rather untidy clumps of *T.ferocior* with some unripe fruits on them. Although I only saw one *Lobivia* at BDH.19, here we found a number of these plants. Some of them were almost flat to the ground, whilst the larger ones were not much more than hemispherical hummocks. But all of them were under a forest of black spines and at the time I took them to be a small *Lobivia ferox*.

.....from W.W.Cristie

On a field trip to Bolivia in company with B.Bates, we travelled north from Culpina and after passing through Inca Huasi, we left the fairly open basin and started to enter a hilly terrain. The first stop was made at 2850m where the road was running along the edge of a narrow valley, and as is very common with roads in Bolivia it was mostly cut out of the bank so as to leave the cultivated land on the valley floor untouched. Getting to the cacti usually means a scramble up a steep cutting for 2-3m. before reaching the untouched hillside. At this time of year (October) there had presumably been little rain so far and there was little evidence of much plant growth, other than a few desiccated shrubs which were only about 40cm high, together with an occasional herbaceous plant. Even the grass tufts were very sparse indeed. A yellow flowered member of the *Compositae* of about 30cm high was the only one to stand out.

In the flattish area at the foot of the hill, B.Bates knew that there were some *Tephrocactus* (Puna) subterranea growing here, but they really were subterranean at this time in the dry season and we could not

find any sign of them. Walking up the moderate slope was just a pleasant stroll and after climbing about 50m higher, we came across the first *Lobivia chrysochete*. The first of these *Lobivia* that we encountered were present in good numbers, but were not yet in flower. but as we rounded a rocky outcrop, we saw dozens of flowering plants, The flowers were orange-red, some 5cm. in diameter and were being actively pollinated by bees. In most places these *Lobivia* seemed to grow out of the solid rock, with no sign of soil. They varied from 5 to 20cm across and some of the smaller plants were in flower. The spination was very variable in length, in curvature, in density, and in colour. On some plants the long brown spines completely covered the bodies, hiding the growing points. Others had more open spination. The ribs were humped rather than continuous.

We continued to walk uphill, still up a moderate gradient, Much of the ground continued to be covered with stones from grit to walnut sized. We left the *Lobivias* behind and then, on a small patch of ground less than a tennis court in size, we encountered some small plants (1cm. in diameter) of *Rebutia suphuthiana* with the typical pectinate spination, then higher still another larger and much spinier *Rebutia* of some 2-4cm. across, which we identified as *R.fiebrigii* - although with hindsight this might be *R. duteiniana*. A short distance away, quite separate from the *Rebutia*, there were some *Lobivia pugionacantha*, as if the *Lobivia* and the *Rebutia* were each selecting some slight difference in the nature of the ground. Then higher still we came across a small black-spined *Parodia* of about 5cm across, which was presumed to be *P.subterranea*. At this point, I suppose we were about 300-400m from the road. The *Lobivia chrysochete*, the *Rebutia*, and the *Parodia* each seemed to have found its own height preference with little or no intermingling, at least on the route that we took up the hill.

Driving some considerable distance further on, having reached the summit of the pass on the road to Pucara (at 3800m), I spotted some bright yellow flowers in a flat level area close to the road. These were a form of *Lobivia chrysochete*, which also had yellow spines. They were growing together with small spiny xerophytic shrubs which were some 60cm high, together with bunches of coarse grass. We did not explore this site extensively, but there seemed to be good numbers of these *Lobivia*, again up to 20cm. in diameter, though only the larger plants were in flower. They were growing in what appeared to be deep stony soil here, not the rock of the previous site.

It may be noteworthy that many of the plants that we saw on the south side of the pass had orange-red flowers - the *Lobivia chrysochete* and *L.pugionacantha*, while on the north side the same species had yellow flowers, as also did the few *Parodia subterranea* which were in flower.

GROWING LOBIVIA CHRYSOCHETE From R.Purslow

Lobivia chrysochete is one of the few examples of a cactus where the written description of the plant lies somewhere in the middle of the range of variation shown shown by the various "varieties", which range from the shorter, thicker spination of some, to the bristly, hooked spines of *markusii*. Most of their flowers are a vibrant orange red, however, I have had flowers on *L.markusii* that exhibit a magenta red hue, as pictured in Rausch *Lobivia 2*, as well as plants of *L.chrysochete* that show yellow-orange flowers. The only notably divergent flower in terms of structure belongs to *v.minutiflora*, which has a much reduced petal structure together with its smaller dimensions.

The one variety that I think could be problematically associated with *chrysochete* is *tenuispina*, which may have only convergent characteristics in that it can reach similarly large body proportions, but in general has a much drabber appearance, both in spination and in body colour, either dark or light.

My own collection amounts to about thirty of these plants altogether. Some of them give a general impression of having curved claw-like spines which sweep upwards so that they almost obscure sight of the body. The shorter spined ones, however, are not quite as all-embracing. It is remarkable to what extent the spine count and the length of the spines varies between all these plants. The most outstanding spination is on the largest plant that I have, with a body of 12cm in diameter and having 27 ribs, a plant of WR 173 which originated from Prof. Diers and is reputed to be original Rausch material. This plant has about 17 spines per areole which range in length from 1.5cm to a mm or two short of 10cm. A second specimen of WR173 has a spine count of 15 with spines which range from 1.5cm to 5cm in length. It is only 9cm across the body and yet has 27 ribs, but it gives the impression of being almost as well enveloped by its spination as its larger companion.

Not quite as well enveloped by its spination is a *v. minutiflora* PM 374 which has a spine count of 21, the spines varying from 10 to 25mm long, but at 10cm across the body and with 26 ribs; also a plant of *v.markusii* WR 215 with spines 10 to 25mm long and a spine count of 16 on a 9cm diameter body, again with 27 ribs. Smaller in size and younger in age are *v.subtilis* MN 144 with 15 spines per areole of up to 15mm long on a 7 cm diam. body having 18 ribs; a *v.hystrix* BLMT 75 with 21 spines of up to 25mm long also on a 7cm diam body, with 16 ribs; and a *v.chunchillensis* BLMT 67 with 12 spines of up to 12mm long on an 8cm diam. body, with 13 ribs.

These are among the larger plants in my collection, as any observations made on those plants which lack real maturity would give rather meaningless information. One feature that I have found which is quite surprising, however, is that the spacing of the areoles on the rib is quite considerable at about 25mm on all varieties - the only exception being the MN 144 *v.subtilis* at 15mm areole pitch. The density of the spination does tend to obscure this particular feature. As small plants, *subtilis* and *markusii* do look similar.

It is not very likely that the spine count, spine lengths, or rib count on my plants are necessarily typical for each of these varieties. As the plants increase in age and size, it is probable that the number of ribs could well show a steady increase, until they are all very similar. And especially bearing in mind the ratio of two to

one between the longest spine on my two specimens of WR173, together with the inevitable difference between spine characteristics in habitat and in cultivation, it may be open to question whether the difference in the spination which are displayed by my own plants do really represent the inherent characteristics of their respective varietal names.

My various plants of *L.chrysochete* do display a degree of variation in spine colour. Most of them have spines of a straw to golden colour, but others have slightly darker spines, whilst the spines on *markusii* look yellow, and those on BLMT75 are nearly white. The maximum number of spines quoted by Rausch as 60 does seem to be somewhat optimistic - I would have thought that a figure in the 40's would appear to be more likely.

Lobivia chrysochete presents few problems in cultivation, as long as the comparatively weak root system is taken into account. It can be difficult to re-root if the roots are lost, due to the somewhat concave nature of the underside of the body. The key to flowering in cultivation, in common with all the other alpine *Lobivias*, is plenty of light, good ventilation, and avoidance of the high summer temperatures, together with fairly regular repotting to encourage steady growth. Otherwise these plants can tend to cease to flower after a few years. Given these conditions, I have had plants of *v.hystrix* and *v.chrysochete* in bud at only 2.5 to 3cm in diameter.

.....from M.Muse

It would be about 1987 when I obtained some seed of *Lobivia chrysochete* WR 317 from a Prof. Diers in Austria, whom I understood had obtained the seed from Walter Rausch. The plant that I retained has flowered for some years now, with the larger form of flower associated with this species.

.....from P.Moor

The seed of *Lobivia chrysochete* which came from *L.v.d.Hoeven* yielded some good germination. There is quite a noticeable variation in the spination of the young plants.

GROWING WHICH SORT OF GYMNOCALYCIUM? From R.Coward

I am growing a plant of *Gymnocalycium mostii* P.380 which has narrower and sharper ribs than the usual form of *G.mostii*. I see that in the Bercht seed list there is a "P.380 *G.mostii* from Sauce Punco, from the *bicolor/valnicekianum* relationship, with narrow, sharp angled ribs". But my P.380 does not have the bicoloured spines of *G.bicolor*. In addition, I have a *G.mostii v.genseri* which is a somewhat similar looking plant to my *mostii* P.380. It was the flower of the B.42 *genseri* that I found different to the other *mostii* that I have.

.....from V.Sorma.

It was in 1997 that I first visited Argentina, together with S.Fischer and M.Sladkoosby. We were in the northern part of the Sierra Cordoba, between Museo Fader and Ischillin, when we found some *Gymnocalycium* VS 142. These plants were like those we had in our collections under the name B.44 *G.bicolor* or B.42 *G.genseri*. For me, these plants belong to the *mostii* group. Not many plants were found, they were from 10-15cm across, most of them offsetting. They were growing together with *G.leptanthum*. The biggest plant of VS 142 in cultivation is now 8cm across. In 2002 H.Till classified them as *G.valnicekianum*, but I do not hold the same opinion.

.....from J.Piltz

The Sierra Tulumba is a mountain range just to the NNE of Tulumba. Our P.380 from Sierra Tulumba and the VS 142 from south of that Sierra at Ischillin, are the same, a form of *G.mostii*. They have been named *G.mostii v.genseri* by Andreae, who received these plants years ago from Frau Muhr, which had been collected by Genser, but they have never been described. At Sauce Punco, P.380 grows sympatric with *G.erinaceum*.

.....from H.Middleditch

A picture from Ludwig Bercht of his LB 1131 *G.mostii* from Cerro Negro, which lies to the south of Ischillin, gives me the impression of being comparable with *G.mostii v.genseri*

.....from L.Bercht

We also found *Gerinaceum* at Sauce Punco and in addition we came across there same plants between Ongamira and Ischillin, both at Ojo de Agua LB 1133 as well as at Cerro Negro LB 1130, where they grew near to LB 1131 *G.mostii*.

.....from G.Hole

It was several years ago that I was able to acquire a selection of habitat-collected seed of *Gymnocalycium* during a visit to Austria, but many of them were only identified by a field number and without a name. This included GN.423-1373, GN.425-1377 and GN.432-1397.

.....from G.Neuhuber

It is now possible to name these three as *Gerinaceum*. They were collected at Los Chanares, at Agua del Rodeo (both in prov. Cordoba) and at Ojo de Agua, in Santiago del Estero, respectively.

.....from J.Piltz

In 1987 I met Genser at Mrs. Muhr's house and we were talking about the "B.42". I told him that, for me, it was a new species or subspecies and I asked him where it had come from. He told me that these B.42 grew near Nono and asked me to describe it as *G.genseri*. Since that time we have been selling these seeds with the name *G.genseri* nom. prov.

This meeting at Mrs. Muhr's house in Buenos Aires was at the end of my trip in 1987, so that I did not have time to see the plants in habitat then, and even in my subsequent field trips I did not visit the location for B.42 near Nono. As I do not describe plants which I have not seen in habitat, a description of *G.genseri* never appeared. And in addition I lacked the opportunity to study the relationship with other taxa. In the meantime,

the Austrian *Gymnocalycium* group have described this B.42 as *G.gaponii*.
.....from H.Middleditch.

