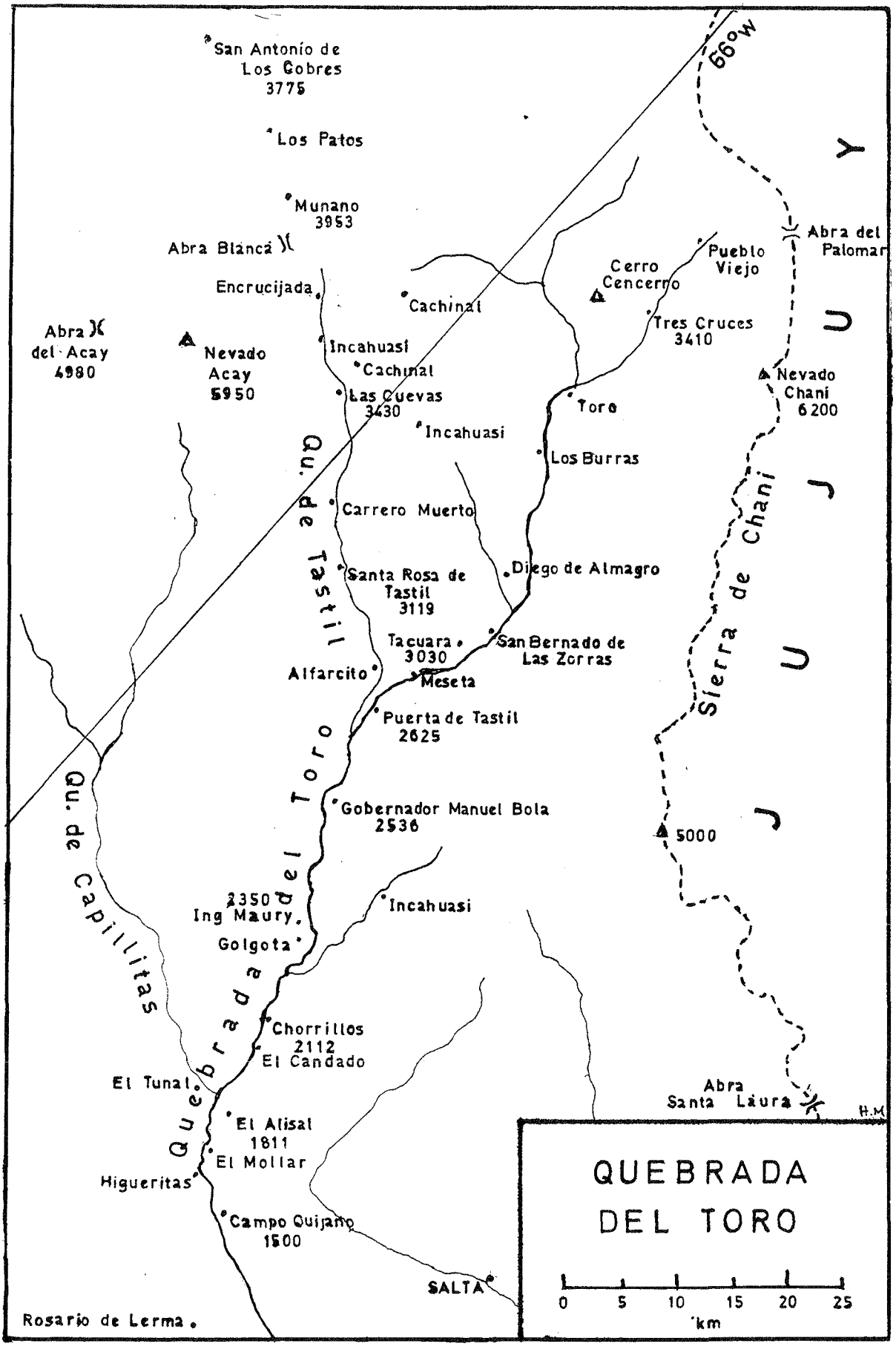
THE CHILEANS '93

VOLUME 15 NUMBER 51

Thelocephala reichei

Fiambala, Argentina

Photo – K. GILMER


San Antonio de Los Cobres 3775
Los Patos
Munano 3953
Abra Blanca
Encrucijada
Cachinal
Abra del Acay 4980
Nevado Acay 5950
Incahuasi
Cachinal
Las Cuevas 3430
Incahuasi
Carrero Muerto
Santa Rosa de Tastil 3119
Tacuara 3030
Alfarcito
Meseta
Puerta de Tastil 2625
Gobernador Manuel Bola 2536
2350 Ing Maury
Golgota
Incahuasi
Chorrillos 2112
El Candado
El Tunal
El Alisal 1811
El Mollar
Higueritas
Campo Quijano 1500
SALTA
Rosario de Lerma
Qu. de Tastil
Qu. del Toro
Qu. de Capillitas
66° W
Cerro Cencerro
Pueblo Viejo
Abra del Palomar
Tres Cruces 3410
Nevado Chani 6200
Toro
Los Burras
Diego de Almagro
San Bernado de Las Zorras
Sierra de Chani
5000
Abra Santa Laura
J U J U Y
H.M
QUEBRADA DEL TORO
0 5 10 15 20 25
km

A.V.FRIC IN THE ARGENTINIAN CORDILLERA
Translated by W.Atkinson from Succulenta January 1936

My last trip to South America had the principle aim of rediscovering the growing places of the plants discovered by Spegazzini. With the exception of Parodia microsperma macrancistra, which grows near the railway station of Vipos, this aim was alas not realised. Plants sent by Spegazzini to Europe first went through Weber's hands, which indicates that Spegazzini did not collect many cacti himself, but had this done for him by plant collectors who sent the plants to him in Buenos Aires. Thus he quotes in the literature the point of despatch as the finding place. I assured myself of the help of the well-known herbarium collector Venturi, who had delivered the most plants to Spegazzini. However, because cacti seemed unsuitable herbarium material, according to the methods of preparation in those days, on account of the juicy nature of the flowers, Venturi had made few, if any notes and recollected even less than I would have wished.

We worked, therefore, on the basis of the old maps and list of post stations from the end of the previous century, and established where the last post and railway stations were at that time, and from where the tracks went out into the surrounding area. In this way Venturi's memory was refreshed and his earlier collecting trips reconstructed. It was quite evident that the construction of new railway lines had completely changed the situation: old tracks, formerly travelled by caravans of llamas and mules had nowadays been totally abandoned and new roads had been built through the countryside.

The most interesting area promised to be the Chani volcano, but the road to it via Tafi turned out to be unusable because of floods. On that account I intended to reach that mountain range from the other side, from the north, and used the not yet completed railway line that will connect Salta with Chile. On arriving where the line meets the foothills I realised that I must be entering an area that was unknown botanically. Consequently at the end of the line I turned round and went back on my tracks. I hired a cart which was drawn by six mules and wandered on foot upstream along the Tastil valley. I could write a whole book about this two week long trip and yet I would still not have described everything. Where the hills became enveloped in the cloud layer, giving a permanently humid atmosphere, one finds a luxuriant vegetation; below, ferns and Tradescantias, above, the pendulous Begonia boliviensis known by the natives as "fire-rain". Higher up, above the cloud layer - and below it as well - is a dry desert where it rains very little. During the journey we had a fierce, cold, rain shower and when I got back to Puerta Tastil I had a heavy fever. Neither in the "Hotel Wellblech" nor in the station were any medicines available, and the once-a-week train could not run because of a landslip. So my plan to go further northwards from Cachi became impossible.

The enforced rest caused by the pain hindered me greatly, but as soon as I found myself in a better state, I tried to climb the nearby mountain. By the time I reached the high plateau I had already filled the rucksack with cacti unknown to me. Once on top an overwhelming spectacle met my eyes; it looked just like a meadow covered with yellow dandelions, but these were flowers of the cacti which grew hidden between the stones. Later I named this plant Lobivia staffenii. When I had dug up more of these plants than I could carry back, I noticed to the north the mighty Volcano Chani covered in permanent snow. It is difficult to convey the impression of this scene, let alone describe it in words. Even though I was standing here at 2400m, the snow-capped peak rose imposingly upwards in the height of summer.

[Fric then spent a further fourteen days travelling to the Altiplano]

....from H.Middleditch

In the Gartenzeitung der Osterreichischen Gartenbau Gesellschaft in Wien, No.4 of 1935, Fric wrote an account of the foregoing trip. The title of that article quotes the trip as 1928, whereas in the biography of Fric by K.Crkal, the visit to South America is stated to have extended from 25.10.28 to 29.3.29. The notes written by Fric in La Rioja were dated the end of December 1928, from whence he travelled to Famatina, returning thence to Catamarca and back to Tucuman. On 8 January, 1929, he wrote some notes in Tucuman, evidently intending to start on the following day for Salta and thence the Quebrada del Toro. From Salta he went by rail to Puerta Tastil. He then spent two weeks with his mulecart trekking round the Quebrada del Toro followed by a respite of a few days at Tastil, then two further weeks around Vulcan Chani. Thus it could hardly have been earlier than mid-February when he left the Quebrada del Toro. Allowing for his return to Buenos Aires and then a sea voyage to Europe, this would appear to match with the end of his trip in March of 1929, as quoted by Crkal.

....from D.W.Whiteley

There is an article in the US C&SJ for 1970, Nos.3 and 5, entitled "A.V.Fric, Famous cactus hunter". It is written by Bohumil Schutz and originally appeared in Kaktusy '69, the journal of the Czechoslovak Cactus Society. This includes the observation "after his return from South America in 1929 ...."

....from H.Middleditch

Comparing the original 1935 Fric account (written in German) with the translation which appeared (in Dutch) in the pages of Succulenta, certain omissions and variations are evident. In the original, Fric hired a mule cart for his two-week trek through the Tastil valley; in the Dutch, he "perceived a mule cart and followed it to Tastil". Also in the Succulenta version, the two weeks occupied in trekking round the Quebrada del Toro is omitted, presumably because the translator would (reasonably) expect a commercial journey from the mouth of the Quebrada del Toro to no further than Tastil to occupy but a day or two.

.....from R.Kiesling

I do not know of any "Hotel Wellblech" at all, nor one of any other name there. When I go there I always sleep on the floor of a barn or in a tent, or in my car. Possibly Puerta Tastil had previously been more important than at present, an essential halt for travellers who were going to San Antonio de los Cobres, capital of the ancient "National Territory of the Andes" which does not exist any longer today. This Territory is today the Puna of Catamarca, Salta, and Jujuy.

....from H.Middleditch

At the time Fric visited Puerta Tastil it was the last station on the line which was being constructed further westwards, to San Antonio de los Cobres and thence to Chile. It is possible that the "Hotel Wellblech" was the accommodation for the workforce building the line, so that it would simply disappear when the construction moved forward a stage.

The results of this part of Fric's last trip to South America attracted much interest and attention in the cactus world. In just the same way that Fric had endeavoured to identify and seek out the discovery places of plants described by Spegazzini, Fric was followed in turn by other collectors who sought the plants which Fric had found in habitat, in order to import quantities of those plants to Europe and thus cash in on the interest generated by Fric's discoveries.

A JOURNEY TO THE PUNA DE ATACAMA. By J.B.Ambrosetti
Translated by H.Middleditch from Bolletin del Instituto Geografico Argentino Vol. XXI 1902

This present article is a description of a rapid journey to the Salar Caurchari in the months of January and February 1902, including a detour to San Antonio de los Cobres, now the capital of the new Territory de Los Andes.

The shortest and best route to the Salar Caurchari from Salta is that via Cerrillos and taking in the splendid Quebrada del Toro as far as Tastil, thence to Chorrillos, climbing the cuesta of the same name to descend via the Quebrada de Tocomar to Caurchari. Troops of livestock pass along this route continually, destined for the Chilean ports on the Pacific coast, principally Antofagasta.

At Cerrillos preparations were made for our journey and for the work to be undertaken over a couple of months in a cold, high, and inhospitable regime. Mules were provided by the provincial government of Los Andes. Our baggage was heterogeneous: boundary markers of iron and of quebracho colorado, long surveying poles, theodolites, tripods, water barrels, bags of various provisions, mainly maize for the mules, and rice, flour, dried beef etc. for the men.

We left Cerrillos on 17 January in a temperature of 24°. After travelling through fields of maize and alfalfa we reach Rio Blanco at the entrance to the Quebrada del Toro. The quebrada now becomes a narrow bed of sand and rounded stones, furrowed by the various arms of the Rio de Toro. Up to El Tunal the riverbed is the track used by travellers and animals and it is almost impassable during floods, but a new road is being constructed up on the slope. From there to the entrance to the Quebrada de Tastil the slopes at the eastern side of the valley were formed of much weathered shale, and those on the west by a conglomerate.

From now on the road improves, except for an appreciable narrowing at Candado (or Angostura) where the quebrada narrows to a width of more or less 500 m over a length of only 50 m. After this the quebrada widens out again. In this stretch are a few hamlets such as Chorrillito, Chorrillos, and El Cebollar. The road continues forward to Golgota, a prosperous ranch belonging to the Torino family, lying at 2400 m; it has extensive fields of alfalfa which produce fodder, two thirds of which goes to the city of Salta. In this section of 32 km we have climbed 820 m. In the surroundings of Golgota there are adequate pasturages where herds of goats and sheep abound. On the following day we left Golgota and after 15 km came to Cebadas at 2620 m altitude, at 25°. At noon we reached Puerta Tastil in a strong southerly wind which made travelling difficult. By my aneroid barometer the altitude of this place is 2700 m; according to Brackebusch 2600 m, and according to the Railroad commission, 2530 m. Further on the Quebrada del Toro received the waters of the Rio Tastil which comes from a NW direction. It is this quebrada which we intend to follow in order to continue our journey. There is a stretch of about a league where the route is formed of a bed of stones. The Quebrada de Tastil is narrow for more than 10 km, bounded by gneiss; apart from this section, it widens out and tiny hamlets exist with small plots of land cultivated for alfalfa, maize, wheat and beans.

On the following day we left Puerta de Tastil at 7 a.m., reaching Tastil at 11 a.m., at 3190 m, continuing on past Las Cuevas at 3420 m (3150 m according to Brackebusch). On this road the hillsides vary greatly in their composition, some shallow gulleys displaying banks of oolitic limestone, others show masses of porphyry or of conglomerates. Next day we followed the Quebrada Cuevas, which narrowed at each step, up to a point where it opened out into a campo. From there we went west to Chorrillos and the Concordia mine, about ten leagues from San Antonio de los Cobres. All the way from Las Cuevas to San Antonio de los Cobres we frequently came across herds of vicunas.

Our work at the salar Caurchari proceeded well into February but the mules became emancipated through lack of fodder and our own provisions were running low, so operations were brought to a close and we returned by the way we had come.

.....from H.Middleditch

There is a place by the name of Chorrillos which is located by Ambrosetti some ten leagues from San Antonio de los Cobres. There is a second hamlet by the name of Chorrillos which is located much lower down the Quebrada del Toro (between Golgota and Campo Quijano) and it is this latter place which is the Chorrillos referred to by several travellers in more recent decades.

A JOURNEY TO BOLIVIA AND PERU By R.Hauthal
Translated by H.Middleditch from Wissenschafftliche Veroffentlichungen der Gesellschaft fur Erdkunde zu Leipzig Vol.7 1911

On 3 October 1907 all preparations being complete, with the farewells of many friends in Buenos Aires ringing in our ears, around 4 o'clock the train set off which would carry me to the north of Argentina. I had chosen Salta as the starting point of my expedition since I would make the ascent of the high Bolivian plateau not by the well-known route over Jujuy and the Quebrada de Humahuaca, which whilst more convenient, is much used, and sufficiently well-known, but through the parallel route of the Quebrada del Toro lying further to the west.

There were a few days' break in the journey both at Cordoba and Tucuman. From Tucuman the railway took us northwards, firstly through almost unbroken forest. We continued northwards as far as General Guemes, from where we turned west, towards Salta.

[After a trip to Mojotoro] From the broad valley floor at the entrance to the Quebrada del Toro there arise terraces at three levels. The first appears at about 150m above the valley floor, at both sides of the entrance to the quebrada; 200 m further up there follows the second, then at 200 m higher again there is the third terrace. These terraces are formed of conglomerate which can be followed up to about 3000 m altitude as far as the Estancia La Cebada, where a great deal of rubble has been carried out from a side valley to the right and into the main valley. Some way above Golgota, the valley sides are formed of conglomerate overlain by a sandy shale. Above La Cebada the broad valley coming from the right is sunk into shale, but on the left side there is still conglomerate.

Much further upstream, above Ojo de Agua, a side valley comes in from the left whilst on the right slope lie scattered many large blocks of rock. Masses of geologically recent detritus have been brought down side valleys by the flowing waters and deposited at the sides of the main valley. Here at the mouths of the small side valleys it forms fine deltas which have later been cut away by the main river, leaving a very steep front face. On the upper part of these deltas, which are often of appreciable dimensions, are the ruins of the dwellings of the old Calchaquis, the first inhabitants of these valleys in considerable numbers. All along the slope may be seen extraordinarily numerous stone walls which form narrow terraces, on which crops were grown. The present day inhabitants are the descendents of the old Calchaquis. They

eek out a miserable existence, because of the extraordinary aridity which prevails. It seldom rains, even being wanting the year long.

The best evidence of the previously more numerous population is afforded by the extensive ruins of an old settlement which lies on the road from Tastil (which is 20 km downstream from Ojo de Agua) to San Antonio de los Cobres. This is an extremely interesting locality. The ruins are located on a plateau at a height of 4000 m at the foot of an absolutely level valley some five leagues in length and about 4 km broad, representing a dried-up lake bed.

The character of the valley changes at an altitude of 3350 m. There the valley, previously running in a north-to-south direction, bends suddenly to the NW and at the same time increases significantly in breadth to about 2 km. Our next night's camp was two hours upstream, at a habitation called Tres Cruces. There the valley makes a sharp left curve.

On the following day I came to the north end of the Quebrada del Toro. A league above Tres Cruces the valley again turned northwards and after seven leagues came out above Moreno on the real high plateau.

.....from H.Middleditch

The greater part of this article is concerned with the lower half of the Quebrada del Toro together with the Tastil valley, but the last two paragraphs refer to the upper half of the Quebrada del Toro, i.e the route taken by Fric via Toro to Abra de Palomar. At the time at which this article was published, the subject of glaciation in the Andes seems to have been of prime interest to many of those of geological bent who were travelling in those mountains. The nature of the landscape is not so much described, as interpreted as evidence of glaciation. An attempt has been made in the foregoing abstract to exclude the author's overlaying interpretation and include only the information about the landscape.

CACTUS HUNTING IN SALTA & LOS ANDES PROVINCES. By Ernesto Vatter
Translated by K.Wood-Allum from Kakteenkunde I,1940

For a long time I had intended to visit the cactus regions of NW Argentina. I was finally able to begin the journey in 1938 .,.. it was evening when I reached Salta. I caught the first bus from Salta to Campo Quijano, at the entrance to the grandiose Quebrada del Toro. I soon found somewhere to stay and got settled in. On the next day I headed for the nearby mountains; the ascent led through a zone of luxuriant vegetation. This area has a heavy rainfall, the clouds pile up against the 3000 - 5000 m high mountains and a heavy rainfall is the consequence. From here the track led up the Quebrada del Toro. The deeper I penetrated into this monstrous ravine, the drier became the earth and the poorer the well-being of the vegetation.

Between Alisal and Chorrillos the ravine divided and forms an island at the fork. Would there be nothing to be found here? To my joy and surprise, the slender, many-branched silver white columns of Cleistocactus strausii were growing on the rocky walls, and what is more were carrying masses of red fruits. In the crevices in the rock and in hollows I found the splendid snowy white spined Parodia sanguiniflora, the occasional plant displaying its beautiful flowers. After much searching I also found an apparently new, fairly heavily spined Rebutia. You have to have a very keen eye to spot the plants that grow hidden. Mostly you find quite small ones for they are constantly being eaten by the numerous goats. High up in this area, as the Cleistocactus strausii petered out, Trichocereus pasacana occurred for the first time with its heavy columns, but its stems were never more than 2-3 m tall. I did not find any further genera here. I carried my booty back to the collecting place and got ready for the next day which was to bring me deeper into the ravine.

The deeper I penetrated into the Quebrada del Toro, the heavier and more impressive became the columns of T.pasacana. Whole slopes were covered with the typical high level form with the white cap. Not far from Chorrillos I experienced a surprise. Parodia stuemeri grew in masses on the mountain sides. I saw plants of 20 cm in diameter, many in full bloom. I could not stop for long as I had to get to Golgota that day. I got there at about 4 p.m. A native family put me up for a few days.

Next morning I set off very early on the hunt, with my host. We climbed around the rock faces, looking for cacti and chopping them out of crevices, Apart from the cacti, there were only lichens, mosses, and poor thin scrub. Amongst the huge clumps of Parodia stuemeri I found here truly magnificent specimens in flower and both had a preference for anchoring themselves in the little gaps and cracks in the rock. On the scree slopes, almost hidden under the rubble, I found Gymnocalycium horizonthalonium with its white, red-throated flower. The epidermis of this species is coarse, almost leathery. Its grey-green colour camouflages it so well that I had difficulty in finding odd examples. It may have been coincidence or it may have been due to other influences, but I have never seen so many cristate forms of any other species as a I did of this. Unfortunately the wonderful old specimens with their huge turnip-like roots were too heavy to transport back. Here, too, the massive columns of pasacana contributed much to the splendour of the landscape. They grew up to 5-6 m with a diameter of 50-60 cm. They form the strongest spination I have ever seen and all had the huge white cap at the growing point. Trichocereus pasacana is everything to the local people. Everything is fashioned from pasacana wood - windows and doors, floors and ceilings, roof and fence, primitive tables and chairs. The trunks are felled like trees, the non-woody tips taken off, and the rest rolled down into the valley where they are cut into boards 10-20 cm wide and then dried. The wood is very light but nevertheless hard and resistant. The bits that are left are used for firewood. Pasacana wood is the universal raw material of the region. Even the fruits are eaten so that everything on the plant is prized. Those who maintain that cacti are nothing more than a weed, a nuisance, and that only cactophiles have accorded them any significance, would learn differently here!

The next day we were to go along the ridge where, according to my host, there were some interesting plants at 3000 to 4000 m altitude. The mules bore us quickly and safely up the ridge early in the morning. We dismounted and began to search on a flattish scree slope. But where should we look? For apart from the pasacanas which were obvious and a few Gymnocalycium loricatum, I could find nothing. My host, who knew what the plants we were seeking looked like and where they were, even found a beautiful Lobivia group - small and grey-brown heads - almost completely hidden under lichen and scree. Now we searched every square meter carefully and our trouble was well rewarded. Again and again we found individual plants and clumps, scarcely showing in the scree because they are so well camouflaged among the surrounding soil and stones. On the relatively small area of just about a square kilometer I discovered a lot of beautiful plants, eight different species in all, all with the same characteristic fine, close-lying recurved spines, mostly comb-like in their arrangement. The spines range from ruby red in new growth to black. During the growing period the plants have developed splendidly in my collection. Unfortunately they have not flowered yet, since I collected them last February, at the end of their flowering period. I shall have to be patient until October/December, our next spring. As we were collecting, my host informed me that the flowers were bicoloured, with red as the base colour. Unfortunately many of

these plants had been eaten by insects, or rather by insect larvae, so that I have had many losses. I was only able to save some by grafting.

I have been diverted by this to rush to the end of my trip and must backtrack. From where I found the Lobivias, I climbed to 5000 m. As I climbed I found three Opuntias which were unknown to me - a flat, a cylindro-, and a spherical Opuntia. The pads of the flat Opuntia are about 2.5 cm wide and 5 cm long, with honey-yellow spines and glochids; the flower almost 2.5 cm in diameter, is bright red and in wonderful contrast to the green of the plant and the yellow-brown of the spination. I did not find any other cacti at that altitude. After a very difficult descent I reached the ranch in the valley late in the evening. I packed the collected plants for onward transmission to Buenos Aires and got ready to move on next day to San Antonio de los Cobres in the Territoria los Andes. At the beginning of the journey I passed through a well populated cactus habitat. The plants grew so close to the railway track that I could identify and differentiate easily between the various species.

Trichocereus pasacana followed the track uninterruptedly. The stems were now smaller and thinner. Near to the border of Salta and Los Andes provinces it had disappeared. In its place white spherical forms appeared. I would gladly have taken one or other beautiful plant with me but the train did not stop once. We soon reached San Antonio so that I could look for cacti on the same afternoon. From where I stood the mountains did not look too high, so I climbed some. My heart was beating fiercely from the exertion for at 5000 m the air was unpleasantly thin. The railway engineers have achieved miracles here. The line stretches uninterruptedly from Salta at 1200 m to the Altiplano. It has already reached 4500 m at San Antonio de los Cobres.

So much for that however; I had to pull myself together at this altitude and draw on all my reserves of strength, to find cacti. Luckily I did not have to search for very long. I found a very beautiful species with yellowish-white to brownish-red heavy spination, individual spines being very long and flexible. The red flowers emerged from the areoles close to the crown. It was worthy of note that the natives call this plant pasacana also. They prize the fruits which are said to be very palatable. Sadly I was not able to bring home one of the most handsome and biggest plants for they weighed a good 100 kg and transportation to Buenos Aires would have been too difficult and expensive. But the smaller specimens gave me just as much pleasure and I could take those with me. These fine 20-30 cm specimens are said to be Soehrensia bruchii. One plant described as Lobivia ducis-pauli is also called pasacana by the natives, but as "Pasacana macho" i.e. masculine, whilst Soehrensia bruchii is termed a feminine pasacana. I then found a small cushion form of flat Opuntia with 3-4 cm spines of a deep amber yellow. The flower is bright red with green stigma.

Next morning I began my journey back to Buenos Aires.

....from H.Middleditch

Above Golgota, Vatter reports that he came across a platyopuntia, a cylindropuntia and a spherical Opuntia. We have already heard from M.Nilsson about his finding Austrocylindropuntia verschaffeltii in the Quebrada del Toro, at 3000 m above Chorrillos, [Chileans No.49 p.22] whilst D.J.Ferguson has likewise observed this species to the south-east of San Antonio de los Cobres. It may therefore be possible that the cylindropuntia found by Vatter above Golgota was also this same species. The flat-padded Opuntia may have been an Airampoa form, to judge by the size of the pads. The "globular" opuntia may well have been a hummock-forming Tephrocactus. The flat Opuntia with red flowers, found in the company of Soehrensia korethroides, may again have been an Opuntia of the Airampoa affinity.

None of the other travellers who have visited the Quebrada del Toro have suggested that any Gymnocalycium are to be found there other than G.spegazzinii. As these plants appear to be commonly found with their upper surface virtually flat and level with the surface of the ground, it is quite understandable that they could acquire a name such as G.horizonthalonum. That Vatter also makes reference to G.loricatum would suggest that these further Gymnos did not have quite the same appearance as those which he regarded as G.horizonthalonum. Perhaps they were not level with the surface of the ground?

Vatter tells us that he stopped with a native family for a few days near to Golgota; from his account it appears that it was from here that took the train to go on to San Antonio de Los Cobres. Consequently the "white spherical forms" which he saw from the train during the course of this journey might have been Pyrrhocactus umadeave, although they might equally well have been Soehrensia bruchii v.nivalis. In addition, could the "snowy white spined Parodia sanguiniflora" seen between Alisal and Chorrillos have been P.nivosa?

....from J Lambert

Both at Chorrillos and at Ing. Maury (Est. Golgota) we found a number of Parodia nivosa, growing sympatric with P.stuemeri.

.....from R.Allcock

In the biography of Fric, "Lovec Kaktusu" by Karel Crkal, there are a couple of references to this species, as follows: "Microspermia nivosa is covered with crystal-white projecting spines, so thickly that one cannot see its body, and from the centre there grow several blood-red flowers. It has however, two drawbacks, to wit, that it flowers very seldom and that I collected it in two different places, so that a few of them which flowered for me were not all fully red, whilst also some had orange flowers - pretty to be sure, but not quite so beautiful. I have for the past two years marked the red-flowering specimens, but always some good soul has pulled out my markers." And later in the same publication: "Microspermia nivosa Fric.; a well-known and widely distributed plant with glassy white spines of lengths from 6 to 24 mm. The specimens of spines in the herbaria are lightly yellow. According to Fric's notes, Microspermia nivosa v. golgota differs from M.nivosa only in respect of the flower. Evidently the name refers to the plants with orange flowers."

.....from H.Middleditch

In "Lovec Kaktusu" there is a photograph of an extremely steep face of rock on which are growing numerous stems of Cleistocactus; this rock appears to be made up of quite thinly bedded layers, as if it was a slate-like material. The stems of the Cleistocacti appear to be about half a metre tall. The legend to the photograph identifies these plants as Cleistocactus strausii. However, this particular species is found in the south-east Bolivian Andes, several hundred miles north of the Quebrada del Toro i.e. a location never visited by Fric. We may be entitled to assume that the Cleistocacti photographed by Fric gave him the impression of being C.strausii. It was probably this misconception which is repeated by Vatter when he says that C.strausii was found in the lower part of the Quebrada del Toro.

BORT IN ARGENTINA Presented at the Attersee Cactus Weekend
Translated by K.Wood-Allum from the G.O.K. Journal for December 1973

Recently I went on my seventh trip to the spiny wilderness of South America. Since the first of my seven visits I have travelled through northern Argentina four times in summer and three times in winter. So now I practically know the seasonal weather and climatic sequences completely.

Between the main cordillera and the lesser front ranges there lie massive valleys, deeply eroded. On the eastern side of the Andean zone the subtropical plants have spread from the lower landscapes to a height they can tolerate, above all at Tucuman. In some parts of the transverse valleys the subtropical vegetation has reached fair heights, for example in the Quebrada del Toro in Salta province. Salta itself is one of the few provincial capitals of Argentina where you can still see families of indians sitting in the main square, and indians all round the town.

On this visit, my first trip was to the Quebrada del Toro, the road being much improved since 1969. Shortly after entering the valley, we found Parodia steumeri which is hidden under bushes. Often it is luck, or experience, as I have on occasion found, which even leads you to find one. They are easier to spot when in flower for the colourful splashes show up well. This Parodia was offered in the catalogues, and may still be, as Parodia steumeri v.uhligiana. I do not believe that this variety is justified but is, on the contrary, the true P.steumeri. In the lower parts of the Quebrada del Toro is also found Cleistocactus jujuyensis v.pulvus, the so-called false Cl.strausii.

Gymnocalycium spegazzinii has an enormous spread over both range and altitude. It grows between 1500/1600 m up to 3500/3600 m, and even up to a height of 4000 m. Gymnocalycium spegazzinii occurs over the whole of Salta province and Salta is after all as large as Austria, Holland, and Belgium put together.

It is not an easy matter to collect Parodia nivosa. H.Till took as the subject of his lecture "cactus hunting in Argentina". I would not call it hunting, on the contrary, it is really a very cautious searching and in every case a laborious and sometimes dangerous activity because these very steep slopes consist of very brittle rocky material and extreme caution has to be exercised so that you do not end up buried at the bottom under all the rubble. Often it is also unpleasant work because the plants, especially P.nivosa, grow in a thicket of Bromeliads which stick into you much more than the cacti. It is also difficult to get the plants out and you often have to hack away all the Bromeliads to get the cacti out.

Above Puerta Tastil is a small high level plain - when I say small it is about the size of Vienna and at 3800 - 4000m. Lobivia chrysantha grows there, buried in the ground, often covered with sand. I remember in 1963 how I was there in January with Walter Rausch and at 10.00 a.m. we had still not seen any plants. Only when the buds opened did we find the first plants. Last year I was there again and I had noted especially where we had found them, although of course one can make mistakes. I knew that I had not, and yet after an hour I still had not found any plants. I saw only holes like sand slicks blown by the wind or as if someone had dug out the plants and dragged them away. Finally I decided to dig out one of these holes with a pick - and there I found L.chrysantha. They were 6-7 cm underground during the winter and many had been eaten by sheep or goats but produced new heads.

On the return trip down to Salta I came across this old man and his daughter on the road. He had walked down from a side valley. He was ill and wanted to go to Salta. I took them with me, for the valley is so thinly populated and they would have been especially lucky to have got any further if we had not met. Certainly they would have had to have waited a very long time.

A GRINGO ON THE HUNT FOR CACTI By W.Knoll
Translated by K.Wood-Allum from G.O.K. Journal, 1974

At Resistancia: from New Year's Eve to 15th January it rained every day, and I had intended to drive to Salta with my nephew Oscar. Finally on the 19th January came better weather; we packed our bags in the jeep and early the following morning we set off. All went well as far as Pampa del Infierno, apart from stopping from time to time to clear the radiator grille of all the butterflies which are on the road here in their thousands. Then the asphalt road comes to an end and we must press on along a dirt road. The rain had softened up this road completely, it was choked with mud and driving was a game of chance, as the jeep hardly answered to the steering wheel any longer. Then the jeep became completely bogged down and so our trip had come to a temporary halt. Fortunately a passing tractor rescued us from this predicament. At 11 o'clock at night we arrived in Joaquim Gonzales, absolutely worn out.

The next day brought forth sunshine and - which was just as welcome - more asphalt road, so that we progressed rapidly. Early next afternoon we arrived at Salta, capital of the province of the same name, splendidly situated in the midst of a high mountain range. [There followed a visit to Quebrada Escoipe and to Cafayate]

Having provided ourselves once more with some money, we obtained provisions for ourselves in Salta in the afternoon, and then rushed off again. Unfortunately Oscar had made a mistake over the distance up to Puerta Tastil - it was much more than his estimated 40 km. Along a track that defied any description and that crossed the riverbed at some points without a bridge, we rattled upstream. It was dark; after Campo Quijano not even a village was seen any more and this accursed Puerta Tastil was willed and willed but simply did not appear. At a height of 2500 m it even began to drizzle a little bit. It was cold and our one hope was for a hotel, a warm bath and a soft bed. Finally at 22.30 hours at an altitude of 3000 m we reached a road sign that told us Puerta Tastil was to be found at a distance of 1km from the road. Along a small lane we drove thither, 1km, 2 km, 5 km, but no trace of a village. Back again, when we then discovered we had chosen the false trail. So we finally reached Puerta Tastil, where the disillusion was still greater - besides the station and two derelict houses there was really nothing at all. Farewell to the dream of a bath and a bed, we set up our tent once again and made a campfire. From the hot stones round about the fire we warmed our chickens and boiled tea. In no time at all there was scarcely more than the bones remaining and the tea had been drunk down; then as much from weariness we rolled ourselves into the covers and crawled inside the tent. Despite the bitter cold we slept like lords.

In the morning it was lovely and sunny and there were lots of cacti. A few yards from the tent we found Lobivia chrysantha WO.47; on the next slope Pyrrhocactus umadeave WO.44, The ridges were thickly covered with two species of Parodia, P.faustiana WO.45 which was frequently to be seen and in the middle of it a small area with P.steumeri WO.46. Both Parodia species and Lobivia chrysantha were in full bloom so I got plenty of photographs. Especially beautiful were the dark golden yellow flowers of L.chrysantha which only protruded a few cm above soil level, the plant bodies not being visible at all in the pebbles and stony soil.

We collected assiduously the whole day long, a small stream providing us with fine clear, cool, water and this time the supper tasted especially good. The night was once again bitterly cold, so that in the morning we were up at the first

rays of dawn to dismantle our tent and start of on the return journey to Resistancia. By noon we were already in Salta, towards evening in Joaquim Gonzales, at 22.00 hours in Monte Quemado, at 2.00 in the morning bogged down in a pocket of mud. Far and wide no settlement, nobody else. So we waited - luckily only half an hour, until a following car extricated us. Between Guanos Muerto and Pampa del Infierno the dynamo support fractured - we rigged up a new one from two strips of tin and a piece of strong wire, that then lasted out splendidly for the rest of the 300 km. At the bitter end the radiator hose split open, so that we had to refill with water every 30 km.

At 2.00 in the afternoon, after 32 hours completely unbroken driving, we reached Resistancia, weary and tired, bespattered with mud and daubed with oil, shaggy and bearded like a forest-thief, but still at the end very happy and cheerful, glad to be back home once again, a little proud at all the hazards and hardships overcome and our hearts filled with memories and adventures.

A DAYTRIP TO THE QUEBRADA DEL TORO From N.Wilbraham

When the I.o.S held their Congress in Salta in 1986, the programme included field trips to both the Quebrada Humahuaca and to the Quebrada del Toro. Previous to this event I had been to Mexico and USA, so I decided to take this opportunity to have a look at some cactus country in South America. On the field trips the whole party went by coach; being an organised trip, the length of stops had to be controlled and so looking for plants rather than weighing up the nature of the surroundings, had to take priority.

Our coach started out from Salta, first crossing a broad wide valley that appeared to be entirely devoted to agriculture. Just beyond Campo Quijano we turned into the Quebrada del Toro, where the tropical forest looked rather similar to that which we had seen near Salta itself. But this quickly gave way to a more open cover of trees and shrubs. Soon even more changes to the vegetation took place until just to the north of Chorrillos we had first sight from the moving coach of a stand of Trichocereus terscheckii. Then came our first walkabout.

Here the valley sides were quite steep, enclosing a wide flat valley floor that was almost certainly the bed of the river in times of flood. At a guess I would put the valley here at three or four hundred yards wide. At the time of our visit the river was running in a couple of relatively narrow channels, more or less in the middle of the valley; the road and the railway ran along the eastern side of the valley at this point. It was quite possible to wade across the river channels to get over to the western side of the valley, where huge patches of Abromietiella breviflora grew on the steep slope. An interesting feature at this stopping point was an island of rock which lay between the river channels running with water and the western side of the valley. This island of rock was fairly tall and had steep, almost vertical, sides. I did not wade over myself to take a look at it, but I was told by those who did that Cleistocactus hyalacanthus and Gymnocalycium spegazzinii were to found growing there.

