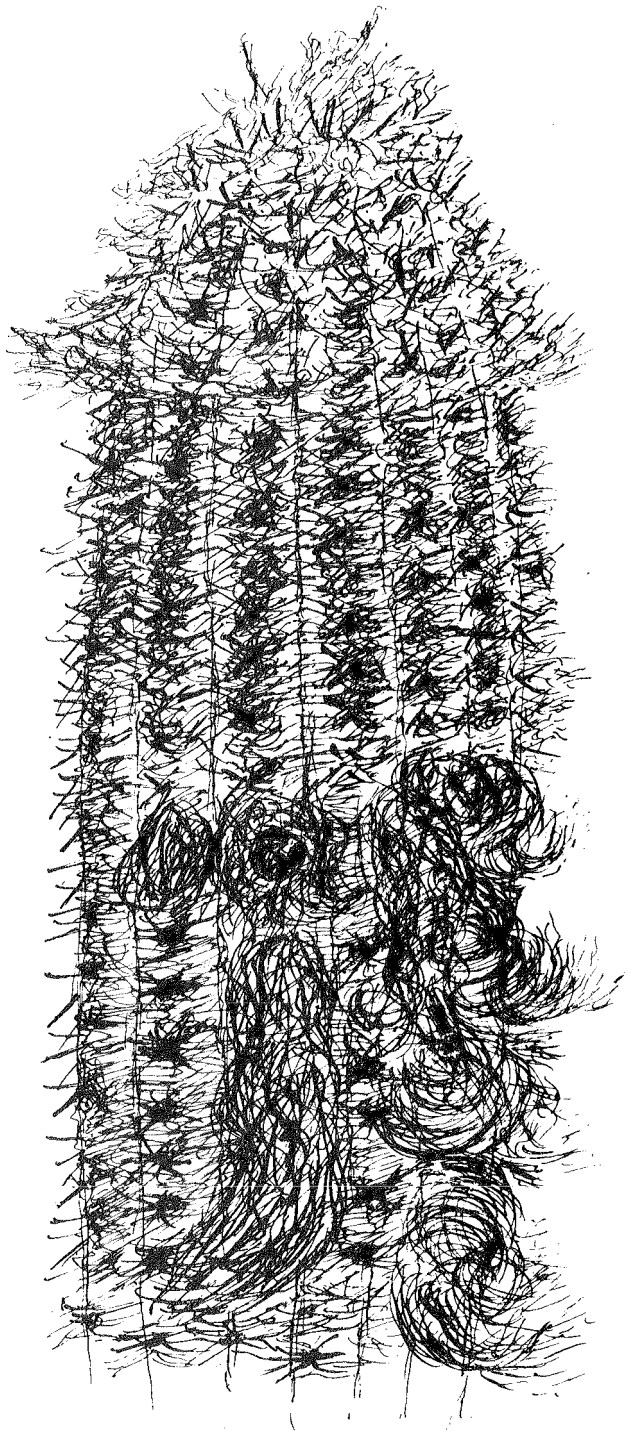
THE CHILEANS '79

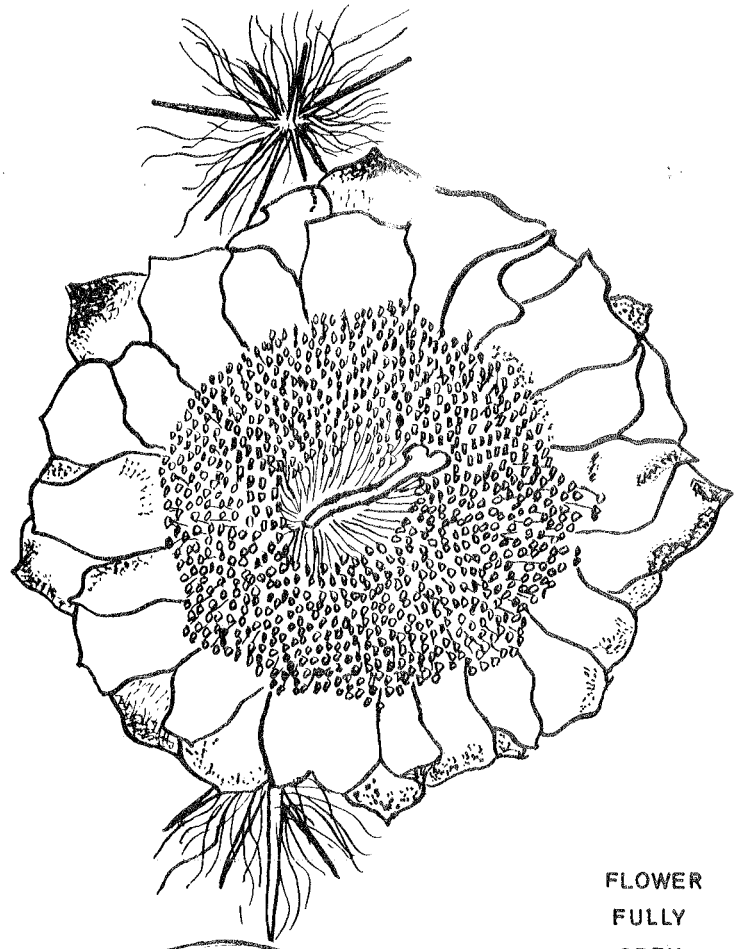
VOLUME 10 NUMBER 36



PILOSOCEREUS AURISETUS

Collection— E.W.Barnes.

FLOWER
PARTLY
OPEN



PILOSOCEREUS
PALMERI

Collection - P. BINT

FLOWER
FULLY
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FLOWER
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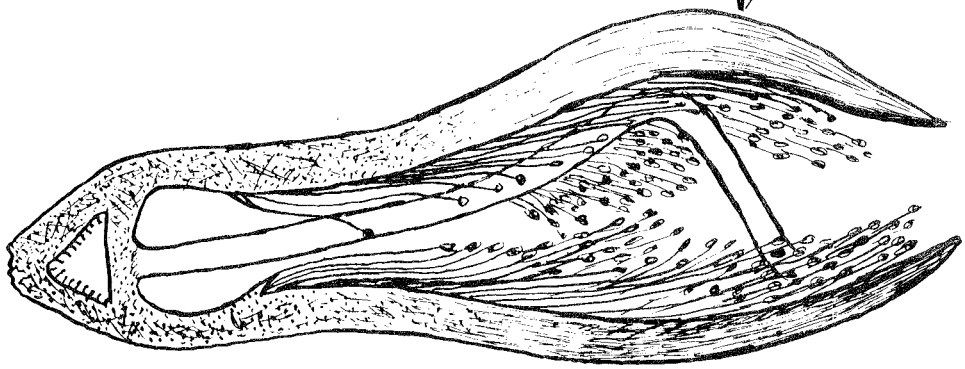


PILOSOCEREUS PALMERI FLOWERS From P. Bint

In about 1967 or 1968 I obtained a small seedling of Pilosocereus palmeri from a local garden centre. I suppose that it was imported from a nursery in Belgium or Holland and it probably cost me half-a-crown at that time. It stood no more than 6ins. high when I purchased it. Now it stands about 26ins. high, still with eight distinct ribs, and it will be between 13 and 14 years old. The new growth exhibits a bluish epidermis colour which is retained for about two years and thereafter it gradually reverts to green over the next two years. Looking at the areoles which have appeared over the last 2 to 3 years, there are four central spines in the form of a cross, the lower one 20-28mm long and the others 15-20mm long, together with 8 radial spines 10-15mm long. All these spines are brown when new, turning yellow during the course of that year and becoming grey thereafter. Some of the central spines retain their brown tips, however.

For a period of five years there had been some growth of extra wool at every new areole, but in the Spring of 1976 there was a sudden rapid growth of wool on eight areoles on the three southernmost ribs just below the level of the crown. This coincided with the start of that fantastic summer. It rapidly transpired that this long, silky white, soft and satiny wool was appearing from areoles that would bear flowers. This wool seems quite long when it appears in the crown but most of the wool is formed into a tight ball round the bud and the true length of this wool only shows itself when this tight ball of wool is pushed open not long before the flower opens.