Whilst the home of *G.mostii* v. *genseri* is near Sierra Tulumba in the north of the Sierra Cordoba, the only place with the name Nono that I can find on my map of the Sierra Cordoba lies nearly 100km to the SW of Cordoba city.

The "B42 *G.genseri*" grown by R.Coward appears to me to bear a reasonable resemblance to *G.genseri* - so, what is this *G.gaponii*?
.....from J.Lambert

I have looked up the exact location of Nono on my maps. this place lies to the south of Villa Cura Brochero, along the road to Villa Dores, between Mina Clavero and Las Rabonas. The *Gymnocalycium* known from this area are *G.vatteri* and *G.calochlorum*.

GYMNOCALYCIUM GAPONII. By G.Neuhuber.

Translated by H.Middleditch from *Gymnocalycium* 14 (3) 2001

When attempting to follow the old road from Villa San Luis to El Condor, over the Sierra Grande, it was successful only with difficulty, although the vehicle suffered some scars. We were able to find some marvellous clumps of *G.parvulum* and *G.monvillei* v. *steineri*. as well as some plants that were not identified. At that time, December 1991, there was not a single bud or flower to be seen, only some fruit, that proved to belong to the *Gymnocalycium* seed group. The open spination, the angular conical body and the spines with a red-brown base were noticeable - and a real surprise.

This new species grows on the gently rising western foothills of the Sierra Grande, together with *G.parvulum* and an *Opuntia* species. Then about 100m further up the slope one comes across *Gymnocalycium monvillei* v. *steineri* and *Notocactus submammulosus*. The ground consists of fine sand with weather-beaten components of grasses and *Selaginella*, as well as low growing bushes there. Below the surface it is gravel with scattered lumps of quartz and granite rocks. The amount of rainfall appears to be scanty, which is on the basis of the vegetation and recognition of the rain-shadow location, which likewise explains the greatly extended subterranean portion of the body of these plants.

After ten years of observation in the greenhouse, knowledge of the flower, raising seedlings and the discovery of further habitat locations, this unusual find will now be described (fully detailed description provided).

The habitats of *G.gaponii* as far as they are known at present, lie along the west side of the Sierra Grandes from Tala Canada Be 182, southwards to Villa Cura Brochero GN 362, 850, Mina Clavera WP 356, and Las Rosas GN 851. Thus *G.gaponii* has a north-south distribution of about 80km. Despite the very similar nature of the habitats, all are to be found on the foothills of the various larger Sierras. Only at Las Rosas could *G.gaponii* be found in surroundings that one could describe as woodland. Its presence there had shrunk to some groups with with only a few younger plants. Naturally at the various habitats some divergent characteristics occur, which however are too slight to detail. More plants deviating from the basic description were found near Las Rosas which display a central spine and the spine count can rise by a couple. At an early age the seedlings display their ribbed globular habit, but latter return to their usual appearance.

.....from H.Middleditch

This *G.gaponii* is described as "Differing from *G.taningaense*" by its partially subterranean, green body and reddish throat to the flowers. In the foregoing article, a picture of an uprooted plant shows that only about a quarter of the body was above ground level, the rest being subterranean. Two habitat pictures are of plants with a green body showing no sign of tending to be dark green or grey-green. On pictures of cultivated plants the spines radiate nearly tangential to the body, perhaps projecting very slightly outwards.

.....from R.Moreton

I do have a plant of B.42 "*G.genseri*" which is totally different to my *G.mostii* and my *G.valniceianum*, which do have a passing resemblance to one another.

.....from J.Lambert

The plant of B42 being grown by R.Moreton may very well belong to *G.gaponii*, although I have never seen it in habitat. It is certainly not *Gerinaceum*, as the spine count is too low in number, both in radial and central spines.

I collected a *G.gaponii* under my number JL.417 at La Mudana, where it is sympatric with *G.horridispinum* and *G.amoenum*, but it has not flowered yet.

.....from H.Middleditch

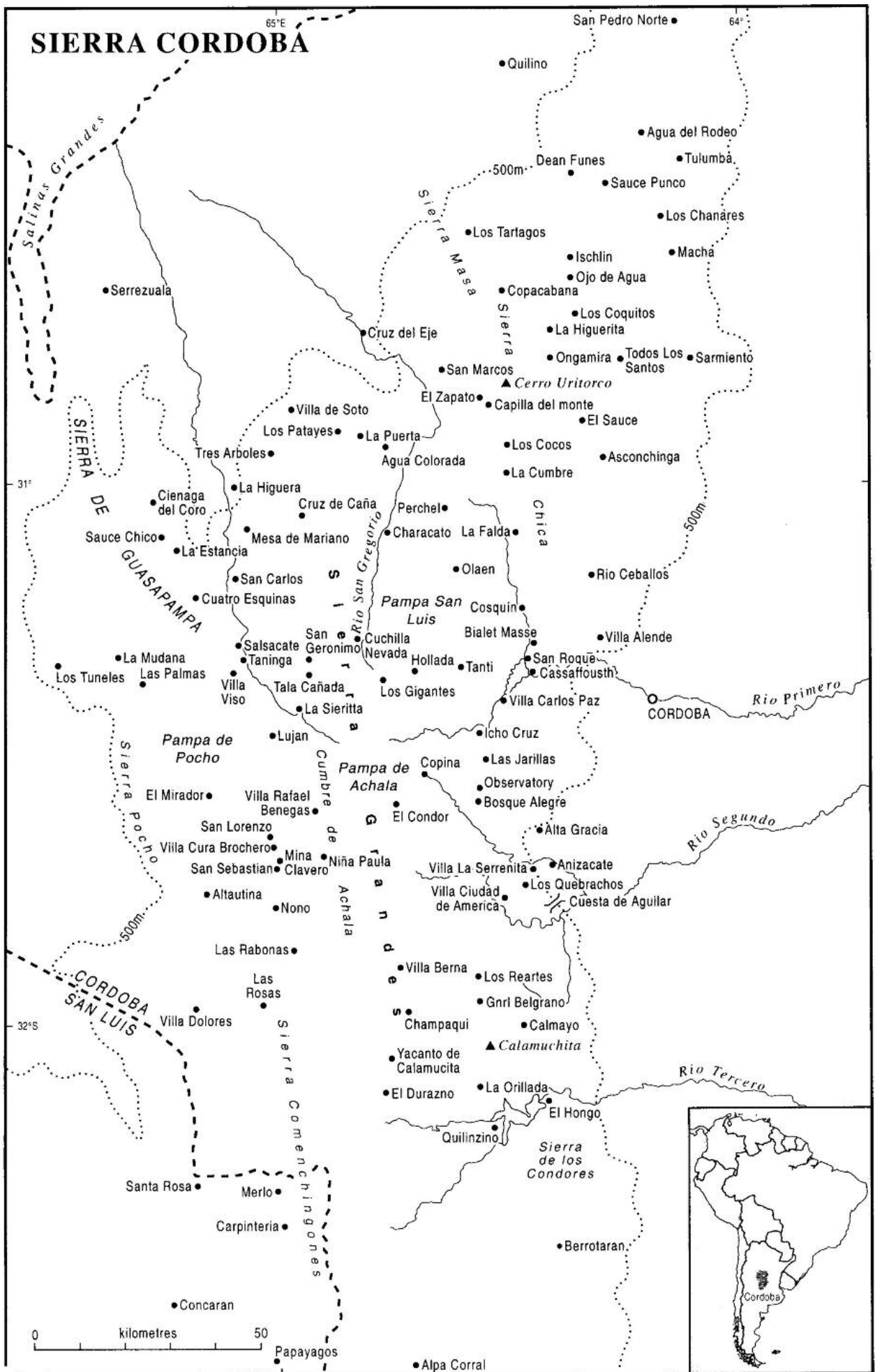
But if we accept the observations (above) from J.Piltz, in regard to B42, then this JL.417 appears to be the same as the real B42! This JL.417 also appears to extend the distribution area somewhat for *G.gaponii*.

.....from J.Lambert

The VS 142 from Ischillin initially appeared to me to be an entirely different species, *G.sigelianum*, of which I collected plants under my field numbers JL 449 and JL 451. There are several differences separating this sp. from *G.mostii* v. *genseri*, such as the tap root, a feature which *G.sigelianum* shares with its closely related forms of *G.capillaense* and *G.sutterianum*, as against a fibrous root system in *G.mostii* and its varieties. Spines are also less numerous - radials 3 to 5 and no centrals (or a single one) in *G.sigelianum*, compared with 7-9 radials and a central spine in *G.mostii* and its vvs.

But of course the irrefutable proof lies in the seed type, which is *Ovatisemineae* for *G.sigelianum* as against *Microsemineae* for *G.mostii*.

SIERRA CORDOBA



.....from H.Middleditch

My copy of the JL field list places JL 449 on the "road to San Pedro Norte" whilst JL 451 is given a location of "between San Pedro Norte and Ischillin". However, this seems to be a rather an odd way of quoting a field location since these last two places lie about 70km apart from each other with the large town of Dean Fumes between the two, .

.....from J.Lambert.

Going south from San Pedro Norte, I did not pass through Dean Fumes, but followed a road more to the east of that place, crossing the main road from Dean Fumes to Villa Tulumba on the way. From there I somehow rejoined the road to Ischillin, but I was unable to see which road I was following on my map of Cordoba. To the best of my belief, the place where I found JL 451 was somewhere to the south of the main road from Dean Fumes to Villa Tulumba.

Both these plants had a long and narrow tap root whilst JL 449 had 3-5 radial spines and one central spine - this latter still to be seen on the three specimens of this plant still in the greenhouse. The JL 451 had 3-5 radial spines and one central spine at some areoles but not at others.

There is quite a interesting article on *G.sigelianum* by H.Till in an issue of the Austrian "Gymnocalycium" 16(1) 2003 with good pictures and a distribution map. Their Fig.5 shows clearly the strong pink shade of the *G.sigelianum* flower. This appears already in the original description of this species as "petals pink" and for *G.capillaense* "petals very white".

My discovery of these plants lies outside the area given by Till in his paper on this species. So that before deciding on *G.sigelianum* as a name for these two plants, I consulted not only that publication, but also Krainz Die Kakteen 1. XII, 1969, (which has a good picture of *G.sigelianum* as Fig.6) as well as G.Frank in K.u.a.S. 21.8.1970. Here, the author insists that *G.sigelianum* has only 3 spines but stronger and less appressed than in *G.capillaense* or *G.sutterianum*, which is correct.

.....from H.Middleditch

The original 1923 Schick descriptions of *Gymnocalycium sigelianum*, *sutterianum*, and *capillaense*, only contain reference to the stout tap root on *G.sigelianum*. Might this suggest that, by default, the specimens used by the author for the original descriptions of *G.sutterianum* and *G.capillaense* only had fibrous roots?

.....from G.J.Swales

In about 1976 the Krainz Die Kakteen carried a revised diagnosis and description of *G.capillaense* by G.Frank, in which it was stated that this species possessed a tap root.

.....from J.Lambert

Looking up my descriptions of *Gymnocalycium* in the *capillaense* complex, in addition to the tap roots on *G.sigelianum*, on my JL42 *capillaense* there was a carrot-like tap root and on my JL105 *sutterianum* there was an even stouter tap root, for which I used the expression "racine napiforme".