After this stop we went on further to the north, coming to a more or less level area on the eastern side of the river, where there was almost a forest of Trichocereus terscheckii, with a substorey of Cleistocactus hyalacanthus and Gymnocalycium spegazzinii. A few more miles yet further to the north, and still on the eastern side of the river, T.terscheckii again occurred on a very weather-carved grey-white rock.

A mile or two further along the road another stop was made. Here, close besides the road on the western side of the river, there was an area of dark grey, disintegrating, shaley and highly treacherous rock. The surface looked rather like loose scree, with odd lumps of solid rock jutting out here and there. Here, too, there were many tall columnar Trichocerei, as well as Parodia stuemeri and clumps of Abromietiella breviflora. With a certain amount of trepidation and considerable care I made my way for a short distance up this slope of loose rock in order to get a close look at, and a photograph of, a small Parodia stuemeri. There were larger plants which could be seen further up the slope but venturing higher appeared to be just too hazardous. From the foot of this rocky slope the ground fell away no great distance to the eastern side of the valley, where the river ran. Here there were willows of some kind and pampas grass growing on the banks of the river.

Finally we reached Puerta Tastil, where we stopped for lunch and pretty well drank up the local supply of soft drinks! There we found, instead of a forest of T.terscheckii, one of T.pasacana. There must have been thousands of these columnar plants in view from our stopping point. From Puerta Tastil the road climbs quite steeply in order to get to Santa Rosa de Tastil, where we had about a couple of hours to search round. Here we found Tephrocactus glomeratus with not a spine, or just one spine, high on the segment. In the same area was what was taken to be Tephrocactus bolivianus, with spines of a length of 5 cm or more. We also found Pyrrhocactus umadeave, in the shape of one single plant about two inches across. Then it was time to take the coach back to Salta.

.....from H.Middleditch

The "island of rock with steep, almost vertical sides" mentioned by N.Wilbraham sounds as if it may well be the same island noted by Vatter, on which he found Cleistocactus growing. The description is also a good match for the photograph in Lovec Kaktusu in which Fric is standing next to an almost vertical rock face on whose ledges and notches are growing the arm's length columns of Cleistocactus, his so-called Cleistocactus "strausii".

A VISIT TO THE QUEBRADA DEL TORO From M. Nilsson

With Salta as our base, we spent a day around Campo Quijano, which lies at the entrance to the Quebrada del Toro. On one hillside, close to the road, we found three different Rebutia spp growing together. There was R.xanthocarpa /senilis MN.198 with small orange-red flowers and rather long, glass-white spines; some R.pseudodeminuta MN.199 with rounded petals of a rich orange-red colour, more brownish coloured spination and broader bodies; as well as a few plants of R.pseudominuscula ME.44 with dark red flowers, small bodies, and strong roots. It is quite amazing that these three species should grow so close to each other. They flower during the same period, but they seem to have a quite separate appearance without any sign of hybridisation between them. This may be due to self-fertile fruits. A few km along the road, at Km.30, there are steep hills to the right. On the bare outcrops we found a Rebutia MN 200 which looks like the typical form of R.xanthocarpa. Then there were long, white, flowers shining amidst the high, dry, grass. It was the common Echinopsis ancistrophora MN.201. Here we found plants with both long and short flowers, but most of them were ca. 100 mm long. The spination was rather weak and curly, on a body of up to 8-9 cm in diameter.

After paying a call on Dieter Herzog in Cafayate, and making another foray into the Quebrada Humahuaca, we returned to the Quebrada del Toro once again. After taking a look at the archeological excavations at the pre-inca ruins near Santa Rosa de Tastil, we camped for two nights in the area to the south of Alfarcito. Around here Pyrrhocactus

umadeave is as beautiful as ever, but according to Rausch it is becoming more and more rare. Lobivia chrysantha MN.216 is not especially rare but it is very difficult to find, as it hides perfectly among the stones. The body colour is often reddish tinted, and the soil has the same colour tone. Often you find yourself standing on these plants. The plants from Santa Rosa de Tastil have the same spination as those from Alfarcito, whilst the population at Las Cuevas MN 102, MN 105, has stronger spines. One day we made a trip to the nearest highest peak. At 3400 m we once more found Lobivia bruchii v.nivalis. The plants had fantastic spines in grey and brown; the flowers were orange-red with a darker throat.

At Chorrillos we collected Rebutia senilis MN 221, growing close to the river among Abromitiella cushions. Fresh, green, plants with clear red flowers. They are different from those at higher level, which have much longer and stronger spines MN 113, MN 115. As we climbed higher over the very steep hillside, we soon came upon the type population of Lobivia chorrillosensis MN 114. The first plants we came across looked similar to Echinopsis ancistrophora, with low ribs and weak, curly spines. They grew in deep moss, grass, or among Bromeliads. Some fifty metres higher, we found a lot of flowering plants. A fantastic sight, and without the flowers they would have been very difficult to discover. Petal colours vary from orange-red to almost violet. Flower tube rather short and very woolly. About a hundred plants were found and some fifty of them were in flower.

.....from R.Purslow

About ten or twelve years ago I raised a batch of Lobivia chorrillosensis from R 157 seed. I have kept a number of the resultant seedlings, which have now flowered. In addition to producing the expected red flowers, other plants have had flowers which were almost a violet colour, and there was even one which produced yellow flowers. As you might imagine this variation in flower colour has led me to be very suspicious of the validity of the seed and so these plants have been grown for a few years in my unheated greenhouse, where I keep my Lobivia which are of doubtful validity.

.....from G.Charles

At present I have some seedlings coming along which have been grown from MN seed which was collected in the Quebrada del Toro. We also collected some seed off the Cleistocactus on our own visit to the Quebrada del Toro and this has germinated quite well. In habitat these Cleistocacti cluster from the base and grow to about a metre high, typical of cultivated C.hyalacantha or C.jujuyensis.

WE PITCH CAMP IN THE QUEBRADA DEL TORO. From K.Gilmer
From a slide talk given to the 1993 Chileans' Weekend.

Before we left for our visit to Argentina, we planned to drive through this valley, but we did not decide beforehand precisely how many days we would be there. But we did intend to devote sufficient time to look for various interesting plants and places there; in the event, we were there for five days.

The entrance to the valley is bounded by mountains at either side. It is quite moist here due to the clouds which bank up against the mountain sides. At about dawn the clouds are at a low level, not far above the floor of the valley, but by the middle of the morning they have lifted and cover the tops of the mountains sides. As a result the vegetation in this lowermost part of the valley is quite different to that further up the valley, where it is much drier. Having passed La Higueritas the valley becomes really very narrow, the river becoming hemmed in by steep rocky walls at either side. Both the road and the railway make their way along by clinging to the steep sides of the valley. Here were Cleistocactus sp., Echinopsis ancistrophora, and a Trichocereus which was not T.pasacana, as well as plenty of green vegetation with non-succulent plants like Solanaceae, Bromeliaceae, Asteraceae and Poaceae. Shortly before reaching El Alisal we made our first overnight camp, pitching the tent not far off the road.

Beyond El Mollar and not far from El Alisal we saw, on a more gently sloping piece of ground, a Cleistocactus which I think may be C.tupizensis. It grows here in the company of grasses, herbs (Solanaceae), small trees (Acacia sp.), Bromeliaceae (e.g. Tillandsia sp) and tall Trichocereus. The ground was covered with small stones and gravel together with a scattering of head-size stones, sometimes with only a few small scattered tufts of grass. On the patches where the trees and bushes grew, the dwarf bushes rise above the stems of the grasses, overtopped in turn by the clumps of Cleistocactus stems rising to almost one metre high. Above the Cleistocacti the green foliage of the trees rose a good two metres and above them in turn projected the columns of Trichocereus. Some of the Trichocereus were branching from part-way up the stem and the flowers at the very top of the stems were quite out of our reach. At many places on this sort of ground we saw flowers of Echinopsis ancistrophora looking as if they were coming up out of the earth, as the plants themselves are virtually buried level with the surface of the ground. Here and there were plants of the ubiquitous Opuntia sulphurea, as well as the small-padded Opuntia which may have been O.corrugata.

Beyond El Alisal the valley widens out somewhat, although the mountains and hills are very rugged with steep rocks closely approaching the road in places, carrying Abromeitela sp.. In the vicinity of Chorrillos we stopped at 1,900m altitude where an almost vertical face of grey-black rock was facing us barely 50m away from the road. On tiny ledges and cracks in these steep cliff-like rocks we could see small compact greyish-white balls which we took to be Rebutia. There were similar patches of almost black-coloured rock dotted everywhere up the mountainside, but we did not do any mountaineering to investigate them. We only found Rebutia growing in places such as this; they were usually growing in small groups, very rarely as isolated individuals. We also saw some Echeveria at this point.

Beyond El Alisal the landscape changes. The surroundings are no longer rugged and rocky but rounded and sloping, although the surrounding mountains are still very high. The floor of the valley is still fairly level and carries some low-growing green vegetation, which is more or less halophytic. Sometimes sheep or alpacas are to be seen grazing here. In many places the sloping sides of the valley are formed of rubble. It was near one of the slopes that we made our next stop, not far beyond Ing. Maury at 2,600 m. Scattered over the stony slope were hundreds of Trichocereus pasacana growing together with Cumulopuntia boliviana and some dwarf bushes, but an almost complete absence of grass. Far more of the ground was covered with bare rubble than with vegetation. Not far from the road we also came across some plants of Parodia here so we were not obliged to clamber up the surrounding mountains to find them. These Parodia were not very abundant and were usually in small groups of about 4 to 8 plants. Some of them were growing between dwarf bushes and fairly large stones, but most of them grew clear of the bushes. Some of these Parodias were fairly large, up to about 40 cm tall and gave the impression that they were mostly making offsets from the base. But we did not try and cut away any of these offsets, so they could possibly have been individual plants growing very closely together. It is still far from clear to me which sort of Parodia this is, but having regard to the location where we found it, the name P.nivosa may be

appropriate. At the self-same spot we came across an Eriosyce sp. The small yellow flower was having difficulty opening because of the press of surrounding spines and two offsets were forming on the plant. There were no fruit to be seen on these plants. We also saw Gymnocalycium spegazzinii and a Lobivia sp. at this location.

Most of the Eriosyce umadeave that we found were growing solitary and only one or two plants displayed any offsets. The largest plant of this sort that we found measured about 30-40 cm high and 20 cm in diameter.

Our next stop was a few km beyond where the Quebrada del Toro and the Quebrada de Tastil join together. Here the floor of the valley is almost flat and some 500m wide, At this location the valley is bounded on the north side by a steep slope of rubble which runs for some distance in a surprisingly straight line, more or less parallel to the road. It carries a sprinkling of tall Trichocereus pasacana. We searched this slope for T.mandragorus but without success. On such steep slopes these small plants would have soon become submerged by sand and grit. So we went over to the south side of the valley where the slopes were equally stony but rose at a far more gentle gradient. Here, too, there was only a sprinkling of columnar Trichocereus. Along the base of the slope there were bushes congregated in broken patches and on the slope itself we found a platyopuntia and an amaryllidaceae. There was apparently very little else in the way of vegetation. But here we had some good luck for after we had been searching for only some 30 minutes or so, we found the first plants of Tephrocactus mandragorus. After we had found the first one, we were able to spot dozens of these plants.

These plants grow in a mixture of sand and gravel in the small spaces between larger stones which are up to head size. The segments are egg-shaped with a rather pointed top, some 20 mm diameter and 30 mm high, and are a red-brown colour. This Tephrocactus does not make large plants and they do not project a great deal above the ground, only two or three segments at the most. Because of the size of the plant and the colour of the segments, it is not easy to find. Some plants have only a few short spines, perhaps 4-8 mm long, mostly projecting downwards and pressed closely against the body of the plant, other plants have a fairly robust central spine perhaps 25 mm long, which projects away from the body. We saw no open flowers on any of these plants. We found only a single seedling plant, about 1 cm high. We made our second overnight camp about 3-5 km further up the valley and about 10 km further on where we again found plants of T.mandragorus. There were a number of white-painted stones to be seen at 50m intervals, standing in a line. We did wonder whether some construction was going to take place right through the middle of that habitat. Tephrocactus bolivianus, G.spegazzinii, a Parodia, a Lobivia sp. which may have been L.ferox, an Airampo form of Opuntia and the ever-present O.sulphurea were also seen here, as well as an Opuntia possibly O.soehrensii.

The next halt was made immediately before we came to Santa Rosa de Tastil, at 3000 m. Once again we met with Trichocereus pasacana, G.spegazzinii, T.bolivianus, two spp. of Lobivia and now for the first time on our ascent of the valley we saw Tephrocactus hypogaea. They had flattened sword-shaped spines shading from pale rust-brown to very deep brown (almost black) at the tip, which stand straight out sideways from the segment. These T.hypogaea made smaller hummocks than the T.bolivianus and they were also similar in appearance to the T.hypogaea which we saw near the upper end of the Quebrada Humahuaca. At this site there were not many T.hypogaea but the T.bolivianus were abundant.

Continuing up the valley we stopped a short way past Encrucijada. Here we are at about 3500 m and there are no longer any Opuntia sulphurea or any Trichocereus to be seen and only a few cacti were to be found in this area. Near the bottom of a steep slope there were some half dozen plants of a Soehrensia sp., but they did not show any signs of flowers. Also in this area were to be found Mediolobivia, always at the top of some hill, where they are always close to shrubs and so grow in half-shade. In almost every direction we looked the stony slopes were dotted with dwarf bushes which did not exceed 25 cm in height. Some of these are species which also grow on the Puna, such as Ephedraceae and Papilionaceae. But some other sorts of plants are to be found here, if it has rained recently. There were various plants with subterranean water storage organs such as Lilaceae and Amaryllidaceae, of which we occasionally found one in bloom. In addition there were some biennials and also some annuals of various plant families, but no grasses.

Our third overnight stop was on the high Puna at about 4000 m. altitude, some km before reaching San Antonio de los Cobres, not far from Los Patos. This is typical puna landscape, an almost level plain bounded by high mountains, with scattered bushes growing well apart from each other, because of the aridity, and never exceeding one metre in height. In November the temperature was about 20°-25°C during the day, but after midday a cool and strong wind blew up from the valley. At night time the temperature fell to -5°C. Here again we came across T.bolivianus, but now rather infrequent, but Tephrocactus hypogaea occurred in large numbers, one plant often growing just a few metres from the next over a great area of level ground stretching several kms in all directions. The biggest plant of T.hypogaea that we found measured 45 cm in diameter; we also found plants of this size, again with closely packed segments, near the Bolivian border. It was interesting to see that the segments from most of the largest plants at this stopping place were smaller than the segments from plants of merely 20 or 30 cm in diameter. The bigger clumps of T.bolivianus were larger both in diameter and height than the bigger clumps of T.hypogaea in all locations. Not only were the clumps larger, but also the individual segments from T.bolivianus were bigger than the segments on T.hypogaea.

Now we turned round to retrace our steps and stop a further night on our return down the valley, on our way back to Salta.

.....from H.Middleditch

In the course of his relatively short stay in the Quebrada del Toro it appears to be possible that Fric may have found a number of cacti which are not mentioned in his own accounts of his travels in this area. Thus, in his Die Cactaceae Vol.1, Backeberg observes (p.351) that T.mandragorus was first collected by A.V.Fric, although the habitat location appears to have been unknown to Backeberg at that time. It may be presumed that the first collection was made when Fric was in the Quebrada del Toro in early 1929. The species name was first published by Backeberg in Cactus France 8.38:1953 p.250 (not p.150 as quoted in Die Cactaceae p.351). As Kiesling observes, in his review of the Argentinian Tephrocacti (Lemaire), Backeberg did not deposit a type specimen when erecting this name so that according to the then current ICBN Rules this name is invalid. Kiesling also records that this sort is to found at Puerta Tastil, but he does not quote a collector. Tephrocactus mandragorus was evidently found by Rausch, R7, during the course of his first visit to South America in 1962, in company with Hans Borth, when both travelled on mopeds. It was also found here by Ritter who provides a photograph of the plant in his Kakteen in Sudamerika. Very few collections appear to have been made of T.mandragorus and as far as it has been possible to establish from published literature and correspondence, Fric, Ritter, Rausch, and Gilmer et al., appear to be the only ones to have found this plant in habitat. At the Chilean's 1993 Weekend we were shown a slide of this plant in habitat, taken by K.Gilmer. The colour of the plant body appears to be the same reddish brown as the immediate surroundings and a plant two segments high appears to be about as tall as it grows, so it can not be an easy task to find it in habitat.

.....from W.Christie

About five years ago I acquired a cutting off Tephrocactus mandragorus which rooted down nicely. It now has (or rather had) half a dozen heads although it has not yet formed a noticeably thickened root. Last year it surprised me by putting out a flower which was typical Opuntia type, lustrous yellow and about 50mm across. The effort must have adversely affected the plant which subsequently lost about 3 heads and looked very sick for a time. It is possible that I over-watered it when it was in flower. Now it is recovering nicely and has grown several new heads. Looking at the habitat photographs of this sort from K.Gilmer, my own plant has a quite distinctive bluish colour to the segments, not reddish-brown of the habitat picture. There are 2-3 very short spines on the uppermost areoles, but these tend to stand out straight from the body, not adpressed as on the habitat picture.

.....from H.Middleditch

Very fortunately I received a small cutting off the T.mandragorus grown by W.Christie. It took quite a long time to root down and produce a fresh offset, so much so that I suspected it was reluctant to get established at all. The last year's offsets are now a pale bluish grey colour; the one new offset produced this year is a much darker purplish brown colour. Together with the two short, wispy, curving spines per areole, it really does look fairly similar to the segment seen in the habitat photograph taken by K.Gilmer. It remains to be seen whether the epidermis retains this bluish colour.

.....from A.Hill

In 1982 I obtained a plant of T.mandragorus from Jumanery, which I understood had originated from a bought-in collection. This plant had four or five segments when it was acquired and now has roughly double that number, but remains quite low growing. It has been kept on a shelf near the eaves so it is quite close to the roof glass. The segments have an unusual pale blue tinge, the areoles are really small and the spines are almost insignificant. About three years ago it flowered for the first time but has not flowered every year since.

.....from B.Bates

My own T.mandragorus is a rooted single segment received from G.Hole, which originated from Buseck. This has now produced one new segment, which is quite different in appearance from the original one. It is about an inch long and perhaps quarter of an inch thick, with a great many areoles which are barely a mm apart from each other. Certainly I do not give my plants lush growing conditions so this form of growth is a bit unexpected.

.....from G.Hole

I have two plants of T.mandragorus which originated from Buseck and I understood that those plants had been in his collection for quite a few years. There are certainly two distinct forms of T.mandragorus,a long-spined form and a short-spined form. The longer spined form has a shorter body and only about ten areoles, whilst the shorter spined form has a body about 1.5 inches long and some 30 areoles, perhaps even as many as fifty areoles. Another of my plants of T.mandragorus has flowered when only in a 2.5 inch pot; provided they get settled down and produce typical segments there is no reason why they should not flower.

....from H.Middleditch

Also at the Chileans' 1993 Weekend we were shown a photograph by K.Gilmer which had been taken near Chorrillos, of a very steep and rugged rock face, most of which was quite devoid of vegetation, but it appeared to be carrying a few small clumps of some form of Bromeliad, as well as individuals or small clusters of the small globular white-spined plant which K.Gilmer had surmised could be a Rebutia.

.....from K.Preston-Mafham.

This picture shows exactly the sort of spot where we stopped and, with great difficulty, managed to get up close to the plants. Fortunately some of them were in flower so we were able to identify them as Parodia nivosa. There was no fruit from the previous year to be seen and the seed was lying there loose on the plant.

.....from K.Gilmer

At this location we looked for flower buds and fruits, especially at the base of the plants because we thought that they could be Rebutia, but found neither. But now I am quite satisfied that these plants were not a Rebutia but were Parodia nivosa.

.....from H.Middleditch

During the course of his wanderings in Tucuman province, around Catamarca city, and from La Rioja, Fric evidently came across various populations of Parodia. In those locations only Parodia of the microsperma group are to be found, which seldom grow bigger than fist sized. In the course of his two-week trek along the Quebrada del Toro with his mule cart, Fric must inevitably have trundled along between Santa Rosa de Tastil and Ing. Maury. It is quite possible that he would find near there the self-same tall growing Parodia reported above by K.Gilmer. In comparison with the Parodia which Fric had seen up until then, a Parodia of over a foot in height would indeed have appeared to be veritably gigantic by comparison. Thus it is quite possible that this is where Fric collected his Parodia gigantea. As far as I am aware this observation by K.Gilmer is the first occasion on which a Parodia of this height has been reported from the part of the Quebrada del Toro which was travelled by Fric.

TWICE FOR A GOOD LOOK - THE QUEBRADA DEL TORO. From R.M.Ferryman

The city of Salta, Argentina, lies at 1190 metres altitude on the Rio Arias in the Lerma valley. Salta is the meeting point for two valleys, one the Quebrada del Toro running over 563 km (350 miles) westward into Chile and rising to 4475 metres (14,680 ft) at the frontier, and the other the Quebrada del Humahuaca, running northward through Jujuy for 354 km (220 miles) into Bolivia at a height of 3462 meters (11.358 ft). There is a railway line in each and scenery of breathtaking beauty can be seen from the train. The Huaytiquina railway from Salta through San Antonio de los Cobres (3750 m) to Antofagasta is is 900 km long, 571 km of which is in Argentina and reaches a height of 4453 m as it passes over the Chorillos pass. The train operates in summer, once a week (Wednesday) although the line appears to be in use at other times perhaps for modest freight. During the summer months (April-November) excursions can can be undertaken from Salta to San Antonio de los Cobres on the "Train through the clouds".

A bus can be taken through the valley using a route much the same as the railway, again operating once per week. However a more frequent service operates as far as San Antonio de los Cobres, currently four times a week. The road quality on the Argentine side is good but the many gradients on the Chilean side call for skilful driving along with constant attention to the effects of thinning air on the engine's carburettor. Today it is also possible to take excursions by minibus from Salta to the Quebrada. It is now a tourist attraction and as such these excursions are available through most hotels and travel agencies.

Clearly then the Toro is not the imponderable hazard for travelling that it once was, at least in its lower reaches. In fairness, given its close proximity to Salta, the ease of the travel to the Toro basin, and the considerable age - even centuries - for which the area has been inhabited, I doubt that the journey from Salta to the opening of the Quebrada has ever been difficult.

The city of Salta retains much of its old colonial charm and enjoys a warm, humid, climate. This is illustrated by the many Tillandsias and Bromeliads that grow on the Ceiba trees and telephone wires, etc., throughout the numerous parks and squares. On the outskirts of the town and within easy walking distance is the impressive Cerro San Bernardo which at 1250 m (4100 ft) offers an inspiring view of the surrounding valley, The arduous climb to the top is now tempered by the use of a cable car and well constructed paths. Taking the cable car up and then walking down offers the best of both worlds.

In the areas around Salta, besides the inevitable traditional ranching for beef, there grows tobacco, sugar cane and grapes for wine making. Salta is also rich in minerals: petroleum, iron, silver, lead, copper, gold, and marble are mined. Transportation is the only restraint on a more active industry.

The Quebrada del Toro is easily reached from Salta; a good tarmac road leads one past Salta airport and onward with signposts directing the traveller to San Antonio de los Cobres. Passing through the village of Campo Quijano, testament to the age of steam may be seen in the form of a small steam loco which is kept in a siding for the children to explore.

Leaving the village behind, one also leaves the flat lands that surround Salta and the climb into the Quebrada starts in earnest. The lower reaches of the Rio Rosario crosses and recrosses much of the route and its depth is an obvious barrier for much of the year. During our visit it was not a problem but it would not have taken too much more water to make at least some of these crossings difficult. Despite the dampness clinging to the lower reaches of the Quebrada, the excitement of reaching one of the meccas of the cactus world more than outweighs this inconvenience. This damp weather pattern for the lower reaches is clearly not unusual for much of the soil on the early rock outcrops was very wet and not easy to travel across. Similarly the initial flora indicated a preference for the damper climate. Begonia tubers clinging to peaty cracks in the rocks and even a type of Digitalis could be found on the flat rocky outcrops.

The first cactus was located amongst this wet vegetation; Rebutia xanthocarpa clung to the rocks among grasses and very healthy species of moss which could, quite literally, be running in water. This was not the result of a unique downpour as some of the grasses were over a metre tall. Cleistocactus jujuyensis also occurred although this species preferred the flatter rocky outcrops and not the almost vertical cliffs preferred by the Rebutia. Both species were in flower and fruits were beginning to set. A third cactus, an Echinopsis of some kind, made an odd appearance. Still in this cloud base but further into the Quebrada, Echinopsis ancistrophora occurred, growing on flat stony ground. By remaining close to the ground they afforded themselves some protection from the many grazing sheep now introduced. During my first visit we were only able to find the plants in bud but returning a week later saw virtually every plant in full flower. There were often as many as eight flowers to a single plant.

Not so impressive here however were the poor specimens of Trichocereus atacamensis v.pasacana which were obviously at the far end of their distribution. Clearly this circumstance and the intervention of farming had done nothing to enhance their appeal. There are also specimens of T.terscheckii at these lower altitudes but the latter is restricted to the lower areas in this valley. I recorded them up to 2280 m. Whilst I would need more time to define both populations, at this stage I would refute the idea that they are simply high and low altitude populations of the same species. Clearly though the Argentinian plants of T.pasacana are very close to the Chilean T.atacamensis, and (dare I suggest) really a single species.

A further river crossing at some 40 km into the Quebrada at 2100 m altitude took us to the western side of the valley, whereupon we came to a large population of Parodia stuemeri growing amongst slate and rocks only 4 to 5 metres above the road and the valley floor. This species was to be seen quite frequently from now on throughout the valley, often with its copper orange flowers open, the plants reaching up to 25 cm high. Here too appeared Parodia nivosa which we were again to find throughout the Quebrada. At this location it grew mainly among the mats of Abromeitiella. Unlike its counterpart, it was never found in flower. Gymnocalycium spegazzinii also started to appear; here as well as at many other locations we found only the odd plant or two in flower, with this curious characteristic of the flower only being half open. In addition, Opuntia longispina with its different spine coloration started to make its appearance.

The road now goes back to the eastern side of the valley, enforcing a further river crossing, but of modest proportion. Soon the first village of note appears, Chorrillos. No more than 6 to 8 houses strung along the river, their presence perhaps more obvious due to the several sturdy willow trees and the inevitable goats. The valley here is around 20 metres wide, with the river no more than 1 metre wide - at this time of year.

Moving further north towards Puerta Tastil, realistically a name only, the area started to look more like the Quebrada I had read about - striking scenery with colourful mountains exhibiting marvellous colour bands in the rock strata. At these times I could wish my knowledge of geology was better: alas all I can do is stare and enjoy.

The Trichocereus were now very dominant giving a real cactus scene. Almost on cue there appeared the cactus I had come to see - Pyrrhocactus umadeave. At first it was modest in size with quite a few mortalities but later on I was to discover many locations for this superb plant. These included establishing itself - along with the Gymnocalycium and Trichocereus - in the soft sandy river bed areas. The age of these plants in the river bed bore witness to the reduction of the river, now less than 1 metre wide and running quite close to the western slopes, maybe 1000 metres away. The best stands of cactus stretched back right into the mountains and amongst the T,atacamensis growing in a light clayish soil with a good deal of rock debris strewn around, could be found Pyrrhocactus umadeave, Parodia stuemeri, Gymnocalycium spegazzinii, Lobivia haematantha and two or three Opuntia forms. With the exception of the Lobivia all the species were found in flower and the Pyrrhocactus exhibited rings of newly formed fruit. By now we were at 2500 m but on our later visit we found that there were Pyrrhocactus lower down at around 2100 m.

Making our way still further north we visited Puente de Tastil, again more name than habitation with possibly two or three homes left. The valley opens out to its widest at this point as the road spurs off to follow a secondary Quebrada towards Pueblo Viejo. Again most of the afore-mentioned cacti are happy on the flat ground here except Parodia nivosa which can only be found amongst the rocks, usually on vertical faces.

Continuing our journey towards Santa Rosa de Tastil, the valley became much narrower and the road now ran at the base of vertical cliffs with the inevitable twists and turns. We made one last stop to find Parodia nivosa amongst the vertical rocks. The pure white spines of the plants lower down the Quebrada were now mixed with dark brown forms, yet everything else remained the same as before, the size and the fruit - although there were still no flowers. On the flat ground or where the incline was less severe, Pyrrhocactus were to be found, along with a Tephrocactus species which was

very similar in form and habit to those I have seen on the Chilean side.

Now we had to return to Salta. This is not the place to be when darkness falls. However I rearranged my schedule in order to return, as this was not a place simply to visit fleetingly and I wanted more time to explore the fascination of the Quebrada del Toro. Rescheduling my flights I was able to return with K. Preston-Mafham for a further two days, a little under a week later.

The return journey to Santa Rosa de Tastil took almost the same length of time, as we undertook a more detailed study of the flora encountered. Without the need to be back in Salta before darkness fell, the extension to our first day allowed us to continue our study of the distribution of P.umadeave and to continue our search for anything we had missed on our first visit. By now our main priority was to locate Rebutia einsteinii which had eluded us all hitherto.

The journey from Santa Rosa de Tastil to San Antonio de los Cobres continues through some difficult terrain as the valley becomes steep and narrow. Soon the familiar sight of stands of Trichocereus "disappearing" into the distant mountains makes way for precipitous cliffs and tortuous bends. Ascending these cliffs one almost immediately comes into contact with Parodia nivosa whilst Pyrrhocactus umadeave and Trichocereus now inhabit the relatively small flat and gently sloping areas.

As the afternoon drew on the temperature dropped sharply and it was time to make camp. In this wilderness we came upon a small hamlet, El Huiaco, complete with church and a number of buildings. One of these seemed to exist simply as a staging post for the regular bus from San Antonio or Chile and the timing of our arrival could not have been better as fresh chicken had just been prepared, presumably awaiting the arrival of the bus from Chile. At the same time we were allowed to pitch our tent within their grounds, thus affording us some protection from what was to be a very cold night.

Next morning we continued our journey observing the Pyrrhocactus and Trichocereus en route. Shortly before Las Cuevas the road enters a plateau; on the one side is a highland plateau complete with grazing Alpacas. Fairly flat and extending into the distance it appeared to be very moist in places. On the other side where the gentle slope took immediate effect, the area was covered with marvellous Pyrrhocactus umadeave. All sizes of plant could be found, again in flower and with newly formed fruit. Clearly altitude has little effect on the flowering time of this plant for here at 3400 m altitude the plants were in exactly the same season as those lower down at 2200 m.

Continuing up the incline we came across large plants of Lobivia chrysantha, flat to the ground and bearing short flower buds. In this environment it is difficult to predict their flowering time. Going into the rocky outcrops we also found Parodia. The books would have us believe that this is Parodia faustiana but I can see no justification for this name; it is simply the higher form of P.nivosa although here there are no white spined plants to be found. Again in fruit, but I am puzzled to know if this or other fruit we collected from Parodias really is this year's crop or that of a past season.

Continuing further north, it is almost impossible to find a suitable place to pull off the road. Having seen no other vehicle since we left our overnight stop, we therefore decided at an appropriate spot we would simply leave it on the road and trust to the handbrake. The westward side was steep but an easy climb and K.Preston-Mafham decided on this route for himself. I chose the descent into a small ravine with a modest, about 1 metre wide, shallow stream running between the road and the vertical rocks. On these rocky cliffs alongside the road I wandered in search of the elusive Rebutia. Tephrocactus can be found very similar to those growing in Chile across the border. Amongst the rocks also were beautiful specimens of Soehrensia korethroides with its golden or reddish spination. Then, almost as an afterthought, Rebutia einsteinii made an appearance, in circumstances that explained the difficulty we had had in locating it. Small solitary plants less than 1 cm high or wide sat in narrow cracks in the rocks. The adaption of cacti to their environment is one of the joys of plant hunting; this Rebutia, so common in cultivation, will long be remembered by me for its determination to survive in what is truly a bleak locality.

By now it was time to return in order to get some last minute photographs of the magnificent landscape. Nature has carved out some incredible sculpture in the sandstone. Moreover the colours, particularly intense now day length was drawing in, gave us a lasting impression on one of the prime cactus habitats.

.....from K.Gilmer

Almost all collectors travel with a vehicle along the roads and make stops here and there. When it is a narrow, winding, and tortuous road, as in sections of the Quebrada del Toro, it is only possible to make a stop and search for plants where there is a place to drive the vehicle off the road. In this region, where there are not many roads, scarcely anyone takes the trouble to travel with a mule or on foot for one or more days through the area well away from the roads. This is why I hold the view that there are many cacti growing in the South American Andes which will not be met with when travelling by jeep.

THIRD TIME LUCKY - THE QUEBRADA DEL TORO From K.Preston-Mafham

Slide talk given to the 1993 Chileans' Weekend

Our tour round northern Argentina in company with G.Charles, R.Ferryman, and C.Pugh, took in a quick trip up and down the Quebrada del Toro, before going on to the Quebrada Humahuaca. When our 4-man tour finished in Salta city, R.Ferryman and I decided to make a return trip to the Quebrada del Toro for a couple of days to stop at some different places and search for cacti. It would be about three weeks later when I again returned to the Quebrada del Toro on my own as there had been plants not in flower on our first two visits that I was still hoping to be able to catch out in flower.

Here we are, starting at the bottom end of the Quebrada del Toro, where the sky is overcast with clouds and it is quite damp. The clouds roll up from the east, funnel up the Quebrada del Toro and lose their moisture there as rain. So this lower end of the Quebrada supports ferns and deciduous woodland. As we go further into the Quebrada, there is less woodland and instead slopes with moss and ferns where cacti are found. The further you go up the Quebrada the drier it becomes, and the more cacti there are.

At our first stop, at the low end of the Quebrada, it was raining at the time so everything was quite wet. This was just below the bridge which carries the railway across the quebrada and here we found the first cacti. It was the classic Rebutia minuscula, which in reality is very little different from R.wessneriana or the R.senilis we saw in the Quebrada Escoipe. Then we saw Rebutia deminuta. To give you an idea of how damp the habitat is where the Rebutias grow, there are also two species of fern here, one of them a maidenhair fern, which classically grows in damp conditions. The other cacti growing here is Echinopsis ancistrophora, which also grows on these steep cliffs, as well as a single stemmed Trichocereus which is possibly T.schickendantzii. This plant only occurred in small numbers with one or two here and

there and none of them were taller than about two and a half feet high, almost club shaped. When we first saw it there seemed to be a possibility that it was just a young T.terscheckii and I was arguing about this with R.Ferryman when we found a plant about a foot high with four dead flowers, so it obviously was not a young T.terscheckii.

In the perplexing way that cacti have of changing their appearance somewhat, the Rebutia at this spot are fairly densely spined with spines which are pale or glossy, and they have a pale orange flower. At this locality we find Rebutia growing in beds of pure moss. There are hundreds of them growing here, but they do not grow every where, rather they favour outcrops of rock with patches of moss or patches of soil in cracks between the rocks. They do not grow on the bare open areas of soil between the rocks.

Now we go some way further on up the valley where there is a flat area, not far from El Alisal. But at the side there are rocky walls where the ferns extend a long way up; growing with them in the rain, R.deminuta and R.minuscula. Cleistocactus are hanging on to sheer rocky walls, growing in notches and ledges; often it is impossible to get anywhere near them. The E.ancistrophora were all in bud at the time of our first visit to this spot and then when we returned some ten days' later they were all in flower. The flowers differ so much within the one population, both in the thinness of the tube and in the size of the flower.

About two km above the highways department depot, just where the road crosses the river on a good concrete raft, we came to steep dark coloured rocky outcrops on which Parodia nivosa was growing. You could see where they were growing, as white spots in amongst the Bromeliads. On our first trip up the Quebrada del Toro I had not realised that the P.nivosa started so low down in the valley as here near El Candado. Most P.nivosa are recorded as seen from Chorrillos or above, but they do start considerably below that. At this spot the P.nivosa are growing on the steep rocks alongside the water-loving Rebutia deminuta, which soon disappear as we go further up the valley as it becomes drier, but the Parodia nivosa forms go right up to Las Cuevas, where they become P.faustiana, which is a considerable range of altitude. Two P.nivosa were in flower here, and whilst I could get up the cliff to look at them virtually face to face, I had to hang on with both hands and so I had no hand free for taking a photograph. On these cliffs on the south side of the Quebrada there must be thousands of Parodia, where they are exposed to the sun. We found no Parodias on the cliffs on the north side of the Quebrada. On the north side of the Quebrada there were still cliffs here on which Bromeliads grew and both R.deminuta and R.minuscula grew there. The R.deminuta growing here have a consistently smaller, darker orange, flower and a consistently darker green body, with consistently darker coloured gingery-brown spines. None of the flowers on this population looked to be the same as the pale flowers on the population lower down the valley.

As one gets further into the Quebrada it becomes drier - there must be less rainfall because the clouds do not get up as far as this, above Chorrillos. Now the Cleistocactus jujuyensis are not growing on the cliffs any longer, but are growing on the flats where conditions are dryer. Growing with them now is Gymnocalycium spegazzinii, which is in flower here. Now we also find Parodia stuemeri for the first time, which also must prefer the drier conditions, but P.nivosa still grows here alongside the P.stuemeri. There are also a few Rebutia minuscula which are now in much drier conditions than they were growing in lower down the valley.