In the same year that the very woolly areoles first appeared, they produced three flowers during July and August. These flowers opened one at a time but in fairly quick succession. In 1977 not as much new wool was produced until much later in the year, when masses of it appeared right up around the crown. Three flowers emerged in 1977, two in July from the 1976 long wool and also one in September — this latter never opened fully. Then in October a bud appeared from the 1977 wool, but this bud aborted after a fortnight, possibly due to insufficient light.

The buds are quite large before they can be seen among the long, dense, wool. The bud is almost black in colour and it does not change in colour until it is almost ready to open, whereupon a faint pinkish tinge is noticeable at the very tip of the petals at the opening point. Normally the period from first noticing the bud to the flower opening is about 5 days. The flower opens in the evening, it lasts only one night and usually it has faded by eight o'clock on the following morning. It is about 5.00 to 6.00 p.m. when the flower starts to show signs of opening. It will be fully reflexed by 10.00 p.m. but on a favourable summer day I have seen a flower wide open before 9.00 in the evening. All the flowers appear to face more or less towards the south.

The open flower is about 50/55mm long and about 35mm across. The outer petals of the flower are smooth and satin-like, deep blue-black in colour. The layer of petals under these are dull rose pink, black tipped, the inner petals being bright pink. This deep pink colour of the inner petals paled quite noticeably soon after opening fully. The stamens are cream-coloured, very numerous indeed. The style, 48-50mm long, white with a faint pink tinge just under the stigma lobes; the stigma is cream, the lobes remaining bunched together, unopened up to at least 10.30 p.m. When I sliced a flower in half (the flower which had not opened properly) there was a noticeable curve to the style, so that when a flower opened this would cause the stigma to protrude just beyond the petals and stamens. The ovary is about 5mm high by 7mm wide; the nectar chamber is 8mm long and the same width and was full of nectar when the flower was sectioned. The flower has a slightly repugnant scent and I wonder if moths or bats are attracted by this aroma, for the purposes of pollination.

This plant is grown in a separate small greenhouse which I have at a setting of 50°F (10°C) on the heater but it usually settles down to about 55°F (14°C). This minimum is maintained all year round; in addition to the Pilosocereus this small hot greenhouse also contains any Melocactus, Discocactus or other warmth loving plants that I have. Despite this form of cultivation, I have still lost a fine specimen of Discocactus, for no very obvious reason.

Comments

. . . . . from A. Johnston.

Although I do heat my greenhouse, I do move some of my Cereus into the house again during the depths of winter to give them added protection against the cold. I have acquired one or two more this year, mostly from Brian Goody at Holton-le-Clay. I have also obtained a nice specimen of Pilosocereus ulei from Tom Jenkins, which is growing quite well. I have found that these cereoids root very well in Arthur Bowers compost and quickly send their roots down to, and through, the drainage holes in the pot.

. . . . . from R. Ferryman

I have established a plant of Pilosocereus royenii which was brought back by Brian Adams from Montserrat, which flowered very well late in the summer. This came to me as a top cutting of about 33ins. in height. The flowering areoles produce quite a bit of extra wool, almost like a ball which is retained for some time after flowering. My plant has two "extra woolly zones", one 12ins. long at the base followed by one 10ins. long with the short wool of the non-flowering areoles, and then a further extra-woolly zone right to the tip. This extra-wooly zone is complete with long wool on every areole but on only three ribs — together with a few areoles on the fourth rib. The plant produced a good two dozen flowers during September-October, often three or four at a time. Equally as often the flowers came singly, whilst on other occasions it produced three buds together, only for one to open followed by the other two on the following night.

The flowers usually began to open at about 17.00 — 18.00 hours and closed around 09.00 hours the following morning. One could usually tell that a flower bud was coming even when it could not be seen, as the wool began to swell and it was obviously firm to the touch; the flower bud then appeared through the ball of wool on the areole and usually opened within about 48 hours. The flower was white, as were the stigma and stamens — or possibly the latter might be described as cream. The outer sepals (Petals?) were browny green and completely naked. The petals always reflexed when the flower was fully open. The stigma lobes always remained closed up together in a bundle. The flower had a musty smell to it. The dead flowers then turned black and would drop from the plant, sometimes landing a fair distance from it.