.....from J.Piltz

All those *Gymnocalycium* which we found in Cordoba and San Luis provinces that I would consider belonged within the overall *sutterianum* - *sigelianum* - *capillaense* group did have a tap root.

.....from G.J.Swales

The original descriptions for these three species of *Gymnocalycium* appeared under the authorship of Schick in Moellers Deutsche Gartner-Zeitung in 1923. The author observes that he received these plants from Carlos Siegel in Capilla del Monte, prov. Cordoba, which Siegel had collected in the Sierra Cordoba, in company with Willi Sutter, also of Capilla del Monte, after whom two of these new species were named. This article includes a picture of *G.sigelianum* having 3 radial spines per areole which do not stand out from the body. This picture is noted as being "half natural size" which gives a body width of 10cm and a flower length of 7cm, which compares with the description quoting a body 8cm wide and a flower length before opening of 8cm. The radial spines on the picture measure about 5mm long which compares well with the figure of 10-12mm in the description.

In addition, there is a picture of *G.sutterianum* similarly at "half natural size", from which the body would be 8cm across with 5 radial spines up to 15mm long and again no centrals, and the open flower would be 8cm long. The description quotes a body of 8cm across and a flower length of 10cm before opening, which would be appropriate for the open flower in the picture. However it also quotes the two upper spines as 25mm long and the two sideways directed spines as 17mm long, the latter figure being a better match to the picture.

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

I have several small plants of *G.sutterianum*, which produce a flower that may be a "dirty" white, a pinkish white, or palish pink. I have not de-potted any of my plants to check upon the root, But I think that I would expect to find a thick central root, tapering and branching below into thinner roots. If we were to take the original Schick photo of this species at the size it actually is (i.e. not scaled up by a factor of 2) then you would have an almost exact representation of body size, spine length, tuberculation, and rib count, of my *sutterianum*s.

.....from H.Middleditch

Since the field collectors quoted by Schick appear to have been domiciled in Capilla del Monte, it is no great distance from there to the locations of *G.sigelianum* JL 449 and JL 451.

The excellent slides of close-ups of the seed of the *Ovatisemineae* type of *Gymnocalycium* P.103 and P.106 which were taken over ten years ago now by F.Fuschillo, are labelled "*G.sigelianum* - *sutterianum* - *capillaense* group" - but both P.103 and P.106 originate from San Luis province. Was this a mistaken identification?

.....from J.Piltz

No, the P.106 was found at El Volcan near San Luis city. It has now been described by the Czechs as

G.fischeri, previously known as *G.stuckertii* sensu Kiesling. The P.103 came from near Villa del Carmen, where it was growing in stony earth together with grasses as well as bushes of about 3 to 4 metres in height. The Austrians have a provisional name of *G.sanluisense* for this plant. Both these plants do belong to the *G.sutterianum* - *sigelianum* - *capillaense* group.

.....from J.Lambert

Although I would accept that there are many members of the *G.sutterianum* - *sigelianum* - *capillaense* complex to be encountered in province San Luis, I should say that I consider both *G.capillaense* and *G.sigelianum* to be restricted to Cordoba, whilst only *G.sutterianum* extends into San Luis.

.....from F.Vandenbroeck

On my 1991 visit to San Luis province I found a tiny *Gymnocalycium* - three or four cms across at the most, to the east of Villa del Carmen. These plants possess huge tap roots almost as thick as the diameter of the plant body. These plants grew in a flat stony area together with *Notocactus mammulosus* and some grasses. I provisionally named them *G.parvulum*.

These small tap rooted *Gymnocalycium* later became identifiable, as during my 2004 travels I was able to observe these plants at several other locations, such as N. of Punilla, and W.of Achiras, as well as in the Sierra Guasapampa, which lies NW of Salsacate. In my eyes these enigmatic plants are to be considered as belonging to the *G.sigelianum* - *sutterianum* - *capillaense* group.

.....from L.Bercht.

From the photograph taken in habitat near Villa del Carmen by F.Vandenbroeck, the appearance of the body of this plant and its relatively small size could suggest that it may possibly be *G.lukasikii*.

.....from G.Neuhuber

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

.....from H.Middleditch

It will be several years ago now that a slide was received from F.Vandenbroeck of this self-same plant that had been unearthed and laid on the gritty-looking ground. If the body of this plant is some 3 to 4cm across, what appears at first to be a carrot-like root with no neck at the junction with the body, could be about one cm less in thickness than the diameter of the head of the plant. But a better look at this picture on a larger screen reveals that the thick upper part of the "tap root" - possibly 5cm long - carries quite a few peculiar humps. Below that portion, there is a much thinner tap root, possibly less than 1cm thick and perhaps 4 or 5 cm long. As the plant is evidently growing in a sandy or gritty ground and is quite lacking in shade, at about 33 degrees south latitude (comparable with the southern shores of the Mediterranean), the ground is likely to get quite hot in the dry summer. So it would not be too surprising if much of the body of this plant was to shrink underground in those circumstances. In spring it might increase somewhat in size, but over a period of time the lower part of the body could well gradually become subterranean. So should this plant be described as having a tap root of barely 1cm thick?

In the Czech description of *G.lukasikii* the "thin tap root" is stated to be 40cm long and 5mm thick, which might pass for this interpretation of the Vandenbroeck picture of the unearthed plant. The Czech description for *G.miltii* quotes a "more or less thickened tap root" which might also pass for the same plant. It might well be asked how many of the more recent Czech descriptions of new spp. of tap rooted *Gymnocalycium* from San Luis compare with the 1923 description of *G.sigelianum*.

.....from J.Piltz

But I would regard many of those "new" tap rooted *Gymnocalycium* names from this area as falling within the *sutterianum* - *sigelianum* - *capillaense* group.

.....from H.Middleditch

Looking at the G.Neuhuber field number list, I see that there are 23 different locations given for *G.sutterianum* in and around the Sierra San Luis, as well as five locations in province Cordoba. Would all these plants have possessed tap roots?

Since both *G.monvillei* and *G.achirasense* are to be found both in the Sierra Cordoba and the Sierra San Luis, it may hardly occasion surprise to find that *G.sutterianum* could occur over a similar distribution area.

.....from G.Neuhuber

The GN Field list in your possession dates from the early 1990's, recording species names which were considered to be the right name at the time. Now - about 15 years later - we know a lot more about some taxa and many of the names in that early list have now been superseded. For example, most of the "*G.sutterianum*" are now *G.fischeri*, or they belong to that group - although the original Czech description for *G.fischeri* is rather poor.

.....from H.Middleditch

In 1842 *Echinocactus* (*Gymnocalycium*) *monvillei* was first described by Lemaire as having a central spine "often 2 inches long, sometimes missing". In the Austrian *Gymnocalycium* 3(3) 1990 review of *G.monvillei*, not only is the variation in the length of central spines or their absence well illustrated, but they also illustrate plants with a wide variation between them in radial spine counts. This includes a variety said to have "5-7 radial spines" which is accompanied by a picture of that variety which carries only 3 radial spines. Similarly the variation in the spination of *G.valnicekianum* was well documented by Piltz, his sketches of the varying spine clusters to be found in habitat on this species being reproduced in Chileans No.64. It would appear that the flood of new names emanating from Austrian and Czech writers has probably failed to recognise this sort of variation that can occur in those plants which they have utilised as the basis for their descriptions.

It was in 1923 that *G.sigelianum* was first described and pictured with 3 radial spines, whilst *G.sutterianum* was described and pictured with 5 radial spines. The 1905 Spegazzini description of *G.stuckertii*

quotes 7-9 radial spines, all with no centrals. The Czech description of *G.fischeri* quotes 3-7 radial spines, which could include both *G.sigelianum*, *G.sutterianum*, and perhaps also *G.stuckertii* sensu Kiesling.

.....from J.Lambert,

I would not think that the distinction between those three original species names is quite that simple, as the spine count is not rigidly fixed. For example, in *G.sigelianum* I observed that radial spines numbered between 3 and 5, whilst central spines were either absent or restricted to a single one. In *G.sutterianum*, radial spines were between 5 and 7, with no central. And in *G.stuckertii* I counted 5 or 7 radials and no centrals. So that separating these species on the criteria of spine count is not really possible.

.....from J.Piltz

Yes, indeed, all the plants that I feel fall within the sigelianum - sutterianum - capillaense group do display a more or less thickened tap root. From the plants that we have seen in habitat, I would also agree that one cannot use just one specific spine count as a basis for applying one or other of these three names.

.....from H.Middleditch

Taking this spine count variation in conjunction with the feature of the tap root, it is not too surprising that the expression "*G.sigelianum* - *sutterianum* - *capillaense* group" has been used.

The Czech description for *G.fischeri* does not state that the plants to which this name would apply had earlier been described as *G.stuckertii* sensu Kiesling. Nor does it indicate that this name would apply to plants earlier recorded as *G.sigelianum* or *G.sutterianum*. Hence these names all continue to remain available for use. No wonder G.Neuhuber observes that this Czech description is "rather poor".

.....from F.Vandenbroeck

My 1985 trip to Argentina took me from Cordoba to Mendoza through the province of San Luis. It was whilst there that I stopped in Esquina, which is a good starting point for a walk into the Sierra del Morro. In the vicinity of Esquina, *G. achirasense* is abundant, often growing into large plants. On that occasion we came across some other plants - we saw only four or five of them - which were growing quite close to one another and I showed that slide at your Chileans Weekend, supposing them to be an *Echinopsis*, perhaps *E.cordobensis*. However, in the course of my subsequent travels in Argentina, I revisited on several occasions the area around San Jose del Morro, which is a tiny village situated close to El Morro, a conspicuous mountain.

In the Spring of 1991 we were once again in San Jose del Morro, where we again came across these *Echinopsis*. We were also in La Esquina and Achiras, where once again we found the small *Echinopsis* first seen in 1986. Both at San Jose del Morro and at La Esquina we found the same plants with traces of flowers and in this way I discovered that they were in all likelihood a form of *Lobivia aurea*.

Also in 1991, I found two *Gymnocalycium* to the north of San Jose del Morro. They were growing on a flat bushy area together with *Trichocereus candicans*, and I eventually felt that they could be considered to be *G.stuckertii*. Travelling between Lujan and Quines, in the north of the Sierra San Luis, I photographed another *Gymnocalycium* which again I considered could be identified as *G.stuckertii*. I found these plants at various places in the Sierra San Luis. They were to be found growing together with *G.schickendantzii*, and *G.ochoterenai*, together with a densely spined form of *Lobivia aurea*. Where these plants grew, the countryside comprised wooded slopes, with bushes and a few thorny trees.

.....from L.Bercht

On the Sierra del Morro we came across a bluish-bodied *Gymnocalycium* which bears a resemblance to *G.berchtii*. On this same Sierra we found *Gymnocalycium borthii* and *G.achirasense* both near San Jose del Morro and near La Morena. These two sorts of *Gymnocalycium* do not grow in populations isolated from one another but both of them can occur in the same area. We also found *Gymnocalycium* LB 1430 which we recorded as a *Gymnocalycium* species but which has now been described as *G.lukasiki*. We did not find any plants of *G.bruchii* on or around the Sierra del Morro, although *G.bruchii* does occur no great distance both to the north and to the east of that Sierra.

.....from H.Middleditch

The pictures of the two *Gymnocalycium* that were seen by F.Vandenbroeck growing near San Jose del Morro, do not seem to be one and the same species. One of them is in bud and flower, the other is in fruit, suggesting different flowering times, a typical situation avoiding cross pollination when two different species grow in fairly close proximity to one another. It will presumably be the plant in fruit from which the seed was received from Vandenbroeck and offered to Chilean members.