It was immediately after a road check point that I found the first Pyrrhocactus umadeave - this on the last of my three visits to the Quebrada. They were quite respectable sized plants. On the previous two visits we had been about 35 km and 12 km respectively further up the valley from here before we found P.umadeave. This was also where I found the first L.chrysantha. Of course it could be growing even lower down the valley and we simply did not see it, but from this point onward it mostly occurred in association with P.umadeave. Higher up the valley, L.chrysantha more commonly occurred in association with P.faustiana. All the L.chrysantha grew almost flush with the surface of the ground, although much further up the valley we did find two or three big ones. They occur over a considerable length of the valley and so there must be hundreds and thousands of them, but they are certainly not easy plants to find. The thunderstorm that chased me back from Iruya brought torrential rainfall to Salta and to the lower part of the Quebrada del Toro, but there was no sign of a drop of rain having fallen from the point where P.umadeave started and thereon up the valley. But the faustiana form of the P.nivosa which grows down in the wet area at the bottom of the valley, still grows up into the dry parts. There were buds on the L.chrysantha on our first visit to the Quebrada, but they showed no sign of having changed, or grown any larger, when I made my last visit there. My suspicion is that the flowers will open shortly after the first rains arrive. On those I tested, all the buds were firm.

At the spot the first P.umadeave are to be found, there was a form of Parodia stuemeri with rather strange yellowish-brown flowers, which was the only place where I found them with this flower colour. There were also P.stuemeri with the ordinary red/orange flower. The Pyrrhocactus umadeave were quite large plants. On the other hand the P.nivosa do not get very big, up to 7 or 8 cm in diameter at the most, but they occur by the thousands.

South of Puerta Tastil at Km 75, there were many Trichocereus atacamensis, thousands of Pyrrhocactus umadeave and lots of Parodia stuemeri scattered around. This was the first place where we saw P.umadeave on our first visit to the Quebrada, so on that occasion we had driven for some 30 km without seeing these plants from the car. Here the plants were indeed fairly big, but the largest plants of P.umadeave were higher up the valley. They grow mostly on alluvial fans at the base of the cliffs. On this site were the typical yellow flowered P.stuemeri, mixed with the normal red flowered plants. Here the Trichocereus pasacana were in flower. We found a seedling plant only 30 cm tall yet the spines were several times as long as the diameter of the plant. Gymnocalycium spegazzinii was pretty common here too, but then it had been pretty common at each stopping place after we first sighted it, which was above the lower, wetter, part of the valley. They are almost always shrunken down into the ground. It peters out before we found L.ferox.

From here I went up to Las Cuevas which is at quite a high altitude. It was here where the largest of the P.umadeave were seen - a great big barrel some 60 cm high and 25 cm across, in full flower. We also saw reasonable natural regeneration to judge by the seedlings. We saw the natives walking back from the higher ground carrying great bundles of brushwood on their backs, which is all they have for cooking. This may work for a number of years but it only needs a couple of years of drought for many bushes to be cut down and none of the seedlings to become established.

Now we are well above Las Cuevas, where lots of L.ferox grow. This, I suspect, is the most southerly known locality for this sort. Each population of L.ferox we saw was rather different to the others. There were two plants here with open flowers, and lots of big buds, unlike the other sites where we found this plant without any flowers. All of the surrounding slopes carry thousands of L.chrysantha, many of them multi-headed, either occurring like that naturally or due to grazing. The commonest plant here is Parodia faustiana, which was named without knowledge of its habitat location, its ecology, or its natural variation. Two-thirds the way up the Quebrada del Toro, between Puerta Tastil and Santa Rosa de Tastil, you find populations of these Parodia made up of both white-spined and dark-spined plants growing together. In other words this is the transition zone where conditions start to change and the even tougher and shorter, darker spines obviously have some selective advantage. These are intermediate plants between nivosa and faustiana.

There were thousands of these plants here and we were able to collect quite a lot of seed at this intermediate zone, as well as from nivosa further down and faustiana further up. Other cactus travellers who have been to the Quebrada del Toro must have either not seen these transition plants or conveniently failed to report them.

A little further on we saw Soehrensia formosa v.nivalis again. Of all the globular cacti this is the one that occurs at the highest altitude. In the cliffs above them, R.Ferryman at last found some tiny plants of Rebutia einsteinii, without flowers. Above this only the Tephrocacti are found.

.....from H.Middleditch

On the occasion of his visit to the Quebrada del Toro, Fric did not leave Tucuman prior to 8 January so it would be approaching mid-January at the earliest when he found Lobivia chrysantha in flower "like a field of dandelions". Vatter tells us that he collected his Lobivia from the Quebrada del Toro in February "at the end of the flowering season". It was 22 November and mid-December when K.Preston-Mafham visited this location and did not find these plants out in flower, but only in bud.

.....from M.Nilsson

The Lobivia chrysantha which we found growing near Las Cuevas were on gentle slopes or local "terraces" on the mountain. These plants are usually flat, level with the surface of the ground. Some plants, especially near the village, were very large, having dozens of heads.

.....from H.Middleditch

The short stemmed, unbranched, Trichocereus found in the lower part of the Quebrada del Toro were tentatively identified as T.schickendantzii. My recollection of cultivated plants of T.schickendantzii is of a multi-headed clump of fairly stout bodied plants and certainly not of a single-stemmed plant. However, in his review of Trichocereus Kiesling states quite plainly that this species can grow "simple or caespitose, up to 60 cm in height, rarely much more". This height is a reasonable match for the plants observed by K.Preston-Mafham. It is also observed by Kiesling that it occurs on "humid slopes in the mountains at the upper edge of the selva or on rocky patches within it" which also appears to fit in with circumstances at the lower, forested, end of the Quebrada del Toro. Also according to Kiesling, in some places "it occurs together with Cleistocactus hyalacanthus and Rebutia sp." which certainly seems to be the case here, even if not all growing together side by side.

.....from K.Preston-Mafham

My own impression of T.schickendantzii was also of a clumping plant which is why I was so dubious about using this name at this spot, but the data from Kiesling definitely fits the plants we saw. The spines on these plants were certainly very short by comparison with the spines on the young plants of T.pasacana which we saw later. We did not have to do much in the way of climbing to get to them as they were no great distance from the road. As far as I am aware this plant has not been reported from here by any one else.

.....from H.Middleditch

A search through the Chileans field number compendium has revealed that T.schickendantzii was reported from El Mollar, Quebrada del Toro, by J.Lambert in 1986. The altitude here was given as 1600 m which again fits in with Kiesling's figures of 1500 to 2000 m which he gives as the altitude at which this sort was to be found. It has also been reported by K.Gilmer who found it in this area in 1990.

.....from J.Lambert

The Tr. schickendantzii which I found at El Mollar were only young plants, growing on a cliff, with very little soil indeed. At that spot the other vegetation was sparse bushes, grass, and some small clustering plants. Other cacti there were Cleistocactus hyalacanthus and Opuntias.

.....from H.Middleditch

Entering the Quebrada del Toro, El Mollar is barely seven or eight km from Campo Quijano. It seems to be probable that this was quite close to where the 4-man party stopped and came across T.schickendantzii.

.....from K.Preston-Mafham

I would not be absolutely sure of this being our stopping point, as I do not really know how our record of locations by km along the road relates to the names on the map.

.....from K.Gilmer

About the Trichocereus which we found near El Alisal, I must observe that a species of this genus has been described which comes from the lower lying parts of the provinces Salta and Jujuy. It is certainly closely related to T.pasacana but differs from that species in respect of a number of characteristics. This is T.volcanensis. In young plants the growth form as well as the spination matches that of T.pasacana, but the mature plants of the two species may be readily distinguished from one another, for by comparison with T.pasacana, T.volcanensis gives the impression of being almost naked on account of the few and above all very short spines. Whether it would be correct to apply this name to the plants we saw near El Alisal, I would not like to say.

.....from G.Charles

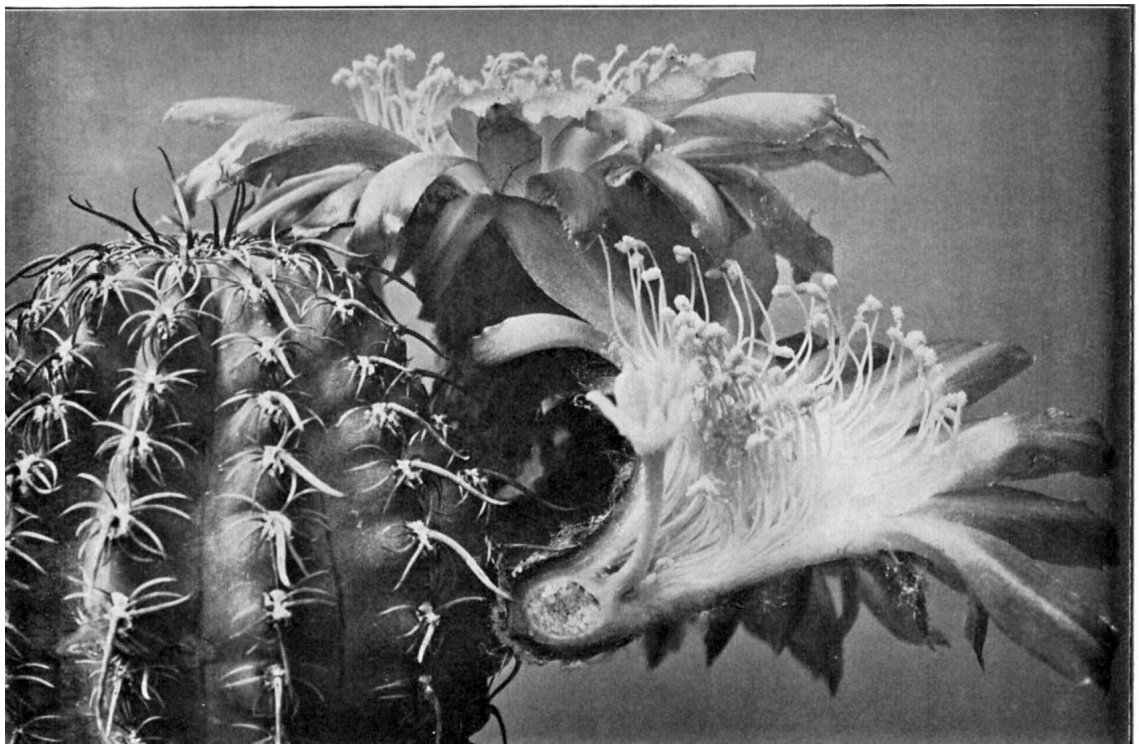
The Trichocereus from the lower end of the Quebrada was a short cylindric plant with short spines, exactly like the "British Standard" T.schickendantzii, which I think it may well be. I really do not think that this could be a seedling of T.pasacana since there were no tall plants growing here and the T.pasacana did not appear to like such a damp environment. Once the damper woodland is left behind, then the Trichocerei can be seen in dense stands on the slopes. The T.pasacana were indeed in view on the mountain slopes for a considerable distance and in many places along the Quebrada del Toro. Further up, when the Pyrrhocactus appear, then the Trichocerei are at the side of the road, on the less steep slopes where we found the other cacti. The young ones, which have long golden spines, start to flower when less than a metre tall. As they get taller the spines get finer and whiter.

.....from J.Brickwood

Although the above account does mention finding plants of both P.nivosa and P.stuemeri out in flower, this is not my experience in cultivation. With me, both P.nivosa and P.faustiana flower in early to mid-summer, along with the microsperma sorts. The faustiana, in my experience, flowers a bit later than P.nivosa, but with some overlap between the two. In strong contrast, the P.stuemeri complex (stuemeri, tilcarensis, pseudostuemeri, setosa, fricii, gigantea, etc.,) flower much later in the year. I find that P.tilcarense is one of the last Parodias to flower each year - sometimes as late as September or even October. However, this performance is not necessarily relevant to their habitat flowering times. If I have learnt anything over the past years, it is that if you move a cactus just six inches in your greenhouse, it can behave quite differently. To quote an example, I keep some Sulcorebutias on a side shelf above the staging. Plants on this shelf are generally in full flower by the end of March, whilst those just a couple of feet below may not flower until May or

June!
.....from W.Verheulpen

My plants are overwintered indoors and usually I bring them out into the greenhouse in the first half of April. So I lose some growing time in early Spring. I do not keep any records of flowering times but from recollection the flowering times of P.faustiana and P.stuemeri are well apart. I am absolutely sure that the flowering times do not overlap. I have a feeling that it is P.faustiana and P.nivosa which usually bloom before the hottest period of summer (June-July), whilst the flowers usually appear on P.stuemeri in the second half of September to early October. Although some of these which flower in September do fit the original description of P.stuemeri, I am not certain whether they are stuemeri or tilcarense.



Andenea kuehnrichii (1.75 x natural size). Photo. K. Kreuzinger Succulenta 19.12.1937

ANDENEA KUEHNRICHII Fric & Kreuzinger sp.nov. By K.Kreuzinger
Translated by W.W.Atkinson from Succulenta 19.12,1937.

A.V.Fric brought back from his travels of 1928-29, which took him through the Andes area of north Argentina, many lobivioid Echinopsidae, among other new species, which have not been imported since. After about nine years of observations under European growing conditions, several of these species can be positively described.

Andenea kuehnrichii, or as Fric first named it Lobivia cincero and then Lobivia kuehnrichii, has maintained its typical characteristics, consistently during two generations in cultivation. Variations in this species are very slight; an occurrence seldom found in related species. Unjustified authors' ambitions and commercial pressures were the mainspring of very many so-called species. At this stage this prickly subject will not be further pursued. Neither will the question of the particular name Andenea, Lobivia, or Echinopsis, be discussed.

The original plants of our species exhibited a 6-15 cm taproot, a globular or short-cylindrical body 2-4 cm diameter, dull, brownish grey-green epidermis and continual vertical ribs. The epidermis was almost without exception corky right up to the apex; also the spines were almost unrecognisably damaged as well as frayed or just broken off. Probably all these conditions were caused by the ravages of the prevailing sandstorms in the area of the habitat. Multiple headed plants were very rare exceptions; and then damage to the growing point was always found.

The following description is based upon grafted, intensively cultivated plants:

Body solitary, hardly ever forming offsets, egg-shaped to cylindrical, diameter 25-55 mm, and up to 130 mm tall; the top slightly depressed, bare except for a little wool on young areoles, from which the spines project. The interior of the body solid, central axis relatively large, diameter about half that of the body at its mid-height; with marked accumulation of cellulose and woodiness. Epidermis velvety matt grey-green, bronzed violet-brown. Between the ribs a dark, glossy, thread-like seam, vertical (or slightly sinuous) going down to the base of the body. Normally there are 11 ribs; often 12-13 ribs; exceptionally 9,10, or 14 ribs on mature specimens. Seedlings usually have 6 to 8 ribs for quite a long time, the central spine being absent - an immature form. In young seedlings the very long hypocotyl, about 12 mm long and 2-3 mm thick, is quite noticeable. Ribs usually vertical, occasionally slightly twisted; near to the crown, of equilateral triangular cross-section, though somewhat flattened nearer the base. A maximum of 11 mm broad and 4 mm

high, rib sides somewhat rounded, continuous, though noticeably bowed inwards above each areole, where the uppermost edge of the areole is sunken into the rib. Consequently the flat face of each single areole stands at roughly a half right angle (45°) to the crown of the rib. Areoles spaced 3-7 mm apart, oval 1.5 - 2.5 mm long and 1-2 mm wide; with short light grey wool when young; later becoming more or less completely bare. Radial spines 9 (-13) in total, spreading from the centre point and lying against the contour of the plant or also pressed against the flank of the ribs; in addition a group of 3(-5) spines pointing downwards and almost parallel, curved to lie against the face of the rib, 3-4 mm long, dark brown with onion-form swelling at base; also always two groups of spines, protruding right and left from the areole, each with 3(-4) glassy red-brown spines curved concavely downwards 3-6 mm long; of these the uppermost pair the longest. One needle-like, shiny, pitch-black, S-shaped central spine 5-10 mm long, 0.6 mm thick and with distinctly onion-shaped thickened base. This central spine projects vertically from the areole surface, then immediately bends sharply downwards; the tip of the spine is again bent slightly upwards, but never forming a hook.

This black, S-shaped central spine is the most striking characteristic of Andenea kuehnrichii; so far no other cactus species has been found with similar habit. A few specimens vary somewhat from the type with generally lighter coloured spination; light fox-brown-red to honey-yellow radial spines and black-brown to brown centrals. This attribute has, however, not proved to be hereditary.

Flowers appear at the side of the body from the upper part of old areoles, towards the end of May. The buds are thickly covered in white-grey felt. Pericarp brown-green, 8 mm diam., passing into the dull green tube, 30 mm long. Scales on pericarp and tube small, olive green with short violet-grey wool in the axils. Outer petals narrow, spathulate with light olive-green central stripe, darker tip and copper-red sides. Inner petals narrow, parallel-sided with truncated end, spreading out flat or with sides rolled under; after unfurling, orange to copper-red, on the second day more light ochre with light copper coloured sides. Hymen 20 mm diam., white; throat silky white. Stamens arranged in three groups in the tube. They all have white filaments and chrome-yellow anthers. The first group of stamens completely fused with the tube wall up to the hymen, then free for 9-10 mm, encircling the hymen in a loose ring. The second group of stamens fused with the tube wall from the base to about 11 mm up the tube, then free; the third group of stamens forming a circle on the tube wall, attached at 2 mm above the base, free from there and closely surrounding the pistil. The stamens of the second group also enclose the pistil though much more loosely. The hymen, the anthers of the second and third group of stamens and the stigma lie at about the same height in one plane. Pistil 21 mm long and 1.2 mm thick, yellowish light green at the base, then lighter, and above (under the stigma) shaded light brownish. Stigma light green, open funneliform with 9-13 lobes, 6 mm long.

Total size of open flower; 35 mm long, 55-60 mm diameter. In full sun or on hot days, flower opens for only one day; when cooler or cloudy, 2-3 days. It opens rotate in the mornings and closes again after midday.

Fruit is ripe in about two months and then bursts open longitudinally (meridionally); a slightly shiny, blackish violet-brown berry 18-25 mm long, 15-20 mm in diameter, with small 1 mm long pointed triangular scales, about 6 mm apart and with very little light grey-brown wool in the axils. Fruit flesh semi-dry, white. Seeds roundish, globular, 1-1.2 mm diameter with 0.7 mm concave hilum, surface dull and blackish grey-green; round the hilum, shiny green.

Habitat, Salta province, Argentina. According to an indian girl, who was sent out to collect a plant regarded as medicinal (a species of Rebutia) and brought back instead Andenea kuehnrichii, this latter grows in the Cerro Cincero. Exactly where this mountain lies, Fric does not know. However, the girl went westwards from Estancia del Toro, and took four days for the journey there and back.

When first imported, Fric named the plant provisionally as Lobivia cincero (see despatch list "Neue Kakteen aus Sudamerikanischen Hochbirgen-Samnernte der botanische Expedition 1928/29 von A.V.Fric ubd Friedr. A.d.Haage jr vom April/ Mai 1929 Nr.33; bezw Nr.2033). In 1930 followed the positive naming, after the cactus amateur Lt.Col. P.M.Kuehnrich of Buch am Ammersee, Beieren. (See Moeller's Deutsche Gartnerzeitung 45 Jg., Heft 4, 1930 p.44; Erfurt). The species was first distributed under the name "Lobivia cincero Fric". Although nobody knew then what the plant looked like, as neither photo nor description had been published, or where the growing area was, specimens of L.kuehnrichii were immediately offered by other importers (Stuemer among others) which had very little in common with the genuine L.kuehnrichii. Later, Fric gave a terse description in Kaktusar 2, No.8, 1931. p.83; Brun: "....There still remains to be mentioned Lob. kuehnrichii Fric. sp. nov., which is distinguished by a short, S shaped central spine, with shiny velvety orange flowers and a ready propensity for flowering, from an altitude of more than 5000 metres."

Finally some cultivation notes. As with all tap-rooted Lobivioideae from the high Andes, Andenea kuehnrichii produces problems when grown on its own roots in European greenhouses. Efforts to root offsets usually fail. When tap-roots begin to form, these are exceptionally sensitive to moisture at the wrong time. Moreover the spination on plants cultivated on their own roots leaves much to be desired, so grafting on to good stocks such as low Piptanthocerei, or Harrisia jusbertii is to be recommended. Plants which are decapitated with the intention of producing offsets, produce such offsets only slowly and in small number. Andenea kuehnrichii remains at present rare and precious in our collections.

Grafted plants grow very slowly (the slowest of all Lobivioideae in my experience), but exceptionally beautifully spined. They flower every year without fail. The lighter spined forms grow faster and more freely than the darker spined types. Andenea kuehnrichii is sensitive in the Spring, to strong sunlight; in any case, more sensitive than other high-altitude species, and more sensitive than the green-grey epidermis would suggest.

.....from R.Crook

I have been able to locate copies of Moeller's Deutsche Gartner-Zeitung at Kew and the No.4 for 1930 includes an article by Fric discussing some of his finds. On p.44 he observes " One of the plants found at highest altitude was the Lobivia kuehnrichii Fric sp.nov. (provisional name L.cincero). However I found neither flowers nor seed. Imported plants do not appear to be tender, and I consider it to be one of the finest plants that I have found. I am busying myself with this and with the large flowering L.staffenii, klusacekii, and dragai."

.....from H.Middleditch

The original translation of the above Kreuzinger article from the German into Dutch was undertaken by A.F.H.Buining. As a forward to this article, a potted version of the description (not as terse, however as that appearing in the 1931 Kaktusar) is provided, in English, French, and German. The English version describes the plant as having "long turnip roots", the French version as "racines tubereuses longues", the German as "langen ruben-wurzlen", whilst the Dutch text gives "langen onderaardschen penwortel". The Dutch version appears to translate as "pen-roots", whilst my German dictionary offers a choice of turnip, carrot, or beetroot for white-, yellow-, or red-, "ruben" but there is no entry for "ruben" on its own.

.....from W.W.Atkinson

Yes indeed, the literal translation form the dutch is "pen root" i.e. a root like a pen - or a tap root as we would say. In dutch a carrot is simply wortel, or more often the diminuitive, worteltje.

.....from H.Middleditch

Hence it looks as though the "turnip root" in the English version is merely a facet of translation and not a feature of the plant. In the details of the flower the petals are described as "orange to copper-red", which might have possibly suggested more than a hint of red in the petal colour. However, the potted description merely describes the flowers as orange to light-ochre colour whilst the first publication of the name in Kaktusar also describes the flowers as orange. On balance it seems that the flowers are to be understood as more of a deep orange than with any distinct red colour.

The location of the Estancia de Toro can fortunately be established from the map provided by Fries (The Alpine Flora in Northern Argentina, 1905) which shows that it is in the upper reaches of the Quebrada de Toro. However, neither my American Geographic Society one million scale map of the area, nor the Argentine Automobile Club map of Salta offer me the least clue as to the whereabouts of the Cerro Cincero.

.....from M.Nilsson

You may find the enclosed copy map which covers the area of the Quebrada de Toro of some help, as it marks the Cerro Cencerro, although it does not seem to locate the Estancia de Toro; it is part of my large map of northern Argentina.

.....from H.Middleditch

Although this map from M.Nilsson does not locate the Estancia de Toro, it can be positioned with fair accuracy on the headwaters of the Quebrada del Toro, en route to Abra de Palomar, by a comparison with the Fries map. It certainly does locate the Cerro Cencerro which lies almost due west of the estimated location of the Estancia de Toro, itself probably lying at about 3300 m altitude. There is no spot height on the Cerro Cencerro so one is merely left with Fric's 5000 m altitude. At least this tells us with a fairly reasonable degree of precision where Fric acquired his Lobivia kuehnrichii.

LOBIVIA KUEHNRICHII Fric By A.F.H. Buining
From NC & SS Jnl June 1950

By chance a copy of a Czechoslovakian Journal "Zpravy, Czeskoslovenske kaktusarske spolecnosti" came into my hands last summer, which contained a description of a Lobivia kuehnrichii Fric & Pazout, page 1 including an illustration. This description, accompanied by a latin diagnosis included a very comprehensive annotation, but Pazout has worded it as if this magnificent plant, which Fric brought from the Argentine, had not yet had a valid description published. In this he is, however, mistaken. I wish to refer him to Succulenta 1937 pp.177-183, where this plant is dealt with in a very exhaustive manner by Fric & Kreuzinger and where a number of features are reported of which Pazout appears to be unaware. The possible argument that this article does not include a latin diagnosis of the plant does not hold good in view of the fact that the original short description can be found in Kaktusar Vol II, 1931. This short reference reads as follows "There still remains L.kuehnrichii Fric sp.nov. to be reported, which is distinguished by a short S-shaped central spine, has velvety, shiny orange flowers and is a prolific flowerer, growing at a height of more than 5000 metres."

As this brief description was published before 1 January 1935 it may most certainly be regarded as valid. As stated, the plant was subsequently dealt with in Succulenta and the description in question lacks nothing in clarity. This article was written by Kreuzinger, checked by Fric and translated by the author (A.F.H.Buining). In protest against the demand for the latin diagnosis which had by then become compulsory, a description was given in English, French, and German languages. I repeat the short diagnosis:-

Plant body solitary, globose to shortly cylindrical, with long turnip-root; epidermis smooth, greyish-green, (9-) 11 (-14) vertical ribs. Areoles oval, with 9 (-11) brown radial spines, I pitch-black "S" shaped central spine. Flowers orange to light ochre in colour with white throat; stigma light green. Fruit egg-shaped, dark brown-violet. Seeds globose, smooth, blackish grey-brown. Native country, Argentina, prov. Salta, at 5000 m above sea level.

The plants were discovered when, at the behest of Fric, an indian girl was instructed to search high up in the mountains for a species of Rebutia called "Cardencito del Christo" which, according to the indians, had medicinal properties. She started on her journey from a place called Estancio del Toro and set off in a westerly direction. The plant is said to grow on a mountain called Cerro Cincero. Four days later the girl returned with the plants which at first Fric provisionally named Lobivia Cincero Fric and which were afterwards given the name Lobivia kuehnrichii.

As the species grows very slowly, even when grafted, it has remained very rare. There is also a variety with a light coloured central spine. I am pleased to be able to provide Kreuzinger's original photograph which was published in Succulenta at the time.

.....from H.Middleditch

It is suggested here by Buining that the name Lobivia kuehnrichii is a valid one. On the other hand, when discussing L.chrysantha in the 1942 Beit. zur Sukk. & pflege, Backeberg intimated that Lobivia kuehnrichii should also be included within the chrysantha group. It had evidently been suggested to Backeberg that the name L.kuehnrichii was not only invalid, but only a catalogue name. It is indicated in Rausch Lobivia 1,2,3, p.124, and elsewhere, that the original publication of Lobivia kuehnrichii was by Fric in Kaktusar 1931. Fric apparently did not believe in providing a latin description for his new species names and also deposited very few specimens in a recognised, or in any, herbarium which would constitute a Type for the species. This may well invalidate the name of L.kuehnrichii.

....from R.Mottram

As this description was made in 1931, no latin description was needed as this requirement only formed part of the ICBN requirements from 1935 onwards; nor was a Type specimen required, since this was a requirement only after 1958. Hence if there was description then the name would be valid. Unfortunately many of the Fric names are to be found with a brief off-the-cuff comment, such as the fruit tasting sweet, but without any real description, in which case the name would indeed be invalid.

.....from H.Middleditch

Although the 1931 Fric description of L.kuehnrichii was indeed very brief, it appears that it did constitute a "description" within the requirements current at that time. Although the 1937 description did not include a latin diagnosis, it was not the first description, only a more comprehensive description. On this basis it would appear that the name

L.kuehnrichii is valid.

From Santa Rosa de Tastil Fric accompanied a mule train going northwards to the Salinas Grandes, for salt. It is quite possible that the mule train stopped at the Estancia Toro for a day or two to allow the mules to get a good feed. From that place to the Salinas Grandes and return, the animals may well have had to survive on their fat alone, provender being scarce to non-existent over that part of their route. The mule train may have proceeded on its way whilst Fric awaited the return of the indian girl. Which might explain why Fric needed to employ a guide and a cook from this point forward, leaving the company of the mule train.

.....from W.Rausch, Lobivia 1,2,3. p.116

It seems that the habitat stated for L.kuehnrichii in Kaktusar 1931 and by Buining In the N.C.& S.J. 1950/26 are somewhat obscure. I have been at "Concerro" (Cincero is incorrect); it rises only 4600 m and is in the distribution zone of Lobivia chrysantha Werd. The forms of L.kuehnrichii are found only further westwards on the other side of the Nevada Acay.

.....from H.Middleditch

In regard to the matter of Concerro or Cincero, we have seen previously in the pages of The Chileans quite a number of examples of the the vagaries of spelling of features and place names in South America and there is nothing to be gained by nit-picking over yet another instance of this. All reports indicate that, of the Lobivia discovered in the Quebrada del Toro, apart from the red flowering L.chorrillosensis, only orange or yellow flowered forms of L.chrysantha are to be found there. Hence there appears to be little difficulty in accepting Rausch's observation that the plants of L.kuehnrichii which he saw on the Cerro Cincero/Cencerro/Concerro are synonymous with L.chrysantha. What we do know quite positively is that Fric was never anywhere near "the other side of the Nevada Acay". In consequence the name Lobivia haematantha v.kuehnrichii (Fric) Rausch is applied to plants never described by Fric which were found at locations never visited by Fric.

Kreuzinger observed that the original plants of L.kuehnrichii were "corky right up to the apex, with spines almost unrecognisably damaged". We have been told by Bort, by Nilsson, and others, that L.chrysantha was found in the dry season in the Quebrada del Toro drawn right down into the ground so that the crown was just below surface level. It would hardly be surprising under these circumstances for the body to be corky below the crown. The action of the body retracting into the ground and (when adequate moisture was available) presumably pushing out again, would hardly improve the spination. If Kreuzinger had actually seen any of these virtually subterranean plants he would hardly have hypothesised about the corky body and damaged spines being brought about by the sandblasting effect of the wind.

.....from R.Purslow

The illustration of L.kuehnrichii in the 1937 copy of Succulenta displays what I call coat-hanger shaped central spines and which Kreuzinger describes as S shaped spines. None of my L.chrysantha have spines like this, but they do appear on plants which I am growing as L.pencapoma, presumably R.238. I have eight plants under this name, some grown from Kohres or De Herdt seed; the others were purchased as small plants from commercial nurseries but those were probably grown from seed from the same sources. The body size ranges between 30 to 60 mm in diameter and they have between 9 and 13 ribs. Not all the central spines are the coat-hanger shape, and especially on older plants some of the central spines are much longer - up to 40 mm long and point straight outwards or somewhat upwards, curving and twisting in various directions. The central spines are often nearly black, but range from buff, grey, to quite dark brown in colour. As is common to many plants, they are darker than the radial spines. The ribs are fairly blunt and only slightly notched between areoles; these notches become more evident on mature plants and are usually more conspicuous at the top of the plant rather than nearer the base. None of my plants have the quite deep and sharp notches between tubercles that can be seen on the plant illustrated in Succulenta, which is in flower. The act of flowering may have had a partial dehydrating effect on the plant and so increasing the notch-like feature between tubercles. Most of my own plants of L.pencapoma will start to flower at about four or five years of age, but because I do not encouraging rapid growth, that will be at about 25 to 30 mm in diameter. So far all of them have had light yellow to orange coloured flowers. The deepest orange might even be described as reddish orange - as shown in Rausch '85 p.62 on sp. La Poma. The fruit will be about half an inch in diameter at maturity, carrying many short hairs. It gradually dries up until it becomes a pale leathery brown colour and then splits, a section of the side wall opening partially outwards from the base. The seed does not fall out, even if the fruit is carefully detached from the plant.

By comparison with my L.chrysantha, these plants flower earlier in the season and the hair on the buds does not stand as neatly upright, nor is the rootstock so thick and substantial, but from the Kreuzinger description the name kuehnrichii would be equally applicable to them. The specific name pencapoma is a n.n. in any case.

.....from H.Middleditch

The L.pencapoma grown by R.Purslow does indeed display the same sort of S-shaped central spines upon which so much emphasis was placed in the original description of Lobivia kuehnrichii. The original Rausch field number list included R238a L.kuehnrichii and since R238 has been offered as L.pencapoma it could be assumed that the R238a also came from this locality. It is now possible to see why Rausch gained the impression that the original L.kuehnrichii came from near La Poma, where he found plants more or less matching the original description of that species, as opposed to Cerro Cincero where he evidently only came across plants similar to those of L.chrysantha which he had seen elsewhere in the Quebrada del Toro.

In the February 1936 catalogue of seeds offered by Robert Blossfeld, catalogue K 360 E, there is offered (on p.25) item 1241d Lobivia pencapoma. This entry does not seem to occur in the Blossfeld catalogues K 330 E for 1933 or catalogue K 370 E for 1937. Presumably this is the origin of the name Lobivia pencapoma Blossfeld n.n. It might be assumed that this entry referred to material originally collected from the vicinity of La Poma, north of Cachi.

.....from R.Moreton

My own plants of R.238 L.pencapoma and R.238a were raised from Kohres seed. They are now over two inches across the body. The R.238 has a slightly more bluish-green body colour and central spines spines up to a good inch and a half long, a pale pinkish-grey colour. Some of these long spines stand approximately upright, but others curve and twist about, mostly up or down, rarely sideways. Sometimes they have a quite sharply curved tip. Their appearance is something like those pictured on L.haematantha v.jasimanensis, Rausch Lobivia 85 p.139. A few of the central spines are much shorter - about one cm long - and are of the coat-hanger shape. The radial spines are mostly quite short by comparison. The R.238a have a more greeny-coloured body and tend to have fewer long central spines, most being about 20 mm long, rather more of them being the coat-hanger shape. None of my plants have a series of coat-hanger shaped central spines running up the rib, as displayed by the picture of L.kuehnrichii in the 1937 Succulenta. Nor do they have such distinct notching of the ribs into tubercles.

.....from H.Middleditch

No constructive observations appear to have been made by Rausch regarding either R.238 or R.238a, but the form with slim, lengthy, wandering, mainly near-vertical spination differs from that of L.chrysantha in any of its reported forms.

.....from P.A.Smart

I have four or five plants under the name of Lobivia pencapoma, but none of them carry the number R.238 or R.238a. One of them is an offset from a plant collected in habitat by Markus; it is some 40 mm across, slightly taller than hemispherical, a dull blue-grey colour, with very flat ribs indeed that are barely divided into tubercles. The central spines are quite eye-catching whilst the radials are almost insignificant by comparison. A great many of the central spines are of what has been described as "S" or coat hanger shape, approx. 25 mm long, a dusty grey-black colour. From the areole they curve to an outward and downward direction so that those from the upper areoles take up a nearly horizontal attitude. At about two thirds to three-quarter length they then start to curve slightly in an upward direction, ending in a quite sharp bend, almost a hook. One or two central spines of similar colour, length, and stoutness, differ in that the outer part curves to a downward bend, not upward.

Two more of my plants of L.pencapoma are what might be described as elongated globular, or even dwarf columnar, with green coloured bodies. The "S" shaped spines also appear on these plants, but in a minority, and only up to about 10 to 12 mm long, not stout, dark brown to black. The majority of the central spines on these two plants are quite slender, they wind and twist in various directions, some upright or nearly so.

.....from I.Hoffmann, C & S.J. U.S. Vol.56 1984

From Cafayate we went with Mr.Herzog on our planned two day trip to Cachi. From Cachi, we headed northwards towards La Poma over a rather tricky dirt road. In places it was not only narrow but seemed barely attached to the steep rock walls, although it was the highway leading to San Antonio de los Cobres. If this is a desert, it must be the wettest desert I have ever seen. Small streams or rivulets came down from every side canyon. Near La Poma was the place Mr. Herzog had promised to find Lobivia kuehnrichii for us. Talk about pain! Those plants are so tiny that it was nose-to-the-ground time again. When Mr. Herzog showed us the first plants, they were flush with the ground, But (wonders never ceased) they had seed capsules on them [April 1983].

.....from R.Purslow

I also have several plants of Piltz P.238 which carries short to long central spines. Most of the central spines are straight, pointing outwards or slightly downwards, but sharply bent or curved upwards at the tip. Some of the central spines curve downwards slightly from the areole and so are of almost coat-hanger shape. But the narrow, raised tubercles form almost discontinuous ribs. The flower colour is red to pale red, with a light coloured throat. The fruit also splits vertically.

.....from H.Middleditch

The entry in the Piltz field number list for P.238 reads Lobivia sp. aff. haematantha from Potrero, Salta, at 2500m. The name haematantha is used by Rausch for certain indigenous Lobivia which are found in the mountainous area which lies to the north, east, and southeast of Cachi. In this area there is a Potrero de Payogasta which lies in the mountains to the southeast of La Poma, and north-east of Payogasta, but at an altitude of about 3000m. Where does P.238 really come from?

.....from J.Piltz

The finding place of P.238 was at Potrero which is certainly north-east of Cachi. It is in the same general area in which Parodia lohaniana is to be found. The Lobivia haematantha from the area round Potrero flower exclusively with a red colour, whereas the Lobivia of this group from Cachipampa and La Poma flower in yellows, orange, and red colours. The central spines of P.238 are usually quite a bit longer than just 1 cm.

.....from R.Purslow

The plants received as Lau 459 were also reported to come from Potrero.

.....from H.Middleditch

It appears that Rausch has found plants near La Poma of which many bear a degree of similarity to those plants which were found by Fric in the Quebrada del Toro, and called L.kuehnrichii by Fric. The spination of R.238 is quite different and distinct from that on R.238a, but it is unclear whether it is one polymorphic population with transitions, or two forms which reproduce their own form of spination. The R.238/238a displays a range of flower colours from red to yellow, compared with the limited colour range of yellow to somewhat orange-yellow of L.kuehnrichii (syn. chrysantha). The red flowers and long spines of P.238 appear to bear fairly close resemblance to the red-flowered, long-spined form of R.238a. It is clearly not a simple matter to draw a hard and fast dividing line between species names in this area, especially considering the polymorphism in L.chrysantha and R.238/238a

.....from R.Purslow

There is a tendency for different groups of Lobivia from this area to converge in general floral and other characteristics, especially the feature of a dark throat, together with a grey-green epidermis and a thickened tap root. Where to draw the line between the various groups is an open-ended problem, but the obvious difference between the chrysantha-kuehnrichii complex and other Lobivias is to be found in the seed.