Regarding the establishment of this plant, my methods are similar to those I use for other Brazilian cereioids and almost any imported plant. For a compost I use either Arthur Bowers ericaceous mix or my own, which consists of 3 parts peat (sedge/sphagnum mix) plus one part of sand; to either mix I add one third of the total of grit — either chicken grit or derby quartz. For those who do not want to mess around with composts, the Arthur Bowers with added grit is first class. However, in my opinion it has a very short useful life — perhaps it looses its acidity, resulting sometimes in the loss of roots in the second year. This has happened to me with Austrocephalocereus, Discocactus and Uebelmannias, yet in my own mix this has never happened — yet!

Whatever compost one uses, and we all have our favourites, I have found it beneficial to pot the plants in a container only slightly larger in diameter than the plant itself, and not very deep. I use round half-pots and only fill about half to two thirds with compost, so with cereiods staking is therefore definitely needed. No particular care is taken with watering, generally the rootless plants get the same amount of water as the rooted ones, but with the extra grit the compost drains that much quicker. I do not use bottom heat at all. It has been my experience that plants that are rushed into root produce thin/weak roots and do not establish nearly so well. My plants do not exactly hang about waiting to root, either. Watering is done from overhead. It is rather important to note that I do not keep picking the plant up to see if it is rooted, as I have seen done many times!! Summing up then, I use an acidic compost, well drained and liberally watered, no attempt is made to rush the plant at all but this treatment is fairly quick anyway and appears to be far safer.

My Pilosocereus royenii was actually soaked overnight in (what started as) a warm bath before being potted up. This was because Brian Adams had pointed out some brown marks on the epidermis and warned me that these were the signs of the larvae of a particular moth. The moth pierces the epidermis and lays her eggs within the plant, the resultant larva then munch their way through the tissue without any regard for its aesthetic value. In this case it might have been a considerable problem and could have set up a rot. I gather that it is fairly common to see these marking in habitat, but my plant was without the root system that possibly protects plants growing in the wild. Bearing this in mind, and being keen not to offer the chance of bed and breakfast in my other cereioids to such unwelcome guests, I hoped that by soaking, the epidermis would take up sufficient moisture so as to allow me to treat the plant with systemic. This I was able to do and there appears to be no further insect activity within this plant. This soaking may well have led to the plant putting on active growth and a fair amount of root and flowers. Any plant which I have received in the past that looks a little dehydrated has been treated to a soaking before being potted up.

I also have a plant of Pilosocereus palmeri, which I obtained from Jumanery as an 18ins. tall seedling, grown in the south of France. I bedded it out when I obtained it in April 1976 in a small bed in my warm house (60°F min.). It is now four feet tall and the top 18ins. show the characteristic woolly areoles and it has produced two extra ribs. As yet it has not flowered but I have great hopes of what may appear this year — the areoles at the top are particularly wooly. I have seen this plant in flower at Holly Gate on three or four occasions and can confirm that the flower was open later in the morning than P. Bint has experienced — at around 11.00 a.m. if my memory serves me correctly. I also have a slide of one of those flowers starting to open when I was there in mid-afternoon in April 1974.

. . . . . from B. Adams

I did not make a particular study of the orientation of flowering areoles on the Cephalocereus (Pilosecereus) in Montserrat, but from memory and a quick look through my photographs I would say that virtually all those I saw pointed between NW and SE, with probably the majority facing generally towards the SW. I do not recollect seeing any, anywhere on the island, pointing between N and E, though that does not necessarily mean that they do not occur.

Well developed plants reach about 20ft. high and, since flowers are only borne on the upper portions of the branches, it is rare to find any at eye level. I have, however, seen a flower being visited by a large (?)beetle during the hours of darkness, and virtually all flowers seem to contain a number of small beetles from the moment they start to open. I suspect that these may be pollen eaters but I am not sure about this. On one occasion I noticed a humming bird hovering amongst opening flowers at dusk, but I did not see it actually visit a flower. The flowers certainly contain copious nectar and so they could be attractive to humming birds provided they do not mind the scent from the flower. The smell of the flowers is strong and it is noticeable over a consierable distance. In almost all cases it is very reminiscent of garlic and I have seen it described as alliaceous. I remember finding only one plant whose flowers lacked the garlic smell but they still had a strong musty odour.