.....from M.Muse

Yes, I did receive some of that seed, in about 1995 I do believe, which had been collected near San Jose del Morro. It germinated and has produced an interesting looking *Gymnocalycium* which has 7 radial spines and no centrals.

.....from L.Bercht

I would agree that these two *Gymnocalycium* seen by F.Vandenbroeck near San Jose del Morro are indeed two different species.

.....from D.Metzing

The plant seen in fruit near San Jose del Morro may be an old plant of *G.poeschlii* but the fruits should be claviform. Alternatively, it may be an isolated population of *G.strigianum*. Now to the plant in flower - there are similar looking plants to be found more to the north in the western part of the Sierra Cordoba, known as *G.gaponii*.

.....from J.Piltz

The plant from San Jose del Morro pictured in fruit looks like our P.106 from El Volcan which Kiesling calls *G.stuckertii*. I would also be inclined to identify the plant in flower as *G.stuckertii*.

.....from R.Coward,

I am growing a *Gymnocalycium* from Mesa Garden seed which they described as "P.106 from San Luis 1100m with very big pink flowers". It has now flowered, with petals that are long and pale yellow, intense pink at the base.

.....from J.Piltz

The *Gymnocalycium* P.106 seen near El Volcan can have either pale yellow flowers, or pale salmon coloured flowers, or a shade in between the two. The flowers are very long with a stout tube.

.....from J.Lambert,

I still have a specimen of *G.stuckertii* which was received from O.Ferrari in 1986, that originated from Dique Cruz de la Piedra near the city of San Luis. This form does indeed display quite a few similarities to *Gachirasense* but is distinguished by the more glaucous shade of the body, with a lesser number of spines than on the plants seen by F.Vandenbroeck at San Jose del Morro, whilst the fruit is also more glaucous and elongate. My plant has sinuous ribs which are broad and rounded, separated by deep vertical furrows

.....from F.Vandenbroeck

It is my impression that far too many new and confusing species names have been invented in recent years for the *Gymnocalycium* which can be found in the northern part of San Luis province. I feel that it may never be possible to get out of the nomenclatural mess that has resulted. In addition, the CITES check-list, although very useful, is not trustworthy and should be consulted with the utmost scepticism.

.....from D.Ferguson

I have collected a lot of *Gymnocalyciums* but I do not feel competent to place names on many of these plants. I do not try too hard in the field, as I was thoroughly confused and did not have good literature along with me on the trip. To me, species looked relatively easy to identify as such, but there seemed to be relatively few true biological species, but with lots of variability within most of them. It was a confused mess so that I only put species names to the most obvious ones. It seems to me that there are far too many species names, with a large percentage probably better treated as varieties.

.....from L.Bercht,

Whilst I was able to collect seed from quite a number of different *Gymnocalycium* during my travels in the provinces of Cordoba and San Luis, it was often difficult to be sure of the precise species concerned, which is why I have found it preferable to list them simply as "*Gymnocalycium* sp." in my LB seed lists.

.....from G.Hole

Over the last twenty years or so there have been many field trips made through this northern part of San Luis province - the Sierra San Luis and adjacent Sierras - an area which had previously been very little visited by cactus hunters. Hence the abundance of "new" discoveries.

.....from H.Middleditch

It would appear that there are still many outstanding queries and doubts in regard to the suitable names to be used for a surprising number of the *Gymnocalycium* emanating from San Luis province in recent years.

The majority of locations which are named in the above review may be found on the updated map of the Sierra Cordoba, in this issue.

NOT GROWING BLOSSFELDIA FROM SEED

.....from N.Tate

I find that *Blossfeldias* germinate readily from seed for me and then die off just as readily well before they are a year old.

.....from R.Moreton

On two occasions I have tried growing *Blossfeldia* from seed and in both attempts all the seedlings were lost when they were very small.

.....from A.Glen.

It is some years ago that I tried raising *Blossfeldia* from seed; the seed was freshly harvested from a plant in the collection of the late N.Wilbraham. Germination was no problem, but I very soon lost all the seedlings.

.....from W.Greenaway

All my attempts at growing *Blossfeldia* from seed have been attended with no success whatsoever. These were all with seed obtained commercially.

.....from M.Winberg

I have tried growing *Blossfeldia* from seed many times, and only once did I succeed in raising a *Blossfeldia* from seed up until it flowered.

.....from C.Garnham.

Until very recently I would have said that succeeding with *Blossfeldia* from seed was entirely down to seed quality - which I suppose I still believe it is, but in a different way. I had sown seed of various *Blossfeldia* spp. which I had obtained from umpteen different sources, with absolutely 0% germination every time, until two years ago. I then decided on one last attempt from a source new to me for *Blossfeldia* seed, and that was Köhres. A packet of 20 mixed spp. of *Blossfeldia* produced around six seedlings which did fine until they were around about 2-3mm in diameter, when I neglected to water them and they expired. So this year I sowed a packet of 100 seeds from the same source and had many of them germinate and grew for a month or two, getting to 1-2 mm across. Then, in under a week, grey mould reduced all but a few of them to mush. These few I have saved by using a mixture of copper fungicide and nimrod. As I go to immense lengths to provide sterile conditions for the seed, and the mould growth starts only on the seeds, I am totally sure that the mould

spores are on or in the seed. The fungus seems to be of at least a couple of species as some seeds produce creeping, pale coloured, fungal threads whereas others quickly produce club-shaped fungal fruiting bodies.

I sow tiny, notoriously difficult seed such as Blossfeldia on to a compost made up of equal parts of moss peat, John Innes seed and cutting compost, and coarse sharp sand, all sieved to a quarter-inch maximum size. The bottom two-thirds of the pot is first filled with peat, rammed down hard, as peat is easier to sterilize successfully, does not rot down as does coir, is basically salt-free, and reduces the growth of lichen, moss and algae. I microwave all components used for seed-sowing in order to sterilize it, and treat previously-used pots with a generous amount of boiling water. For tiny seeds such as Blossfeldias and certain Parodia, I make up the pot full of compost, dampen it, then place it in the plastic bag that the pot is to stay in and microwave it. In this way the entire seed-sowing set-up (apart from the seeds themselves) is sterilised by steam. I then sow the seeds and water them in by using a very strong solution of copper fungicide made with ordinary tap water. Thus it is only the seeds which cannot be cleaned of any potential fungus growth. The tap water down here is free of anything like algae - I have had sealed bottles of our tap water standing in full sunlight for over two years and it is still crystal clear.

Although I water in all the seed with the copper-based fungicide, this is only a treatment that affects the surface of the seed - badly burdened seed is doomed no matter what type of seed it is, small, medium, or large, irrespective of the genus. I feel that all the evidence points to the fungus being carried within the seed case.

.....from P.Bint

Fortunately I have been able to scrounge two or three ripe fruits off a Blossfeldia "subterranea" when visiting a collection recently, which I am enclosing.

.....from J.Cooke

I have been able to collect four seed pods from my Blossfeldia, which are enclosed. I would be interested to know if anyone has any success with them.

.....from A.Johnston

This year I have been able to harvest quite a lot of seed from various spp. of Blossfeldia.

.....from H.Middleditch

This seed was divided up and conveyed to various Chileans' members who regularly grow from seed, at the same time requesting information on any successful outcome of its sowing with an indication of the seed sowing method adopted.

.....from R.Marriott

I have tried raising Blossfeldia liliputana from seed but unfortunately with 0% rate of success. The Blossfeldia seed received from Chileans' members was divided between myself and a fellow enthusiast and germination took place for both of us. Compost was a 50-50 mix of John Innes No.2 and fine grit, not sterilised, watered from below with boiled tap water, no fungicide or other treatment added to the seeds, compost, or water. The seed was sprinkled on to the top of the compost and left exposed, the top of the pot was then covered with clingfilm and stood on a warm windowsill in the house. The other half of the seed was given similar treatment, except that the seed pot was stood in an unheated propagator in the greenhouse, where germination was quicker. Unfortunately both batches of seedlings expired after only a few weeks.

.....from F.Wakefield

This Blossfeldia seed looked just like random bits of rubbish, but after being sown and moistened it started to swell. Even then it was extremely small, less than half a mm in diameter, spherical shiny chestnut coloured with a large white attachment about twice the size of the seed. There were three germinations, two of which shortly went a milky white colour and have expired. The remaining seedling is barely pin-head size and at the moment it is standing still, despite having been kept moist and over a soil-warming cable during the winter.

.....from C.Garnham

My standard seed-sowing procedure [as above] was used for this Blossfeldia seed and grey mould started to appear after only five days. This grey mould has seldom been a problem for me.

.....from F.Wakefield

Yes, I think that fungus spores are sometimes carried on the seed, but at the same time any seed so affected is usually dead anyway. There seems to be two ways of protecting seed against fungus attack, the better one being to drench the compost and seeds, after sowing, with Filex. This is a 65% solution of Propamacarb hydrochloride. Unfortunately it is expensive - about £60 per litre or more - but at the concentration used it is reasonably economical. I have used it for some years for all my seed sowing (garden plants included) and have found that the germination rate of many seeds is vastly improved. This product is not available to the general public but a friendly professional gardener can solve that. The other method is to soak the seeds for a few hours in a weak solution of Sodium hypochlorite, a very effective sterilising agent and freely available. I have used this as well and it seems to work.

.....from J.Cooke

As to Sodium hypochlorite it would certainly sterilise seed, as it is the same stuff used for bleach - "kills all known germs". But I wonder if it would also sterilise the seed inside as well, especially porous coated seeds. It also breaks down to leave sodium chloride which cactus seedlings would not like. I would be inclined to use a weak solution and then rinse with sterilised water to remove any residual agent left on the seed, before sowing. I seem to remember that ordinary bleach is about 10% sodium hypochlorite solution - I would dilute this to get a 2% solution first.

.....from H.Middleditch

If seed is sown on to compost and then sprayed with a sterilising agent or fungicide, it appears to be quite possible that only the upper, or exposed, surface of the seeds will feel the effects of the spray. In this way, any

fungus attached to the underside of the seed may well fail to come into contact with the sprayed fluid. Soaking the seed in a sterilising agent prior to sowing would seem to be more likely to wet the whole of the surface of the seed. Even better than just soaking the seed might be to put the seed into the vessel in which it is to be soaked, then pressure spray it there, then shake it about in the hope that it might turn over, then pressure spray it again. In this way, almost the whole of the surface of the seeds might become wetted by the sterilising agent.

It is possible that the fungal growths observed by C.Garnham may be just the single species, the thin threads being the hyphae and the club shaped bodies the spore bearing heads.

.....from J.Cooke

As to Blossfeldia, I have one labelled *B.subterranea*. It is on its own roots and was grown from seed by a branch member, the seed possibly coming from S.Brack (Mesa Garden).

.....from H.Middleditch

Perhaps more information about the method adopted by "the branch member growing Blossfeldia from seed" could be of interest. And was it commercial seed?

.....from J.Cooke

Yes, my information from one of our Branch members who succeeds in growing Blossfeldias from seed and subsequently on their own roots, is as follows. His compost is a mix of commercial J.I., grit, and perlite, which is sterilised before seed sowing; the pots or seed trays are also sterilised beforehand, and the initial watering is done with boiled water. Apparently he is absolutely convinced that the loss of very young seedlings of Blossfeldia can be attributed to either bacteria or similar micro-organisms, or to the growth of moss or algae which he believes even to a small degree will overwhelm the tiny Blossfeldia seed. The seed pots or seed trays were loaded into a shallow box equipped with fluorescent tubes under the lid, which is kept at the back of a garage and benefits from no external light. Initially this box was sealed but apparently it suffered from attaining too high a temperature internally, so a couple of ex-computer fans were fitted at the ends and the seed pots or trays sealed with cling film, in order to exclude mould or bacteria. After germination, the seed pots or trays were removed and placed on a windowsill, still sealed, and left there for several months until the seedlings were of sufficient size to enable them to be exposed to the open air. One of the Blossfeldias so grown from NCSS seed is still with me, on its own roots.