.....from H.Middleditch

One might reasonably assume that the "S" shape or coat-hanger shaped central spines seen in cultivation on plants of R.238 and R.238a, also appeared on plants near La Poma which were presumably seen in habitat by Rausch. The similarity between this spination and that not only described for Lobivia kuehnrichii but displayed clearly on photographs of that sort, probably led Rausch to associate his La Poma finds with L.kuehnrichii. In his Lobivia 85, Rausch gives the distribution of his L.haematantha v.kuehnrichii as the area between La Poma, via Tintin, to the head of the Cuesta de Obispo, and quotes Lobivia kuehnrichii Fric as a synonym. Evidently Rausch did not find the L.kuehnrichii Fric on Cerro Cincero and has concluded, incorrectly, that L.kuehnrichii Fric does not come from the Quebrada del Toro. Hence in Lobivia 85 Rausch fails to list L.kuehnrichii as a synonym of L.chrysantha. The Rausch name Lobivia haematantha v.kuehnrichii is perhaps unfortunate as in one sense it is misleading, despite the spination having similarities with the Lobivia kuehnrichii of Fric.

ECHINOCACTUS sp. No.2 By R.E Fries
Translated from Nova Acta Regiae Societatis Scientiarum Upsalensis Ser.IV Vol.1 1905.

Of very similar habit to the illustration of Echinocactus [Neoporteria] nidus Soehrens in Monatsch. fur Kakteenkunde X. 1900. However, since a description of this species has not been conveyed to me, I can not judge whether both of these two are identical or not.

Globular, 300-400 mm tall; ribs spirally arranged, divided into distinct tubercles. Areoles oval, furnished with felted wool. Radial spines and central spines scarcely distinguishable, 20-25 all together, up to 45 mm long, the outer more or less following the body contour, forming an extraordinarily dense tangle. The crown of the body is naked, the spines coming together over the top and enclosing it. The finer spines are white, the stronger ones are golden yellow at the foot, lilac coloured in the middle and violet at the tip. The flowers stand at a distance of a couple of cm from the growing point; they are yellowish-green, 35-40 mm long.

.....from A.V.Fric "Cacti for planting out in the rock garden" Moellers Deutsche Gartner-Zeitung Vol.45 No.4 1930

Of late, both myself and the firm which sells my seeds, have received enquiries about how one should cultivate the high mountain cacti, in such overwhelming numbers that I am not able to answer them all personally. Since I have acquired my customers for the large part through this journal, I am able to provide the answers here through the goodwill of the Editors. For the moment I am not able to answer in any positive manner, since I myself am still carrying out trials. In addition to my previous experiments I have to hand the (unfortunately too numerous) reports of my customers about their successes and failures.

The most problems are with Friesia umadeave Fric (gen. nov., sp.nov.). This new genus was discovered by the botanist Fries and described by him in 1905 as an Echinocactus sp. similar to Echns. nidus. Even at 2400m above sea level I found very handsome specimens, whose spine colour varied from black, brown, and red to white. Then I encountered it at 4400 m altitude with snow-white spines. The first test-sowing whilst still on board ship was satisfactory. On the other hand two sowings in the glasshouse produced nothing at all. In late summer I sowed some seed in the open air on the rock garden, and almost every seed germinated, for all that the seedlings were eaten by wood-lice. The reports from customers are very variable; between 0% and 90% was reported, but most of them however, were complaining about this particular species. The plant unquestionably requires plenty of air. I intend sowing in the open air under a fine wire gauze. I have saved few of the imported plants. Even Dahlem have not established them. As an import it appears to be one of the delicate plants. The rest of my stock are in good shape in cold frames. I have none planted out. Nor have I any seedlings. Seedlings which some of my customers have raised should flourish and be very hardy.

.....from R.Ferryman

Fries compares his plant of Echinocactus with the illustration of Neoporteria nidus in MfK, which may not be surprising at first glance. Both species have upward curved spines which are dense enough to obscure the body of the plant. Small to medium sized plants of P.umadeave, say 4" across, would bear a superficial resemblance to mature plants of N.nidus. The spination quoted by Fries is accurate but not consistent. Plants can be found with white to yellow spines which are darker at the tip. Violet tips may not be accurate, but I can understand what he means; I would prefer to suggest that dark straw to brown coloured tips are the more dominant.

.....from H.Middleditch

The plant we now know as Pyrrhocactus umadeave was quite probably the same as the plant described above by Fries as Echinocactus No.2 and subsequently by Fric as Friesia umadeave. It was probably found by Fric in January of 1929. We are told by Fric that he found it first at 2400m and then at 4400m altitude. The first altitude would correspond approximately to the height at which Puerta Tastil lies, in which area the plant has been found by later travellers. Although the figure of 4400m was quite probably an exaggeration like quite a few other similar figures quoted by Fric, a location approaching this altitude must lie outside the Quebrada del Toro. It can only be on the altiplano or on the slopes of the mountains bordering the part of the altiplano traversed by Fric, which lies between the Abra Palomar, El Moreno, and Tres Morros. This plant was subsequently reviewed by Werdermann in the October 1931 issue of the German Cactus Society Journal. This review was accompanied by a photograph taken by Ritter of a plant in habitat. In that review the finding place of Puerta Tastil was accredited to Ritter and the finding places of provinces Salta and Jujuy was accredited to Stuemer.

.....from F.Ritter. 40 Years' Adventuring, 1977

On 17 November 1930 I set foot on Peruvian soil for the first time in the harbour of Callao .... making a trip inland .... and left Callao again on 19 December 1930 by steamship for Mollendo. From there I went via Arequipa to La Paz and thence to Tupiza. In the following months I travelled widely in Bolivia, Argentine, and Chile, leaving Callao again on 14 May 1931 to return to my residence at Saltillo in Mexico.

.....from H.Middleditch

From the foregoing timetable it would appear that Ritter included the Quebrada del Toro in his itinerary during his travels through Argentine in the first half of 1931, at which time he would presumably have taken the photograph of this plant which appeared in the October 1931 issue of the D.K.G. Journal.

.....from R.Ferryman

When I look at the illustration of P.umadeave which first appeared in the Monat. der DKG, it looks different in some respects from what I take to be typical Pyrrhocactus. From the pick in the picture it is likely that this plant would be around 8 inches high. It is not easy to tell if the plant is carrying buds or fruits, but to me they look more like fruit with dried flower remains. They are not close to the centre of the plant and to judge by their proportions these fruits are much larger than I would have expected to see on Pyrrhocactus. Indeed they seem to be so large as to be almost beyond belief. Although I have had flowers on my P.umadeave, I have never been able to set fruit on it, much to my disappointment.

.....from H.Middleditch

From Werdermann's review in the M.DKG, we read that a living plant was sent by Hosseus to the Dahlem Botanical Garden in Berlin in 1928, but which expired before flowering. Fric evidently met with this plant in the course of his travels in the Andes, early in 1929. Shortly afterwards it was found by Ritter who provided both a photograph of the plant and a description of the fruit, which are incorporated in Werdermann's review. The photograph is stated to be "greatly reduced" for publication; if the plants in this photograph are fairly mature, with a body of some 200 mm in diameter, then the ring of flower buds and/or fruit is almost 100 mm in diameter. However, this does not tally with Fries' description of the flowers being "at a distance of a couple of cms from the growing point". On the other hand, Werdermann gives the flower disposition as "from areoles somewhat distant from the crown".

.....from F.Kattermann, "Eriosyce" 1994.

Werdermann's description was based on material from Ritter and Stuemer. However, the picture furnished by Ritter does not represent E.umadeave, but rather a form of Neochilenia curvispina. It is possible that Boedecker, from whom Werdermann received the material, mixed up the information.

.....from J.Lambert

I collected P. umadeave at Puerta Tastil, where the plants are abundant but medium sized, about 150mm across. However my friend Theys photographed and collected quite a big specimen of about 250-300mm across, some 30km further to the north-east near Las Cuevas. It is true that in P.umadeave the flowers and fruits appear on areoles at some distance from the apex. On the other hand, the fruits are not significantly larger than on other species of Pyrrhocactus; I would agree with the suggestion of a size of about 15 to 20mm. As a matter of fact the fruit does hardly protrude through the heavy spination.

.....from M.Nilsson

When we were travelling up the Quebrada del Toro we did find some old, dry fruits on Pyrrhocactus umadeave, but they are very rare. The unripe fruits that I found was 2-3 cms away from the growing point, dark green and more or less globular. The only ripe fruit were those that had got stuck among the dense spines. The size of the fruit would be about 15-20mm in diameter. In cultivation, germination of the seed that I had collected was very poor; there were only two seedlings and they did not survive.

.....from K.Gilmer

On our visit to northwest Argentina we drove south from Abra Pampa along Ruta 40, following the margin of the Salinas Grandes until we reached the turn-off for Purmamarca. We then took Ruta 52, the road to Purmamarca, which leads over the Abra de Pives to the Quebrada Humahuaca. As we approached the climb to the Abra de Pives, we took the rather poor road which comes in on the right, from El Moreno. After we had travelled barely half a km down this track, we came across some plants of Eriosyce umadeave. There were plants of all sizes here, with numerous young plants and seedlings. But on Ruta 40, between Pozo Colorado and the turn off for Ruta 52, we only saw large plants.

.....from H.Middleditch

The two foregoing locations, which lie about 20 km apart, are in Jujuy province, whereas the Quebrada del Toro is in Salta province. In 1931 Werdermann reported that Stuemer had collected P.umadeave in both Jujuy and Salta provinces; it might therefore be deduced that Stuemer had found this plant both in the Quebrada del Toro and also en route from Abra de Pives to El Moreno, prior to 1931. However, the two locations for this plant reported by K.Gilmer, both only short distances off the road from Purmamarca via Abra de Pives to El Moreno, do not appear to have been visited by any of the many travellers who have travelled this route since 1931.

.....from J.Lambert

When I went to El Moreno, I took the road which goes to that place from Tres Morros, both coming and going, as the dirt track beyond El Moreno in the direction of the Abra de Pives was in too poor shape to risk it.

.....from K.Gilmer

We were unable to travel any further south along the poor road branching off from Ruta 52, because it had been destroyed by rain.

.....from H.Middleditch

In his original description of Echinocactus II, Fries gave the finding location as El Moreno. This place was where he pitched his camp on October 15th 1901 and from whence he made "longer or shorter excursions" into the surroundings over the course of the following two months. These took him, amongst other places, eastwards to Laguna Colorado which is no great distance from the start of the ascent to the Abra de Pives, southwards to Nevado de Chani, and westwards in the direction of San Antonio de Los Cobres. Apart from El Moreno itself there are few, if any, other place names in this particular corner of the altiplano, so that any find from this area was likely to have been recorded by Fries as from El Moreno. Up to the present time there does not appear to have been any report of P.umadeave being found at a specific location outside the Quebrada del Toro; hence the foregoing observations by K.Gilmer are the first recorded sighting of this plant (that I am aware of) in the area investigated by Fries. This record gives support to the suggestion made by Kiesling that Echinocactus II of Fries could well be P.umadeave. Moreover, a photograph of P. umadeave taken at the Ruta 40 location by K.Gilmer is of a plant completely enveloped by upswept spines which form almost a shell round the exterior of the body, just like the illustration of Neoporteria nidus in the DKG Journal for the year 1900, to which Fries refers.

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

Our second headquarters was made at Moreno, about 11,500 ft above sea level. The vegetable formation is a "puna", a dry high-lying plain with low bushes. The central point of the puna contains a large salt lake or salt marsh, the shores bearing sparse halophytic vegetation. Animal life is very deficient. High fells surround this elevated tableland, the highest being Nevado de Chani, about 20,000 ft. The mountain slopes bear numerous cacti, many with beautiful flowers. The rainfall of the puna is very slight, the puna forming a closed water-basin. The streams are few in number and come to an abrupt termination. The brooks simply carry down to the plain the fine silt and sand, leaving stones and gravel in the vicinity of the mountain, the salina only receiving the salts dissolved in the water. There are large fields of drift sand. The central portion of the salina consists of common salt. The salt crystallises into visible layers, from which the Puna indians hew out blocks of about 25 kilogms in weight, two of these forming the normal burden of a donkey. These Puna Indians then take the salt to the valleys for sale. Numerous excursions were made from Moreno to most parts of the Puna. Nevado de Chani was climbed by Fries, Rosen, and von Hofsten. Another excursion undertaken by Fries et al was pushed as far west as the Puna de Atacama.

.....from H.Middleditch

It was probably one of these self-same salt caravans which Fric joined during his spell in the Quebrada del Toro.

.....from R.Ferryman

The trip to Argentina made with G.Charles, C.Pugh, and K.Preston-Mafham involved a timetable which enabled many stops to be made but with a limited amount of time at each. The trip culminated for me at Salta. The group travelled to Quebrada del Toro where we spent an extremely interesting day amongst a whole variety of species and forms. For me this single day was quite inadequate for such a mecca for cactus, and together with K.Preston-Mafham I stayed for a further three days, subsequently flying back to Buenos Aires. The second trip to the Quebrada del Toro proved enlightening and I was able to trace the distribution of Pyrrhocactus umadeave to elevations and terrain previously unknown to me.

Indeed, one of the major successes of the Argentine trip was the chance to study P.umadeave at first hand. This

species is rarely encountered in cultivation and has a reputation for being virtually impossible to grow. This reputation is also encountered when discussing Eriosyce. My own efforts certainly confirm these two genera are most challenging. I have yet to see plants of either genera well grown and flowering in any collection, with the exception of a few grafted specimens. I therefore endeavoured to record as much detail as possible whilst I was in the Quebrada del Toro.

It was good to see plants flowering at 8 cm diameter, not isolated plants but the major part of the population. Specimens of P.umadeave reach 50 cm in diameter and the same in height. Superficially, these larger plants do look very similar to Eriosyce as indeed do a number of "spiny" Neoporterianae from Chile, notably N.eriosyzoides. However, this obvious characteristic is shared by many globular cacti within Echinocactus. The fruit of P.umadeave is quite different from that of Eriosyce. I was only able to collect old fruits from P.umadeave during my visit, not many, only 2 or 3 despite concentrated searching. These were globular and obviously dry but around 15 mm in diameter - if anything, slightly longer than broad. Like Austrocactus, the seed is not easy to germinate. I prefer not to use heat but sow around January in the normal glasshouse environment and confess to being satisfied with 10% germination.

.....from H.Middleditch

Pyrrhocactus umadeave has been reported from the Quebrada del Toro, where it was found by K.Preston-Mafham et al. at an altitude of around 2500m. It has been reported by J.Lambert at Puerta Tastil at 2600 m. by M. Nilsson from higher up the quebrada at Santa Rosa at 3200 m., and by Ritter from "2500 - 3000 m." The plants seen by K.Gilmer on the altiplano could well be at about 3450m altitude.

.....from F.Kattermann, "Eriosyce" 1994

Plants of .... P.umadeave have regular snow cover and growing at 3000 m altitude is frost hardy. [They] must reach a large size before flowering.

.....from H.Middleditch

Travellers in the habitat of P.umadeave not infrequently refer to the very high snow-line in that area of the Andes; hence I have reservations about the accuracy of this first comment by F.Kattermann. Unless he means a snow shower which covers the ground for no longer than a day or so. But that is hardly regular snow cover. Regarding size, as observed by J.Lambert, these plants grow to a fairly large size in habitat. It was reported by R.E.Fries as up to 400 mm tall. Of the large imported plants of P.umadeave which came into this country about twelve to fifteen years ago, few attained 10 to 12 inches in diameter. Those collectors who obtained these plants report an almost universal lack of success in establishing them.

.....from P.Bint

I have seen several collections in and around Manchester where large imported plants of Pyrrhocactus umadeave resided as a result of purchases from nurseries like Jumanery, Whitestones, etc. Unfortunately none of them ever managed to become established and although some of them did grow somewhat, it was from inner plant strength rather than from root production. None ever flowered. I suspect that that will be the message from anyone who bought them. At the moment I am growing some from seed and even they are far from easy, some of them are succumbing already.

PYRRHOCACTUS UMADEAVE FROM SEED.

.....from R.Moreton

What do you know of the habitats of the Argentine Pyrrhocactus? Would it throw any light on why P.strausianus is easy from seed, P.bulbocalyx is not too bad, but P.umadeave is very difficult?

....from R.Ferryman

Like R.Moreton, my experience of growing P.umadeave from seed has been frustrated because of poor germination. As yet however I am not sure if it is simply that poor germination is typical of this species or simply that seed supplies are not as fresh as they should be. Several Chilean members have told me that Eriosyce, too, are impossible to germinate but my own experience of seed of this genus which I have collected myself refutes this, they germinate very well for me.

Seed of P.umadeave has been obtained from R.Kiesling and from various commercial sources, but I have succeeded in growing on only three plants, all ex-Kiesling seed, but nothing at all from commercial sources. The large imported plants of a decade or so ago are probably no more. I did not manage to purchase one and had to wait until R.Mottram bought in a batch from Frau Muhr - much smaller plants, but by all accounts equally as difficult to keep. In this respect they remind me very much of Eriosyce, both are near to impossible to establish as imports and seed raised plants are hardly ever seen in collections, Why? Are we missing some vital cultivation clue? Eriosyce are to be found at altitudes ranging from sea level up to almost 2000 m but irrespective of their location they are difficult.

.....from J.Griffin

Having sown what seems like hundreds of seeds of Eriosyce, I have still only got a handful of seedlings. Even though I have tried scarifying some of the seed with sandpaper, it did not seem to bring about any improvement in germination.

....from H.Middleditch

These are not the first comments about the poor germination from seed of Pyrrhocactus umadeave. In the above report by Fric from the 1930 Moellers Deutscher Gartnerzeitung it is evident that he and his customers both encountered poor germination results with the seed.

The species was originally described by Fries in 1905, as "globular, 300-400 mm high"; presumably being more or less globular it would equally attain a diameter of 12 to 16 inches. The height of 16" will undoubtedly be exceeded by many Neoporteria, but the globular size of P.umadeave is far larger than might be expected for any other sort of Neoporterianae.

According to the data conveyed by Ritter to Werdermann, the fruit of P.umadeave was elongated-ellipsoid, 30-40 mm long and 15-20 mm broad, pale brownish. In general terms this size of fruit is appreciably larger in bulk than the fruit that are normally produced on Neoporterianae, many of which do carry fruit that are 30-40 mm tall but from my own experience in cultivation, are slender club-shaped.

Compared with the other Neoporterianae, P.umadeave grows to about twice the globular size, it carries flowers and fruit further away from the growing point, the fruit is larger and of a different colour, whose seed is not easy to germinate, and mature habitat plants are far more difficult to establish in cultivation. In all these respects the plant more closely resembles the characteristics to be found in Eriosyce. This may provide an indication of why the seeds have proved to be as difficult to germinate as Eriosyce.

....from R.Ferryman

Now as to body size, there are few Neoporteria that reach the size of body of 300-400 mm quoted by Werdermann for P.umadeave, one such exception being the coastal forms of subgibbosa. As to transitensis, this was never seen by me at anything over 200 mm high, but on the other hand, N.eriosyzoides can and does reach such heights, I have illustrations of this plant growing near Huanta at certainly 400 mm tall.

There is some similarity between N.eriosyzoides and P. umadeave; both are extremely stately plants, taller than broad with dense spination. One can find N.eriosyzoides up to 2300 m (KK says 2800 m.!). There is very little similarity in the fruit, however as N.eriosyzoides has more or less globular fruits of 10-20 mm in diameter, this according to the size of the plant.

.....from H.Middleditch

Might this last comment suggest that the size of fruit on P.umadeave reported (above) by J.Lambert at 15-20 mm was due to it being on a plant of only modest size? In regard to the seed itself, is the seed of P.umadeave similar in appearance to seeds of other Pyrrhocactus (Berger) or is it closer to Eriosyce?

.....from R.Moreton

As it happens I have a good selection of species of Argentinian Pyrrhocactus seeds just at the moment, most already sown, but I have managed to salvage a seed or two from each, or the husk of a germinated seed. All but two of these have the testa covered with a very thin outer skin; if this outer skin is rubbed off, the individual testa cells then become very conspicuous. The odd ones out are P.strausianus and P.umadeave, both being quite remarkably ribbed without any conspicuous cell structure. On these the outer covering seems to be very adherent. The seed of Eriosyce ceratistes is about 3 to 4 times as large as that of the Argentinian Pyrrhocactus.

The rib-like contouring of the seed of P.umadeave is shown in Fig. 8F of the Buxbaum-Krainz folio on Pyrrhocactus. However, there seem to be one or two anomalies in this work. They show Fig 8 as P. umadeave FR 32 and call it a primitive sort, yet Fig 9i shows P.froelichianus FR 32 and they call it a transitional sort, although the two diagrams of strongly ribbed seed seem to be virtually identical.

Looking at the Buxbaum Morphology of cacti, this illustrates a seed of Neochilenia jussieui which is of similar ribbed appearance to that of P. umadeave. Perhaps there are seeds of other species of both Neochilenia and Pyrrhocactus which display this same ribbed characteristic? Both from the size and appearance of the seed, P. umadeave seems to have nothing to do with Eriosyce.

.....from H.Middleditch

In regard to habitat, there may be one significant respect in which P.umadeave differs from all the other Pyrrhocactus (Berger) which are found in Argentina, and that is the altitude at which it grows. We have heard from R.Ferryman at The Chileans' Weekends that the Neoporterianae which he has come across in central Chile become more and more difficult to find as altitude approaches some 2000m, although occasional examples are to be found above this altitude. I had gained the impression that they did not rise up to 2500 m; however, in the RMF Field Number list I see that there is RMF 257 P.andicolus near Central Molles recorded from 2800 m. Does this mean that they commonly reach a higher altitude than I believed? In Chileans' No.45 the Argentinian Pyrrhocactus were reviewed and available evidence presented there suggested that these plants were to be found within an altitude band between 900 and 1400 m. By comparison it appears that P.umadeave grows at at higher elevation than most other Neoporterianae.

.....from R.Ferryman

But 2800 m altitude is exceptional for Neoporteria. In fact where RMF 257 was found on a mountain slope, the summit was no more than 50 m higher. It has to be said that not too much work has to be done at the higher altitudes but my own thoughts are that the curvispinus group extend to 2200-2400 m.

.....from H.Middleditch

Which effectively places the Neoporterianae at altitudes of up to 2400m and P.umadeave at an altitude range of 2400 to 3400 m.

.....from R.Moreton

It rather amazes me to be able to report excellent germination from seed of Eriosyce RMF 217 ! This seed was surface-sown, as usual, and after a respectable time just two seeds had germinated. After another two weeks or so there was no further germination, so the seed pot came out of the propagator. However, when I was taking a look at this pot the seeds were so large that I decided to cover them and put the pot back in the propagator. Lo and behold, in just a few days, there was almost 100% germination!.

SOWING SOME SEEDS OF SUCCESS From P.Moor

In Chileans No.48 I noticed a comment on the subject of germinating seeds of Neowerdermannia. Over the last winter I tried two packets of these with some success, one from Mesa Garden and one from D.Rowland. Both packets contained about 15 seeds. Germination was quite slow and erratic, but so far I have got seven good seedlings from the Mesa garden sowing and two from the D.Rowland seed. I used the same technique for Eriosyce rhodentiophila of which nine have germinated. From a sowing of Pyrrhocactus umadeave, four have germinated. Success still eludes me with Austrocactus, a packet of which was sown in the same way with nil result.

The compost I use consists of two parts of J.I.No.2 and one part of Arthur Bowers seed/potting compost; after mixing it is then sieved through a kitchen sieve with holes of about 4 mm square in order to remove any excessively large pieces. Grit is then added, the amount being determined by filling a trial 2" pot and seeing how long it takes to soak the compost when it is stood in boiled rainwater. Grit is added until the compost is soaked in a time of three minutes. This only needs to be done once and a note made of the amount of grit required for the future. This mixture is then placed in a 6" BEF pan, covered in clingfilm and then microwaved for five minutes. Some moisture from the compost condenses on the underside of the clingfilm during this process. The pots to be used are washed clean and also given a short burst in the microwave. Into the bottom of each 2" pot I put a length of 10 mm wide "Fybamat" capillary matting, placing it corner to corner. This serves to ensure good water take up when the pots are in the propagator. The pots are then filled with compost and gently tapped to settle it somewhat. The filled pots are then placed in boiled rainwater and allowed to get completely soaked

Onto a sheet of white paper a small amount of hormone rooting compound is sprinkled; I use one which contains Captan, a fungicide. The seeds are added to this and the paper moved gently to ensure that the seeds all get coated. The seeds are then transferred to a second piece of paper, taking care that any excess powder remains on the first sheet. The

seeds are then gently shaken on to the surface of the compost in the desired pot, ensuring that they are evenly distributed, and a label added.

My Ward electric propagator has an 8" x 11" base try. The bottom of the propagator is lined with capillary matting and soaked in boiled rain water before placing twenty four pots into it. Using a hand sprayer filled with boiled rain water I then gently spray the surface of the compost to make sure that the seeds are wet. The two rotary ventilators in the plastic lid are kept closed during the first phase of the germination process. I do not cover the propagator to cut down the light as I feel that light levels in this country are far below those experienced in their native lands. The propagator is placed on a windowsill facing south-south east. The heater is not fitted with a thermostat so I have it plugged into a twenty four hour time switch. The settings of this are adjusted so that the heater is on during daylight hours only. A simple room thermometer is placed in the propagator. During the early part of the year this would normally indicate a maximum of 80°F. I ask my wife to check on the temperature during the day and if it reads in excess of 100°F then she will switch off the heater. Without the effect of the sun, the propagator would seem to raise the temperature by about 20 to 30°F above the ambient of the room.

First thing in the morning, and then again in the evening, I always remove the lid of the propagator to check for signs of germination and, if necessary, I will occasionally spray the seeds with boiled rainwater to ensure they are kept damp. Once the seeds are growing and an acceptable level of germination has been observed, the use of the heater is discontinued and the ventilators in the lid are opened fully. I then start watering with boiled rainwater containing a small quantity of Phostrogen to promote the vegetative growth of the seedlings. After three to four weeks I remove the lid and transfer the pots to a standard size pebble tray with capillary matting in the bottom.

The pots containing the seeds of Neowerdermannia, Austrocactus, and Pyrrhocactus umadeave, were removed from the propagator in the evening and placed close to the window until they were put back into the propagator next morning. They would thus have the maximum thermal cycle each day.

REICHEOCACTUS REDISCOVERED? From K.Gilmer

In the course of our visit to Argentina we travelled from Patquia to Famatina, then to San Blas and on to Tinogasta. Before heading for Belen, we drove further north to Fiambala and then turned west along the valley of the Rio Guanchin, or Angostura de Guanchin. Many of the hillsides were completely covered in sand, without a solitary speck of vegetation, but with other places partially or completely covered with stones, as well as patches of substantial rock. Here we came across plants of Tephrocactus geometricans growing on sandy ground with a sprinkling of stones. It was only by chance that we also found some other plants, in quite small numbers, in a more stony patch. We are not sure if this is the Reicheocactus pseudoreicheanus i.e Lobivia famatimensis, or something else altogether. We saw no bud, and no flower, and only one fruit. The fruit was spineless, with numerous hairs on the areoles, looking like a typical Lobivia fruit. The plants themselves were 20 to 25 mm in diameter and up to 7 to 8 cm long, with many short, whitish spines. They were growing among chunks of stone, most of which were larger than the height of the plant.

When we were back in Germany I discussed this find with Walter Rausch, who went out to the site in January/February 1993 in company with F.Kuhas. Rausch now believes that this plant is a Neochilenia. He found plants of 10-15 (-20) cm in length and 2 cm in diameter. The tuberous root is 30 cm in length and the connection between the root and the body is very thin - only a few mm in diameter. Like ourselves, Rausch found no flowers or buds, but he brought home some plants which are now being cultivated by Rausch, Kuhas, and Scheck. No flower buds, flowers, fruit, or seeds have been seen up to the present, so the genus or species is still unsettled.

.....from H.Middleditch

Slides of this plant in habitat were shown by K.Gilmer at The Chileans 1993 Weekend, when the possibility was considered that this plant may have been a Lobivia famatinensis. It would be almost as far removed from the traditional habitat of this species as from that of Neochilenia. So the question arises whether Lobivia famatinensis ever grows with the body attached to the root by a thin neck.

.....from W.Christie

I have unpotted my two plants of L.famatinensis and had a look at the top of the roots, but there is no sign of a pronounced neck between the body and the root system.

.....from H.Middleditch

The plants reported by K.Gilmer are barely one inch in diameter and three inches long; the plants reportedly found by Rausch are of similar body thickness but up to six or seven inches long. In his review in K.u.a.S. of several Thelocephala and Neochilenia, K.Knize illustrates a somewhat elongated plant of Kz 113 in habitat at Maitencillo, Huasco valley at 500-600m altitude. He elects to call this N.lembckei and describes it as 2-3 cm in diameter, whilst to judge by the proportions, the body may be some 8-10 cm in length. Knize also records a Kz 113a from Maitencillo, at 400m on the banks of the R.Huasco, which he calls Neochilenia reichei sensu Ritter, of which "I found no significant difference from N.lembckei".

It will be quite evident from the treatments of Thelocephala by several authors that there has not been entire unanimity over which names to apply to what plants. But on balance, the elongated plants appear to be favoured more by designation as Thelocephala reichei. Hence this title has been used, for the moment, for the plant found by K.Gilmer. The finding location is at about 27° 45' S, whilst Vallenar lies at about 28° 30' S, which is no great difference in latitude. In the absence, for the time being, of any other reported occurrence of this plant in the general area of Fiambala, it may be considered that it has been conveyed there by chance, either as plant or seed. This conveyance might be attributed to some fauna but unintentional transport by the hand of man would appear to be equally possible. The extensive elevated terrain between the eastern and western chains of the Argentine Andes is subjected to a harsh climate and produces only an exceedingly sparse vegetation, so that it supports very little in the way of permanent human habitation. Nevertheless, the movement of men and beasts throughout this area appears to be much greater than might be imagined.

JOURNIES IN THE ARGENTINE REPUBLIC By L.Brackebusch
Translated by H.Middleditch from Verhandl. der Gesellsch. fur Erdkunde zu Berlin 18. 1891.

[The author describes his travels in many parts of the highlands of N.W. Argentina, commencing in 1881. In August of 1883 he set off from Tucuman, via Trancas, Cafayate, Quebrada del Toro, La Poma, Cachi, Cafayate, Jacimanao, Penon, to the R.Abaucan and Saujil.]

Then I set off from Fiambala along the same route taken by Burmeister [in 1860], climbing the Quebrada de la Troya; I then crossed the Portezuelo de la Punilla to the headwaters of the R.Blanco, thence via the Salinas del Leoncito, Rodeo, Iglesia and Talacasto, to San Juan which I reached in the middle of November. The post-chaise took me to Mendoza, the train to Cordoba, and I was back in Germany for Christmas. In the following year my map of the "Interior of the Argentina Republic" was prepared and published.

In the November of 1886 I went from La Rioja to Belen from where my route went towards Hualfin, but bore off east for Gulampaja, south of Laguna Blanca, then (crossing my route taken in 1883) via San Buena Ventura towards Cerro San Francisco. From there I rode south to Casadero. There I came across a farmer from Hornillos, south of Vinchina, who was travelling with an extensive mule train to the celebrated annual fair at Huari on the Laguna de Aullagas in Bolivia. This renowned annual market is attended by thousands of cattle drovers from Argentine, Chile, Bolivia and Peru every year, and ought to be an interesting event. Peculiarly enough I have never found it mentioned in the literature I have consulted up to the present time. There are almost no cattle drovers in northern Argentina who have not undertaken the lengthy and difficult trip to Huari. Almost all the muleteers have travelled there.

After I had made a diversion to Tamberia, on the muletrain route which later joins that over the San Francisco pass to Maricunga and further into Chile, I rode over the Planchada and Piedra pareda (4200m) to the plain of Saujil and Fiambala, where I came once again to my guest house in Saujil where I had already been in 1883 ....

On the 12th March I left Saujil, following the aforementioned muletrain route up the R.Chaschuil, crossing the pass of Cienega (4200m), continuing southwards down a valley, to Chaschuil. I left there for the next valley, once again along the muletrain route which Burmeister had taken in 1860 and which I came across in 1883. From here we came to the headwaters of the R.Jaguel, then to Laguna Brava, then over the Alto Negra to the headwaters of the R.Blanco. There I instructed the muleteer to take my muletrain to the encampment of Puna Negra whilst I went only with my guide to investigate the Come Caballos pass, leading into Chile. This pass was first ascended from the Chilean side by Domeyko. We then made a visit to the Pena Negra pass over which, to my great astonishment, ran a good road.

We spent the night in the shelter house of Come Caballos. This house is very solidly built, with a conical roof and with a snailshell-like entrance, low, and it affords room for about six persons. It is well intended, but built in a most impractical manner - one cannot endure being inside it for the smoke. In the evening we heated the shelter like a baking oven, using the Adesmia horrida which is abundant here. It was a very cold night and we passed the evening snatching some sleep by another fire outside the shelter. Then the ashes were swept out of the shelter, after the smoke had dissipated itself. The walls were almost glowing from the huge fire which had burnt within them. By this time the temperature inside the house was tolerable and we passed an agreeable night in there.

We then went down to the Cordillera Mogotes. I crossed the ridge and descended the west side in the dusk, where I took a rustling stream to be the origin of the R. Huasco. There was not a trace of provender for the mules and once again it was a bitterly cold night. I then followed the course of the R.Blanco for some way, crossing the route I had taken in 1883. I then left this valley, turning eastwards over the ridge which runs from Leoncito, by the pass of Descumbrimiento, and reached the headwaters of the R.Guandacol, going on to Guandacol itself. Here I obtained fresh horses, a new guide and muleteer for a trip to Chilecito and Paganzo.

[The next trip visited passes over the Cordillera from the north of San Juan province, southwards] ... With my guide I made a day trip to the Portillo de los Helados (4150 m). We had to stop overnight close to the head of the pass. There was no shelter and the night temperature fell to -20°C. The only thing we could burn was cattle dung, often so used for this purpose in the Cordillera and in every respect excellent material for making a fire. ..... We rejoined our troop of mules and followed the valley to the Valle del Cura. After three days we were then unsure of how we could cross the eastern Cordillera. By good fortune we met up with a troop of mules which had come over the Tortolas pass from Chile and would continue over the Conconta pass. Now we had got our bearings, I went with my guide first to the Tortolas pass (4500m) on the border with Chile, the next day crossing the Conconta pass (4500m). and from here we reached Puerto de Conconta, where we purchased some mutton, and prepared a pancake from an ostrich egg, which brought an agreeable change in our very frugal diet. It was the first habitation that we had come across in 24 days.

We then went on via Tudcum and the hot springs of Pismata to Iglesia, where once again we were hospitably received by the Fonseca family. On the further way to Castano we met up with a band of hundreds of Guanaco and ostrich hunters. In the northern Cordillera the Vicuna are abundant; they are absent from the southern cordillera as well as in the lower mountains where they are replaced by the much smaller Guanaco. Hundreds of hunters and beaters come together on horseback, and they often continue the whole day long, under the leadership of a headman, who is obeyed to the letter. With the help of hundreds of dogs from the hunting band, they drive both animals into a hollow, there to be caught with bolas and lasoos and despatched. Usually the men in an area are away from home on account of such hunts so that procuring a guide and muleteers is often a problem. We then joined the R.San Juan, which was at low water, and followed the valley back, finally, to San Juan.

.....from F.Schickendantz, Petermann's Geographische Mitteilungen 1868

The ground around Andalgala is highly productive, since the streams running down from the nearby snowfields of Aconquija irrigate an important number of fields of lucerne and vinyards. The spirits produced by the vinery are exported in large quantities to Bolivia.

.....from I.Bowman, Desert Trails of Atacama, 1924

One might suppose that so isolated a community as Poma would have little value. The settlement is important as a station in the livestock trade with southern Bolivia. Every year a stream of mules, asses, llamas, sheep, and cattle go north from the Poma valley over high passes to Bolivia, where they are sold to the mines or the railroads, or at the great annual fair at Huari, Bolivia. At this celebrated fair there gather every year an immense number of merchants from northern Argentina, Bolivia, and Peru. They trade in all manner of products of mine, forest, field, and garden. It is one of the principal bartering places of Hispanic America.

The fame of San Pedro de Atacama and the facilities it has for attracting transient herds, attract the stockmen of Catamarca, La Rioja, San Luis, and Cordoba. For years they have sent droves of mules to be sold in the nitrate oficinias

of the coastal desert further north. They come in from the pampas to Catamarca, where they are wintered, and are sent to San Pedro de Atacama by way of Antofagasta de la Sierra.

.....from A.W.Johnson & J.D.Goodall, Birds of Chile 1965.

The first specimen of James' flamingo known to science was shot on a lake at the foot of Isluga volcano, Tarapaca, in 1850, but it became recognised as a distinct species only when Charles Rahmer, with financial help from British businessman Barkeley James, obtained a few more specimens from the same region in 1886. The fact that nothing more had been heard of this bird prompted R.P.Allen in 1956 to observe "The most astonishing fact concerning James' flamingo is that its habits and nesting practices have never been described. No actual breeding grounds, past or present, are known. At the moment this would seem to be one of the outstanding mysteries of the avian world".

Such a statement was a challenge we could not ignore. Accordingly we set about organising an expedition and in mid-January of 1957 left for the north. Travelling by pick-up truck, army lorry, horse and mule, we covered a distance of 3,100 miles and, in the course of five weeks, visited almost every possible flamingo habitat in the mountains of northern Chile. In addition we made a side trip across the Bolivian border to a lake known as Laguna Colorado, and there not only obtained a specimen of the long-lost James' flamingo but also located the first known nesting colony of this species.

On arriving at the lake we found flamingos feeding in great abundance in stretches of shallow water all over the lake. Later, while walking round the lake, we met a Quechua indian who told us that he had just arrived from the interior and that it was his custom to come once a year with his family and settle on the shores of the lake to gather flamingo eggs for sale in the villages of the hinterland, where they were very much prized for food.