The vegetation among which the Cephalocerei grow is rather dry but mostly evergreen bush. Acacia spp. (introduced from Africa) are today probably the most important element. I do not have any first hand knowledge of the climate of other Caribbean islands such as Curacao, but I suspect the climate of Montserrat might be similar. The island certainly experiences a distinct dry period usually from February to June/July, though somewhat variable in length and severity from year to year. Even in

the dryest parts of the island, though, total annual precipitation is probably not less than 35 inches which, despite high day temperatures, could hardly be called arid. The extremely porous soil, derived from volcanic ash and agglomerate, is probably as important in determining the xerophytic nature of the vegetation as the amount of rainfall and its seasonality.

. . . . . from G. T. Trewartha "The Earth's problem climates" 1966.

Along the northern margins of Venezuela and Columbia from about 62°W to almost 76°W, and including adjacent southern parts of the Caribbean sea as well, is one of the earth's major climatic anomalies. The abnormality is dual in character, for there is both (a) a small total annual rainfall, and (b) a concentration of the precipitation at the time of low sun. Most of this dry area is semi-arid or steppe, although limited areas may qualify as desert. An adequate analysis of annual rainfall variations within the dry belt is impossible because of data deficiency. Moreover, on the mainland station rainfall profiles are local and complicated by variations in terrain and in coastline orientation. Only the Netherlands West Indies combine the desirable features of location in the heart of the dry belt, relatively low relief, and a sufficiently dense station network which make a study of temporal precipitation characteristics significant. A composite rainfall profile of the precipitation records from 17 stations on these islands shows a total annual rainfall of 569mm (22.4 inches) of which 75 per cent falls in the five months September to January inclusive. Only 16 per cent occurs in the five driest months, February to June inclusive, while July and August have only slightly more than the driest months.

. . . . . from H. Middleditch

Plants of the genus Pilosocereus are to be found growing in the wild over a large distribution area, ranging from southernmost Florida in the United States of America, through Mexico and Central America, as well as on many of the Caribbean islands, and into the northern parts of the South America. Here they extend all the way from northernmost Peru, through Ecuador, Columbia and Venezuela into Brazil where they are to be found as far south as the province of Minas Gerais. They are not found at high altitudes, so Pilosocereus are basically of tropical low-altitute plants. Consequently they are never subjected in the wild to temperatures below freezing and very probably never exposed to low temperatures i.e. several degrees above freezing. In general terms, it grows under conditions similar to those in which Melocactus are found and would appear to prefer cultivation conditions under which Melocactus thrive.

During one of our Continental cactus tours we paid a visit to the nursery of Stern at San Remo, on the Italian Riviera. The time of year was early June, the morning being pleasantly warm and certainly not hot. Outdoors in the garden we found a Pilosocereus which stood possibly eight feet high, and it carried a pale pink flower. As the photograph shows, it was almost wide open. As it was at about head height above the ground, must ingenuity was entailed in holding the camera steady, close to the flower, in order to take the photograph.

ESPOSTOA FLOWERS **From Mrs. R. Howard**

I live down at the cold end of New Zealand — the collectors who live in North Island get much more warmth than we do down here. It is not as easy to get flowers here as on many species that do well in North Island, but then I think maybe the colder areas produce better spine colour. We are out in the country here, which is a bit of a handicap in some ways and many times I think it is a shame that I cannot share the flowers with other collectors. Quite a number of my plants will have been in my collection now for upwards of twenty years — some of them in the greenhouse but quite a few grow outside. Sometimes we have a poor growing season, very dry with cold winds, and the plants outside have a hard time. It can be so bad that some of the tall cacti outside bend right over — I have had a Trichocereus spachianus bend over and break right off.