.....from C.Dean

I have only tried growing Blossfeldia from seed once, when a local branch member brought some seed of *B.liliputana* to a meeting after his grafted plant had set copious seed. Nobody else accepted the challenge, so I took the seed! Germination appeared to be excellent. I grow in individual pots, sealed in polythene bags, and normally try and keep the seedlings moving with some heat through the first winter. Unfortunately, the poly-bag was not up to the task, and the pot dried out during the winter so that it was difficult getting the seedlings started again the following year. With the pot out of the poly-bag, there were some inevitable losses and eventually I pricked out some tiny seedlings into a new pot, in the autumn. Growth continued to be slow, but there were still some seedlings left after the winter.

.....from A.Glen

Quite late in the season I sowed some of the Blossfeldia seed on to the surface of a 1 to 1 mixture of John Innes No.1 and "potting sand" which had been washed to get the finest material out of it. Now I have about 40 green pinheads which I am trying to encourage to grow. I am trying to avoid the growth of moss or algae on the surface as I fear that it might swamp the seedlings, so I am not keeping the compost as wet as I would normally do.

.....from J.Cooke

The Blossfeldia seed made available by other members was sown as follows: First of all the holes in the pot to be used were sealed up using a heated glue. The compost, consisting of JI No.3 plus a little added seed grade perlite, was microwaved in a plastic tub for 6 or 7 minutes. After firming this compost into the pot it was watered with tap water that had been boiled for roughly five minutes. The untreated seed was then sown on to the compost, after which the pot was covered with two layers of clingfilm.

Now, about a year later, the film is still untouched and there are about 30-40 miniature Blossfeldia seedlings about 1 to 3 mm in diameter. Many have now a couple of areoles on top. There is no sign of algal or fungal invasion even after twelve months. I am summoning up the courage to remove the covering film and water with a weak fertiliser solution. But I will replace the film afterwards. I have tried the same process in the past with seeds from my own plants, but with no success.

.....(later) now, three years after the sowing, I have four plants left, still on their own roots. The biggest is 5mm across and looks quite reasonable, if you have a lens handy.

.....from C.Garnham

The Blossfeldia seed which I received in 1998 was sown using my usual procedure and just over a year later there is one seedling remaining, still on its own roots. It measures just under 5mm across and is probably the largest Blossfeldia that I have so far managed to grow.

.....from P.Hoxey

It will be two years ago that I purchased 100 Blossfeldia seed; they were sown on a compost of J.I. No.2 plus some sharp sand, watered in and put in the propagator, covered by a sheet of glass. There was germination in 2 to 3 weeks, when the glass was lifted slightly to allow in some fresh air. They were kept damp by spraying at intervals. Over winter they came into the conservatory and were still sprayed a little, at intervals. There are still six or seven seedlings on their own roots, each about 2mm across.

.....from J.Ring

Raising Blossfeldia from seed to flowering size has defeated us so far. We have got these plants up to about half pea-size on their own roots but we have never kept any beyond two years. A big breakthrough came

when we discovered that the fungicide Thiram acts as a selective weedkiller to destroy the moss and blue-green algae that tends to smother these tiny seedlings. When this kind of growth is first observed the fungicide powder is sprinkled on to the compost using a fine sieve, which is then sprayed with sterilised water. At the present moment we have some six month old Blossfeldia seedlings which have got areoles. Of course we could graft but we are keen to grow these plants on their own roots.

.....from A.de Barmon

Some seed of Blossfeldia was purchased from De Herdt in 1994 but I did not get around to sowing it until the end of 1997. There are now about a dozen seedlings still on their own roots, of around 5mm in diameter. This is my only experience with growing these plants from seed, but my friends who are successful with them say that the moisture level must be kept high in the first weeks after sowing. The critical stage seems to be the first three months, when no areoles are produced. Once the areoles do appear, growth becomes obvious - to 5mm in twelve months. To double their size then needs only another two to three months.

My seed compost consists of 50% peat and 50% perlite, which is not sterilised. Seeds are sown on to the surface of the compost and left exposed. They are watered in with tap water straight from the tap, and re-watered every 5 to 7 days, also with tap water. No fungicide is used. The seed pots are covered with a sheet of glass which is left slightly open at one side in order to allow free circulation of air, then placed close under artificial fluorescent lights which are lit for 12 hours every day. After germination occurs - usually some two weeks - the seed pots are put on to a warming cable which is only in operation at night time.

The only drawback to this method is the algae which grows in the pot.

.....from R.Marriott

In an effort to establish a plant of Blossfeldia on its own roots, I invested in a multi-headed grafted plant. My plan was to simply to de-graft a couple of heads, and then hey-presto I would have my own plant of Blossfeldia growing on its own roots. But - no success. De-grafting and establishing Blossfeldia on their own roots seems to be just as hard as growing them from seed, since they lose their moisture so easily. Next time I try rooting a cutting off a grafted Blossfeldia, I will treat it as a seedling and enclose it in a two inch pot covered with clingfilm, in an effort to retain the moisture within the plant.

.....from G.Slack

It will be as far back as the 1970's that I acquired a Blossfeldia liliputana on a graft. On a couple of occasions the grafting stock has deteriorated so much that the plant needed de-grafting, but all attempts at rooting it down ended in failure, leaving no alternative but to put it on to a new grafting stock.

Over the course of this period of time, it has produced quite a number of offsets, which do not appear from an areole, but burst out from within the body of the plant.

.....from J.Cooke

Of my two Blossfeldias growing on their own roots, one is still solitary, but on the B. subterranea there are now three offsets. These actually grew from separate areoles, well down on the side of the body, and did not burst out of the side of the body by forcing their way through the epidermis. The main body is now about 2cm across, the oldest offset is about one cm across, the smaller pair about half that size.

.....from A.de Barmon

In my own collection I have a plant which is labelled Blossfeldia minima DH 51.94, which has typical Blossfeldia roots. roughly matchstick thickness, which strike out in various directions from under the base of the plant. One of these roots which is close to the surface of the compost next to the plant body, has now produced an offset, which has split the skin of the root and appeared, complete with mature areoles, from within the root itself.

.....from J.Carr

I do have a couple of Blossfeldia on grafts and these do have many offsets on the main head. These offsets appear to originate from the areoles, but I believe that they do burst through the epidermis at the areole and push the areole itself off the body.

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

Blossfeldia - a peculiarity is the mode of offsetting. They have the characteristic of pushing out offsets from within the exposed part of the body, which break out through the epidermis as they expand. Similarly, an offset can break out from under the head of the plant.

.....from P.C.Laney

I can confirm that some Blossfeldia offsets do indeed seem to burst out through the epidermis, all grafted plants. I do have some Blossfeldia un-grafted and will investigate how the offsets appear on those. As far as I can remember from my visits to Argentina, I never saw offsets bursting out from the epidermis, so I suppose that it has to do with the grafting.

.....from J.Carr

In a great many places along the roads which we travelled in Bolivia, the road followed a river valley. In order to make the road of adequate width, there were many places where it was necessary to cut into the hillside. On the occasion of previous visits to Bolivia, we had stopped at three places along the road from Sucre, via Tarabuco, to Zudañez, where the rock face cut out of the hillside right at the very edge of the road was home to innumerable Blossfeldia which must have taken advantage of the moisture rising up from the nearby river. So on our subsequent visit we again made a stop at the same three places, only to find that there was no sign of any Blossfeldia. The reason was because even more of the hillside had been cut away in order to widen the road, leaving just bare rock. There must have been hundreds and thousands of Blossfeldias which must have been lost in this manner.

.....from H.Middleditch

All accounts of Blossfeldia being seen in habitat appear to agree in finding these plants growing on an

almost vertical rock face - which is not always solid rock, but rock made up of relatively thin layers of various thicknesses. Not infrequently these habitat locations are found in the near vicinity of running water, which might provide some airborne moisture for the plants. But most often, the rock face on which the plants are found growing is said to be damp, as if there was a very gradual, but steady, seepage of water out of the bedding planes between the layers of rock.

If this particular strata of rock in which these plants are found growing, outcrops to the surface again at a somewhat higher elevation, any rain falling on the upper outcrop would result in moisture being absorbed by the exposed bedding planes. This moisture would gradually migrate down the strata to the lower level where the same strata outcrops as a vertical face and supports the growth of the *Blossfeldia*. There could be an appreciable distance between the upper and lower outcrops of such rock strata, so that even if a relatively tiny amount of water was held by a square metre of any one bedding plane, the amount held by the body of strata as a whole could be very large indeed. Percolation of moisture from the upper to the lower outcrop could take weeks, or even months, so that there would very likely be a more or less constant percolation of water at the lower outcrop where the *Blossfeldia* grow, even if there was several months dry season without any rain falling on the upper outcrop.

If this supposition is correct, it would appear that the number one requirement for growing *Blossfeldia* from seed is never to allow them to dry out completely.

.....from G.R.Allcock

I have a method for simplifying watering of many of my smaller plants which might be of some use for this purpose. Before filling a pot with compost, a short strip of capillary matting is pushed through one of the holes in the base of the pot, leaving an inch or two curling round the bottom of the pot and a short length outside the pot. A pad of capillary matting is placed inside a tray, covering the bottom of the tray, and the pots are then stood on this matting. A string of capillary matting is then run from the tray to the water container, which is always kept topped up with water. In this way, the water is constantly fed from the water container to the base of the tray, and into the bottom of each pot, so the pots are effectively automatically kept moist at all times.

.....from H.Middleditch

It would be of interest to hear of any trials of this system for raising *Blossfeldia* from seed, and what were the results.

EXPLORING AROUND CHALA From F.Vandenbroeck

Exploring in the region round Chala, we found some interesting forms of *Islaya*. Travelling along the Pan-American Highway north of Chala, we passed the long and gently shelving sandy beach until, about 7 or 8 km to the northwest of Chala, we came to a low rocky promontory close to the shore, the more level patches covered with gritty sand. Here we found some columnar *Islaya* with long, slender, dense brownish spines. Most of these plants were reclining with age, and most of them were flowering. Almost all of the flowers had petals which seemed to have been eaten or nibbled, probably by beetles. Only one specimen had the petals intact. These plants are possibly to be identified as Ritter's *Islaya maritima*.

Travelling inland, we found some more *Islaya* before we reached Chala Viejo. These were globular greyish plants with a glaucous body colour, a relatively small number of fairly short and robust black spines. The lower half of the plants were completely devoid of spines and the exposed body displayed a red brown colour. These plants were also in flower. They may possibly be *Islaya copiapoides* Ritter, but the names *I.paucispina* or *paucispinosa* might equally apply to these plants.

Continuing to travel in a north-easterly direction we passed through Chala Viejo and came out of the real desert belt. Here we were in a boulder strewn landscape where the first *Neoraimondias* appeared. Here we found elongated, reclining plants of *Islaya* with an extremely dense coarse black spination, which struck us as being very different from the *Islaya* seen to the south of Chala Viejo. Some of these plants were in fruit.

To the south of Chala, we travelled up the Chaparra valley until once again we had passed through the real desert belt. Here we found some neatly whitish spined, globular *Islaya*. Here again some of these plants were in fruit. These plants may correspond to Ritter's *Islaya flavida*.