.....from H.Middleditch

Clearly there was traffic over the elevated mountainous parts of north-west Argentina, even though it was almost uninhabited. The traffic to and from the celebrated annual fair at Huari was largely in a north-south direction. But travel and trade was very regular in an east-to-west direction. As Brackebusch observed, "many cattle are driven across the Cordillera to Chile, since in the latter country very few fatstock are raised" - and the Argentine pampas was a renowned cattle raising area. When Burmeister left Catamarca in 1860 to travel via Fiambala to Chile, he spoke of this in terms of a well-known and well-used route. The valley in which K.Gilmer found the plants of Thelocephala lies along this very same route. Hence human transport of Thelocephala reichei from the Huasco valley to near Fiambala, either as plant or seed, is not impossible. It has been responsible for emigration of floral components in the recent geological past.

.....from Strasburger, Textbook of Botany

The central Asiatic region is rich in endemics, of which many species evolved during the progressive extension of of the central Asiatic steppes and semi-deserts in the Tertiary and Pleistocene. Some 400 of these species extend westwards to central Europe, many of which first invaded central Europe in the wake of man as weeds of cultivation or ruderals.

EARTH CACTI IN HABITAT IN CHILE By H.Lembcke
Translated by H.Middleditch from K.u.a.S. 10.10:1959

Travelling north in the search for Chilean cacti we reached the Huasco valley at Vallenar. Along a tolerably good road one arrives at a small port of the same name about 70 km away. This spot Huasco has been mentioned repeatedly in the cactus literature. Amongst others, Neochilenia napina occurs here. I would put N.napina as the prime example of an earth cactus. Under the title of earth cactus I would include all species whose volume of succulent subterranean parts is larger than the aerial portion. As is well known, most of the other cacti are stem succulent. It is however not unusual for a stem succulent to display root succulence, without the latter predominating, as for example with certain spp. of the genus Copiapoa, Neoporteria, etc.

In respect of evolution the earth cacti have undergone a most far-reaching adaption to the quite extreme environmental conditions. Because they have shrunk level with the surface of the ground, only in that way have they become capable of survival even under the extreme conditions of their habitat. Simple dwarf species of less volume without subterranean succulence were barely able to survive in the arid regions. Obviously the expression earth cactus implies no systematic significance. Quite apart from that, the species described here are nevertheless closely related to each other.

Neochilenia napina is difficult to find, even if one receives quite precise data on habitat location. The plants usually have a diameter of between one and three cm, barely project above the surface of the ground, and are often partially covered with sand or small stones. In addition, the body colour is seldom greenish but more reddish, brownish, or greyish and so can scarcely be distinguished from its surroundings.

If, despite that, this species is so well known, it is on account of its area of distribution starting right at the edge of Huasco itself. Finding the plants must be easier in the flowering season. The fine yellow flowers with occasional tones of brown, are very striking. Insofar as I am acquainted with the habitat area, which indeed stretches for over 20 Km inland, N.napina favours level patches of ground or gentle hills. At the same time a single level spot is often very small. The nature of the ground is not always uniform. On stony substrate these are usually close to rocks. No plants are to be found on the south side of rocks or large stones.

Since the plant bodies are not uniform in respect of colour and spination, I would attribute this predominantly to the not entirely uniform habitat conditions. In first place as a further factor would seem to be added natural variability. I could not find plants which one could really speak of as true varieties, since in such a situation they should also have been perceived as a pure stand. If one designates a variety spinosior or mitis, then these must occur either to the south or the north.

Taking into account several unearthed plants, it is possible to establish that the underground portion is regular in its basic nature, but it can be extremely variable in its form. Two components may be clearly distinguished, namely 1.The thin neck, and 2.The tuber with its root system. In every instance the neck forms a marked narrowing between the aerial part of the plant body and the tuber. In its form and length it adapts itself completely to the immediate surroundings. Since I have found long thin necks equipped with areoles, then the neck is unquestionably part of the body.

The tuber consists of nothing more than the carrot-like thickened main root-stock. It is commonly irregular in shape and likewise adapts itself very largely in form and size to the various ground conditions. Between plant bodies and tuber their is no fixed size relationship. Smaller plants can under certain circumstances have larger tubers than larger plants. The fibrous roots come out of the tuber and specifically from the upper part, often at one or two sides. With this sort the

roots are evidently related to the natural site conditions, since the plants in their water-intake largely direct themselves to the dew i.e. atmospheric moisture. This sort of moisture penetrates no deeper into the ground and the roots are most appropriately at the upper part of the tuber, immediately below ground level.

It is self-evident that around the area of N.napina, at least under similar climatic conditions, closely related earth-cacti occur. If little or nothing was known of these up until now, this is attributable to a large extent to the mimicry of the species. A typical example of that is N.reichei. As is now known, this species was rediscovered three years ago, for the first time after 57 years, by Fankhauser and Kraus [Krainz - Echinocactus reichei K.Sch. Sukkulentenkunde VI 1957] Independantly of that, F. Ritter also located this species, some months later still.

As I have been able to establish in the meantime, the distribution area of the species is greater than supposed, and the danger of extermination does not exist. The distribution area of N.reichei is located well away from the coast, in one place however getting almost up to the distribution area of N.napina. Transitions between these two species have not been found.

The flowers of N.reichei are barely distinguishable from that of N.napina. Both bodies are noticeably rounder and project further above the ground. It happens fairly often that the bodies of N.reichei become monstrose. The cause of this seems to be that unfavourable conditions temporarily interfere with the growth of the plant. In that way a constriction originates on the plant body, or a body becomes completely gnarled and under favourable conditions a new body arises from it, which then sits on top of the old one. Plants which grow up between stones have often been able to negotiate the sheltered zone by means of a worm-like growth. Somehow it appears that N.reichei leans over for that purpose, to produce irregular body forms.

The bodies are generally not much larger than with N.napina, but there occur exceptional plants which far exceed the customary growth. If one such plant has two or more stems, the branching usually originates in the above-described fashion from a wrinkled-up head. The ribs are not discernable, but are broken up into small tubercles. The spines are small and slender. The spine colour varies from reddish brown to pale yellow. In comparing the underground parts of N.reichei and N.napina, it is noticeable that these can scarcely be distinguished one from the other. It may perhaps be said of the neck, that this is often longer in N.reichei. Necks do occur of a diameter of only a few mm, which however are 30 mm long.

Northwards from the Rio Huasco the coast is then again difficult of access. Not until the valley of the Rio Copiapo, which moreover flows partly underground, is the coast easily reached again. There I collected cacti for the first time three years ago and specifically in company with my friend P.Kraus. Don Pedro, who managed a Hacienda in the Copiapo valley, drove with me to the vicinity of the port at Caldera. We traversed across the sand for hours under a blazing sun and saw not a single cactus. On the trek back to the vehicle, Kraus suddenly drew my attention to some small, completely circular rings in the sand. Dropping down flat on the ground, the sand was puffed away from the rings. From what came to light, we took it to be a dried up root, which then revealed itself however as an earth cactus.

At the time I first of all believed that my friend and I had found N. reichei, and F.Ritter who was waiting for me on my return to Santiago, initially agreed with me in my opinion. Krainz immediately received plants from us. As I understood it, Krainz regarded it as N.napina v. mitis. That our specimen could not be considered as N.reichei was clear to me through conversation with Fankhauser, who at the same time had found the true N.reichei. In the meantime Ritter had visited our finding location and worked on a study of the literature. As he told me, our find should be regarded as a rediscovery of Echinocactus odieri v.mebbesii. A year ago C.Backeberg adopted a position on this discovery. He is of the opinion, that it ought to be considered a new species.

At the time I had accepted the view of F.Ritter as correct and our plant was distributed as N.odierii v.mebbesii. It is nevertheless possible that Ritter had made a mistake at the time and also the view of Backeberg is not to be rejected out of hand. It is, however, still premature to pass a conclusive judgement. In the course of time I have visited the habitat of N.odieri v.mebbesii on more than one occasion. Unfortunately, however, never at flowering time. According to the observations of P.Kraus, the flower form and colour is similar to that of both N.napina and N.reichei.

The body has, as a rule, a diameter of less than 1 cm, but can occasionally attain up to 2-3 cm. The body form is very flat and dished, so that the outer rim stands higher than the inner part. At the growing point is to be found an additional depression. The colour of the body is yellowish-grey. The tubercles are very small and the spination is tiny. The neck is shorter, thicker, and of more uniform proportions than with N.napina or N.reichei. The form of tuber is likewise more uniform and decidedly swollen. The roots are found not in the upper part of the tuber but usually lateral.

This earth-cactus is a perfect mimicry species. The colour of the plant body is generally lacking in contrast with its surroundings. The flat body shrinks completely into the ground. At least the crown is permanently covered with sand, so that at most the outer margin of the body can be observed as a small ring. This species occurs in flat and slightly undulating terrain. It was noticeable to us that the plants are confined to a specific sand grain. These places are recognisable by a somewhat darker tone of colour.

The N.odieri v.mebbesii readily forms small colonies. These originate perhaps by this means, since seeds become blown together in a slight depression and germinate there. In addition it happens that new seedlings establish themselves around the mother plant. If the plants stand very close together, they interweave their thickened rootstock which blends together and a small colony is produced like a single plant with off-shoots. Although apart from this there also arise real offsets. The described species is rare and in obvious process of decline. More often dead than living plants are found. The principal cause of this decay is, in addition to the aridity, a small rodent whose holes we constantly broke into whilst we tramped over the sand. The small rodent roots up the earth cacti out of the ground and gnaws into them so that they expire.

To the distribution area of N.odieri v.mebbesii adjoins areas of other earth cacti. The location of this species is very difficult. As luck had it, even after a few days only a few plants had been found. To the south there occur earth cacti which differ from the above named species mainly in that they are larger. Inland we found some three plants,which varied in their form.To the north our species seemed to slowly disappear. The terrain became rocky there.

If the earth cacti are taken into cultivation, their characteristic features are easily lost; the grafted N.napina in collections is an example of this.

.....from H.Middleditch

This article appeared in print only a few years prior to our early European cactus tours. On the first trip to Belgium in 1963 visits were paid to one or two members of The Dodonaeus, in whose collections an astonishing range of plants were being grown as grafts. Indeed, almost everything being propagated seemed to be on a graft, the picture being rather similar on both visits in subsequent years. It may have been this practice which Lembcke had in mind when he says that

the plant ceases to follow its habitat mode of growth when "taken into cultivation".
.....from R.Ferryman

The Lembcke article is a very interesting and thorough report of two species of Thelocephala. The Huasco valley has seen some changes in the thirty odd years since Lembcke's report. Much of the valley is now cultivated with irrigation from the Rio Huasco. There has been irrigation in this valley for a long period, but the technology and the results have advanced remarkably even in the twelve years I have witnessed. The cacti have not suffered too much, although west of Vallenar where the cacti stands are is now a rubbish dump and it can be safely stated that there are very few if any cacti round Huasco.

Thelocephala napina can be found south of Vallenar and due west to the outskirts of Huasco. It appears to prefer the slightly inclined land overlooking the valley, growing amongst rocks and boulders. It is basically a small plant and the largest one recorded by me was 4 cm in diameter. It certainly did grow amongst rocks but I cannot confirm that it never grew south of rocks. It was sometimes twin headed but never offsetting. Body colour was more often than not greybrown, sometimes even muddy brown. The root is carrot like but not always single. The neck described by Lembcke is typical of a number of species of Thelocephala.

It appears to me that these plants draw themselves down into the ground during the dry season. Sand, dust, and debris collect around and between these pockets effectively raising the soil level a little. On the coast at Huasco this is very evident, as on the slides shown at the Chileans' Weekend of RMF 277, where some plants were buried by blown sand to a depth of several inches. Lembcke makes the point about small hollows where the plant sinks into the ground. These hollows certainly fill up, making detection of the plant extremely difficult.

Thelocephala napina is scarce; I use that word carefully for many Thelocephala appear scarce, but in my opinion it is their adaption that makes it dificult to determine if a species is scarce or just well hidden. I do not take napina to be well hidden for it is not a difficult plant to find - given the right location and season.

The story behind the plant Lemcke thought was Neochilenia reichei is now well recorded; it is Thelocephala lembckei. It grows very close to the habitat of T.napina but although I have found intermediates, I have never found the two plants growing together. These two plants are very close in flower form and colour. Similar to T.lembckei is T.duripulpa which grows to the north and along the Huasco coast. Both the latter species often have an elongated neck, again a result of earthing up. Thelocephala lembckei is often found with regenerated heads, more so than either of the other two species. Thelocephala duripulpa grows quite elongated both in habitat and cultivation and is I believe the origin of the clone cultivated by the yard as Neochilenia reichei. I have photographed and shown at the Chileans' Weekend, Thelocephala with necks in excess of 150 mm in length, which prompted the buried stem versus root discussions. They are quite clearly stems.

The plant Lembcke mentions from the area of Caldera is T.krausii. A beautiful species and very difficult to find. We spent an entire day locating four specimens from a large sandy area where some years previous I had seen a fair number - lost, or simply hidden? This species grows in sand and draws itself down; out of flower it is extremely difficult to find. I did find it in flower some years ago - RMF 131. (The photograph in Kattermann's "Eriosyce" is the slide I gave Adriana Hoffmann!) It offsets into reasonable clumps maybe 75 mm across. The offsets occur at the rim of the plant and quickly form their own mini tap roots. My own few plants are offsets from these clumps. This plant is very difficult in cultivation and is particularly slow growing; it is also very susceptable to over watering no matter how well drained the compost medium. Its habitat is very restricted and whilst this can be considered as coastal, it does not grow close to the shore but rather in an area between the coast and the mountain range.

To the north, the terrain changes quite quickly into rock. I have not found it to the south where the terrain continues sandy, but here grows T.odierii as we head towards the Morro Copiapo. My contact at Bahia Inglesa tells me that T.odierii has failed to flower in any real numbers for the past seven years.

The rodent holes which Lemcke mentions are typical of this terrain and certainly they were evident around the Caldera location. They have been seen by K.Preston-Mafham and he may be able to identify the inhabitant; I can only profess to seeing lizards scurry in and out of these small burrows.

THELOCEPHALA From R.M.Ferryman

The name Thelocephala was first applied by Y.Ito to encompass a group of plants hitherto found under the invalid Fric name of Chileorebutia. It is however to Friedrich Ritter that we have to look both for the continuing use of the name Thelocephala and for a fuller explanation as to what features separates this genus from other Neoporterianae.

Ritter acknowledges that the Thelocephala group is very close to Pyrrhocactus sensu Ritter (or Neochilenia Backeberg), but he suggests that there are important differences to be found in both the fruit and in the form of the body. The fruit of all the Chilean Neoporterianae have elongated pink hollow berries from which the seed is released through its basal opening. Thelocephala have the same basic form of fruit but with a much thinner wall, which is covered with wool and/or bristles to a greater or lesser extent and the seed is held at the top of the fruit in a carpel sack. Ritter contends that these seeds are released only after the fruit has become detached from the plant and has been blown around by the wind over the surface of the ground. Ritter holds this characteristic of wind blown fruits to be all important. It is also stated by Ritter that the body of Thelocephala is low and flat to the ground and does not produce ribs. Here the important difference is that Thelocephala does not produce ribs as in Pyrrhocactus (Ritter).

Whilst accepting the existence of these features, unfortunately they do not stand close scrutiny as the basis for separating the genus, because these features are not confined to Thelocephala. A number of Thelocephala I have collected do display the formation of ribs; although these ribs are not as obvious as in Pyrrhocactus (Ritter) there are nevertheless ribs present. This feature is even more pronounced when the plant is under cultivation and in full growth or grafted. It is most evident in T.napina and T.glabrescens. The fruit appears to have given Ritter a number of problems, too. In his early collecting of the northern Pyrrhocactus (Ritter) the species aricensis, iquiquensis, saxifraga, recondita, and residua were considered by Ritter to be Chileorebutia. The Winter catalogue of 1959 lists: FR 201 Chileorebutia iquiquensis sp.nov. "formerly classified under Horridocactus but by virtue of the fruit a Chileorebutia". This particular plant was described by Backeberg in 1955 as Reicheocactus floribundus on account of the wool covering of the flower tube, but Reicheocactus has even less to commend it as a substantive genus than Thelocephala. Ritter, accepting Backeberg's earlier name, now calls FR 201 Pyrrhocactus floribundus. These northern plants quite clearly have wind-blown fruits; having accepted that, Ritter it seems then adds more weight to the fact that these plants produce ribs, so that this would seem to be his more important criteria. Yet in habitat the plants from Antofagasta i.e. reconditus and the more recently described P.vexatus, have a very striking resemblance to Thelocephala in so far as they are small, usually around 3 cm in diameter, grow close

to the ground and have large tap roots. However, if one considers that Antofagasta is some 220 km north of the most northerly reported location of Ritter's Thelocephala then it becomes clearer why he chose to place the northern plants within Pyrrhocactus (Ritter).

The fruit of recondita is extremely thin walled with numerous bristles; in cultivation the seed is contained within the carpel sack long after the fruit dries up and falls off the plant. In these respects the fruit of reconditus is more typical of Thelocephala than some of the described Thelocephala spp. During my trips in the field in Chile I have encountered many Neoporteria (including Pyrrhocactus) with their fruit intact. These fruits are easily removed yet need a slight tug to detach them. My own theory is that they are harvested by birds and rodents. On the other hand I rarely met with the wind blown fruits standing upon the plant. I have however seen the dried fruits of Thelocephala lying on the ground, thus confirming the existence of these plants in that particular locality. This can often be the first sure sign that the place is the right spot to search for Thelocephala.

Notwithstanding the wrangles over their taxonomic status, this group represents a truly fascinating development of plants in Chile. They also offer the enthusiast a delightful group of small growing, easily flowering, plants as perhaps their current popularity indicates. This popularity owes much to our better growing techniques and, more importantly, to a greater understanding of the natural habitat of the plant and its requirements. In the past, Thelocephala have been regarded as very difficult to grow, extremely slow and more likely to be encountered grafted, which completely destroys much of the beauty of these true dwarfs.

In the wild these plants inhabit flat or gently sloping sites, growing in a variety of different substrates ranging from quartz sand to clayish soil. It has been suggested that they also grow below soil level in the more sandy terrains but I have rarely encountered them growing in this way. They are found always, but always, in very dry areas of particularly low rainfall. It therefore follows that under cultivation they require only modest amounts of water and a very free draining compost. Perhaps the biggest problem concerns the large rootstock but generally seed raised material can be accommodated in the commercial long tom pots without undue problems.

Ritter acknowledges some 16 species extending over an area from Domeyko in the south to Cifuncho in the north, a distance of some 400 km. For the most part they grow at coastal sites, with one or two species following the valleys inland no further than 50 km at most. I have found these inland species at altitudes of up to 625 m. The low rainfall over the whole of their distribution area indicates that most of their moisture intake is obtained from the coastal fogs. It is perhaps worth putting on record that when I collected T.odieri from the area near Morro Copiapo I had an opportunity to share refreshments with a gentleman who had taken to algae farming on the immediate coastline. He informed me that it had not rained for four years in this area and he had not seen the Thelocephala in flower for the past three years. Most species have fairly restricted habitat, some less than half a square km, others enjoy a far wider distribution and with it, a greater diversity of terrain. There are "classic" Thelocephala habitats where one expects to find these plants. but of course it does not always follow that one will do so. I have searched many of these classic sites without success. As an example, the species esmeralda grows along the coastal plain up into the hills among rocks and shrubs, but at the foot of its particular habitat there lays an impressive stand of Copiapoa columnar-alba. Stretching for several km this low flat land is home to thousands of these Copiapoas along with odd examples of C.grandiflora. The soil is soft and sandy although not loose, typical Thelocephala country. But to the best of my knowledge, tried and tested in this location, no Thelocephala grows there .

In the wild, Thelocephala are often multiheaded but this is usually due to damage for only two species offset naturally. The damage is often caused by grazing Guanaco or wild donkey, but fortunately the plant usually survives so long as the root is unharmed. Today these wild animals are probably far more threatened than the Thelocephala.

A brief summary of the species recognised by Ritter are outlined in a south to north distribution. It is worth acknowledging that there is still some uncertainty surrounding two of the older names, Echinocactus odieri and E.reichei, due to no locality being quoted at the time of their descriptions. These are referred to below. It is doubtful if one can ever be certain as to their true identity; indeed they could be one and the same species but I have endeavoured to outline the relevant information without entering into too much detail.

T.fankhauseri FR 1451

The most southerly species and a plant relatively recently described by Ritter. I found this species growing on flat ground near Trapiche; it has a beautiful black body and clear yellow flower. I suspect that this plant has in fact been in cultivation for a number of years under the unpublished name Neoporteria napina v.lanigera, a plant collected by Paul Hutchison. The flower and tube easily distinguish this plant from napina, whilst the fruit is much thinner with white bristles.

T.tenebrica FR 1092

Another new name from Ritter that I have so far failed to locate in the wild. Reported to grow to the west of the habitat of fankhauseri i.e. nearer to the coast. From the description the two spp. appear to be very similar.

T.lembckei

Originally collected by Lembcke and sent to Backeberg with the claim that it was Echinocactus reichei rediscovered. Backeberg refuted the claim as the plants did not have the spiral ratio quoted by Schumann in his original description. Adopting the spiral ratios used by Craig for Mamillaria, Backeberg then set about describing Neochilenia lembckei and N.imitans from the plants sent to him by Lembcke. In my experience, however, the spiral ratio system used by Craig does not hold good for Thelocephala, and the plants described by Backeberg are clearly one and the same species. Ritter, too, thought that he had recollected the long lost E.reichei when he found his FR 501. He now maintains that this is not so, and refers FR 501 to T.lembckei. To add to the confusion, Backeberg described FR 501 as Reicheocactus neoreichei; hence sensu Backeberg there are two genera and three species names for the same plant!

T.duripulpa FR 1056

As the name implies, this species has hard fleshy fruits. It is said to come from the Vallenar area and in my opinion is insufficiently different to warrant separation from the foregoing species.

T.reichei

Ritter suggests that E.reichei has never been re-collected and points to "The very large body size of the original E.reichei". The original description by Schumann does not indicate the body size, only the spiral ratio and floral dimensions. It is probable that Ritter is referring to the herbarium specimen at Dahlem from which the body diameter has been taken and used by subsequent authors. However, the plant preserved at Dahlem, which still exists today, bears the label "Echinocactus reichei K.Sch., Botan. Garten Berlin, aus Chile von Reiche 18.7.03" with the accompanying notes: "When preserved, it was probably a cultivated, grafted plant. It is not marked as "type" but certainly is from the type collection." This then would explain the very large body diameter for 75 mm is not unusual for a grafted Thelocephala, as

plants in my own collection clearly indicate. It would seem, then, that given the original description was made from but one plant, the spiral ratio being as unreliable as I have found, then E.reichei has in all probability been re-collected. It is further probable that Lembcke (and others) were right in suggesting the original location would have been Vallenar.

Vallenar is a small town which lays some 48 km from the coast along the Huasco valley. The plants so far mentioned under this heading all grow along the valley on the small hills. They are quite widespread without ever being "common". I have made collections from several locations at both sides of the valley and found them up to 625 m altitude. The furthest inland location at which I found Thelocephala is 45 km from the coast, high up in the hills. The valley is of such a nature that the coastal fogs have unrestricted passage inland as far as Vallenar. The valley bottom is a fertile plain irrigated from the river with gently sloping sides. The slopes are for the best part devoid of vegetation, probably as much the result of habitation as of anything else. Massive stands of Copiapoa with occasional Neoporteria, Pyrrhocactus (Ritter) and Thelocephala occur on the hill tops but there is very little other vegetation.

Plants in cultivation under this name often show a marked tendency to elongate, particularly when grafted. This characteristic is not usually found in the wild as the foraging Guanaco and wild donkey would quickly take advantage of them. However, plants which I collected six years ago continue to grow completely within character; similarly seedlings now 5 years old are still looking quite typical. There is, however, a population I found growing on the coast to the north of Huasco that is certainly much taller than round. I measured one plant which was partly buried in sand but 15 cm high. Cuttings from this collection continue to grow tall.

T.napina

The type species of Thelocephala. Found by Philippi in 1872 and thankfully well recognised, a tribute to his precise description and habitat details. It is probably the best known plant of the genus and well represented in cultivation. Alas the same cannot be said of it in the wild for its habitat has been eroded by habitation. The original location of Huasco has very few localities where it could survive and it is to be found further away where civilisation is less in evidence. Indeed in some of the outlying areas it meets T.lembckei on what appears to be the distribution limit for both species and it can often be confused with the latter species.

Philippi also described Echinocactus mitis from the same area, but it is generally agreed that mitis represents only the juvenile form of napina.

T.nuda FR 1425

Another recent Ritter name. Found by me in 1985 and in 1987 on coastal hills north of Huasco near to Carrizal Bajo. It is in my opinion no different from the species glabrescens which becomes fairly common further to the north.

T.glabrescens FR 710

Entirely coastal from north of Huasco to Totoral Bajo, inhabiting both coastal flats and gently sloping hills leading from the narrow coastal plain. For a Thelocephala it is fairly abundant and with this abundance comes a number of body forms and flower variations. The tube is not bristly as in T.nuda but there are no other distinguishing characteristics. A low growing species always flat with the surrounding ground, it is characterised by its flattened tubercles. Nevertheless as one approaches Totoral, intermediates appear between this species and T.fulva (see below).

T.aerocarpa FR 498

A small range of hills inland by Carrizal Alto support what for me is the finest Thelocephala. Variable in spination, some of those I have seen look like small Echinocereus reichenbachii. The central spines are often evident, up to 1 cm long. The superb carmine flowers have numerous black bristles amongst the dirty white wool on the tube and make this plant quite distinctive. Usually solitary, it can be as tall as 7 cm and 3 cm broad.

T.fulva FR 500

Considered by Backeberg to be a variety of aerocarpa, but this is strongly contested by Ritter. It resembles aerocarpa in body form without having the variation that exists within aerocarpa. In flower and tube form it is much closer to glabrescens. It is restricted to a small habitat around Totoral, favouring the flat topped hills, its appearance being very consistent. On the lower coastal plains, however, there are forms that are not easy to determine whether they are a better fit for fulva or for glabrescens.

T.odieri

This was originally described by Lemaire in Salm Dyck 1850, without a type locality. The habitat was placed at Copiapo by Forster, Schumann, and subsequent authors. This is not entirely surprising as many of the plants of that time were attributed to Copiapo as much for its port facilities as for its vegetation. Ritter accepts Copiapo as the likely habitat and the plants from the coastal area around the mouth of the R.Copiapo do come very close to the original description. It grows flush to the ground and has a particularly small, short, conical, tap root. As mentioned above, it is not seen in flower in habitat very often; Ritter even suggests that it is difficult to find two plants in flower at any one time.

T.odieri v.mebbesii

There are two further names from Copiapo of which their treatment by Ritter is rather interesting. Firstly to the east of T.odieri grows Backeberg's Neochilenia monte-amargensis. Ritter suggests that this is a natural hybrid between Pyrrhocactus confinis and Thelocephala odieri. My own studies of the habitat indicate a very stable population without any obvious throw-back to the parents Ritter suggests. It has a very restricted habitat but nevertheless there is little to support Ritter's views. For me this represents a good taxon, but clearly undermines Ritter's "no-rib" concept for Thelocephala, so that it constitutes a Pyrrhocactus sensu Ritter. The fruit is also that of Pyrrhocactus (Ritter). It is also very possible that the old name of Echinocactus odieri v.mebbesii could apply here. The description of E.odieri v.mebbesii as outlined by Forster makes no mention of the stronger spination of the variety or of its habit of offsetting, both of which features are quoted by Schumann. Quite clearly the Forster and Schumann plants are not the same. Neochilenia monte-amargensis has stronger spines and obvious centrals and does produce offsets from the body.

T.krausii FR 502

Offsetting or clumping is not common amongst Thelocephala; those that have been discussed so far are always single except where damage has occurred, which results in un-natural though not unusual clumping. This species is the only one that that does offset freely from an early age and the young offsets are quick to produce their own tap root. The plant comes from the sandy coastal area around Caldera, to the north of T.odieri. Ritter suggests that this could be the Schumann E.odieri v.mebbesii on account of its freely offsetting nature as Schumann states in his description. Ritter prefers not to retain the older name due to the confusion created by the two differing descriptions of the same name from Forster and Schumann. The description by Forster is the earlier one and as it clearly does not relate to Schumann's name, it appears that Ritter is correct. However Ritter also states that the strong spination quoted by Schumann is evident in krausii, yet in his own description he only quotes spines of 1-2 mm, which is the same as he gives for odieri. I have not seen any plants of krausii in the wild with this strong spination, they all have very small spines in accordance with the

Ritter description. Ritter also states that it is rare to find this plant in flower due to the extreme aridity of the area, but I have been fortunate enough to find a number of flowering plants and also several in fruit. Unlike the odieri mentioned above, my impression here is of a very healthy population.

T.longirapa FR 1321

Described by Ritter as having an extremely large rootstock, 15-30 cm long. The illustration also indicates that the plant lives up to its name. Its habitat is a small coastal area between Chanaral and Caldera which is also the area for T.malleolata v.solitaria (see below). I have found Thelocephala in a number of locations through this area but never with such large rapiform roots. It is however my belief that this species is no more than an extreme form of the T.malleolata v.solitaria

T.malleolata FR 517

Growing to the north of Chanaral, this species offsets freely in the same manner as T.krausii. The white areoles give the plant a distinctly woolly appearance particularly on young offsets. A form has been selected in cultivation and given the unpublished name of v.lanata. It is not very common in habitat and in my experience it is restricted to only 2 or 3 localities which are all quite close to each other.

T.malleolata v.solitaria FR 517a

It is to this variety that I refer longirapa FR 1321. Much more abundant in the wild than the species, it lacks both the white wool and the clumping nature of the species. Ritter quotes the rootstock as 6-12 cm but I have found plant with roots of 15 cm, hence my belief that the plant is synonymous with longirapa.

T.esmeraldana FR 518

When Philippi described Echinocactus occultus he claimed that it "grows along the entire coast line from Copiapo to El Cobre". Whilst there is little doubt that there is some degree of exaggeration in this extent of distribution, there can be no doubting that T.esmeraldana formed part of Philippi's overall concept of E.occultus. There are however some differences in the flower and the fruit, since E.occultus fits into the Pyrrhocactus sensu Ritter whereas T.esmeraldana with its woolly and bristly tube is indeed a Thelocephala. There are however forms of T.esmeraldana that exhibit ribs, particularly when in full growth. This species is particularly widespread around Esmeralda and although restricted to the immediate area it enjoys a wide distribution from the low flat coastal strip up into the hills and as far south as Pan de Azucar. Perhaps unusually it can be described as abundant. With this abundance comes variation and this can be seen in body colour, the range from the usual tuberculate type body form to ribbed forms, flowers from cream coloured to cream with pinkish or carmine outer petals, but never the clear yellow which Philippi indicated for his occultus. It is probable that Philippi included all the then known Thelocephala in his distribution of occultus, since they are all similar in that they are for the best part hidden, but their distribution does not extend into the full northern range which he quotes.

T. sp.Cifuncho

This is the furthest north Thelocephala that has been reported. It was found by Pablo Weisser and acknowledged by Ritter as probably a new species, but to date it is undescribed. I was fortunate enough to locate this plant during my visit in 1983 and it appears to be very rare. I say appears advisedly because Weisser reports that the plants are subterranean, growing beneath a layer of quartz. Those plants which I found were just visible from the surface, but like most Thelocephala, flush with the ground. In appearance the plant is closest to T.malleolata v.solitaria with dense brown wool on the tube. Seedlings, too, take on the appearance of T.malleolata with the white woolly areoles and look quite unlike their nearest neighbour T.esmeraldana.

In summary it may be repeated that it is not possible to substantiate the view put forward by Ritter that this is a distinct genus. These plants represent an interesting group but are too close to others of the Neoporterianae to justify retention of the name Thelocephala. Indeed, even Backeberg could not accept that they could be split from Neochilenia. The number of species also needs to be rationalised for there are small differences between some of the names. Most are easily recognised but the separating features are quite plastic. One interesting observation which I made concerns the root stock. The plants north of the Copiapo valley (from odieri northwards) have the typical carrot like root immediately under the body, whereas those to the south have a very thin neck that joins the body and the root. This does not appear to be an adaption by the plant to its habitat as the type of habitat is often very similar, be it Carrizal or Esmeralda.

Such is their adaption that it is quite probable that there are many more populations of this group still to be found. For me one of the lingering questions will always be how anyone could find such small plants in such terrain. It is one thing to know that they are there somewhere and spend hours looking for them, but it is quite another to really discover them, bearing in mind that they are not often in flower and that the fruits only sit on the plants for but a moment.

.....from S.Kooij

I have been fortunate to obtain some habitat collected plants of Thelocephala from W.Maechler in Switzerland. A form of T.lembckei which came from the Huasco valley has a tremendously narrowed neck between the body and the root. On the other hand a plant collected about 50 km north of Planta Esmeralda, which may be the Weisser sp. nov. plant, shows no narrow neck. Photographs of other habitat collected plants without any narrow neck between body and root are;

esmeraldana	Planta Esmeralda
malleolata	Pan de Azucar
v.solitaria	Portofino
longirapa	Punta Flamenco
krausii	N.Caldera
odieri	Porto Viejo
nuda	Carrizal Bajo
fankhauseri	Trapiche

and of habitat collected plants which do display a narrow neck:

glabrescens	Totoral Bajo
fulva	Totoral
aerocarpa	S.Carrizal Bajo
lembckei	Huasco, and Maintencillo
napina	Huasco
duripulpa	Vallenar

.....from H.Middleditch

These observations are generally in line with those made by R.Ferryman with the exception of the most southerly

occurring species, T.fankhauseri, which is recorded by Kooij as lacking any narrowed neck.
.....from A.W.Craig

My own plant of T.fankhauseri RMF 79 was potted up at the end of 1993 so I can readily confirm that there was a definite neck between the body of the plant and the thickened rootstock.
.....from R.Purves

The only plant which I have of Thelocephala is T.esmeraldana, grown from RMF 159b seed. Having moved aside the top dressing and inspected the connection between body and root, I find that it has a very thick base below the body, with no sign that I could see of a narrowed neck at this point.

ECHINOCACTUS REICHII K.Schm. By H.Krainz.
Translated by H.Middleditch from Sukkulentenkunde VI Jan. 1957

In the spring of 1955 I called upon the Swiss A Fankhauser on the occasion of his vacation in Europe from Santiago in Chile, who in previous years had undertaken various cactus trips in the company of Mr. & Mrs. Geymer into the cactus growing regions of Chile. During his sojourn in Zurich, we discussed among other things the "reichei problem" which greatly occupied the then central research body of the D.K.G. from 1939 to 1941. [There follows a review of the then current confusion between L.famatimensis Speg. and Echinocactus reichei K.Schumann.].

During his visit to Zurich I asked A Fankhauser if, on future collecting trips, he could keep a look out for Schumann's Echinocactus reichei. In the middle of October 1955 I received a letter from him, with the most gratifying and significant news that he quite probably had rediscovered E.reichei K.Schm. which had remained totally lost since its original discovery. Fankhauser wrote "Now my first extensive excursion and cactus-hunt has been completed. By car and by mule we were ten days north of Santiago. My travelling companion was Francisco Kraus, whom you know personally. As luck would have it, it was on the Chilean National Day that I once again found the reichei after its 57 year long disappearance. We reckoned there were over 1000 specimens which grew on a decidedly limited tract of some one hundred metres. Isolated plants were in full flower. Enclosed are two habitat photographs of plants in flower. Both plant and flower are in agreement with the original description of Schumann. Some plants are being forwarded to you by the fastest available carriage. In addition to the reichei, we have found yet another probably unknown cactus, about which I must discuss with you later.

"The plants we found always grew above ground level. The projecting body is globular to almost cylindrical, rarely club-shaped. The small tubercles are certainly arranged in spirals. The tiny spines are rust-red to whitish and pressed closely against the body. The crown is a little sunken, slightly woolly. Almost all the specimens tend to branch and display also the well-known peculiar wrinkling. The body of the plants are up to 12 cm long and up to 5 cm in diameter. The roots are thickened to potato-like and are joined to the body by a thin neck. I also found almost spineless plants such that they were camouflaged by nearby stones."

Fankhauser later sent me a fruit complete with the seed, whose description follows (sketches by the pupils of the Zurich city Arts School). Fruit reddish brown to violet, with a circular opening at the base, fairly thickwalled, stuffed full of seeds, oval, 1.5 cm long, 1 cm in diameter, with flower remains attached, and small white areoles from which project thin, reddish brown bristles up to 5 mm long, with tiny pointed scales. Surface segmented on account of bends, unevenly raised creases. Seed roundish to bonnet-shaped, ca. 1 mm in diameter, keeled at one side, with a small swelling positioned on the hilum which encloses the micropylar opening. Hilum yellow, circular. Testa greyish-black, around the hilum black and finely tuberculated, elsewhere mossily rough, on the keel irregularly finely tuberculated.

The flowers conform precisely with Schumann's description. To guard against any possible uncontrolled exploitation, the exact habitat location will not be published for the time being at the request of A.Fankhauser.