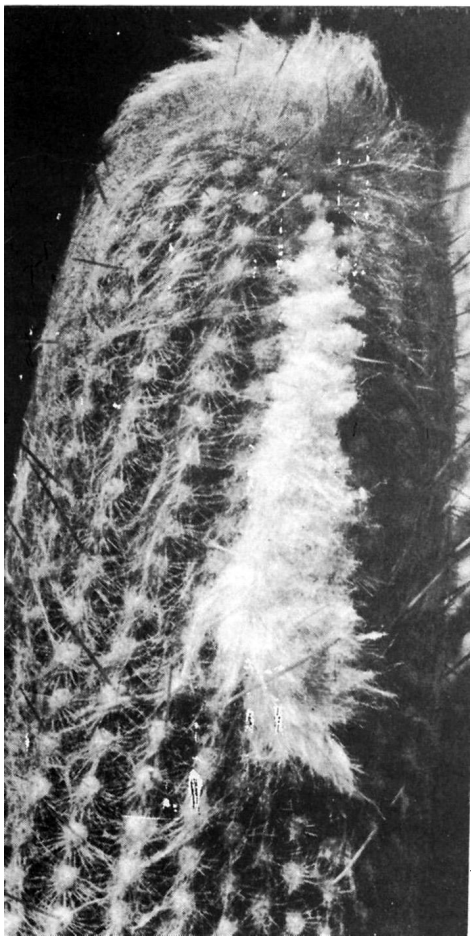
I had long given up hope of seeing some of the plants flower. The Milas had been with me for years, but then two of them flowered in the same year. Both Espostoa and Weberbauerocereus have flowered in the greenhouse: Pilosocereus palmeri has flowered too. This has a region of denser wool at the top but not a true cephalium as in Espostoa.

The Espoastoas are grown inside the greenhouse and they do not have very large pots and have not been repotted for years. The largest Espostoa is now about 8ft. tall with one branch about 3ft., another 2ft. and a third nearly that length; it is growing in a 12ins. pot where I suppose it has been for fifteen years. Others grow in 10ins. and 8ins. pots. I give them liquid fertiliser in the growing season. I am considered odd by other growers in New Zealand as I do not repot plants or only very rarely. Yet visitors admit that my columnar plants are outstanding and I think the hard growing produces stronger spines and wool. I wonder if it is the near starvation diet which helps them to have cephaliums. Anyway the cephaliums are the "things" which intrigue me most about cacti. The cephalium apparently continues to grow with the plant and I wonder why it is formed on the side away from the sun on both E. lanata and E. ritteri.

The first plant to have a cephalium was E. ritteri. When it was about 4ft. high a tuft of fawn wool appeared at one side near the top. This gradually thickened and grew at both ends but only on one side, until it was a thick pad of fawn wool about a foot long. The following season the small flowers (about 1½ins. across) pop out of this wool. Next with a cephalium came E. lanata, starting at about 4ft. high, only it has pale cream wool. Again, flowers appeared from it the following year: the plant continues to grow, the cephalium with it, so now the plant is at least 8ft. tall with about 4ft. of cephalium. The cephalium is in a "gutter" with the thick wool about 1½ins. long. The growing point at the top is clear of the cephalium which starts about an inch down the side. The

PILOSOCEREUS sp.

Collection - STERN - SAN REMO. Photograph - H. MIDDLEDITCH



ESPOSTOA LANATA

Photograph - RAUH

Bei. d. Ken. d. PER. Kak.

ESPOSTOA MELANOSTELE

KRAINZ - Die Kakteen

. ›xt one to form a cephalium was E. melanostele v. borealis which is a small and quite slim plant, more colourful than E. lanata. When about 2ft. or so tall, a few dirty grey tufts of wool appeared near the top, on the side away from the light. More tufts came here and there over about four inches of height until they had all "joined" together, but in all made only a very sparse cephalium. This seemed to pull the growing tip over towards the cephalium which is in a kind of curved depression. It flowered in the following season, the flowers being much the same as other Espostoa. Between that autumn and the following summer it made a sparse cephalium down the opposite side of the stem, so it now has a cephalium on each side. As yet the newer cephalium has had no flowers. The growing point is still clear of both the cephaliums. This plant is different from E. lanata, which does not bend over at the top towards the cephalium.

The flowers appear on all the Espostoa in ones and twos between October and early March — late summer to autumn, although they can appear at other times of year. They open at dusk — earlier if the afternoon is cold and dull — and close when the morning warms. In late autumn a flower can remain open well into the morning. Espostoa ritteri in particular can stay open a long time, even until around the afternoon, when it collapses rather than closes. It is very difficult to cut off a flower as they come out of the very thick part of the cephalium. The flower on E. lanata is about two inches across. The petals are small, blunt, and greenish-white, and a few of the outer ones are greenish brown. The tube is short with numerous medium-sized scales, lightly covered with fine white hair. The stamens are white and numerous, and stand erect in a thick circle about ½in. from the base of the petals. The stigma is exserted another ½in. above the stamens. As far as I could see, the stamens all came from around the bottom of the tube wall.