.....from A.W.Craig

In the course of travelling in Peru in company with K.Preston-Mafham, we arrived one evening in the coastal town of Chala in southern Peru. This town lies in the arid coastal zone which supports little vegetation besides the cacti. We hired a taxi in Chala which took us a short way along the Pan-American highway, closely following the coast, before we turned inland in the direction of Chala Viejo. This road then followed a dry valley or depression, running between low, sandy foothills rising by moderate sandy slopes at either side of the road. The tops of these foothills all lay at precisely the same level, forming a flat terrace incised at intervals by dry valleys, such as the one we were following.

After travelling inland through this sort of terrain for two or three km, we stopped to look round. On the flat tops of these low sandy foothills we found scattered plants of *Islaya*, although a few of these plants were also to be seen at the upper part of the sandy slopes below the terraced top. The larger of these plants would possibly be 3 or 4 inches tall, with the largest occasional plant perhaps up to 6 or 7 inches tall which would be about twice its body thickness. Some of these plants were in flower, but my slides of these plants have caught only a single flower wide open on a plant and I do not recollect seeing any plants carrying more than one open flower. A few plants were seen carrying a single elongated pink fruit. These terraces and the slopes up to them, as well as the dry valley we were following, were entirely devoid of any other vegetation.

After continuing some way further along this same road we made another stop when we were perhaps 3 km before Chala Viejo, at about 350m altitude. In the distance to the southeast we could pick out with the binoculars what appeared to be *Neoraimondia* growing on the slopes of the low hills which extended as far as we could see in that direction. But there were none of these plants to be seen either on the flat sandy terrace we were now crossing, or on any of the closer mountainsides to the north. We decided to walk across the flat sandy area for a distance of about 1 km, in order to reach the foot of the mountains whose steep slope started abruptly straight out of the flat sandy plain. Whilst we were crossing the flat area we came across a few scattered, sprawling, specimens of *Haageocereus* as well as some very scattered plants of *Islaya*. Once having reached the foot of the steep slopes of the mountains, we walked round the lower part of these slopes and found patches of *Haageocereus* growing in comparative abundance. By comparison with the sandy flats, these slopes were mostly formed of rock, stones, and grit. At one spot some sedimentary material was held up by a very small rocky outcrop only a few yards in extent and it was in this small patch of ground that we found a few *Pygmaeocereus*. Nowhere else on these slopes, or over the terrace, did we find any *Pygmaeocereus*.

Going back to our vehicle and continuing along this road we then passed through Chala Viejo and stopped about 2 km further on, at about 500m altitude. Here it was about 2 km across the valley floor between the mountain slopes at either side. There were again *Islaya* to be seen not far from the road, but here the *Islaya* were much larger plants in comparison with those nearer the coast, being up to 10 inches tall. The lowermost part of some of these plants were more or less devoid of spines and were concertinaed to some degree as if they had become somewhat shrunken lengthways. At this point the sand near the road was very fine and loose so that when walking on it ones feet went down in the sand to about ankle height, although in odd places ones feet might have sunk in even deeper. Perhaps this sand became wind blown at times and may have contributed to the loss of spines on the older growth on the *Islaya*. This fine sand may have been scoured off the upper mountain slopes.

From here we carried on inland with the valley floor rising slowly but steadily, for a further 4 km by which time we had reached an altitude of 650m. On the more or less level ground of the valley floor were scattered a few large, rounded boulders. There were now *Neoraimondia* to be seen, together with sprawling clumps of *Haageocereus*, and also the somewhat taller *Islayas*. There were also some *Corryocactus* here, of which just one was to be seen displaying one or two orange flowers. We had now come to a point where on some previous occasion a now dried-up watercourse had cut a fairly deep and virtually vertically sided narrow gorge into the sandy floor of the valley. We then decided to retrace our steps back to Chala.

.....from F.Vandenbroeck

Where we made a stop on the road going from the coast to Chala Viejo, it must have been almost the same location as that described by A.W.Craig. The description of the nature of the surroundings there is exactly as we found it.

.....from K.Preston-Mafham (at The Chileans' 1995 Weekend)

After leaving Chala and following the coast for some way, we turned inland, following a flat-bottomed valley which would vary between about a mile and half a mile wide, which was completely lacking in any vegetation. We made a stop when we caught sight of one or two *Islayas* on the upper edge of the embankment which formed the side of the valley. We scrambled up this embankment, which would be only about a couple of metres high, coming out on to a pretty level terrace where we discovered more *Islayas* - but fairly scattered. They were about 3 or 4 inches thick and mostly ranged between 4 inches and 7 inches in height. They were growing in what I would call gritty sand, which was quite compact underfoot.

At our second stop, where we walked across more or less level ground towards the foot of the mountains, the *Islaya* we found there were mostly only small, some 3 or 4 inches or so. At the third stop, inland from Chala Viejo, we found some *Islaya* which were very big, up to about 12 inches or so in height, but they were leaning over so they looked as if they were shorter than that. Looking at the slide taken by A.W.Craig at this last stop, when we were to the north of Chala Viejo, these *Corryocactus* plants were fairly widespread. We did see orange flowers on them and I wonder what name should be given to these plants.

.....from M. Williams

Our visit to Peru in 2001 took us south down the Pan American Highway. At Km.714 between Atico and Ocona there were stands of *Neoraimondia aticensis* on steep rocky slopes stretching immediately inland from the Pan-Am. Along this stretch of road it is only about 150 metres from the road to the ocean and the seaward side of the road appeared to be bereft of vegetation except for two plants of *Islaya grandiflorens*, out of flower and striving to survive with long exposed roots running in a marginal amount of soil along a flat rocky shelf just a few metres wide. I saw no *Islayas* or other vegetation inland of the road.

Just beyond Ocona, going towards Camana, at Km.766 along the Pan-Am we found *Islaya copiapoidea* on a steep slope above the road, in company with *Haageocereus decumbens*. There were quite a number of these plants in good condition, some in flower and showing a superficial resemblance to *Copiapoa*. The altitude at road level was 260m. This location must be vulnerable to weather and climate because when I revisited it in 2005, a few weeks later in the year, the plants were in poor condition, there were no flowers although there was some evidence of flowering and there were considerably fewer plants.

We then stopped at Km.796, which is north of Camana, and walked inland from the road across a wide flat sandy expanse which appeared to be devoid of vegetation and in about 2km we came to the start of a population of *Islaya divaricatiflora*. We continued walking for about another kilometer, hoping to see plants in better condition or in flower, but concluded that out of many hundreds of plants overall, perhaps 60% were dead and the remainder were in very poor condition, although some had flowered. When I returned there in 2005, I found that these plants were still under similar stress and there appeared to be less plants than before. The altitude here is 250 metres.

From Chala we then took the dirt road inland to Chala Viejo. The road continues to climb very gradually beyond Chala Viejo towards the right hand side of a wide valley and it was some 21km inland from the Pan-Am, and not before we had climbed to 600m, that we came across any plant life at all. These turned out to be *Islaya chalaensis* growing on the flat valley floor. They were in excellent condition and there were many plants ranging from small flowering plants of 4cm across to large single headed and multi headed specimens. They gave me the impression of having longer and stouter spines than any of the *Islaya* which we had seen elsewhere so that the bodies were more obscured by the spination, although there were exceptions. Certainly *Islaya chalaensis* has stronger spines than *I. divaricatiflora* or *I. copiapoidea*. All the old areoles are devoid of wool, however, so that the body can be easily seen. The new areoles in each case are woolly, *I. copiapoidea* being marginally more so. On revisiting here in 2005, it was pleasing to find that the condition and number of plants were unchanged.

.....from W.Rauh, Der Peruanischen Kakteenvegetation 1958

From an ecological viewpoint, there are two groups of *Corryocactus* to be distinguished in southern Peru. The first, represented by *C. brachypetalus* which colonises the lower-lying coastal rocks and sandhills to be found in the Loma zone from Atico to Mollendo, at altitudes of between 50 and 600m. The second group, represented by *C. brevistylus* and *C. puquinensis* are to be found in the summer rain zone which lies at a higher altitude, of 2400 to 3300m. The first is a relatively small-flowering sort, the latter two have larger flowers.

.....from H.Middleditch

The location at Chala lies further to the north-west than the stretch of coast between Atico and Mollendo, which is quoted in Rauh's publication as the extent of the coastal Habitat for *Corryocactus*. [See Chileans' map - Nazca, The Divide]. Hence Chala Viejo represents an extension to the area of distribution reported by Rauh in 1958. Will it still be *Corryocactus brachypetalus*?

.....from W.Rauh, Der Peruanischen Kakteenvegetation 1958

Corryocactus brachypetalus = *Cereus brachypetalus* Vaupel, forms clumps of stems from 1.5 to 2 m high, branching from the base flowers from the upper third of the stem, up to 5 cm long and up to 3 cm in diameter. Flower tube dark greenish carmine-red; outer petals orange-red, the inner ones a paler orange-red.

.....from K.Preston-Mafham

The flower we saw on one plant was much smaller in diameter than the sizes given by Rauh for *Corryocactus brachypetalus*, but this could simply be variability, like any cacti.

.....from G.Charles

On our 1999 visit to Peru we did make an overnight stop at Chala. On the following day we drove up through Chala Viejo until we were 21 km from the coast. Here we were in a valley bottom which was mostly sandy but also with a scattering of rocks. There were *Neoraimondia* here, as well as *Haageocereus* and also *Islaya chalaensis*.

.....from H.Johnson, K.u.a.S. 3 (3 & 4), 1952

After visiting Arequipa we turned back and reached the road to Camana, entering the lower mountains below the pampas. After Camana we followed a long stretch of coastline. Before late afternoon we reached Atico. This fertile area lies in an otherwise lifeless dry region and owes its existence to the topography of the terrain, in that an unusual sopping wet fog is led funnel-like into the basin. Here grows 3 or 4 different *Haageocereus*, a splendid enormous-growing *Islaya* which attains a height of of 23 cm and 10 cm or more in diameter and has very small pale yellow flowers, an orange flowered *Corryocactus*, and - away from the shoreline - *Neoraimondias*.

As we journeyed towards Chala [from Atico], we found a different *Islaya*, a few examples of which were almost bronze coloured. They grew down to the shore - up until now, *Islayas* had only been known to occur in the Pampas at altitudes of about 1000m.

.....from F.Vandenbroeck

As to the "fertile area around Atico", so-described by H.Johnston, this never really occurred to me as such, although it is of course true that near to this place some interesting cactus populations may be found going down close to the ocean. To the south-east of Atico there is a remarkable population of *Neoraimondia peruviana* consisting of large growing plants which come down to not far from the water's edge. As far as I know, this is the only spot where such a phenomenon may be viewed. Also large numbers of *Haageocereus australis* can be seen here.

.....from W.Rauh, Der Peruanischen Kakteenvegetation 1958

Where the slopes of the Andean foothills come right down to the shore near Atico, *Neoraimondia* grows on the steep hillside within sight of the ocean.

.....from H.Middleditch

Looking at the body sizes quoted by both Ritter and by Rauh & Backeberg for the *Islaya* reputedly growing near Atico, only *Islaya maritima* is quoted by Ritter as attaining a body size of "about 20 cm high and more, 5-12 cm thick". None of the other quoted body sizes even approach these figures.