.....from H.Middleditch

It is observed by R.Ferryman that the typical mode of growth of Thelocephala is for the body to be barely projecting above ground level, if at all. The reichei which he reports from north of Huasco which grows in an elongated fashion would appear to be an exception; certainly he makes no other reference to Thelocephala growing above ground level in the form of a mini-column, between Huasco and Vallenar. Yet, if we accept this valley as the location for reichei, and in particular for the location of Fankhauser's recollection of reichei, Fankhauser reports plants "up to 12 cm long and 5 cm in diameter", a distinctly elongated above-ground mode of growth. He also apparently made very plain his desire to avoid publicising the location where he found these plants. Are there any records still extant at the Zurich City Succulent Collection which may indicate just whereabouts Fankhauser did find his reichei?
.....from D.Supthut

I have had a look into our archive of letters and was successful in locating the correspondence of 1955 with Fankhauser. At that time Fankhauser asked Krainz expressly not to publicise the precise locality. Fankhauser has probably given Ritter the information, however, who in his turn passed it on to somebody else. This third party drove to the locality at once and dug out great numbers of the reichei. According to Fankhauser there are however not many plants in this locality in the surroundings of Vallenar. Thelocephala reichei always grows above ground, globular or cylindrical, and is often branched. Between the plant body and the potato-like tuberous root there is a 2 to 3 mm thick thread-like neck. Fankhauser distinguishes this clearly from the napina group, which always grows underground and is not branched. The area of distribution for napina is primarily between Caldera and Huasco.
.....from W.Christie

I have had a plant of Neochilenia reichei for more than fifteen years, from being a small seedling. It has always been grown on its own roots and as I do not have a deep pot I have simply potted it up higher than normal so that a good part of the root is exposed. This makes it easy to see that there is a marked constriction between the body and the swollen root. The body of the plant remains cylindrical, about 2.5 inches high and 2 inches in diameter. During the summer the body is a light reddish-brown colour, but during the winter it becomes somewhat shrivelled and turns more of a dark brown colour. The tubercles are arranged not in ribs but in spirals; the spines are pectinate and about 3-4 mm long. It flowers reliably every year with deep yellow petals and the flowers are certainly hairy

THELOCEPHALA FANKHAUSERI By S.Kooij
Translated by W.W.Atkinson from Succulenta 72.4, 1993

Thelocephala fankhauseri Ritter FR 1451 is one of the most southerly occurring Thelocephalas. It was found close to Domeyko, near the town of Vallenar, by the cactus expert A.Fankhauser of Santiago. This plant is a real rarity, certainly in cultivation. A few amateurs have succeeded in rediscovering these plants, which have become vary rare in habitat.

I have succeeded in establishing a population in my collection by sowing seeds that I obtained. Now, for the first time since the initial sowing in 1988, there is enough seed in hand to make a start on propagating this plant and so make it available to more cactophiles.

My Swiss cactus friend Wendelin Maechler, himself a collector and expert on Copiapoa, who has visited Chile many times, managed on his latest trip to trace a number of rarities in the genus Thelocephala. I will present you with the results of the Maechler expedition and begin with T.fankhauseri.

These plants make long forked tap roots so that deep pots serve as a good accommodation. The body is flat in nature and solitary, up to 7 cm in diameter, with a depressed crown and lacks a narrow neck between body and root. At flowering age 13-21 ribs, as far as they can be recognised. Epidermis dark greeny-brown to almost blackish brown. Flower up to 4cm long, petals lemon yellow up to 2.6 cm long, the outermost with a purple-brown midstripe.

Plants appear in collections under the name T. napina v.lanigera and I cannot say for certainty at the moment that this plant is T.fankhauseri. Plants of T.napina v.lanigera in my collection come from various sources and do look rather like T.fankhauseri but in my view are not the genuine T.fankhauseri, because they lack the typical strong black spines.

A NEW GENUS FOR AN OLD NAME? From H.Middleditch

The November 1992 issue of K.u.a.S. carries a leading article by T.Engel in which all Notocacti are transferred to the genus Parodia. At the same time a large number of Notocactus names are reduced to synonymy. This publication appears to be a consequence of the deliberations of the I.o.S on nomenclature in the cacti and in particular of the proposals emanating from Taylor and Hunt at Kew.

Within the cactus family there are a number of genera in which each individual species can be assigned to a major group within the genus as a whole. This is the case, for example, in Gymnocalycium where each group within the genus has clear-cut distinctions in the seed characteristics, as well as some differences in plant habit; certain of these groups also differ in the nature of the fruit; in addition, each group has a limited area of distribution within the well recognised geographical spread of the genus as a whole. The distribution of each group is largely determined by macro environmental factors, especially climate and altitude. On the other hand the genus Matucana can with equal ease be divided into two sections, one of which has been conveniently referred to as Submatucana. But it is very difficult to defend this name as a genus in the wider context of plant nomenclature. The same could be said of sections of the genus Rebutia. A similar view could be taken in regard to Parodia and Notocactus. To a general botanist, there is a clear need for a rationalisation of generic names in the cacti.

The names of most plants in the world's Flora tend to be largely of interest, concern, and use to academic botanists. Where they are used by gardeners and nurserymen e.g. with alpines, they seldom appear to excite controversy. On the other hand, cactus names are used by a great many collectors outside academic circles; not a few of these collectors find that current nomenclature, once grasped, is quite a convenient conversational tool for identifying reasonably clearly just what sort of plant is being discussed. To move to what appears to be one step away from classing all South American cacti either as Echinocactus or Cereus, hardly has a great deal of appeal to most cactophiles. Especially when such changes seem merely to descend out of the blue, without the sort of explanation that accompanied the original introduction of the displaced names.

The close relationship of Notocactus and Parodia will be evident to even a casual observer and needs no detailed scrutiny, so that their reduction to synonymy will no doubt receive a nod from the company of academic botanists. But for the growers who wish to make clear what plant they are talking about, such a change is a hindrance and not a help. Of course there is also the continental group of Notocactus enthusiasts who operate under the banner of "Internoto". Will they now become "InterParodia". And what will the Parodia enthusiasts who operate as "Parodia kette" think of that?

Of course the number of species names in the genus Notocactus could justifiably be questioned. Especially in Rio Grande do Sul we now know that many of these plants are to be found on patches of rocky outcrop which may range from less than the size of a tennis court to as large as a football field, almost invariably surrounded by ground unsuitable for cacti. As a consequence, it is not too surprising that each population can differ somewhat from the rest, in addition to variations within a population. In the past, each variation seems to have acquired its own name. Some years ago we welcomed to the Chileans Weekend K.-H.Prestle from Holland, who had visited Uruguay and Rio Grande do Sul, and who seemed to have invented even more new names for Notocacti! Do the Internotophiles prefer this abundance of names, or will they take on board the proposed changes?

The name Notocactus was used by Schumann as a section of the genus Echinocactus; the plants listed by Schumann as Section Notocactus were included under the genus Malacocarpus by Britton & Rose in 1920, who also placed Echinocactus microspermus under their new genus Hickenia. The name Hickenia had already been used by Lillo in 1919 so this was superceded by the name Parodia in 1925, before Notocactus was erected as a genus. Hence the name Parodia has priority over Notocactus.

.....from A.Hofacker

The idea of submerging Notocactus into Parodia is not new to me. At our last meeting of Internoto we had a great discussion about it. Our botanist members accept Notocacti as Parodias, but the rest of our members do not. I also prefer to see Notocactus retained as a separate genus. On the other hand one cannot say the same about all Notocactus names, especially those given to plants found by Prestle. He made hundreds of new names. He never found forms or varieties, but always new species. He even gave new names to very well known plants with old names and so perplexed a great many other collectors. It is very likely that all these names were one of the reasons for the lumping undertaken by Taylor.

....from N.Gerloff

The article by the biologist Dr.Thomas Engel in K.u.a.S. has caused some disquiet and concern here. The new combinations of Taylor & Hunt (Kew) were known to us a long while ago, but no-one paid much heed to them as the whole matter was not well substantiated. Many names were reduced to synonyms which do not belong together - even

many old taxa were not taken into account and several errors made by others were accepted.

Naturally the large number of species names in Notocactus will have to be condensed, but that has been accepted for some time by the specialists here. Engel also offered this article to our Internoto journal, but our editor would not put it into print until critical comments had been added. Now Engel has put it into print just as it was. There is no discussion accompanying it, but only praise for fellow biologists. We have a saying "one crow does not scratch the eyes out of another crow".

No commercial dealer is now writing out new lists and having new labels printed. The expert on Notocacti (Dr.Engel) has only himself to blame, since he has written it as if everything was in proper order. It also appears to me that the new CITES check list produced by Hunt 1992 shows that both only copy each others' mistakes and presumably nobody has yet said that they have made a mess of it all.

In the meantime Prestle has become rather more cautious, but as he always works on his own he makes many errors. Nevertheless he knows a great deal more about Notocactus than Taylor & Hunt are aware of. They only know their plants from the first descriptions.

....from K.H.Prestle

The article by T.Engel in K.u.a.S. has irritated many cactus fanciers, especially the Notocactus as well as the Parodia fanciers. We have received a great deal of correspondence and it is clear that the entire cactus world is in general unhappy with the Taylor-Hunt transpositions. In consequence the Notocactus fanciers remain with the previous conception and reject completely the name Parodia for the Notocacti.

Now with this matter it is the case as always, that when pronouncements are made from on high, as in this instance from the I.o.S. amongst others, they must come well documented to have any chance of registering a success. Therefore I am personally preparing to write an extensive treatise so that this problem can be more closely examined and scientifically documented. Nyffeler (a Swiss botanist) has pointed out that Taylor/Hunt and others referred to the work of W.Glaetzle and myself published in Bradleya 4/1986. On the topic of Parodia, however, we only reported in that review that no conclusion was possible, since no comparable work is available for the genus Parodia and so no comparison can be made.

F.Brandt has also only been able to put forward sketches which could without doubt be called incorrect and contrived, regarding the way in which the funiculus emerges.

Unfortunately Prof. Buxbaum has been a cause of annoyance with his work on the funiculus as such a position is always shaky and indeed in the meantime has been replaced by other data, so that it is no longer so important after all, although it is accorded much significance.

Actually Taylor & Hunt have in general given no argument as to why these re-combinations should be undertaken. It is pure bluff and shows the I.o.S. in a very poor light. As far as the species names of the genus Notocactus are concerned, everything from the last 60 years has simply been disregarded and has gone back to the position of Britton & Rose, an impossible situation and an outrageous one for scientists.

.....from S.Theunissen

Ever since the Notocacti sensu Buxbaum were put into synonymy with Parodia, the change has been discussed during the Internoto conferences and certainly in private correspondence, although perhaps not in the Internoto journal. In general terms one can say that Notocactus fanciers are not filled with enthusiasm by the idea that they now have a more or less extended collection of Parodias. So far I know of no-one who has rewritten their labels and personally I shall not be doing so either.

At the beginning of the previous century our hobby was beginning to take shape, when there were only a few genera; Lemaire (1839) knew only the following genera: Anhalonium, Astrophytum, Cereus, Echinocereus, Echinonyctanthus, Epiphyllum, Hariota, Lepismium, Mamillaria, Melocactus, Opuntia, Peireskia, and Pilocerus. In the subsequent decades these were apparently not sufficient to differentiate adequately between the many forms of plants and in consequence many more genera were erected.

Our hobby has always been distinguished by having mainly amateurs who were concerned with these plants, some of whom could unquestionably be regarded as authorities on account of their many years of practical study and knowledge. Whatever Biologists learnt through their academic studies, the amateurs learnt through study and/or field work, admittedly only in the field of cacti. At the same time, there were biologists who were aware of our thorny friends in cultivation and they applied their theoretical knowledge to those plants which they had at their disposal. Unfortunately these two groups of people barely acknowledge each others' existence, which sometimes produces unhappy consequences. The academic is wedded to theory whilst the amateur seeking knowledge reproaches the academic for his lack of practical experience.

Professor Buxbaum was a trained scholar who as early as the nineteen thirties had contact with some very interested cactus fanciers and fieldworkers such as Backeberg, Buining, Fric and Werdermann, who also held him in respect and regarded him as a specialist. In the sixties he established a classification for a group of cacti which was acceptable to many and was not widely discussed: the Notocacti sensu Buxbaum. He undoubtedly investigated the grounds for this scientifically and arrived at a separation of these plants from all others on the basis of scientific criteria. Anyone who is keenly interested in this group of plants can, without any great difficulty, pick out the Notocacti from any number of various globular cacti. A decade ago a discussion raged over whether or not the Brasiliparodia, the Eriocacti, and the Brasilicacti should be merged into Parodia. Brandt, who was often despised because of his opinions, in 1984-85 came to the conclusion on purely theoretical grounds that these subgenera of the genus Notocactus had to be transferred to Parodia. Brandt declined to simply conform with established viewpoints and always found a means of publishing his own diverging views which were not necessarily incorrect. Because this annoyed some people, attempts were made to gag him, but it was not successful.

After some years then N.Taylor came along with partially the same opinion as Brandt and no protests were heard. Fortunately Taylor himself has followed the Brandt viewpoints. Honour where honour is due! These opinions of N.Taylor were put before a wider public for discussion in the November 1992 issue of K.u.a.S.

On that account let it not be said however, that we, as Notocactus fanciers, must dissolve our club. As already observed above, the Notocacti remain a group of cacti which can be readily distinguished from other cacti. Since we are interested in this particular group of cacti, I believe that we are likely to retain our established name without any problem.

Nevertheless we are at liberty to examine the work of Taylor critically. At the same time I must rely entirely on the data in the article by Nyffeler in Internoto 13 (4) 1992. To all appearances Taylor has accepted the treatment of Notocacti by Prestle and Glaetzle on the supposition that it embraces the whole group. I will not decry the authority of either of these authors, but it would have perhaps been better if Taylor had made use of the monograph on Notocacti by G.Schafer

(Kakteen/Sukkulenten 14 (1-4) 1979) as the source for his studies, which is recognised by all Notocactus fanciers as the best in this field up to the present time. Taylor has not devoted a great deal of time to his studies, since already in 1987 he came out with his new combinations based upon the work of Glaetzle and Prestle in 1986. We are confronted here with an academic who probably only knows the Notocacti in theory. On the basis of his theoretical knowledge he has then placed the Notocacti into synonymy with Parodia. In that way there begins the reversing process in which from many genera there will again be few. If this goes on further it will finally finish up again with the few genera which were known early in the previous century. In that way the work of serious cactophiles and scholars would be rendered null and void. Perhaps Taylor really does have pure science on his side, but for us cactophiles, it is unsuitable.

I can not understand why T.Engel, as a longstanding member of Internoto, has not availed himself of the availability of certain pieces of information which have been discussed in the intervening period in our club and so rectify what Taylor has plainly represented incorrectly. For example, it was 25 years ago that van Vliet established that N.muricatus belonged in the group related to N.ottonis and did not belong to N.concinnus. I myself have documented in several contributions that N.apricus is a synonym of N.caespitosus. The suggestion by Taylor that N.caespitosus and N.minimus/tenuicylindrica are synonymous therefore can not stand scrutiny. Even the attachment of N.muegelianus to the form-complex round N.horstii has already been documented, whilst in the first description of N.incomptus this relationship was also clarified. Notocactus vanvlietii, N.rauschii, N.orthacanthus and many other spp. are not to be met with in the whole of the list, even though they were described quite some time ago. More recently some forms of N.scopa were described with yellow or white stigma lobes. Whoever was slightly acquainted with Notocacti would certainly apply a question mark to several of the synonyms.

In conclusion I must say that the work of N.Taylor may be supported by science, but that it has many shortcomings, since it has been put together too hastily. On the other hand T.Engel has let slip an opportunity to correct some flaws which he must have been aware of as a member of Internoto. I cannot see myself being associated with this proposal, since for me the difference is still too great between the Notocacti sensu Buxbaum and the "other Parodia".

....from W.Verheulpen

The proposals of T.Engel in K.u.a.S. have certainly alarmed a number of people. I was requested by W.Weskamp to give a talk on the true Parodias at the annual Notocactus meeting held at Maastricht in April. Unfortunately speaking to an audience in German is not one of my strong points so I had to decline the invitation, but very fortunately Jorge Piltz agreed to do the job. So the Notocactus people should now have a good idea what a Parodia looks like and whether lumping should be proceeded with or not (I think NOT!) The misfortune seems to be that within the I.o.S. a number of people seem to be pushing the reduction in numbers of genera as proposed by certain of their English members. Once again the Brandt type of mistake is going to be repeated. Why are these people not capable of undertaking some joint research with others in order to achieve some defensible standpoint?

.....from D.J.Ferguson

I do not favour the wholesale lumping of well-defined genera, and do not like the lumping of the Notocacti under Parodia. I find it interesting that the I.o.S. did not lump Frailea and Blossfeldia as well, since I would regard these two genera as quite closely related to Notocactus and Parodia. I would consider all these plants as two major groups, firstly:

1. Frailea - Plants with low tubercles or tubercled ribs. Seeds smooth, large, helmet-shaped, with one trichome per testa cell. Fruit as in Parodia.

2. Blossfeldia - monotypic. Basically a true Parodia, but with minute spines and a seed surface like Frailea

3. Parodia - Includes species with tubercled stems and tiny smooth seeds with a strophiole. Fruit are indehiscent and delicate papery. Commonly with hooked spines. Includes only P.microsperma and close kin. The only trait which separates Blossfeldia is the trichomes on the seed.

4. Brasilicactus - Not easily separable from Parodia. Seeds more tuberculate, black, elongate, with little evidence of a strophiole. Without hooked spines. Includes haselbergii, graessneri, and chrysacanthion. Tied to Parodia by nivosa, penicillata, and setosa, which are intermediate.

And in the second group:

5. Notocactus (inc. Wigginsia) - Ribbed plants with typical seeds with a dull rough testa and large pale basal hilum - pale colour is analagous to a strophiole. Most without hooked spines. Fruit are bags which elongate at maturity. These are thin-walled but not brittle at maturity, although they will dry to brittleness with time, and are always somewhat sticky internally, not dehiscent.

6. Uebelmannia - Close to Notocactus, reproductive parts all smaller, and seeds different. Epidermis unique.

7. Eriocactus - small barrel to columnar cacti with oblique stem apices. Ribbed, fruit basally dehiscent, stiff, dry. Seeds shiny black, elongate.

8. Protoparodia - Low ribbed plants, usually with hooked spines. Fruit rigid-walled, dry, basally dehiscent. Seeds black, not much longer than wide, without obvious strophiole. In many respects similar to Eriocactus. Clearly distinct from Parodia sensu stricta.

.....from H.Middleditch

It would be very easy to point out certain flaws in the foregoing; not all Protoparodia fruit are rigid-walled, also some seeds in this group are much longer than wide, in particular those of the series Oblongispermae Buxbaum. This appraisal demonstrates how one person will look more closely at certain characters and draw conclusions from what he sees, whilst another pair of eyes will see a different set of relationships. The proposal to sink Notocactus into Parodia is one such viewpoint but it does not appear to be greeted with universal acclaim.

BOLIVIA REVISITED DECEMBER 1992 From B.Bates

On 7 December we arrive in La Paz in the early morning after a journey of thirty hours from Southampton, via Heathrow and Miami. We go straight to our hotel where we drop our bags. After ordering some maps and changing some money we go to pick up our vehicle, which has been reserved and is waiting for us. The rental price has nearly doubled in three years. We fill up and head out of La Paz, but a combination of travel fatigue and a fault on the vehicle means we go no further than to the east of La Paz, where we meet with Tephrocactus bolivianus. During dinner at the hotel, the heavens open and the heavy rain turns the main street into a river

On the following day we set off from La Paz; we travel rapidly to Pandura where we turn towards Eucalyptos. We stop (BDH 1, Bates, Down, Hughes) between Pandura and the spot where J.Kirtley and I stopped in 1989. As usual at our stops, each of us goes off in a more or less different direction for the best chance of finding whatever is growing in the vicinity. The plants we find are L.pentlandii, R.pygmaea, T.bolivianus, and O.orurensis (an airampo type). There are also quite a few N.vorwerkii, which look similar to the Lobivias. This time the Lobivias are not in flower, but there are some

fruits. The Rebutias are in flower, as are some of the O.orurensis. From here we go on to stay overnight at Oruro.

After breakfast we leave early heading for Potosi. and drive to a hill about 20 km to the south of Oruro (BDH 2 = B/K 8). Here is Lobivia pentlandii, T.bolivianus, O.orurensis and N.vorwerkii again, but the Rebutia is R.orurensis. There is also Helianthocereus orurensis and H.bertramianus together with an Opuntia sp. From there we drive to Challapata and stop shortly after, finding T.bolivianus and L.pentlandii (BDH 3). At 7 km north of Cieneguillas we stop again (BDH 4) where we find lots of Opuntia weingartiana in flower along with T.bolivianus, O.orurensis, Lobivia pentlandii, and Helianthocereus sp. We carry on to Cieneguillas and stop just south of the village (BDH 5 = B/K 13). There are Parodia sp. to which you could put three different names. Which name takes priority has not yet been investigated. Also here is L.ferox, O.celsianus, O.weingartiana, T.bolivianus, an Opuntia sp. of the airampo type, a Platyopuntia sp. and Helianthocereus sp.

After staying overnight at Potosi we set off for Cucho Ingenio to try and locate Weingartia westii. But first we stop about 10 km north of Cuchu Ingenio when we see O.trollii (BDH 6), carrying ripe seed. We also find Lobivia versicolor, Rebutia pectinata, Parodia maassii, Helianthocereus tarijensis, Tephrocactus bolivianus, T.rossianus, Opuntia sp (airampoa), Platyopuntia sp., Oxalis carnosa, Oxalis sp. with purple flowers and a bulb with red zygomorphic flowers. Beyond Cuchu Ingenio, where the road divides for Sucre and Cotagaita, we find W.westii within 20 metres of the road! With ripe seed (BDH 7). Also here are L.ferox, L.versicolor, P.maassii, another Parodia sp., Helianthocereus tarijensis, O.celsianus, Opuntia weingartiana, T.bolivianus, T. rossianus, Opuntia sp. (airampoa), Platyopuntia sp. with yellow flowers and green stigmas, and Oxalis carnosa.

Approaching Vitichi we see a small Trichocereus (BDH 8). Back in England, this is tentatively indentified by H.Middleditch as T.camarguensis. There are no flowers or fruits, but well developed buds. We manage to collect old fruits off Trichocereus af. tacaquirensis. We also find O.celsianus, T.bolivianus, an Opuntia sp., and our first Cleistocactus, C.tupizensis. From here we go straight on to Cotagaita, but I cannot recognise the location some 4 km south of Cotagaita where J.Kirtley had asked me to investigate B/K 20. At 10 km south of Cotagaita (BDH 9) we find Trichocereus af.macrogonus, O.celsianus, Opuntia sp., and L.cotagaitensis which are not common. Our overnight stop is at Cotagaita.

Before breakfast I climb the nearby hill to the monument. What appears to be a nice brown plant proves on close inspection to be fresh growth on a corky T.macrogonus. A little higher up are some plants which I take to be Weingartia, but which turn out to be L.cotagaitensis - out of flower this is no different from the L.lateritia at San Pedro. From here there are Parodias in view (BDH 10). These are up to 18 cm diameter and up to 50 cm tall. On return to England, J.Arnold identifies them as P.obtusa and the type locality is Cotagaita. In addition to the L.cotagaitensis, none of which are in flower, there is also a more slender Lobivia up to 35 cm tall with shorter black spines and yellow flowers. Could these also be L.cotagaitensis?

From Cotagaita we set off in the direction of Tarija. The first section is fairly flat; we stop 25 km east of Cotagaita (BDH 11) and find a 38 cm high Lobivia, which is probably the same as the plant seen at Cotagaita. There are also P.maassii, T.bolivianus, T.cf. tacaquirensis, O.celsianus, Opuntia sp., Jatropha sp., and Habaranthus sp. The road then becomes mountainous, with streams flowing across the road into the river which runs parallel to the road. But this road is nowhere near as hazardous as that from Tupiza to Impora taken by J.Kirtley and myself in 1989 when we crossed the same mountain range but further to the south. When we join the main road we turn south, with a halt at Villa Abecia before going on to Iscayache for our overnight stop.

From Iscayache we head for Tarija and stop after 20 km (BDH 12) to photograph a beautiful orange flowered alpine, which we subsequently begin to suspect is almost an indicator for the presence of cacti. At this site we also see Sulcorebutia tarijensis, which I do not recognise for a while, as well as Rebutia alboareolata, Echinopsis mamillosa, a tuberous Peperomia, and a Bromeliad. Shortly after we see E.mamillosa in flower (BDH 13). Further along the same road we see a Lobivia with magenta flowers very near to the road (BDH 14), which proves to be L.tiegeliana; there is also E.mamillosa with red flowers. Here the terrain is undulating, made up of large slabs of rock with the plants in the cracks between slabs.

After a brief halt in Tarija itself we head for Cajas pass and Entre Rios. We stop four times along this length of road, the best of which is BDH 16 where there are Cleistocacti growing all over the hillside. But unlike when K.Preston-Mafham stopped at this spot. there is no ripe seed. However there is E.mamillosa with white flowers, E.obrepanda with red flowers, Lobivia cardenasiania also with red flowers, Rebutia spegazziniana with orange flowers, T.macrogonus, O.vestita or verschaffeltii, Begonia sp., Peperomia sp., and a purple flowered convolvulus. We go a little further along this road and make another stop (BDH 17) where we find Cleistocactus jujuyensis and then turn back towards Tarija. On the way back we stop to look at an array of plants including Echinopsis, Cleistocactus, a Cereus with a reddish bud, and at least three different Opuntias.

After staying overnight in Tarija we next aim for Culpina, making a brief halt at BDH 12 again for photographs. At about 9 km north of Iscayache we stop where we see fields of O.trollii (BDH 19) which does carry seed. There are also Echinopsis, O.?verschaffeltii, Tephrocactus ?pentlandii, and a Tephro sp. here. Three km further on we stop again (BDH 20) where we see O.celsianus and O.trollii growing together. We also find L.ferox, Parodia escayachensis, T.bolivianus, T.pentlandii, and an Opuntia sp. (airampoa). Another 2 km further on we see a veritable feast of cacti, the highlight of which is a colony of football sized Parodias with long, slim, seed pods, which have not yet been identified. These plants are roughly 20 cm in diameter and height, with a 3-4 cm long pink to yellow coloured fruit which is covered in long white hairs. The seeds are of the larger Parodia type. The name of P.suprema was later suggested, but the fruit does not fit. We do not see any flowers. Again both O.celsianus and O.trollii grow here, this time with two spp. of Helianthocereus, a Trichocereus, O.weingartiana, T.bolivianus, and an Opuntia sp. (airampoa). Above San Pedro (BDH 22) we stop to look at Weingartia cintiensis, L.lateritia, P.maassii, an Echinopsis, and a Jatropha sp. En route to Culpina we hope to find Parodia occulta, but we are unlucky. We have considerable difficulty obtaining food and overnight accommodation in Culpina.

From Culpina we intend going to Yuquina, but after picking up one of the locals we get to Salitre instead. We stop above Salitre (BDH 23) to look at Oreocereus, P.culpinensis, L.ferox, H.tarijensis and O.weingartia. The road then starts to deteriorate to such an extent that we turn round and head back the way we came, but stop at a field of O.trollii where again we are lucky and collect seed (BDH 24). Oreocereus celsianus also grows here, together with L.ferox, E.obrepanda, T.pentlandii and two other Opuntias. It was here that R.K.Hughes discovered flowering plants of R.albopectinata. We carry on and stop about 18 km west of Culpina for a host of cacti, but no P.occulta. We continue until we are high above San Pedro where we had seen a L.lateritia about 50 cm tall. There is also W.riograndensis and E.obrepanda. We descend and stop again above BDH 22 where we find W.cintiensis. From San Pedro we head north, making a stop some 5 km north of Padcoya for a field of Weingartias. Also a few L.cinnabarina together with Parodia and T.bolivianus. We reach our overnight stop at Puna after dark.

From Puna we set off for Sucre, stopping briefly 10 km north of Chaqui for some T.rossianus, then again 12 km north of Betanzos for O.weingartiana. We pass through Millares and stop just beyond it. I use the field glasses to spot the Gymnos on a wall of rock behind the houses, so we go back to the village to climb the hill (BDH 31). The G.millaresii are in fruit with some ripe seed, but you have to be quick to collect the seed as the ants barely let the seed ripen before they take it. In fact they take about a quarter of the contents of a seed pod during the time I am up the hill. After photographing several Gymnos and a couple of Weingartias, I suddenly realise that there are lots of Blossfeldia in the cracks between the layers of rock. From all my research I had no record of any Blossfeldias from this locality. There are also Echinopsis huotii. From there we go on to our next overnight stop at Sucre.

The next morning we climb the Cerro Churuquella, the type locality of S.canigueralii, which we find, as well as R.fiebrigii, E.sucrensis, O.vestita, a Cleistocactus, an Echeveria, a Peperomia both leaf succulent and tuberous, and a purple flowered Oxalis. In the afternoon we head for Ravelo, only making one stop where we find the three different forms of S.losenickyana. The small pectinate spined form, the intermediate green form, and the adult form with the stronger spination.

After a further night in Sucre, we head for Alamos and from there to Chimori. We are unable to go any further than the quarry at Chimori as the road is closed beyond that point. Here we do not find any Sulcorebutia, only Echinopsis and Cleistocactus. On the way back we make three stops and find S.frankiana at the first, S.alba at the second, and S.vasqueziana at the last. The area round Warankha pass is given over to cultivation and there are only a few plants in the rocky margins between the fields.

After our third night in Sucre we head for Tarabuco, stopping after 13 km for a site of assorted cereoid plants (BDH 38) and again after another 5 km. At this spot (BDH 39) there are also superb specimens of P.yamparaezii, Echinopsis obrepanda, Cleistocactus sp., Trichocereus sp. and O.vestita. Some 17 km after Yamparaez we stop (BDH 40) when we see L.cinnabarina in flower and find S.tarabucoensis. We stay overnight in Padilla.

The next day we aim to get to Las Higueras, or even further. We have a stop just north of Padilla and then again north of Villa Serrana (BDH 46) where we find S.crispata which are exactly like the plants of KK 1154 and Lau 394 which are so common in cultivation. We stop again after Nuovo Mundo, when Harrisia is seen sprawling near the side of the road. There is also Roseocereus growing here and I am now in total agreement with D.Hunt that Roseocereus is in fact synonymous with Harrisia. On closer inspection we also find a variety of G.pflanzii, various Cerei, Peireskia sacharosa and P.diaz-romeroana, a Cleistocactus sp. and two different Opuntias. Three km further on I see a fruit on a 6 m high Cereus and stop to investigate it; when I reach the ridge I spot some Vatricanias complete with cephalium. They are beautiful with their ginger whiskers. There are also several of the spp. from the previous site, but I do not see any Peireskia. About 8 km further on we encounter a muddy stretch where a stream crosses the road and our vehicle gets well and truly stuck. Going for help and getting extracted costs us most of the rest of the day, so we then go back on our tracks and stop at Villa Serrana for the night.

Travelling back to Sucre the next day, we make two or three stops on the way where we find only Echinopsis.

Leaving Sucre and heading for Aiquile, we stop after the cement factory to look for S.applanata, but without success. Then a few km north of Mojotoro (BDH 51) we find W.lanata, E.sucrensis, Cleistocactus sp., Roseocereus, Neocardenasia, Opuntia sp. and Jatropha. Before stopping for the night in Aiquile we head north to look for the Gymnos that were found by J.Kirtley and myself in 1989, but cannot find the site. There is a lot more agriculture here than at the time of our previous visit, something that we noticed at several other places that we had passed through in 1989. At 28 km north of Aiquile (BDH 52) we collect last year's seed off Roseocereus.

The following day saw us en route to Cuesta de Santiago; we stop and find S.swobodae. Below the road the plants are quite dessicated and have mainly yellow and cream spines with a few dark spined plants; above the road the plants are more turgid and darker spined plants predominate. We carry on another 6 km and stop again, where we find S.purpurea of the HS 26 type with green bodies. At this site (BDH 54) there are also E.huotii, Echeveria, and a tuberous peperomia. Beyond Santiago we only find Echinopsis, so we return to Aiquile. A search for S.albissima is unsuccessful, but we stop at the site of S.mentosa just south of Aiquile.

On the next day it was planned to visit Paschja, but we fail to find the correct road after more than one attempt, losing a great deal of time; so head straight for an overnight stop in Cochabamba.

We then travel east out of Cochabamba, heading for Epizana. We stop after about 50 km for Corryocactus in flower. There are hundreds of fruits but no ripe seed. There are also Cleistocactus sp., Echinopsis, and Puya. Before reaching Epizana we do find S.tiraquensis, in company with E.calorubra. Below the road all the cacti have been cleared for fields. On the way back to Cochabamba we stop to find S.steinbachii on a rocky island which has been burned off by the locals. The Sulcos are scorched but they are growing out. At this site (BDH 61) there are some large clumps of E.cochabambensis. We return to our lodgings in Cochabamba.

Christmas day was spent in Cochabamba itself. On the next day we visit the Cardenas Botanic Garden, which is locked up, but the cacti are in worse condition than at the time of our last visit. We travel some way out of Quillacolla on the road leading to Independencia and stop when we see what we take to be Echinopsis cochabambensis, but on looking at the slides later they turn out to be Lobivia caespitosa! On the way back to Cochabamba we stop to investigate the Cerei and also find more E.obrepanda, O.vestita, and the purple flowered Oxalis. Back in the hotel, there is a heavy shower.

Next day it was back towards La Paz, not stopping until we get to Pandura, where we return to the spot visited by J.Kirtley and myself in 1989 (BDH 64). The Rebutia are of the steinmanii type and the L.pentlandii has ripe fruit, otherwise it is the same as the first stop we made three weeks earlier. From there we go on to El Alto and Achacachi. As we go through Hualata Grande we spot T.floccosus growing against the stone walls around the fields. We reach Sorata in the dark and obtain lodgings.

We leave for Quiabaya but neither the scenery nor the road are very promising so we turn back towards Lake Titicaca. Just outside Achacachi are the T.floccosus we saw in 1989 and the L.maximiliana are in fruit. It is lashing down with rain as I walk into the hotel in La Paz. On our last day we visit the Valle de Luna; there is ripe seed on O.fossulatus but not a single ripe pod on C.melanotrichus. We also find one ripe fruit on E.bridgesii. Then it was back into La Paz to pack bags, return the hired vehicle, and prepare to fly back.

.....from J.Brickwood

In Weskamp's "Parodia 2" there is an extract from a letter written by Rausch which runs as follows - "I collected a small Parodia in 1968 at high altitude near Cana Cruz, in Mendez province. It is ... Parodia occulta. A few years later I also found this species growing right next to the road. It is possible to drive or walk along this stretch of road without noticing it at all."

.....from F.Ritter, Kakteen in Sudamerika Vol.2

Parodia occulta... Type locality Cana Cruz, prov. Mendez, where it was found by me in February 1963, being the only known habitat location.

.....from H.Middleditch

The site for P.occulta quoted by Rausch and by Ritter is the Cana Cruz in Province Mendez which lies on the south side of the R.Camblaya. On the north side of the very deep valley in which the R.Camblaya runs, there lies the road from Palca Grande via San Pedro to Culpina, along which B.Bates' party looked for, but did not find, P.occulta. On my ex-Brandt map of Bolivia there does appear to be a place with the name of Cana Cruz on this road, but this is in N.Cinti province.

.....From F.Vandenbroek

Yes, We were so lucky to find the minute Parodia occulta. During a walk from Salitre to La Cueva we found it growing on a mountain crest. The plants are up to 2cm in diameter and somewhat withdrawn into the ground.

.....From H.Middleditch

The account by B.Bates makes reference to finding Peireskia diaz-romeroana. This species does not seem to be common in cultivation.

.....from C.Holland

It will be about four or five years ago that I grew Peireskia diaz-romeroana from seed which came from van Donkelaar. There were probably about a dozen germinations. These was simply left in the tray in which they had been grown, one of them reaching a height of about 20 cm in little over a year. To my pleasant surprise it decided to put out a flower when it was only 18 months old, still unbranched. The flowers were terminal and white in colour, which surprised me because Backeberg quotes a red colour for the flowers. Fortunately the next largest seedling also flowered and although there were only ever one or two flowers per plant at a time, I was able to cross pollinate between the two plants, which resulted in fruit being set. The fruit took a few weeks to ripen until it finally became almost black, about 7 or 8mm in diameter. It contained only about six seeds. Eventually I got round to to pricking out the particular tray of seedlings in which these Peireskia had been for four years. When I took the largest plant out of its tray, I got quite a surprise, as the root had gone down to the bottom of the tray and there it had formed a horizontal tuber. This tuber was almost 20 cm long, and about 4 to 5 cm thick. It was not of uniform cross section, but displayed a slight narrowing at two places along its length. There were very few hair roots, and these were all at the growing tip. The consistency of the tuber was not unlike a seed potato which had been left to shoot for too long, that is, very soft and spongy.

From the few seeds produced, I now have a second generation of seedlings.

.....from B.Bates

Fortunately I have been able to refer to Cardenas' original description of Pereskia diaz-romeroana which is accompanied by a drawing of the plant complete with horizontal tuberous root.

PERESKIA DIAZ-ROMEROANA sp.nov. By M.Cardenas
Translated by H.Middleditch from Cactaceas Nuevas de Bolivia, I; Lilloa, Vol XXIII, 1950

Bush of 1-2m in height, well branched. Roots lengthy, woody, provided with fusiform swellings at intervals. Stems cylindrical, of some 2 cm in diameter in the main branches with detaching bark of ashen green or brown colour. Lateral branches more or less 1m long, almost horizontal. Areoles on the branches large, 2-3 cm apart, with grey felt and some somewhat curly white hairs , 5-6 mm in diameter, round or elliptical, prominent. Spines five on the new growth and up to 12 with age, unequal, being of some 5mm in length at the shortest and 2 cm or a little more at the longest. All the spines somewhat flattened, swollen at the base, whitish or lustrous yellowish. Leaves without a stalk, alternate, oval-elliptic or elliptical of 1-2.5 cm in length by 8-10 mm in breadth, pointed at the tip. Obtuse at the base, of dark green colour and furnished with long white curly hairs in the axils. Flower buds completely covered with shiny, curly, white hairs. Flowers in compact group (3 flowers), at times inserted with leaves. Each flower as short as 1 cm long. Ovary naked, bright green with very tiny scales and furnished at its upper margin with five bracts; outer petals dark red, generally three; inner petals 4-5, pointed, reticulated with a purple wine colour; stamens numerous inserted at the base of the style, filaments reddish, anthers orange, style yellowish white, slightly longer than the stamens, stigma lobes short, stout, forming a sphere as a whole, yellow, five in number. Fruit 3-5 mm diameter, purplish black, juicy. Seeds in quite small amounts, shiny black, of 1-1.5 mm in diameter with a prominent lateral scar. The fruits carry at their upper part the dry floral remnant with a thick tuft of hairs at the base.