The only fruit ever set was on E. ritteri which I crossed with E. lanata, but the cross the other way did not take. The fruit grows until it is almost as large as a small hen's egg, globular but slightly flattened on top. It is not spiny but there are a few hairs in odd places. It is a really marvellous pink colour.

Comments

. . . . . from B. J. Chudleigh

When we moved from Australia to New Zealand some fourteen years ago, It was only possible to bring about 800 of my best plants with me. I had already found that Espostoas are rather slow growing as pot plants and resent repotting, so when we came to Tauranga I started several Espostoas off with a free root run. Within five years, Espostoa lanata had reached four feet high with one large branch and several new ones forming in all directions. Espostoa mirabilis v. primigena was also four feet high, with several branches. The main stem on Espostoa hylea was nearly five feet high with eight branches.

Shortly afterwards, all of them began to develop cephalia, when they would be about five feet high. The first obvious sign is that the growing tip tilts slightly towards the side facing the most light. We had a lean-to greenhouse with an eight-foot high back wall on the west side, so the growing tips tilted towards the east and then the cephalia started to appear there. A narrow band of ribs becomes sunken just below the tip of the plant, giving an effect of a gutter and the sunken areoles develop thick tufts of wool. A plant with numerous branches will have cephalia pointing outwards from the centre of the plant, but mainly pointing in directions other than south, so south pointing branches will have cephalia on the east or west sides in most cases.

Cephalia vary a lot in colour, ginger on E. hylea, white on E. lanata, greyish white on E. ritteri, deep brown on E. Mirabilis but generally very similar in form and wooliness. Thick stemmed species like E. lanata have a wider cephalium than the thin E. hylea but the proportions are similar. The thinner species also seem to tilt a little more at the tip, the tilt straightening out as the stem elongates with the same tilt just at the top 15cm. or so. Flowering starts quite soon after the cephalium first appears — I would not be absolutely certain about the lapse of time between first seeing the cephalium and flowers appearing, but from memory I would say that it was a year at most. The cephalium usually grows in an unbroken strip right from the start, but E. mirabilis v. primagena did produce a cephalium in scattered tufts, with flowers from each patch. The flowers do not appear in order from bottom to top nor on any particular season's growth, but flowers can appear erratically so that, in any one night, flowers can be open over a length of caphalium, but rarely in any great numbers at one time. It is not uncommon for branches to originate from within the cephalium.

When the growing tips reached the glass, the plants had to be beheaded and restarted. When we moved to Katikati in 1977 most of the Espostoas were far too large to move, so they had to be left behind and some cuttings restarted here. In under three years, Espostoa melanostele reached four feet in height, with three offsets from the base, but no cephalium yet. Espostoa superba, with just short reddish spines and no long centrals, was also four feet high with three large branches from the base and over a dozen small branches from the base and lower sides of the main stem and branches. Espostoa nana, a sprawling, widespread, decumbent clump, was not quite four feet across with seven main stems and a mass of offsets in the centre.

. . . . . from H. Middleditch

In Backeberg's Die Cactaceae there are quite a large number of illustrations of Espostoa in habitat and in some instances it is possible to see that the uppermost part of each cephalium-bearing stem is tilted slightly towards the cephalium. It would appear that this particular characteristic is repeated in cultivation. Until plants reach flowering age (or size?) they bear only normal areoles, but flowers only appear from a cephalium. The cephalium consists of a band of radically modified areoles, spread over a width of four or five ribs. These areoles are sunken below the normal epidermis level and carry a mass of hair. This hair is

regarded by Buxbaum as growing from the nodes (or axils) on the pedical of flower; these start to form the cephalium just below the growing point of the plant, while the rest of the flower only appears very much later — possibly two or three years later, perhaps even more. The exterior of the pedicel which bears this mass of hairs is described by Buxbaum as the "cauline zone". To produce this mass of hair must surely require a large number of axils (or nodes) on the pedicel; the perianth, too, carries many scales, each one originating from a node. So the flower of Espostoa carries many nodes and it also has a great many stamens, as well as numerous petals. A large number of floral parts, we are told, is a primitive feature; does the appearance of the pedicel prior to the flower also constitute a primitive feature — so primitive that it represents a growth form which preceded the angiosperms? In the disappearance of the tadpole's tail, Nature provides — for those who have eyes to see — a time lapse action replay in a few short weeks of the millions and millions of years of evolution when sea-going animals gradually learned to live on land. Is the cephalium on Espostoa a vestigial remnant (like the tadpoles tail) from the predecessors of the Angiosperms? What is this clue which Nature has left for us, which we can look at, but apparently we cannot read its message?