.....from W.Rauh, Der Peruanischen Kakteenvegetation 1958

Near Chala there is a 1 to 2 km broad and level desert strip which is exclusively occupied by *Islaya paucispina* and *Islaya mollendensis* (K.127). These are a small, insignificant plant, appearing in large numbers of individuals standing in sand up to as far as the crown. We met with this interesting genus for the first time near Chala. Only in old age does *Islaya* attain an elongated body - up to 50cm long. In its young form it is hidden in the ground up to as far as the woolly-felted crown, but as it becomes older it grows in a slanting manner, and thereby regularly turns its crown away from the sea.

In the area around Chala the following vegetation zones may be observed on the coastal strip. On the terraces rising immediately above the shore there was noted an association of blue algae and *Islaya*, in which

other vegetation was absent. This was followed more inland by the Haageocereus formation, which changes into the Loma formation.

Islaya paucispina and *I. mollendensis* are to be found not only on the coastal terraces near the sea, but also on the hills to the south of Chala of about 300m in height which are more distant from the sea, over which the road leads down to the valley of the Rio Chala. Here, too, together with the blue algae, they colonise the light garden-soil like gypsum rich ground. The plants appear to favour ground of this nature, since *I. copiapoides* (K 42, 1954; K 135, 1956) from between Ocona and Camana, as well as *I. brevicylindricus* (K136, 1956) from above Camana, also colonise a similar habitat in similar company i.e. with blue algae.

.....from H.Middleditch

During the course of the Continental Cactus Tours in the 1960's a visit was paid to the Heidelberg Botanic Garden. At this time, W.Rauh was away on a field trip to Madagascar. In the course of discussions with members of the staff there, it was hinted in a most careful and circumspect manner that W.Rauh was not entirely happy with the manner in which Backeberg had treated the cactus harvest from Rauh's trips to Peru, as laid out in the second part of Rauh's book on the Peruvian Cactus vegetation. In that publication, Backeberg very much followed his pre-war practice of seizing upon relatively minor variations in habit as a basis for establishing a new species name.

When the new species of *Islaya* under the authorship of Rauh & Backeberg first appeared in *Descriptiones Cactacearum Novarum* 1956, the K42 specimen was described as *Islaya paucispinosa* whilst in 1958 the K42 specimen was described in Rauh's book as *I. paucispina*. In his *Kakteen Lexikon*, Backeberg listed both *paucispina* and *paucispinosa* as individual species, which is simply not correct for the same Type specimen. In the 1956 Backeberg publication, the Type plant for *Islaya grandiflorens* was given as K.130a, whilst in the 1958 Rauh book it was given as K.130, yet another error by Backeberg. Evidently Backeberg was more concerned to get his works into print than to check his facts, thereby sowing the seeds of complicated nomenclatural problems.

Coming back to the thoughts expressed by F.Vandenbroeck about the *Islaya* seen firstly on the rocky coastal promontory to the northwest of Chala and secondly en route to Chala Viejo; the name of *I. maritima* is suggested for the first and *I. copiapoides* for the second. There are some tortuous and convoluted arguments put forward by Ritter in connection with these names.

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

In August 1953 I found near Chala an *Islaya* which I called *I. chalaensis*, which was a *nom.nud.*, and in June 1956 I found near Atico, in addition to this selfsame *I. chalaensis*, a further *Islaya* to which I gave the name *I. maritima nom.nud.* In the Winter catalogue for 1957 the species from Chala appeared under my name [*chalaensis*] and in the 1961/62 Winter catalogue the second species from Atico [*maritima*]. Rauh discovered the species at Chala in 1954 and the second species at Atico in 1956. In the 1956 publication [*Descr. Cact. Nov.*] and that of Rauh in 1958 [*Peruvian Cactus Vegetation*] a significant confusion was presented. Rauh & Backeberg misunderstood that there were two good, separate spp. [at Atico] between which there were no transitions and, as far as I could establish, also no natural hybrids; instead of these they professed to see three spp. here. For the forms which grow between Camana and Ocona and which I can only recognise as a variety of the species from Chala [*chalaensis*], they established yet a fourth species - *Islaya copiapoides*.

Rauh & Backeberg saw in the more strongly spined forms of the species from Chala [*chalaensis*] a new species, published as *I. paucispina* Rauh & Bckbg 1956, whilst they considered the finer spined examples of the same species to be *I. mollendensis* (Vpl)Bkbg., to which they do not belong and which grows much further to the south near Mollendo. Since the specimens of *Islaya* from immediately close to Chala consist of one single species [*chalaensis*] with smooth transitions from stouter to weaker spination, they were mistaken.

For the Rauh collected *Islaya* from Atico, Backeberg created the species *I. grandiflorens*. But near Atico, in addition to the species collected by me as *I. maritima*, as well as by Rauh [as *grandiflorens*] I also collected there the species from Chala. However, despite their great distinctiveness, Backeberg must have taken them as one, since the significant point which he made about them was "scarcely rising out of the ground, roots often swollen, ribs 20-21" which correctly applies only to the species from Chala.

.....from F.Vandenbroeck

As to any *Islaya* near Chala "standing in sand up to as far as the crown", this is certainly true, I can clearly remember this phenomenon near Chala but also in populations of *I. bicolor*, which grows farther to the north. In fact, the very first *Islayas* which I got to see were growing in this manner. It was during my first Peru travel in July 1980, when I was very inexperienced and knew little or almost nothing about South American cacti. According to the notes that I made at the time, we were some distance past Chala on the road to Atico when we found these plants, in yellowish powdery sand, in which our feet would sink up to the ankles. They grew there all alone, their greyish sand-blown heads inclined to the north. July is the winter time in Peru and the plants must have looked very lifeless.

.....from F.Ritter (Ibid)

On account of poor referencing, Rauh in 1958 described as *I. paucispina* what Backeberg published in 1956 as *I. paucispinosa*. The description of *I. paucispina* Rauh appears however firstly to be only of the strong-spined specimens of the Chala species, since Rauh states "radial spines very robust", and secondly his description is incorrect in several elements e.g. "flower 1.5 cm long" whereas in fact this species has the longest flower of all the *Islaya* as various flowers which I examined at the Type locality were between 30 and 35 mm in length.

Under the name of *I. grandiflorens*, Rauh & Backeberg [1956] published a diagnosis which in essentials applies to *I. copiapoides v. chalaensis* Ritt.; none of the data which it includes is incorrect for the latter. In this [1956] diagnosis of *grandiflorens* moreover the statements regarding the spination can also be applied to the

species described here as *I.maritima*.

However, the new diagnosis of Rauh [1958] and specifically his pictures also show that under his *I.grandiflorens* Rauh meant my *I.maritima*.

However, Rauh had [evidently] made his new diagnosis and description without making a mention of one word of the data which did not correspond to the 1956 Rauh & Backeberg diagnosis of *I.grandiflorens*. Thus Rauh ought not indeed to have employed the name *grandiflorens* [in 1958], since it had already been used in 1956 in connection with a diagnosis that was only applicable to *I.copiapoides*.

Hence the 1958 species name *grandiflorens* Rauh becomes an illegal later homonym of the 1956 published diagnosis for another species of the same name.

.....from F.Vandenbroeck

Reading Ritter's comments in regard to these *Islaya* names leaves one in what might perhaps be called a state of bewilderment. On the other hand, Rauh's rigid division of the coastal area into three well defined zones seems to be rather too schematic. This sort of schematic division may apply to some isolated zones of the coast but I would consider can hardly be generalised.

.....from H.Middleditch

A detailed and very time-consuming check of all the statements made by Ritter and Backeberg in regard to their respective names for one and the same *Islaya* has led to the conclusion that it could well be simply a matter of individual personal opinions.

.....from A.Lau, South American Cactus Log X, US C&S Jnl 1980

Atico is a small town on the coast, notable (to me) for the cactus of the *Islaya* genus with the most bizarre spination. With *I.grandiflorens* Lau 101 the spines are bluish grey in the centre which with age turn golden yellow. The flowers are quite large, about 4 cm in diameter. The felt between the dark, young spines near the apex is yellow which creates a very attractive picture.

.....from H.Middleditch

This flower size of 4cm diameter does just exceed any of the flower sizes noted by either Ritter or Rauh for the *Islaya* spp stated to grow near Atico. But it is unlikely that it was actually measured with a ruler.

.....from R.Zahra

In my own collection I have plants of *Islaya longispina*, *maritima*, *bicolor*, *grandis* KK 582, *krainziana*, *paucispina*, and *aticens*. These plants have all been grow from seeds bought from K.Knize and so there could be a question mark against what they really are. In my own opinion, all these *Islayas* look very similar, but there are minor differences in spines and areoles. The spines of *I.longispina* are not really longer than those of the other species. *Islaya bicolor* has a thick spination which covers the body completely. *Islaya paucispina* has brown spines which cover the body completely, and are a little thinner than those of the other species. The areoles are also slightly yellowish. *Islaya aticens* has the largest plants - this is not because they are older, because all the plants are more or less the same age. The spines of *I.krainziana* are very colourful, shading from grey to brown. The flowers are all very similar. None of the plants that I have come anywhere close to the photograph take by A.W.Craig of *Islaya paucispina*.

.....from H.Middleditch

Coming back to Chala, it is stated by Ritter (p.1303) that his *Islaya* *maritima* grows both near Atico as well as on the coastal hills not far to the north of Chala, separated from his *I.chalaensis* n.n. which grows "immediately next to Chala". If the *Islayas* seen by F.Vandenbroeck at a point close to the coast which lay and some 7 to 8 km to the north of Chala, were "not far to the north" of Chala, as opposed to being "immediately near" to Chala, then they could indeed be *I.maritima* Ritter. Especially as some of them displayed a quite long body, comparable with the "up to 20cm" body length quoted by Ritter for this species. The globular plants with less ribs and fewer spines, seen by F.Vandenbroeck some km along the road to Chala Viejo, might well be regarded as *I.paucispinosa* = *I.chalaensis* n.n. Ritter. It is observed by Ritter that these plants become about "twice as tall as thick" in age, which might seem to fit the form of *Islaya* seen by A.W.Craig and K.Preston-Mafham, more or less on the same stretch of road as those seen by F.Vandenbroeck.

.....from F.Vandenbroeck

In 1981 we were near Atico and on a coastal terrace to the south-east of that place we found some *Islaya* which I would also consider to be *I.maritima*. These *Islayas* were quite large and easily surpassed a length of 20 cm. The longest specimens grew wholly decumbent, lying on the soil. Unfortunately I never saw any *Islaya* in flower in this area. The *Islaya* which we found on the coastal promontory some 7 km to the NW of Chala, were about the same maximum size as those seen near Atico.

.....from H.Middleditch

Which might suggest that the name *Islaya* *maritima* could be applied at both these locations quoted by F.Vandenbroeck, bearing in mind that Ritter quotes "body elongating to 20cm or more" for this species..

.....from F.Vandenbroeck.

We also found more *Islaya* on steep coastal hills to the west of Ocona, plants with fewer and more robust radial spines, which would seem to me to be possibly *Islaya copiapoides*.