Material studied - Xerophtyic scrub in the stretch from Ttacko Laguna to Pulquina (route Cochabamba-Santa Cruz) 10-1947, Cardenas No.4388. Type.

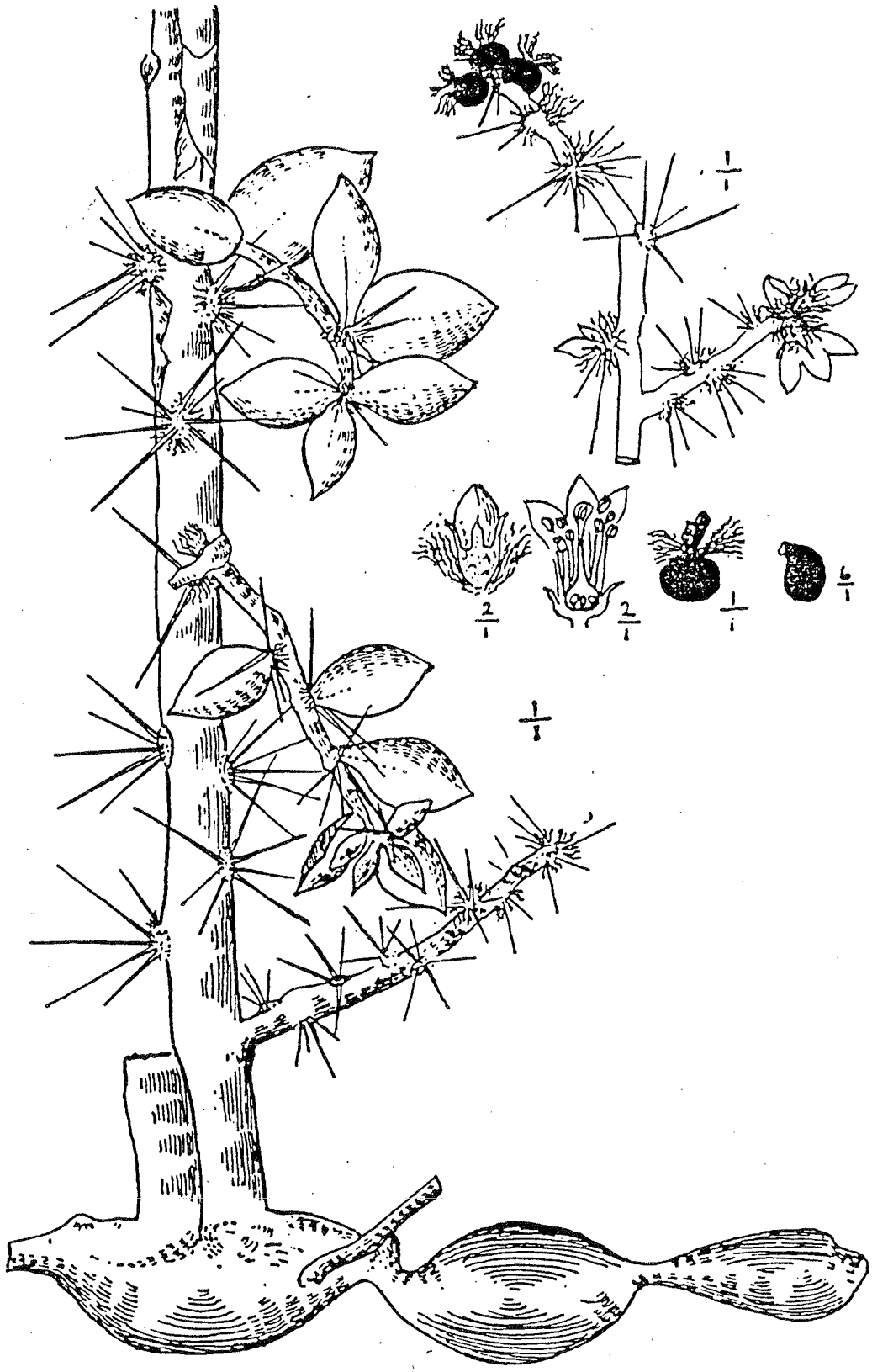
Observations: The species described above is similar to the Pereskia weberiana Schumann, which was collected by O.Kuntze in the surroundings of the small farm of Tunari in Ayopaya (Dept. Cochabamba). It is distinguished by its more branching habit, more numerous spines, the occurrence of tufts of curly hairs at the base of the leaves, the flower buds covered with long hairs and the flowers of purplish-wine colour and not white, and by a geographical separation of quite some distance from the habitat location of the other species.

The newly described species is known under the native Aymara name of Uturunku, which means jaguar, an undoubted allusion to the very spiny character of its branches. This species is named in honour of the late Dr. Belisario Diaz Romero, of La Paz, who was a worthy self-taught naturalist of Bolivia during the first three decades of this century.

.....from H.Middleditch

In his description of P.diaz-romeroana, Cardenas quotes "spines initially 5, later 12"; the description of P.weberiana K.Schumann, Gesamtbeschreibung der Kakteen p.42, quotes "spines initially one, later up to 5". Under the heading of "observations", Cardenas notes that "it [i.e. the species diaz-romeroana 'described above'] differs from P.weberiana by ..... more numerous spines, and ..... by flowers of a purplish-wine colour and not white". In his Die Cactaceae Vol.I p.112, Backeberg observes that "in his description of P.diaz-romeroana Cardenas gives the flower colour of P.weberiana as wine red. That is an error" which suggests that Backeberg has misread the Cardenas description. However, when producing a 6-Volume work covering the whole of the Cactaceae in a period of 4 years it is not a simple matter to ensure that you get everything right.

Although the Cardenas description is written "Pereskia" this does not appear to be the correct spelling. To quote from Schumann, Gesmt. der Kakt. p.41, "Peirese, Nicolaus Claude Fabrice, or in accordance with earlier latin usage, Peireskius ...."; and then on p.758 "Up to the present time there has been no uniformity of view achieved over the correct spelling of the genus. As the author himself wrote in the Roll of Parliament at Aix, ... Peireskius, ... it appears to me that the form Peireskia is worthy of acceptance." In addition to the spelling of the genus, the use of capital letters by Cardenas for the specific name i.e. Diaz-Romeroana, is rather puzzling as it appears to be common practice to use small initial letters for specific names.



Pereskia Diaz-Romeroana Cardenas Lilloa XXIII, 1950

.....from R.Mottram

The ICBN includes a recommendation No.73 on this very point, as follows - " all specific .... epithets should be written with a small initial letter, although authors desiring to use capital initial letters may do so when the epithets are directly derived from the names of persons ....."

.....from R.K.Hughes

Just to the north of Villa Serrano we stopped at BDH 46 where there was still cultivated farmland around. We then left this behind to travel through green forest until we reached the pioneer settlement of Nuovo Mundo. Beyond here we passed along a level road through a quite different high altitude forest before descending through changing vegetation to the dry scrub forest. It was very strange to meet a number of unattended groups of cattle along the high altitude forest section, As the dry scrub forest is green, despite the hot arid conditions and presumably just before the rains, can we assume most plants here are evergreens? Going further in the direction of Las Higueras I had no idea that we were dropping except perhaps that the midday heat was oppressive. On looking at the altitude BDH47 is at 1470m and BDH48 is at 1275m, with just 3.1km between them, so we must have been going down. At BDH48 the number of bromeliads in the trees would indicate that there is atmospheric moisture available.

Driving along the road it appears that you have dense green jungle each side for most of the way with no other view but the road ahead, On stopping (at BDH47) it can be seen that this is not the case and it is quite possible to find a place to wander from the road in amongst the trees and undergrowth without much difficulty. You have to keep a sharp eye from ground level to head height to avoid thorns or spines. Close by the road the ground appears to be flat but within the scrub it undulates somewhat similar to the sandhills on our coasts. It was possible to find a slightly higher spot free of vegetation where one could get a less restricted view of the area. To our left some distance away the land could be seen to rise quite steeply to a ridge of peaks. These slopes were clothed in green scrub forest except for where rocky outcrops formed bare cliffs.

Tropical scrub here as elsewhere seems to be designed to allow a lot of sunshine down to ground level. However, at ground level the effect seems to be a patchwork of dense shade and bright sunshine on the light dusty earth. It is terrible for photography due to the high contrast. I would guess that the taller trees are about 30 feet or more in height whilst most would be between 15 and 20 feet high. Some tall columns of a Cereus species would fall into this group The various thorn bushes formed a 5 to 10 foot high undergrowth which would include the small to medium sized Roseocereus tephracanthus. From ground level to 2 or 3 feet would include the Gymnocalycium, Bromeliads, and Harrisia, most stems of the Harrisia lying horizontally on the ground.

In the undergrowth of thornbush we found two sorts of Peireskia, but only one plant of each, growing like climbing roses in the dry scrub below and between the trees. The plant with clusters of large pink flowers at the end of the stems was well clothed in quite large privet-like leaves below spines that were first red and then turned black from the tip downwards. The other plant with small white flowers formed a more open leggy bush with smaller privet-like leaves on the upper, younger branches. This gave the impression of being better armed with its yellow spines and was also in fruit. These were berries the size, colour, and juiciness of black currants, in groups of 2 or 3 along a section of stem. The single white flower must be 2 or 3 times the diameter of a berry. The seeds in the berry seemed at first to be united, but then broke up into maybe 1, 2, 3, or 4 seeds. Of the dozen or so seeds which I brought back home with me I had 10 germinate.

.....from H.Middleditch

In his Die Cactaceae, Backeberg divide Peireskia into two groups, one with larger flowers, the other with smaller flowers. To judge by the locations and distribution quoted, the larger flowering Peireskia appear to occur at lower altitudes around the Caribbean, Brazil, Paraguay, and Argentina as far south as Tucuman. The smaller flowering sort are reported from the lower Huancabamba valley, Peru; from north of Cochabamba; and from near Pulquina. This report from the Bates-Down-Hughes trip, of the smaller and larger flowering sorts growing together, appears to be unique. As the pink flowering sort was in bloom and the other with just one white flower was in fruit, it appears that the two may have staggered flowering times.

.....from F.Vandenbroeck

Of course Peireskia is a plant which is easily overlooked: it is just an inconspicuous part of the dense spiny schrubbery of its Chaco-like habitat. The places where I observed Peireskia were between Camiri and Boyuibe in August 1988 (winter) and near Palos Blancos in December 1992. I must have seen Peireskia in Paraguay, but since it was wintertime there I do not clearly remember. Near Palos Blancos the plants were flowering with typically opuntioid flowers. The plants I saw in the Bolivian Chaco I originally identified as Ritter's P.sparsiflora, which according to Hunt is identical with P.sacharosa.

.....from T.Herzog, Die Pflanzenwelt der Bolivischen Anden 1923. Die Vegetation der Erde XV.

The genus Peireskia is endemic in the bush forest as well as in the tall forest of the Gran Chaco, where despite its succulence it occurs largely in shaded and damp conditions. But it also catches the eye in a peculiar small flowered sort in thornbush in the Andean valleys.

The eastern ranges of the Cordillera mostly rise pretty abruptly from the Chaco plains and form an effective boundary wall between these and the interandine valleys. On account of the relatively significant height of the eastern ranges there occurs the phenomenon of orographic rainfall and a clear distinction between the outer side adjoining the Gran Chaco and the interandine valleys. The windward (E.) side receives abundant rainfall, the leeward side being significantly drier. All these eastern ranges have one thing in common, namely, the deeply entrenched west-to-east orientated valleys crossing the line of the mountain chains. Almost everywhere the rivers choose the shortest way through the frontal ranges lying in their path and all these valleys are plainly very old.

The vegetation of the xerophytic interandine valleys displays many features in common with that of the xerophytic scrub Formation in the alluvial Chaco plain beyond the mountains to the west. The rainy-green forest of sub-tropical character on the east-facing outward slopes of the border ranges penetrates a short way into the mountain chains in the vicinity of the three large rivers Bermejo, Pilcomayo, and Rio Grande, seemingly rising on average no higher than 1400m. In spite of that, outlyers of this subtropical vegetation in the valley of the R.Pilcomayo extend to above 2000m in the shelter of the surrounding high mountains, according to H.Hoeks' account in Petermanns Geograph. Mitteilungen No.1 for 1906.

[Peireskia is recorded as a common component of the scrub formation between Valle Grande and Mataral; also between Pulquina and Comarapa]

.....from M.Cardenas, Bolivian Cactus formations. U.S. C.& S.J. XLI.3.1969

Going down from Pulquina to Saipina, at about 1600m, the bushy Peireskia saipinensis Card. appears.

.....from H.Middleditch

The Peireskia diaz-romeroana at BDH 47 lies roughly to the south of La Higuera; this place is located just off the map of Upper Rio Grande, Chileans No.47, downstream from the confluence of the Rio Grande and R.Mizque. Here, at 1470 m altitude, the BDH party were following a road leading down to the Rio Grande; from the exceedingly sparse data available it appears that the road would cross the Rio Grande at roughly 1000m altitude, from where the river has some 150 km to run before it cuts through the very last front range and flows into the Chaco plain. Yet the large-flowering type of Peireskia was also found here. The Peireskia locations quoted by Herzog and Cardenas (above) appear to lie at a somewhat higher altitude than BDH47. Do we accept that the Peireskia found by Herzog between Pulquina and Saipina are all the "peculiar small-flowering sort"?

BOLIVIA REVISITED From R.K.Hughes

My previous visit to Bolivia was with a packaged tour which took in a number of tourist sites and places of interest in Peru, with only a few days in Bolivia to visit Tihuanaco and Sorata. The trip made jointly with B.Bates and P.Down was quite different, for in the time available we tried to maximise the number of interesting spp. seen. This relied on travelling quickly between habitats where it was known that plants were to be found. So we covered over 2000 miles in three weeks plus one day, with 67 sites where we saw plants, at most of which we took photographs and at many we collected seed. This meant that there was not a great deal of time to keep notes up to date, but fortunately B.Bates kept a detailed log of the pinpoint mileage and altitude at each site. But it is going to take a long time to catalogue all my slides and correlate them with all my notes.

On this occasion there were no cacti seen on the Sorata side of the pass, due to a combination of low cloud, fog, and the difficult road. But on the Titicaca side of the pass we saw some fine specimens of Tephrocactus floccosus; these grew in the long piles of stones which were the walls between the small fields, near to habitations. We met with another problem when leaving Aiquile and passing through Tintin; after seeing Sulcorebutia cylindrica we came to a railway station where there was no-one to ask for directions and no direction signs either. Eventually we did get back on to the road for Cochabamba. Back home, I see from the map and the information from W.Gertel in Chileans' No.47 that it now looks as though we may have been much closer to the type habitat of Weingartia purpurea than we knew at the time.

At about fifteen of our stopping places we saw Tephrocacti that we called T.bolivianus. At several locations, including that near Cieneguillas north of Potosi, these plants had larger segments and long, strong spines; it is quite distinct and needs a species name. Possibly Backeberg's T.ferocior would be most apt; however, T.chichensis and O.cylindrarticulatus would seem to have been named a year earlier in 1952 and may be true contenders for this species.

I gave the name T.rossianus to a number of plants that we found, with varying spination, mainly on account of the spherical joints, although this was not always a clear feature. The flowers could be red, yellow, or orange. I gave the name T.pentlandii to another very similar plant that was found at two other sites, both of which also had Oreocereus trollii growing there. These plants had rather smaller joints that appeared to be ovoid rather than spherical. The range of flower colour may have been even wider than on T.rossianus. It is difficult to know if this difference in the segments would remain after a rainy season. These pentlandii forms also have only one or two spines in the areoles in the apex of the joint. A close look at the spines on both types where they bend back towards the segment shows that they are flattened. This has me wondering if some of the small jointed plants usually called T.glomerata are correctly named.

.....from J.R.Kirtley

During the journey through Bolivia in November 1989, in company with B.Bates, the hummock-forming type of Tephrocactus was seen at various locations. In attempting to identify these plants, I placed them into four groups, each group being broadly based on the style of growth and appearance. Those plants which were seen at several locations between Achacachi (near Lake Titicaca) and our stop at about 40 km north of Potosi, could be regarded as T.bolivianus. Both at the stop some 40 km north of Potosi and at four other places, we saw Tephrocacti which in comparison with those we regarded as T.bolivianus had: (1) Larger individual segments and (2) A sprawling mode of growth (3) Similar spination, areole size and disposition on segment (4) Flowers, though of comparable size, did not have the same gloss to the petals, nor open as fully, nor display same depth of colour.

At Cieneguillas, 35-50 km north of Potosi, two plants were observed; both were large, sprawling, low hummocks, growing in good earth, on nearly flat ground among granite rocks, close to cultivated areas. The epidermis is dull grey, spines brown fading to straw then grey, up to 5 cm long. Dry grass growing among the segments blended with the spines. Flowers yellow, not fully reflexed, more funnel form than those seen on T.bolivianus, stigma lobes and filaments whitish. Buds with short whitish spines or bristles in tufts around the base of the tepals.

At 26 km north of Potosi, plants grew in red sandstone soil and rocks, among dwarf bushes and tall grass. Hummocks were higher than the plants seen earlier; new segments green, flowers paler yellow, funnel form.

At 4 km south of Cuchu Ingenio, the plants seen are similar to the foregoing, but with a greater depth of colour in the flower. They grow on gently sloping ground, very stony, in company with Lobivia ferox, Oreocereus celsianus, Opuntia and Parodia, among sparse dwarf bushes.

At 20 km south of Cuchu Ingenio, plants grow with Parodia and Opuntia on very stony, sloping ground, among dwarf thorn bushes and shrubs. Flower colour is variable from creamy white, lemon yellow, to deep yellow.

At 37 km north of Tupiza is a Tephrocactus growing in shale in company with a Parodia of approx. 10 cm diameter. The Tephrocactus consists of about 18 large segments; everything about it is grey - epidermis, spines up to about 8 cm.; even the Parodia is grey. Perhaps due to dust? The spination appears to be much more dense than previously seen. No buds or flowers.

.....from F.Vandenbroeck

I am quite convinced that Tephrocactus is one of the most confusing plant groups to study. For information about identification, distribution, and type habitats of these plants I generally refer to Ritter's descriptions. As you probably know, Ritter's account gives the impression of an appreciable range of variation and hybridisation of the species. However, recognising species of Tephrocactus in nature is a real problem. The more you stare at them the more you become intrigued by them and also the more confused you get about them!

It could be said that the further you travel south from Potosi to Tupiza, the more prominent T.bolivianus becomes, whilst T.pentlandii is only met with sporadically in these southern parts. Weakly spined but large hemispherical hummocks are found near Escayachi and to the south of La Quiaca, with segments having only two or three spines per

areole, whereas near Yunchara the plants are densely silvery spined and the hummocks are smaller and flatter, similar to those near Lecori. I believe that these are forms of T.bolivianus but I would not venture to say this with absolute certainty. On the other hand, some of these may belong to forms of T.pentlandii v.dactylifera. The plants we found more to the south, near Purmamarca and Quebrada del Toro, also form cushions of about the same size as those in Bolivia.

Near Escayachi we tried to unearth a fairly big hummock but we had to give up the task as the plant had formed a formidable tap root and was virtually impossible to dig up. We have seen some plants with fruit, such as near Yunchara. The fruits reach an impressive size and are usually yellow when ripe.

.....from K.Gilmer

Travelling north through the Quebrada Humahuaca, we found hummocks of a Tephrocactus which we would tentatively identify as T.bolivianus, at 3150m some 18 km north of Humahuaca, then again at 3300m some 5 km before reaching Iturbe. Further north still, near the border with Bolivia, on the road from La Quiaca to Cieneguillas, we found large clumps with very big and nearly spherical segments up to 8 cm in diameter, displaying large humped tubercles. This may be a form of T.ferocior Backeberg, as the habit is similar to Fig.333 on p.334 of Die Cactaceae Vol.I.

.....from F.Vandenbroeck

The photograph taken by K.Gilmer near Tafna of the Tephrocactus with the large globular segments is in my opinion one of the many forms of T.bolivianus sensu Ritter. We were in Tafna in the course of our travels in Argentina but I do not recollect seeing plants of quite this appearance. But I remember climbing a hill near Yavi where I came across large clumps of greyish plants which seemed to have developed quite gigantic segments with a very fierce spination. In these tracts you can find Tephrocactus by the thousands.

During our descent towards the villages of Cieneguillas and Yocalla, north of Potosi, we spotted some isolated columnar cacti. Approaching them they turned out to be Oreocereus celsianus. Searching the surroundings we found Austrocylindropuntia weingartiana, large clumps of Tephrocactus rossianus, and large clumps of a Tephrocactus which at first puzzled me. The latter displayed big round loosely packed segments, tangled spines and palish yellow flowers. Later on of course it became clear to me that these plants were typical representatives of T.bolivianus. These plants were the first specimens of T.bolivianus that we came across during that trip to Bolivia. Coming down from La Paz - Oruro - Challapata, you only see T.pentlandii and when you suddenly get confronted with the first T.bolivianus it is a kind of shock, but henceforward there is no hesitation in telling the two species apart!

The slides which you sent to me of the plants seen in 1989 by two Chileans' members near Yocalla and Cieneguillas, Bolivia, do indeed show what I consider to be T.bolivianus. In my travels I have been struck by the very distinctive features of T.pentlandii and T.bolivianus. A rough indication of differences between the two would be as follows;

Tephrocactus pentlandii	**Tephrocactus bolivianus**
compact semi-globular hummocks	loose, somewhat shapeless heaps of segments
egg-shaped greenish segments	larger, round greyish segments
mostly erect, regular shaped groups of yellowish spines on the upper part of the segments	a confused mass of greyish or blackish mostly flattened spines
smaller bright yellow flowers	large, broad, pale yellow flowers.

.....from H.Middleditch

At The Chileans' Weekends it has been observed both by R.K.Hughes and J.Kirtley that there was a discernible difference between the Tephrocacti on the altiplano and those seen from the valley of the R.Pilcomayo southwards via Potosi. On the altiplano the hummocks were usually compact and the flowers a bright yellow; around and to the south of Potosi the hummocks were usually loose, with pale yellow flowers. This view is echoed by F.Vandenbroeck. But the names given by Vandenbroeck to each of these two groups do not match the B/K and BDH names! The two names pentlandii and bolivianus were originally described by Salm Dyck in 1845 in the Allgemeine Gartenzeitung and subsequently repeated with some abbreviation in Hort Dyck 1850. In 1898 Schumann made no attempt to define the distribution of these two species, which were subsequently confused by Britton & Rose, whilst Backeberg provided no real data on distribution. Kiesling has not visited Bolivia and does not know the plants in this area, but Ritter has travelled here extensively. In effect, Pentland and Ritter are the only two sources of distribution data.

Ritter states that T.pentlandii comes from the eastern part of the high mountain area. It might be presumed that this means the east side of the altiplano and the mountains even further to the east. This is confirmed by Ritter stating that T.pentlandii is found at Villazon/La Quiaca, by his illustration of a specimen from San Antonio, north of Iscayache, and by his comment that this species originally came from the most accessible part of Bolivia between La Paz and Lake Titicaca. Ritter observes that T.pentlandii grows over a larger distribution area than T.bolivianus "in all directions" and adds that T.bolivianus usually occurs at altitudes between 2700 and 3700m. From Titicaca to Challapata the eastern part of the altiplano lies at altitudes in excess of 3700m whilst a large part of the depression which occurs between Potosi and Tupiza is at an altitude of less than 3700m. On the altiplano, between La Paz and Challapata, Tephrocactus were seen at B/K 3 at 4000 m altitude, at B/K 4 at 4030 m, at B/K 5 at 3760 m, at B/K 7 and at B/K 9 at nearly 3800 m. On the basis of the altitude at which they occur, these B/K and BDH sightings recorded between La Paz and Challapata would appear to be T.pentlandii sensu Ritter. Leaving the altiplano and taking the road across the mountains in the direction of Potosi, Tephrocacti were found at BDH5 = B/K 13 at 3555 m altitude, at B/K 15 at 3685 m altitude (both at no great distance to the north of Potosi), and a further location near Cuchu Ingenio at about 3567 m altitude; by location and altitude these Tephrocacti would appear to be T.bolivianus sensu Ritter.

.....from R.K.Hughes

After climbing out of the La Paz valley we travelled across the altiplano as far as Challapata, where we turned into the mountains to the east. We followed a river valley for some 50km and then came out on a fairly broad and level patch of ground. There was a rocky outcrop quite some way from the road so we decided to tramp across to see if there were any cacti there. We did find some Tephrocacti of the same general appearance as those we had seen on the altiplano. This was BDH3 at 4036m altitude.

.....from H.Middleditch

Ritter observes that the hummocks of pentlandii can be compact to open, with segments usually more tapered above than below, the degree of tuberculation of the segments as well as the form of the tubercle is very variable, whilst all transitions from spineless to many-spined can be found. For bolivianus Ritter quotes a range of spine colours and lengths, observing that the spines are "spreading, bending, and overlapping - only found by exception in pentlandii - never packed

close together upright". He also describes the segments as "usually egg-shaped, 6cm long by 5cm diam., smaller in some places, larger in others, tubercles prominent or less so". The flowers are described as pale yellow for bolivianus and for pentlandii as "deep citron yellow or golden yellow, the outermost petals with red".

On the basis of data given by Ritter for the habit of the hummock, the segment. tubercles, or spination, it would appear to be difficult to decide precisely what plants might merit the name pentlandii and which the name bolivianus. However, the difference in flower colour quoted by Ritter is also observed above by J.Kirtley i.e. T.pentlandii sensu Ritter on the altiplano, and T.bolivianus sensu Ritter from the Rio Pilcomayo southwards. This also matches the rather sketchy geographical and altitude separation quoted by Ritter.

OPUNTIA BOLIVIANA Salm-Dyck
Translated by H.Middleditch from Allgemeine Gartenzeitung 13. 1845

The old stem is over a a foot high, segmented, openly branching. The segments are elongate eggshape, 2-2.5 inches long, 10-12 lines thick below, barely 4-5 lines thick above, quite bright green when young, furnished with white dots when viewed under a magnifying glass, the old ones drab yellow, very smooth, without tubercles and with sunken areoles. The areoles are furnished with a pointed leaflet barely one line long which soon drops off, roundish, and when young (in addition to the yellowish grey felt) also covered with short, curly wool, soon vanishing. The spines are four, but by abortion often only one, two, or three, needle-like or bristle-like, 3-4 inches long, flexible, upright below and not radiating away from each other, whitish, almost translucent, reddish-yellow above and curved in various directions with a sharp pointed tip. One feature quite distinguishes this species: the young segments do not appear from the top, but always at the side of the segments.
.....from H.Middleditch

It has been pointed out in these pages on a previous occasion that Tephrocacti are almost unique among the cacti in that they do not possess a growing point (other than as seedlings or by exception). It appears that we now have to concede that Salm Dyck was the first to place this feature on record.

This 1845 description followed the usual form adopted at that time by having a diagnosis in latin, followed by amplifying observations, here in German. Apart from the omission of one or two pieces of data, the 1850 description in Hort Dyck was a repeat of the 1845 description, but this latter was all in latin. By selecting the same word from the 1845 and 1850 descriptions it is possible to obtain an indication of the meaning attributed to certain latin words at that date - at the very least, the meaning understood by Salm Dyck. There may be more such pairs of descriptions in which different latin words occur. Such abstracts would provide a valuable check against Stearn's Botanical Latin for the meaning of latin words as understood in that era, which may differ from the meaning given by Stearn.

TEPHROCACTUS (Cumulopuntia) BOLIVIANUS F.Ritter
Translated by H.Middleditch from Kakteen in Sud-Amerika p.492

The original description of Opuntia boliviana by Salm-Dyck corresponds well with the habitat forms of a variable sp. of the central and southern Bolivian highlands and the adjoining high altitude region of Jujuy, which however went under various synonyms with Backeberg. What Backeberg described and pictured as T.bolivianus (SD) Backbg belongs to pentlandii, despite the so ample and accurate description by Salm-Dyck in 1845 which Backeberg has almost disregarded with his species diagnosis. According to my observations the following data from Salm-Dyck is applicable for this species, but does not relate to the pentlandii forms which Backeberg interpreted as T.bolivianus, viz:- The long spines often of 10 cm in length, whilst bolivianus [sic] itself in the long-spined varieties dactylifera and colchana only rarely attains a spine length of 6-7 cm. The spine colour of white with yellowish-red ends is the rule, although to be found as well with pentlandii v.colchana which grows at a very distant location and even at this time is still not readily accessible. The marked spreading, bending, and interweaving of the spines is typical of the species here, but only to be found by exception with pentlandii. The egg-shaped form of the segment is likewise typical here, whilst pentlandii has cylindrical segments with a segment length of 5-6 cm according to the statements of Salm-Dyck. With bolivianus the length and number of the spines varies over a very wide range, likewise the size of the segments; even the prominence of the tubercles on the stem is regionally variable. The example described by Salm-Dyck applies to one from within a greater breadth of variation. In Bolivia there are no other globular cacti to which the description of Salm-Dyck applies.

Here I provide details in accordance with my own observations:- Hummocks more spread out and flatter than with T.pentlandii v.dactylifera and somewhat less compact. Segments regionally of very different size, usually some 6 cm long and 5 cm thick, almost egg-shaped, at many places smaller, at others larger, in the latter case they become longer without significant increase in thickness. They can become 12-13 cm long by 6-7 cm thick. The tuberculation can be prominent or less so; the tubercles are rounded, on old segments the tubercles are very flattened and barely distinguishable. Areoles 2-4 mm diameter. Spines never packed close together, standing straight upright as commonly seen with pentlandii v.dactylifera, but are distinctly spreading and overlapping, the stronger ones somewhat angular or flattened and bent, rarely are all spines more or less straight; spines sometimes only 2-3 cm long, usually longer, the longest frequently well over 10 cm long; on the lower areoles are often found in addition some fine short spinelets; rarely are there only 2-3 spines developed at each areole, usually around 5-12, occasionally up to about 20, whilst the approximately lower half of the segment is spineless, the colour is usually pale brownish-yellow to fox red, usually whiter below; later the spines are whitish-grey - they can even be white from the outset; the spines are never dark or black or clear yellow or brownish yellow as is often the case with pentlandii. Flower 50-55 mm long; pericarpel 25-30 mm long with small areoles and sturdy brownish-red to yellow glochids; at the lip of the tube numerous spinelets can be developed or can be completely absent. Nectar chamber ca. 2mm high; filaments white, anthers pale yellow; style white, very stout, stigma lobes pale yellow with 9 to 10 arms of 5 mm length. Petals pale yellow, about 25 mm long, opening basin shaped. Fruit 3-6 cm long, 2.7 to 5 cm thick, yellow to greenish yellow, often reddened by the sun, nearly globular to barrel shaped, blunt at both ends, floral scar 5-15 mm deep; areoles with white felt, in the upper three quarters to quarter of the fruit, of 1.0 - 1.5 mm in diameter, with yellow glochids of a few mm to over 1 cm in length. On the margin of the floral scar areoles 4-10 mm apart, which can be quite spineless or carry a bundle of upright shorter to longer, fine needle-like spines of the same colour as the spines on the segments. Very little fruit pulp clinging to the seeds by means of which the fruit becomes edible. Seeds ca. 5 mm long, slightly longer than broad, and slightly wider than thick, ca. 4 mm thick, weakly pointed at

the base, pale brown arillus hoop less broad, very prominent, as with T.pentlandii two parallel ribs start from the base, more at the ventral side.

This species often grows together with T.pentlandii but only very rarely hybridising with it. It ascends to a less altitude than the latter, with habitat locations in the mountains at heights of more or less between 2700 and 3700 m. Grows in the heartland of T.pentlandii but extends to a far less extent in all directions than the latter sp.

.....from H.Middleditch

In his Kakteen in Sud-Amerika, Vol.2, p.488 Ritter quotes "Tephrocactus minor Backbg 1853" when fairly obviously 1953 is intended. In similar vein, on p.492 he notes " Salm Dyck added in 1950 ....." when 1850 was presumably intended. Likewise the observation on p.492 "Whilst boliviana itself in the long-spined varieties dactylifera and colchana ..." which is self-contradictory as it stands, since on p.490 he erects T.pentlandii (SD) Ritt v. dactylifera (Vpl) Ritt.; the questionable phrase would read more logically as "Whilst pentlandii itself in the long spined varieties dactylifera and .....". Also on his p.492 Ritter, among the synonyms for his T.bolivianus Ritter gives T.flexuosus Bckbg 1935, whilst on p.490 he lists T.flexuosus Backbg 1935 as a synonym of T.pentlandii v. dactylifera. Hardly any literature in the field of cacti is free from errors, but these particular ones can be spotted with ease. It is those which do not give themselves away so readily that are the real problem.

There is a clear reference in the Salm-Dyck description to "openly branching" (laxe ramoso, weitlauftig astig), This appears to match the "loose heaps of segments" referred to by F.Vandenbroeck and the "more open form of growth" seen on the plants near Cieneguillas, some 40 km N. of Potosi, by our U.K. members who have seen these plants in the field. There is really only one route from La Paz (via Oruro and Challapata) to Potosi, which was followed not only by our UK members but must likewise have been followed by Pentland when he was Her Majesty's Consul in Bolivia and collected these plants. On this occasion it appears that we must acknowledge Ritter's selection of names as correct i.e pentlandii on the altiplano section of this route, bolivianus from Yocalla and Cieneguillas onwards.

In general terms the altiplano is not a place in which to find reliable streams or rivers. Perhaps the crossing of the R.Pilcomayo shortly after Cieneguillas was the first flowing water to be seen after leaving La Paz?

.....from J.R.Kirtley

After giving the matter some thought I do believe that we met with fresh water in the neighbourhood of Challapata - probably the river flowing down the valley that we ascended on the way to Ventilla and Potosi.

.....from H.Middleditch

Between Potosi and La Paz, the R.Pilcomayo and the river at Challapata appear to be the only places where the horses could conveniently be watered, when Pentland travelled this route. The probability is that the passengers would take this opportunity to stretch their legs during the halt. It may well be that Pentland, (like Ritter, and others) was struck by the overall difference in the hummock forming Opuntia he saw at these two places and so collected specimens from each spot, to be described subsequently by Salm Dyck as pentlandii and bolivianus.

BOLIVIA - NOW OR NEVER from P.Down

Having contacts with a local school in Cochabamba, and never having been in real cactus growing territory before, the chance of joining B.Bates on his trip to Bolivia seemed too good to miss, before the passage of time made such a trip impracticable for me. The trip was timed so as to see plants both in flower and in seed, and also aimed to see the most plants at the most places within the time available. Because B.Bates had done his homework on what sort of plants we were likely to find at which places, I think we got that side about right. We were indeed able to get to many plants when the seed was ripe, but that also meant that many plants were not in flower. The local ants had perfect timing on seed ripening; they often beat us to the seeds or the ants had to be removed from the seed pods before the seeds went into the packet.

.....from H.Middleditch

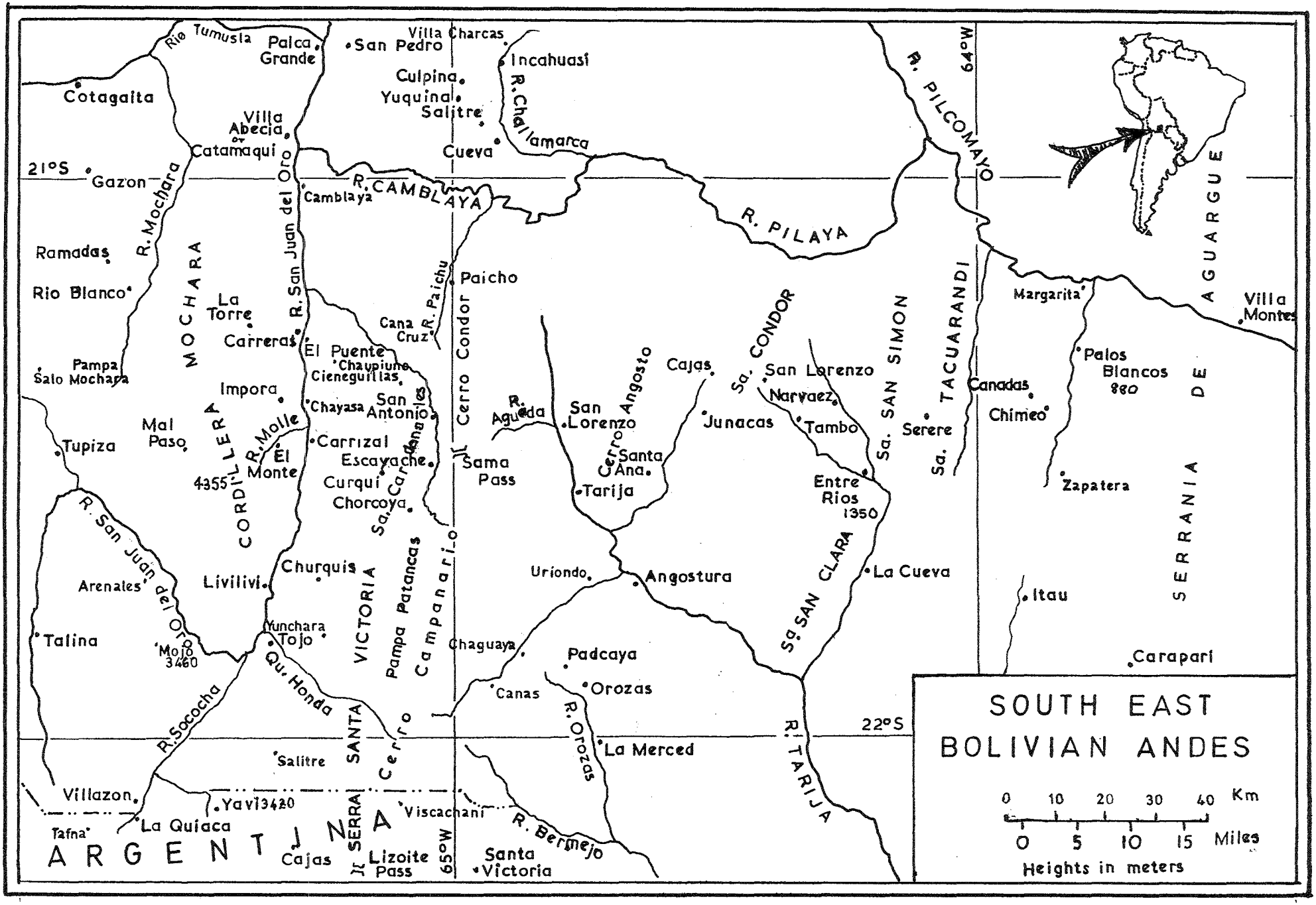
In reading the accounts of Ritter's various journeyings in South America, I am often struck by his travelling an appreciable distance to some part of Bolivia, only to spend two or three days there, and then take off for another spot a hundred miles or more away. Eventually I came to the conclusion that Ritter had, in the course of his travels, established which cacti would be carrying ripe seed at what specific time of year, so that all the travelling backwards and forward over quite considerable distances was to be in the right place at the right time to collect ripe seed. But perhaps it was to be just ahead of the ants?

....from P.Down

Before we had set off it was suggested to me by H.Middleditch that it might even be difficult to identify in habitat whether a plant was a Lobivia, an Echinopsis, or a Weingartia - and it was! The Neowerdermannia, too. Although I have been growing cacti for forty years, the size of the plants which I saw I the wild quite amazed me. It was a most imposing sight to see acres of Oreocereus trees, often with the only other ground cover being dwarf Opuntias. To see clumps of Parodia some 60 cm across and other single Parodias 40 cm tall was an unforgettable experience. Lobivias and Echinopsis the size of footballs were another excitement. Variation within a species was also an education, the various Sulcorebutia swobodae being very impressive. Light bodied, light spined, some dark bodied and dark spined, and a few intermediate forms, all within one square metre.

The vast majority of cacti were growing on the side of hills; Oreocereus trollii was one of the few exceptions, growing on a flat plain. Usually the plants were growing in the cracks on sloping flat rock or in small pockets of very stony ground on the side of hills, thus getting good drainage. Near Cotagaita we came across huge plants of yellow spined Parodia, growing about 20 cm diameter and 40 cm tall. They looked like lumps of gold when backlit by the sun. They grew either in cracks on sloping flat rock or in very stony ground, doing slightly better when protected by shrubs, which were not abundant. To the north of Iscayachi we again saw some quite large sized Parodia; here the crown of the plants were full of white wool. The seed pods were of unexpected size, shape, and colour, being about 3 to 3.5 cm long and pink, rather like the seed pods of P.ayopayana, but covered with white wool.

Perhaps the highlight of the trip was seeing Vatricania, which were growing in what we would call a copse in England, most of the trees being an Acacia sp., together with clumps of Trichocereus and a very few Gymnocalyciums, and a whole variety of Bromeliads. The trees were taller than a man on horseback, so that as we walked between them it was not possible to see any great distance. It was only by chance that we suddenly found the Vatricania and the Trichocereus, when we almost on top of them.


Rio Tumusla
Palca Grande
Villa Charcas
San Pedro
Incahuasi
Culpina
Yuquina
Salitre
R. Challamarca
Cotagaita
Villa Abecia
Catamaqui
Cueva
21°S
Gazon
R. Mochara
R. CAMBLAYA
Camblaya
R. San Juan del Oro
R. PILCOMAYO
64°W
R. PILAYA
Ramadas
Rio Blanco
MOCHARA
La Torre
Carreras
El Puente
Chaupiuma
Cieneguillas
Cana Cruz
R. Paichu
Paicho
Cerro Condor
Pampa Sato Mochara
Impora
Chayasa
San Antonio
R. Molle
Mal Paso
Tupiza
CORDILLERA
El Monte
4355
Carrizal
Escayache
Curqui
Chorcoya
Sa. Cardenas
Sama Pass
R. Agueda
San Lorenzo
Cerro Angosto
Cajas
Sa. CONDOR
San Lorenzo
Narvaez
Tambo
Junacas
Sa. SAN SIMON
Sa. TACUARANDI
Serere
Entre Rios
1350
Tarija
Santa Ana
Margarita
Villa Montes
AGUARGUE
Palos Blancos
880
Canadas
Chimeo
Zapatera
SERRANIA DE
R. San Juan del Oro
Arenales
Livilivi
Churquis
Uriondo
Angostura
La Cueva
Sa. SAN CLARA
Itau
Talina
Mojo
3460
Yunchara
Tojo
VICTORIA
Pampa Patancas
Campanario
Chaguaya
Padcaya
Carapari
R. Sococha
Qu. Honda
Canas
Orozas
R. Orozas
22°S
La Merced
R. TARIJA
Salitre
SANTA
Cerro
Villazon
Yavi 3420
Viscachani
R. Bermejo
La Quiaca
Tafna
ARGENTINA
Cajas
SERRANIA
Lizoite Pass
65°W
Santa Victoria
SOUTH EAST
BOLIVIAN ANDES
0 10 20 30 40 Km
0 5 10 15 Miles
Heights in meters

.....from H.Middleditch

It was most unexpected to hear of the large plants of Parodia with the elongated fruit. By the size of the plants and also from the location at which they were seen, these plants are likely to belong to the maassii group. What can we find out about Parodia which display these elongated fruits?

.....from F.Buxbaum, Die Kakteen C VIe, 1966

[from the Latin] Parodia - Fruit dry, globular to ovate, with thin dehiscing pericarp furnished with remains of floral wool; only in subgenera Obtextosperma elongate-cylindrical, reddish, hairy, without seed in the upper part.

[from the German] Parodia - The fruit are small, globular to ovate with dried flower remains; fruit wall thin, dry and hairy, and eventually breaks open. Only in the subgenus Obtextosperma are they red and - besides isolated normal fruit - are extraordinarily elongated tube-like with no seed in the upper part.

Obtextosperma - The only species known up to the present time is P.ayopayana, at the extreme north of the distribution area for Parodia.

.....from J.Brickwood

In Weskamp's Parodia 2 the following spp. are included in the subgenus Obtextosperma:

P.ayopayana v.buxbaumiana. Fruit cylindrical, 4 cm long, covered with tufts of white wool

P.borealis Fruit 2-3 cm long, carmine, later reverting to spherical

P.comosa Fruit bright red, 2-3 cm long, with flecks of white wool and scales more abundant towards the base

P.miguillensis Fruit 25 mm long, lilac red, completely covered with tufts and flecks of long white wool, later reverting to more or less globose.

P.pseudoayopayana Fruit up to 2 cm long, pink with white tufts of hair.

.....from P.Allcock

At one time I was growing imported plants of P.ayopayana, borealis, comosa, and echinus, which originally came from Uhlig in the late 1960's. These plants were between 8" and 12" tall; P.comosa stood out by virtue of its long,thin, needle-like spines, whilst echinus was offsetting round the base. They all had tiny little orange flowers which were only about 5 mm across. They all produced long, hollow fruit.

.....from F.Vandenbroeck

During my visit to Bolivia in November-December 1992 I saw a lot of Parodia spp. but of course it was not the best season for finding them with fruits. But curiously enough on the road out of Morochata towards Independencia we did find specimens of P.ayopayana carrying their long, woolly, pink fruits. Inevitably when lifting the fruit of the plants the tiny seeds escaped through the basal hole, most of the time. Some of these plants were just showing woolly yellow flower buds.

.....from H.Middleditch

In the section dealing with Parodia in the Buxbaum-Krainz Die Kakteen (I.IX.1966) the data on the fruit does not appear to be entirely clear. In respect of the spp. in the Obtextosperma they observe that the fruits are tubular, extraordinarily elongated "neben vereinzelten normalen fruchten" - in addition to sporadic normal fruit, or alongside sporadic normal fruit? This observation also occurs in two other places in the treatment of Parodia.

.....from R.Moreton

Having consulted a neighbour whose native tongue is German, I am able to confirm my understanding of this particular phrase, which means that long and short fruits occur together on the same plant, most of the fruit being elongated, with only a few "normal" short ones.

.....from H.Middleditch

But the Parodia seen by Bates, Down & Hughes in Bolivia were outside the recorded location area for Obtextosperma Parodia. So are there any other Parodia on record as having long fruit?

.....from J.Brickwood

The only other Parodias outside the Obtextosperma group which produce elongate fruit that I can find in Weskamp Parodia 2 are as follows:

P.echinus Fruit spherical, later up to 15 mm long, pink, hollow

P.obtusa. Fruit 12 mm long, usually pale coloured, rarely red, covered with thick white felted wool.

P.commutans Fruit cylindrical, 2-5 cm long, pale green or pale yellow to pale carmine. covered with tiny scales ca. 5mm apart with thick tufts of white wool

P.maxima Fruit cylindrical, ca. 20 mm long, pale carmine or carmine, later shrinking; completely enveloped in long white wool.

.....from H.Middleditch

Both P.commutans and P.maxima belong to the maassii group of Parodia, and are reported to occur in southern Bolivia. However, several names in the maassii group were published by Ritter as species or varieties and subsequently lumped under P.maassii by Krainz, only to be subsequently reseparated by Ritter in his Kakteen-in-Sudamerika. In addition, some original Ritter varieties now became a species. As a result, some care has to be exercised in correlating names when consulting Ritter's Kakteen in Sudamerika and other literature.

Parodia maxima was originally published by Ritter in Succulenta in 1964, together with three other first descriptions of Parodia spp. The first of these descriptions is of P.commutans, and the following description of P.maxima commences with the words "distinguished from P.commutans on account of ...". The fruit of P.commutans is recorded as "2-3 cm long, pale green, pale yellow or pale carmine". The finding place for this species was stated to be near to Impora. The fruit for P.maxima was stated to be "carmine" in the latin, "paler or more carmine red" in the dutch. By inference, since no fruit sizes are given then the fruit on P.maxima did not differ in size from the data given for P.commutans, i.e. 2-3 cm long. The finding place for P.maxima was given as Cieneguillas.

In his Kakteen in Sudamerika, Ritter adopts the same proceedure of starting the description of P.maxima with the words "differs from P.commutans in respect of ....". For P.commutans he quotes a fruit "elongates like a cylinder when ripe, 2-5 cm long, pale green or varying from pale yellow to pale carmine. with small scales about 5 mm apart with thick white wool, with large round basal aperture." For P.maxima, the differences from P.commutans in the fruit are given as "lighter or deeper carmine, rarely entirely pale, never yellow. Scales only rarely retained". Again, by inference, the fruit on P.maxima is 2-5 cm long. The discovery locations for both species were unaltered from those quoted originally in Succulenta.

This data from Ritter on fruit length for P.maxima appears to be in confliction with that given by Weskamp in his "Parodia - 2". It could be suggested that Weskamp has failed to read the Ritter description of the fruit with sufficient care.

Elongated fruits do not appear to be attributed to any other spp. or vv. of Parodia in the maassii group. For

P.commutans the habitat given by Ritter, Impora, lies on the road which runs more or less west from the Rio San Juan del Oro to Tupiza. The habitat given by Ritter for P.maxima, lies on the road running in the opposite direction from the Rio San Juan del Oro, at Cieneguillas, north of Iscayache, along which the "football sized Parodia" was seen, as reported above by B.Bates. On map sheet SF 20-5 produced by the Instituto Geografico Militar, La Paz, the road distance from Iscayache to Cieneguillas measures about 16 km with no allowance for bends etc. The football sized Parodia was found by the Bates, Down, Hughes party at an actual road distance of 18.9 km north of Iscayache, which is likely to be near enough to Ritter's original finding location for P.maxima i.e. Cieneguillas. Ritter gives a body size of up to some 9.5 inches in diameter - reasonably close to football size. As the finding location, the body size, and the fruit, all conform reasonably well to Ritter's description it might be suggested that this Parodia found at BDH 21 is Parodia maxima.

.....from F.Vandenbroeck

In the course of our trip to Bolivia in November-December 1992 we drove down the El Paicho valley, which lies to the north of Iscayache. There is only way way down the valley and this eventually comes to a dead end. On the rim high up above the valley Parodia suprema is growing in quite large numbers together with the remarkable Soehrensia randallii. The vegetation and landscape down in the valley are quite unusual. We had hoped to find G.armatum here, which seems to me to be a little-known species, but we were disappointed. Quite unforgettable were the innumerable magnificent specimens of Parodia maxima.

.....from H.Middleditch

How did F.Vandenbroeck decide which name to apply to which of these two sorts of Parodia, I wonder?

.....from F.Vandenbroeck

It is virtually impossible to confuse P.maxima and P.suprema. The latter remains rather small and grows somewhat depressed, has blackish spines, and its habitat is at high altitudes. On the other hand, P.maxima grows exceedingly large - much larger and higher than a football!, has blonde yellow spines and its habitat is at lower altitudes. It occurs abundantly between Cieneguillas and Chaupiuno, and also in Valle Paicho. We did indeed find woolly elongated fruits on plants of the Protoparodia group in the uplands of northern Argentina and southern Bolivia. On our 1985 trip to Argentina we collected lots of seeds from P.maassii and P.schuetziana. Near Iturbe the fruits on P.maassii were still quite fresh because this species flowers late in summer. In the month of April a good number of plants were still flowering whilst most of them were also in fruit.

.....from H.Middleditch

The foregoing observation clearly indicates that elongated fruits were found not only on Parodia in southern Bolivia but also in northern Argentina. Apart from Ritter's record of elongated fruits on P.commutans and P.maxima, this appears to be the first instance on which fruit of this nature has been reported from Parodia of the maassii group. It is confirmed by the observations made by P.Down. The comment from F.Vandenbroeck also appears to be the first instance of elongated fruits being found on Parodia in northern Argentina, again on plants of the maassii group.

A SOUR EXPERIENCE From R.Allcock
At The Chileans' 1993 Weekend

The last two years have been a disaster for my attempts to cultivate South American cacti. Even Chamaecerei die wholesale in my greenhouses, as well as seedlings of Echinopsis eyriesii! Fortunately the reasons for this seem now to have become apparent. The principal culprit is the pH of my compost. Late in the summer I started to pay attention again to pH, and found that acidified water, at a pH of 5.5, woke up some plants which have done nothing for years.

There are complicated interactive effects between soil composition, pH, lack of growth, brown scarring of new growth, mineral deficiencies, and overhead spraying. It is a long story, but for practical purposes the upshot is that my present compost, which is very open and low in organic residue, produces extremely good growth in the first year, no growth in the second year, and death in the third. This is the general picture, which varies considerably from plant to plant.

The composts which I used to use were close and considerably higher in visible organic material; they produced meagre growth over many years, but with growth coming to a stop perhaps after five to ten years, and demise after say another five years, again with considerable variation from one species to another. Their pH was about 6.5, but drifting with the passage of years to 7.0 to 7.5.

According to my ancient BDH soil testing kit, the rain water comes at about pH 7.2, while the tap water was occasionally off the scale, giving a blue reaction. The chart of colours ends at pH 8.0, which gives only an aquamarine colour. We are in a so-called soft water area, so must deduce that the water authority was occasionally excessively enthusiastic to alkalinify the water for us. We became aware of this tap-water problem when we long ago bought the BDH soil testing kit, and since then have used rain water on the collection. Thus my problem lies not with the water, but with the soil.

My present composts, which have brought matters to a head, are based partly on soil from a very old and fully decayed garden compost heap. This soil should be very rich in minerals, which will be available to the plants if the pH lies in the correct band of values. The pH of this material, before use, is in the range 6.5 - 7.0, as opposed to my ordinary garden soil, which registers at pH 7.5. The lower pH of the old compost is of course due to humic acids. To achieve adequate aeration I have been adding either broken brick (pH 8.0) or, for seed sowing, equal parts of horticultural vermiculite (pH 9.0) and peat (pH 5.0). Sand is also incorporated. The pH of the freshly prepared mixes lay respectively in the ranges 7.0 to 7.5 for plants and 5.5 to 6.0 for seed sowing. Over the course of time however it rose in both cases to 8.0, which was utterly disastrous for the plants involved. This rise may be traced partly to the long-term escape of alkalinity from within the alkaline inorganic ingredients, and partly to the decomposition and evaporation of the humic acids, in the cases where peat was present. In composts where peat was present, (namely for seedlings) the production of fresh supplies of humic acids was unintentionally inhibited by the repeated use of Chinosol, and in the other case there was no undecayed organic material available for such production.

However, in my previous compost use was made of half-decomposed leaf mould and peat in copious quantities, typically one third of the mixture. It has been suggested to me by R.Mottram that the bacteria which would be present in these materials would enable the plants to take up the trace elements in spite of the unsuitable pH of the other ingredients. Hence the much longer survival times in my old composts, and results a great deal less catastrophic.

When the issue of pH raised its head in the 1970's, my collection was mostly Astrophytums and Mesembryanthemums, which can all tolerate some alkalinity. No conclusive improvement was found from using nitric

acid in the water at that time, so we lost interest in the question of pH. But now I have started to pay attention to pH again. One early step was to neutralise the brick chippings by a 48 hour soak in a solution of a strength of 200 drops of concentrated sulphuric acid per litre of water, which gives a solution of about pH 0.2 (by calculation). I now find that 50 drops per litre (4 ml per litre) is satisfactory for my bricks, provided that all mortar is carefully knocked off before crushing them. The end product shows a reaction in the range 5.5 to 6.0. In addition, I changed to using water at pH 5.0, made by adding citric acid or hydrangea colorant (Aluminium sulphate) to rain water. The intention is to vary the proceedure by trying out several acids.

The problem these days is to get hold of the concentrated sulphuric acid, since some laboratory suppliers are ultra cautious about it getting into the wrong hands. Once the lime in my compost has been turned to gypsum by the use of this acid, it will probably be better to switch to more volatile acids, such as nitric or citric. Nitric acid is widely used in horticultural greenhouse work and is available for that purpose. Citric acid you can get even at your local home brew store. One quarter of a teaspoonful to a gallon of tap water should give an innocuous ph 5. Another idea would be to try aluminium sulphate, which Chempak can supply in bulk.

It will be interesting to see how the plants fare under a properly regulated regime of acidified waterings. It has already woken up some plants that have done nothing for years.

.....from J.Cooke

Both sulphuric and nitric acids are, in their concentrated form, extremely hazardous substances. In my opinion they are really far too dangerous to be stored in a domestic environment. If any members do come by either of these substances, I would recommend that they are diluted immediately, in the following manner.

First of all sufficient bottles will be required for storing the dilute acid. These should be clearly labelled. For personal protection, goggles (not glasses) are essential, together with a pair of kitchen gloves and a set of old clothes should be worn. A plastic container of adequate size will be needed in which the dilution can be carried out, together with something to stir the solution; both the container and the stirrer must not be metallic, or contain any metal. For a stirrer, a glass or plastic rod, or a two foot length of small bore PVC pipe will do.

The next step is to work out the volume of water needed. For sulphuric acid, 20 volumes of water will be required for each volume of acid to be diluted. For nitric acid, 10 volumes of water for each volume of acid. The water should be poured into the large plastic container and the acid then added to the water, drop by drop. If the acid is added too quickly, hot spots will be formed. By occasionally placing the hand on the outside of the container the temperature can be monitored. Do not remove the gloves to do this!

Once diluted the solution will be fairly safe, although contact with it will still be ten times worse than a splash of lemon juice! In the concentrated form these acids will rapidly dissolve skin, clothes, most metals, concrete, plaster, wood and many other things. It would therefore be most unwise to contemplate storing the acid in the concentrated form in case any inadvertent spillage occurs. Indeed it would be advisable to make all preparations for carrying out the dilution before setting out to collect the concentrated acid and then diluting it straight away. The most important last word - add the acid slowly to the water.

For anyone who does not fancy using acids then there is an alternative, to use substances which will dissolve to form an acidic solution. Mild organic acids such as citric, tartaric, or ethanoic can be used. Yet a further alternative is to use ferrous sulphate. This will decompose in water to give a very dilute solution of sulphuric acid. An amount of 0.1 gm of iron sulphate will yield approximately the same number of hydrogen ions as 1 c.c. of 1 mole per litre of nitric acid, or as half a cubic centimetre of one molar sulphuric acid. Aluminium sulphate, sold as hydrangea colorant, also decomposes to give dilute sulphuric acid. For a trial, an amount of 0.1 gm per litre of compost would be a suitable start.

.....further from R.Allcock

The treatment with acidifying salts is bringing great benefit and not only to seedlings. Many plants, which have not been repotted for a dozen years or more, are now growing again! Many are still in composts other than my own, as they were not repotted when they were acquired. This might suggest that many composts, including commercial ones, are susceptible to alkalination.

In the process of examining various alternatives, I have already been trying ferrous sulphate, at about two dessert spoons (level) to each gallon of water. There has been a continuing and visible improvement in the growth of my plants, more evident even than the improvements obtained earlier with aluminium sulphate. This strong effect may well be due both to the very weak acidity of the ferrous sulphate (which thus allows of the above-indicated enormous dose, as against only one teaspoon of aluminium sulphate) and to its chemical instability, which guarantees that over a period of days all of its sulphate ions will be released.

It is possible that the ferrous sulphate will decompose to ferrous hydroxide, thereby increasing the acidity of the compost; then the ferrous hydroxide may change to ferric hydroxide, producing further ions in the process and again contributing to the acidity of the compost. The ferric hydroxide would be in the form of a rusty clay deposit and this does certainly appear.

In a ten day run I found that the addition of 7 gm of ferrous sulphate to 1 litre of John Innes No.3 drops its pH from about 6.5. to about 5.5., with stabilisation already after three days. Over the long term the bacterial action should however increase, to give ultimately a drop larger than this. If we assume that the pH for J.I. Nos. 1,2, and 3 are respectively 5.5, 6.0, and 6.5., and if we assume that the chalk content is the ultimate determining factor in the bacterial action, then we may hazard a guess that maybe 3.3 gm of ferrous sulphate to each litre of J.I. compost would suffice over the long term to lower the pH in use by one unit. For this is the amount required to reduce the chalk content from No.3 to No.1.

.....from J.Cooke

The course of the decomposition of Ferrous sulphate in water is a rather difficult question. As supplied, Ferrous sulphate (or Iron (II) sulphate as it should be more correctly called) contains water of crystallisation and has a formula

$$FeSO_4.7H_2O$$

The course of reaction outlined above does not appear, however, to be correct, as the reaction proceeds by way of oxidation of the Fe ion by atmospheric oxygen. If a fresh solution is left in a glass vessel, a brown ring will form at the top as the oxygen attacks the Fe ion. This may sound fairly simple, but the complication is that this reaction is highly pH sensitive. In alkaline solution it proceeds rapidly, in acidic solution very slowly if at all. Having read a few references to this subject it appears that very little is known for certain. Were decomposition to proceed to completion via atmospheric oxygen, the following would account for the ions present

$$4FeSO_4 + O_2 + 10H_20 = 4Fe(OH)_3 + 4H_2SO_4$$

The sulphuric acid would ionise so that the increasing concentration of H^+ ions would prevent complete

decomposition. The Iron (III) hydroxide $Fe(OH)_3$ would decompose to hydrated iron oxide.
.....from R.Allcock

The detail of the formula for ferrous sulphate, in particular the water of crystallisation, is very useful, as it is important when it comes to calculating relative doses of ferrous sulphate versus sulphuric acid in treatment of crushed brick, etc. As a further experiment I have added a dessert-spoonful of ferrous sulphate firstly to a gallon of rainwater and secondly to a gallon of tap water.

With rain water a greyish-brown deposit falls to the bottom of the vessel; this is probably ferrous hydroxide and the reaction may proceed along the lines of:

$$FeSO_4 + 2H_2O = Fe(OH)_2 + SO_4^- + 2H^+$$

After about a fortnight the pH has fallen to about 3 and deposition has stopped. The liquid can then be poured off into a clean vessel. No further deposition occurs. But if the pH of the liquid is now raised by dropping in some crushed limestone, then further ferrous hydroxide is deposited, which could only occur if some unchanged ferrous sulphate still existed in the solution. This demonstrates that both ferrous sulphate and ferrous hydroxide can exist in mutual equilibrium at a pH which is about 3, although I am not able to measure it accurately. When the liquid has been poured off, the grey-brown and wet deposit becomes exposed to the air. After some days, it goes orangey-brown - rust! This stuff is presumably hydrous ferric oxide $Fe_2O_3.nH_2O$.

The experiment goes differently if ferrous sulphate is added to tap water, for then rust forms straight away due to the presence in the tap water of the oxidising agent sodium hypochlorite. It thus appears that ferric hydroxide is not formed until the ferrous hydroxide is either exposed to the air or to other oxidising agents, such as sodium hypochlorite. The reaction might proceed along the lines of

$$4Fe(OH)_2 + O_2 + 2H_2O = 4Fe(OH)_3$$
$$2Fe(OH)_3 = Fe_2O_3.3H_2O.$$

.....from H.Middleditch

The experiment with the rain water clearly demonstrates that as the pH drops, the hydrolysis of the ferrous sulphate comes to a standstill, but will re-commence if the pH is raised. This confirms the observation by J.Cook that the decomposition of ferrous sulphate in solution is pH sensitive.
.....from R.Allcock

In my chemistry book I now find a reference to aluminium sulphate, as follows; "Thousands of tons of aluminium sulphate in the form of crystals, $Al_2(SO_4)_3.18\ H_2O$ are used each year in the clarifying of drinking water, as a mordant in dyeing, to size paper, and in the tanning industry. Its use for these purposes depends upon the fact that it hydrolizes in water to produce a solution of $Al(OH)_3$, a jelly-like precipitate, which makes it effective.

$$Al_2(SO_4)_3 + 6H_2O = 2Al(OH)_3 + 3H_2SO_4$$

Hydrolysis reactions are reversible and slow. For this reason, when aluminium sulphate is added to water supplies, milk of lime is also added to react with it:

$$Al_2(SO_4)_3 + 3\ Ca(OH)_2 = 3CaSO_4 + 2\ Al(OH)_3$$

The gelatinous aluminium hydroxide settles, carrying down with it suspended particles, including some bacteria."

This extract makes me fairly confident that the stuff which we buy as aluminium sulphate is $Al_2(SO_4)_3.18H_2O$, which does indeed seem to be composed of small crystals.
.....from P.Leigh

Browsing through the shelves in a garden centre recently I came across an item which I had not seen before, Phostrogen Acid plant food, which I gather is a new product. The N.P.K. content is 15,10,15 and it also contains magnesium, sulphur, iron and manganese. The claims are that it rapidly acidifies alkaline soil no matter how chalky or limey. I am intending to try it out on my own plants next year.
.....from M.Muse

A couple of years ago I decided to try some coir in my compost in place of peat. The coir seems to be a lot cleaner than peat when handling it. Unfortunately the results have been very disappointing. Seedlings do not seem to have grown quite as well as in my compost with a peat ingredient, but the most serious problem has been with seedlings or young plants which started in a compost with a peat content which have been potted on into a coir based compost. They simply will not grow. I am suspicious that this might be accounted for by the pH of the coir.
.....from H.Middleditch

It may be of some use to try and establish the pH of commercially supplied coir.

HIT FOR SIX?.....from M.Muse

There are Parodia seedlings currently going around as P.mercedesiana DH 166; this is an error which started in Steve Brack's seed list. The correct number is DH 116. The MG numbers refer to Brack's catalogue numbers - Mesa Garden.
.....from J.Brickwood

Both DH116 and DH166 are reported to be P.mercedesiana; DH116 was the holotype. My own ex-Mesa Garden DH166 from seed certainly look like Weskamp's illustration of this number, but have not flowered yet. Even more confusing is that Brack lists a P.mercedesiana with no field number, which does not appear to me to be the same as his "DH 166". Another anomaly in the Brack list is Parodia WR 571a "P.setifera, contrasting black and white spines", as well as Parodia WR 571a "P.maleana". My resultant seedlings look nothing like P.setifera or allies, so goodness knows what they are. Rausch does not seem to have made very convincing identifications of the Parodias he found, nor does he appear to have retained his Parodia discoveries, so the seed now appearing on the market recently must have come from an indirect source.

A PARODIA REAPPEARS.....from J.Brickwood

Recently a note was received from M.Nilsson accompanying a seed order which I had sent to him, stating that his Parodia MN 137 from the Valle Grande area in a remote part of Jujuy province is very free flowering and grows in an almost subtropical climate. He adds that it probably belongs to Parodia saint-pieana. From seedlings which I grew last year, I think that it is indeed P.saint-pieana and hence is a very significant rediscovery.

A RED RAG -BAG? .....from M.Muse

The review of red and pink flowering Gymnos in Chileans Vol.15 No.50 pp.95-99 has left me somewhat confused just what was the purpose of this - to me - a rag-bag of species? Outside of flower colour I can discern no unifying theme or point of focus.

.....from H.Middleditch

With hindsight it may well have been of advantage if a summary of the known relationships in the field of red/pink flowering Gymnos had been included, viz: the multiflorum, achirasense, horridispinum, schuetzianum forming one group, the mostii, kurtzianum, oenanthemum a second group, both groups being found in the highlands of Cordoba and San Luis. In the highlands to the east and north of Catamarca city is to be found the well known G.baldianum, whilst in the highlands to the west and southwest of Catamarca city is to be found G.carminanthum and G.tillianum although the paucity of field work and study of these two names leaves reasonable doubt as to whether it is here a matter of two species, or one.

A clear indication of the origin of the name G.oenanthemum was provided both by Doelz in the article reproduced in Chileans No.50. as well as the illustration mentioned by Doelz which appears in the 1932 Haage catalogue. In K.u.aS. 11,39,1988 H-F. Haage reminisced about G.oenanthemum, observing that his father "well recollected the first plants of this species, which he had been sent from abroad. The grey-green, almost red-brown body resulting from the intensive sunshine distinguished the new species even without flowers from the species of G.monvillei or G.multiflorum well known at that time. ... In the first description (Backeberg 1934) the flower colour was specified as only as light ruby colour. Only in a later description (Backeberg 1959) was a salmon tinge also given as possible. Even in our stock both colours occur. Systematically we find G.oenanthemum together with G.valniceckianum, G.multiflorum, G.horridispinum, G.kurtzianum and others classified in the group of the Hybopleura."

It is of interest to see that Haage mentions a salmon tinge in the flower colour of some of the G.oenanthemum grown in their nursery. The original description of Echinocactus mostii by M.Gurke in Monats. der Deutsches Kakt. for 1906 refers to the outer (not outermost) petals as pale salmon colour, at the base a darker dirty red colour with a violet tinge, the innermost petals pale red. This is a further link between G.oenanthemum and the mostii-kurtzianum group. However, the above reminiscence includes not a word by H-F. Haage about the illustration in the 1932 catalogue of F.A. Haage (his father), of one of the first G.oenanthemum in flower in his stock. But then I have to admit that it is with distressing frequency that by chance I come across valuable pieces of data in the literature that could (and preferably should) have been found a place in a review of a particular plant or group which appeared in The Chileans not long before. Those who live in glass houses ....

SULCOREBUTIA PSEUDONYMS? From W.Gertel

In Chileans No.50 there was a note from P.Deane about his plant of HS 217. Of course HS 217 is S.cochabambensis of the type similar to Rausch's S.clizensis. It is also certain that the location of the two field numbers are more or less the same, a little hill north of Tolata. Rausch called the plants S.clizensis because one can see Cliza from the top of that hill. The problem with P.Deane's supposed HS 217 is quite understandable because his plant came from Uhlig who acquired and sold the plants which the German customs confiscated from Swoboda. Unfortunately most of the plants got mixed up or could not be identified correctly. Everyone who purchased any of this batch of plants from Uhlig could easily have wasted their money since the plants had lost their real value. It is with regret that I have to say this and also to warn any prospective purchasers about the remaining plants or propagations from them.

.....from H.Middleditch

This timely advice makes clear the doubts which will surround the identification of any as yet unsold plants from this batch. But how about propagations passed on from collections whose owners have already purchased any of these plants? How does a fresh owner know whether they have acquired a plant masquerading under false colours?

CHILEANS 1995 WEEKEND

It is intended to hold The Chileans 1995 Weekend at Cavendish Hall, Nottingham University, over the Weekend of 15th to 17th September 1995. Details will be sent to members who attended either the 1994 or 1995 Weekends, or to any other members on request. It is anticipated that we will hear how our members fared who have recently returned from Chile, and from Peru. We also expect to hear from P.Down about his impressions of Bolivia on the Bates-Downs-Hughes trip. A visiting speaker is expected from the continent to tell us about his visits to southern Brazil and Argentina. The cost per head for meals, accommodation, and facilities, is expected to be about £98.20 per head.

CHILEANS 1995 PLANT LIST

Following the successful trial of a list last year, a new list will be available to all UK and EU members in May. It will feature a selection of cerei grown from habitat seed collected in Bolivia. There are also many species of Gymnocalycium, Parodia, etc. from seed collected in Argentina by members in 1992. Cuttings from Rebutias and Sulcorebutias from the collection of John Donald will also be available. To obtain your copy, please send a large (C4) stamped (28p) self-addressed envelope to Graham Charles, Briars Bank, Fosters Bridge, Ketton, STAMFORD PE9 3UU England. Lists will be *despatched in May* as soon as Graham can prepare them.Plants can only be sent to countries of the European Union. Members outside UK should send 2 International Reply coupons.

OPEN DAYS - 1995

Two of our members have offered to hold Open Days at their respective collections in 1995; R.Purves, Guildford 0483 232669 on May 8th and A.W.Craig Teesside 0642 782398 on 21st May. It is essential that intending visitors contact the number concerned beforehand, when navigational guidance can be provided.

Errata No.50

p.100 under Gymnocalycium Schuetzianum by Jiri Kundelius. "On some plants it is broad" should read "on some plants the bud is broad".

CONTENTS

In the Argentinian Cordillera A.V.Fric	105
A journey to the Puna de Atacama J.B.Ambrosetti	106
A journey to Bolivia and Peru R.Hauthal	106
Cactus hunting in Salta E.Vatter	107
My seventh trip to Argentina H.Bort	109
A gringo on the hunt for cacti W.Knoll	109
A daytrip to the Quebrada Toro N.Wilbraham	110
A visit to the Quebrada del Toro M.Nilsson	110
We pitch camp in the Quebrada del Toro. K.Gilmer	111
Twice for a good look - the Quebrada del Toro. R.Ferryman	113
Third time lucky - the Quebrada del Toro K.Preston-Mafham	115
Andenea kuehnrichii K.Kreuzinger	118
Lobivia kuehnrichii A.F.H. Buining	120
Echinocactus sp. No.2 R.E Fries	121
Pyrrhocactus umadeave from seed Members	125
Sowing some seeds of success P.Moor	126
Reicheocactus rediscovered? K.Gilmer	127
Journies in the Argentine Republic L.Brackebusch	128
Earth Cacti in habitat in Chile H.Lembcke	129
Thelocephala R.M.Ferryman	131
Echinocactus reichii K.Schm. H.Krainz.	134
Thelocephala fankhauseri S.Kooij	136
A new genus for an old name? Members	136
Bolivia revisited - December 1992 B.Bates	138
Pereskia diaz-romeroana sp.nov. M.Cardenas	141
Bolivia revisited R.K.Hughes	144
Opuntia boliviana Salm-Dyck	146
Tephrocactus (Cumulopuntia) bolivianus F.Ritter	146
Bolivia - Now or never P.Down	147
A sour experience R.Allcock	150
Hit for six M.Muse	152
A Parodia reappears J.Brickwood	152
A red rag-bag M.Muse	152
Sulcorebutia pseudonyms W.Gertel	153

Special interests

Austrocactus	A.Johnston, 11 Malvern Rd., Scunthorpe DN17 1EL
Cereanae	G.J.Charles, Briars Bank,Fosters Bridge,Ketton, Stamford PE9 3UU
Cleistocactus	T.Lavender, Kalanchoe, Market Place, Tetney DN36 5NN
Copiapoa	A.W.Craig, 32 Forest Lane, Kirklevington, Yarm TS15 9LY
Discocactus	R.Moreton, 91 Umberslade Rd., Selly Oak, Birmingham, B29 7SB
Echinopsis	M.Muse, 32 Fielding Rd., Birstall, Leicester, LE4 3AJ
Frailea	C.Holland, Newling Farm, Litcham, Kings Lynn PE32 2PB
Lobivia	M.Lowry, 7, Bygot Close, Leconfield, Beverley HU17 7NN
Matucana	D.Aubrey-Jones, 62 Rosehill Park, Caversham, Reading RG4 8XF
Melocactus	J.Arnold, Suffolk House, 2 Oak Hill, Washingborough, LN4 1BA
Neoporterianae	R.M.Ferryman, Nichelia, The Street, Stonham Aspal IP14 6AH
Opuntia	R.Crook, 35 Cardinal Close, Worcester Park, Surrey KT4 7EH
Rebutia	M.O'Hara, 242 New Road, Booker, High Wycombe, HP12 4RG
Rhipsalis	A.Hill, 8 Vicarage Rd., Grenoside, Sheffield S30 3RG
Tephrocactus	R.K.Hughes, 16 Ashbourne Ave., Bootle L30 3SF

THE CHILEANS

Organiser	H.Middleditch, 5 Lyons Ave., Hetton-le-Hole DH5 OHS
Treasurer	R.L.Purves, 19 Brocks Drive, Guildford GU3 3ND
Membership Secretary and Back Numbers	Mrs.G.Craig, 32 Forest Lane, Kirklevington, Yarm TS15 9LY