.....from H.Middleditch

It may be noted that Ritter accepts the Rauh "between Camana and Ocona" location for *I. copiapoides*, but qualifies this on his p.1297, observing that his "*I.copiapoides* v.*pseudomollendensis* is found between Atico and Ocona, the more southerly occurring of these plants, nearer Ocona, tending to look more like *I.copiapoides* the nearer they grow to Ocona". Evidently when it suits Ritter, he will combine those *Islaya* near Chala which exhibit a range of spination from that of *I.paucispina* to that of *I. mollendensis* into his *I.chalaensis* n.n., whilst on the other hand he will separate the intergrading *I.copiapoides* and *I.copiapoides* v. *pseudomollendensis* when that suits him. However, the plants pictured by F.Vandenbroeck to the west of



At Chala

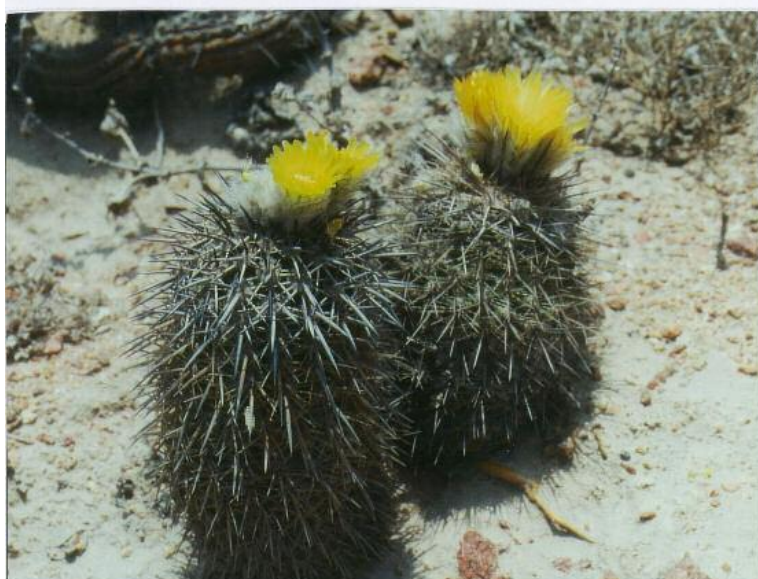
Photos: A.W.Craig



The sea-shore at Atico Photo: F. Vandenbroeck

At Chala

Photo: F. Vandenbroeck



At Ocona

Photos: F. Vandenbroeck

Ocona do not have the high rib count for *I. copiapoides* quoted and illustrated independently by both Rauh & Ritter. In addition, there is clearly a difference in the density of spination between the single plant and the pair of plants pictured by F. Vandenbroeck to the W. of Ocona, but this could be regarded as a parallel example to Ritter's contention that the spination on *I. paucispinosa* can vary from few and strong to more spines but less robust.

.....from F. Vandenbroeck

Near Ocona there was a large population of several hundreds of *Islaya* growing on steep hills. On the whole, it could be stated that the plants in this population have a shorter, stouter, spination and a smaller, more bluish, body. It is difficult to be precise about the size of these plants but I believe that they hardly reached 15-20cm in length. In my eyes they are more like the plants to be found en route to Chala Viejo.

.....from H. Middleditch

Of the plants in the two pictures taken at Ocona by F. Vandenbroeck, one has a short, open spination, scarcely if at all obscuring sight of the epidermis, which does indeed bear comparison with the plants pictured some 5 or 6 km from the coast en route for Chala Viejo. By comparison, the pair of plants seen near Ocona have a somewhat longer but far more dense spination, completely obscuring any sight of the body.

.....from F. Vandenbroeck

Your comments on the different aspects of the plants photographed near Ocona are of course understandable. These plants are two somewhat extreme forms taken out of the same large population.

.....from H. Middleditch

The *Islaya* seen independently both by K. Preston-Mafham as well as by F. Vandenbroeck at a spot some 5 or 6 km from the coast en route to Chala Viejo, apparently fall within Backeberg's *Islaya paucispina*, which Ritter tells us displays a range of spination. At a similar distance from the edge of the sea, near Ocona, there were *Islayas* seen by F. Vandenbroeck which were "like the plants seen en route to Chala Viejo", which also display a range of spination. These may well be *Islaya chalaensis* n.n. sensu Ritter.

.....from R. Mottram

When Ritter says that the 1956 and 1958 descriptions of Rauh & Backeberg for *Islaya grandiflorens* "do not correspond", he is correct inasmuch as they have been based upon different Types i.e. those corresponding to K130a (Backeberg 1956) and K.130 (1958).

Ritter's substitute name, *maritima*, for the later description, is the usual procedure, but all substitute names have the Type and circumscription of the original replaced name. As the Type locality of K130 and K130a are within a km of each other, it would be reasonable to assume that Rauh had simply selected two representative samples from the population, to demonstrate the range of diversity. Therefore one would expect the two descriptions to differ in matters of detail, but it is unlikely that Rauh had considered them to belong to different taxa.

So nomenclaturally they are two different things, with different Types, but in practice *Islaya maritima* is probably referable to *Islaya grandiflorens* Rauh & Bkbg 1958. It would be very unlikely to find two such closely allied plants at one locality that could be considered distinct enough to be two separate species.

Ritter, in considering his *I. chalaensis* n.n. to be the same thing as *I. grandiflorens* Rauh & Bkbg 1956, decided to change the rank to that of variety, in order to preserve his own name, so he published it as *I. copiapoides* v. *chalaensis*. He is entitled to do that under the rules, because no name existed previously in the rank of variety for this plant.

In summary you have the two entities with the following alternative names, one being:

Islaya grandiflorens Rauh & Bkbg 1956 (published 1957) Type K130a

Islaya copiapoides var. *chalaensis* Ritter Type FR 128

and the other;-

Islaya grandiflorens Rauh & Bkbg 1958 nom illeg. (Art. 52.1) Type K130

Islaya maritima Ritter Type K130

In the case of the first plant, you have to use the epithet *grandiflorens* if you refer to it as a species, but *chalaensis* if you consider it as a variety. In saying this I am assuming that K130a and FR 128 represent the same taxon. However, Ritter should not have implied that *grandiflorens* 1956 is the same as v. *chalaensis* without listing it in his synonymy - perhaps just an oversight. But it would not displace his name, because they are names published in different ranks.

For the second plant, only *Islaya maritima* is the correct name.

.....from H. Middleditch

Between the carelessness of Backeberg and the convoluted efforts by Ritter to justify his own viewpoint, it can be very difficult indeed to set out a proposal for what name to apply to which *Islaya* from this part of southern Peru. Possibly the name *I. maritima* could apply to the plants growing on the rocky promontory some 7 km or so to the northwest of Chala, and *I. paucispinosa* (or *I. chalaensis* n.n.) to those growing on the coastal terraces north of Chala. On the plants pictured to the north of Chala by both F. Vandenbroeck and by A. W. Craig, the rib count would appear to be less than that associated with *I. copiapoides*.

It is of course perfectly easy to consider all these *Islaya* names as irrelevant and regard these plants as simply variations of the one single species, ecotypes reflecting minor local variations in the local ecology, such as differences in mist precipitation, ground which is firm or consisting of drifting sand, a surface made up of fine sand or coarse grit, the harshness of the surroundings reflected in the presence or absence of any other vegetation - and its nature, and so on. It appears that all these *Islayas* exist in very similar overall conditions, which vary only between dry desert where little or nothing else can survive, to slightly less dry desert, where different cacti as well as some other sparse vegetation, also grows. As the foregoing views indicate, deciding

which species name is suitable for which Islayas does pose some difficult problems.

In the accompanying pictures of Islayas, those seen by F.Vandenbroeck near Ocona could be called either *I.paucispina* Rauh & Backeberg or alternatively *Islaya copiapoides* v. *pseudomollendensis* Ritter. It appears to be open to question just how useful either of these names are, in view of the degrees of similarity of all the plants in the accompanying pictures and also in view of the variations of body form, spination, etc., reported above from locations no great distance apart from one another.

SETTING FRUIT ON REBUTIA

.....from M.Z.O'Hara

Most of the literature that I have been able to consult states that *Aylosteras* are self fertile and that *Digitorebutia* are (with some exceptions) self-sterile. Those that are self-fertile do not seem to be named. Compared to other genera, little work seems to have been done on *Rebutias* since the essays in *Ashingtonia* by J.D.Donald in the 1970's and even then *Digitorebutia* did not appear to have been considered in much detail. Most authors seem to ridicule Backeberg for raising the genus *Mediolobivia* but without giving any rationale for doing so. Then W.Rausch in his *Lobivia* '85 transferred the *Mediolobivia* to *Lobivia* but little in the way of explanation is provided to support this classification. This situation led me to decide to have a look at these groups.

It would be in 1994 that I made a start by looking at a selection of flower sections and subsequently extended to looking at any *Rebutia* that I happened to have in flower at any time. Fortunately it was possible to make use of one room in the house for this activity. This involved taking the plants indoors before the flowers opened. Night time temperatures were about 12°C, daytime temperatures up to 20°C although this could be much higher on a sunny day, the west facing window only receiving direct sunlight from about four o'clock in the afternoon. There were no other plants in the room and no windows were kept open for ventilation, so access by insects was minimal, In any case, there are not many insects about here in May-June time of year, by comparison with July-August. The plants were kept well watered, and sprayed most evenings.

The study of self-fertility was not planned but occurred more or less by accident. Of course some of the flowers opened and closed in the room whilst I was not at home and none of the flowers had been pollinated, either with themselves or crossed with others. Nevertheless it was noticed that flowers which had not been sectioned did start to swell as though they were setting seed. A note was made of those flowers on each plant which appeared to be setting seed. These plants were given special labels and eventually returned to the greenhouse so that the pods matured. Some of these plants set flowers later in the year but these flowers were removed as they appeared.

Altogether 23 different species of *Digitorebutia* set seed in the house and also seven species of *Aylosteras*. Only *Aylosteras sumayana* and *A.supthutiana* failed to set seed in the house. The *R.leucanthera* proved the biggest surprise to me. In 1992 I had tried to produce seed by self-pollinating this plant in my greenhouse.; it had produced many flowers, the pollen was ripe but not a single seed was produced. In 1993 I tried the same thing again but again with no success. In both cases I lifted the pollen on to the stigma which was opened by using tweezers. The following year, with the plant kept indoors whilst in flower, it produced seed with no interference from me.

.....from H.Middleditch

Is it possible that the stigma could be receptive only when the lobes opened of their own volition, and non-receptive when they were standing in a closed attitude?

.....from A.de Barmon

My *R.schatzliana*, which Ritter tells us comes from Pucara, set fruit for me in 1998 when the fruit was small, but full of seed. This seed subsequently germinated well. My plants were given extra feed in 1999 so that they grew better but failed to set fruit when cross pollinated. The same thing happened with my *R.albopectinata*. From the scarcity of offers of seed of *R.froehlichiana*, this sort may also suffer the same problem in cultivation. I would like to know if anyone has any ideas why this happens and also what steps could be taken to improve setting fruit on these particular sorts.

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<i>Lobivia</i>	J.R. Kirtley, 11 Fire Station Houses, Alnwick NE66 2PB	jim@kirtley7.fsnet.co.uk
\$ <i>Matucana</i>	P. Hoxey, 34 Stonehill Road, Great Shelford CB2 5JL	paul@hoxey.com
Neoporteriae	R. Moreton, 91 Umberslade Road, Selly Oak, Birmingham B29 7SB	
\$ <i>Notocactus</i>	P. Moor, 60 Milton Hall Road, Gravesend DA12 1QW	philip.moor@blueyonder.co.uk
<i>Opuntia</i>	R. Crook, 35 Cardinal Close, Worcester Park, KT4 7EH	
\$ <i>Parodia</i>	J. Brickwood, 48 Haselworth Drive, Gosport PO12 2UH	john@jbrickwood.freemove.co.uk
\$ <i>Sulcorebutia</i>	J. Cooke, Orchard End, Chipperfield Road, Bovington HP3 0JR	julian@cactusorchard.freemove.co.uk
<i>Tephrocactus</i>	R.K. Hughes, 16 Ashbourne Avenue, Bootle L30 3SF	
\$ <i>Weingartia</i>	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

The Chileans

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