. . . . . from G. J. Swales

A growth form which preceeded the Anglosperms? Come now, can't have this!! A growth form cannot precede a plant group! In any case, earlier plants didn't have flowers so be definition they could not have flower stalks i.e. pedicels. One other point, is it correct to say "axils (or nodes)"? These are not equivalent, surely? Personally I would have considered a cephalium an advanced feature but I must confess that I have not studied them in any detail. In addition, some people would query suggestion that the tadpoles' loss of its tail really is a mirror of evolutionary development.

. . . . . response from H. Middleditch

Surely flowers cannot have appeared more or less overnight, many millions of years ago? Some link, now extinct, must have evolved gradually from the Gymnosperms? Does not the appearance of the cauline zone before the flower on Espostoas now mirror some facet of this evolution?

In the N.C.S.S. Glossary of Succulent Plant terms I see that a Node is a point on the stem at which a leaf is borne. If I am under the correct impression that all flower parts are modified leaves, then the scales on the tube of a flower will be borne at a node. The same publication defines an axil as "the upper angle formed between a stem and any structure which arises from it". Naturally it is agreed that a node is technically different from an axil; but since all axils occur at a node on a cactus flower, they will be equal in number. The comment made above is laying emphasis on the large number of flower parts, rather than on their specific nature.

THE VALLEY OF THE RIO RIMAC from John Medway

The river Rimac does not flow placidly even through the city of Lima. It falls continuously and sharply throughout its length, from its source in the high Andes barely of one day's journey from Lima, down to the Pacific Ocean. For most of that length it is closely bounded by precipitously steep valley sides and it is not until it reaches the area around Purachuco, which is a few kilometres to the east of Lima, that one sees significant cultivated areas at each side of the river, where the valley becomes much broader and the sides of the valley become less steep. Both the road and the railway running from Lima up to La Oroya and the Cerro de Pasco mines, follow the valley of the Rimac and stay close to the river until well above Matucana — indeed, almost as far as Oroya.

To a resident of these islands the word river will probably conjour up visions of wide water meadows and tree-girt fields spreading from green banks. Nothing could be farther from the appearance of this river and its immediate surroundings. The bed of the river is strewn with boulders and below Chosica there are islands in the river formed from pebbles and larger stones. Nowhere is the river itself very wide — typically 40-60 feet broad above Chosica and, because of the broken rock in its path, it is very tricky to ford. In odd places it may be smooth and flow placidly, but mostly the water is rough as it hurries downwards, boiling and foaming round the rocks. In some places there are deep holes in the bed of the river where the water has come rushing between the rocks. It is not a matter of taking your shoes off to cross the river, in fact it is better to keep them on, as a few nasty grazes and bruises remind me.

The approaches to the water are made over rough boulders; between these, below Chosica, coarse grass and reeds grow here and there together with patches of something similar to our sallow willow scrub, although the plant is probably in no way related. The immediate banks of the river support a population of less xerophytic plants — none of them can I identify apart from the Eucalyptus trees which are a feature of much of the populated areas of Peru and which are in any case introduced. The valley to the east of Lima and beyond Parachuco is flat for perhaps a mile each side of the river, and crops are raised there. Maize seemed to be much in evidence, but cotton, brassicas, potatoes and other root crops were all being cultivated with the aid of irrigation from the river waters. At this spot one is at the upper edge of the garua — or coastal mist — but still quite some distance from the region of reliable rainfall further up the river.

At Chosica there is a largish town of some thousands of people, many of whom commute into Lima daily as this is the perennial sunshine area — and here the cacti begin. I remember one day when we had stopped at a cafe in Chosica which was

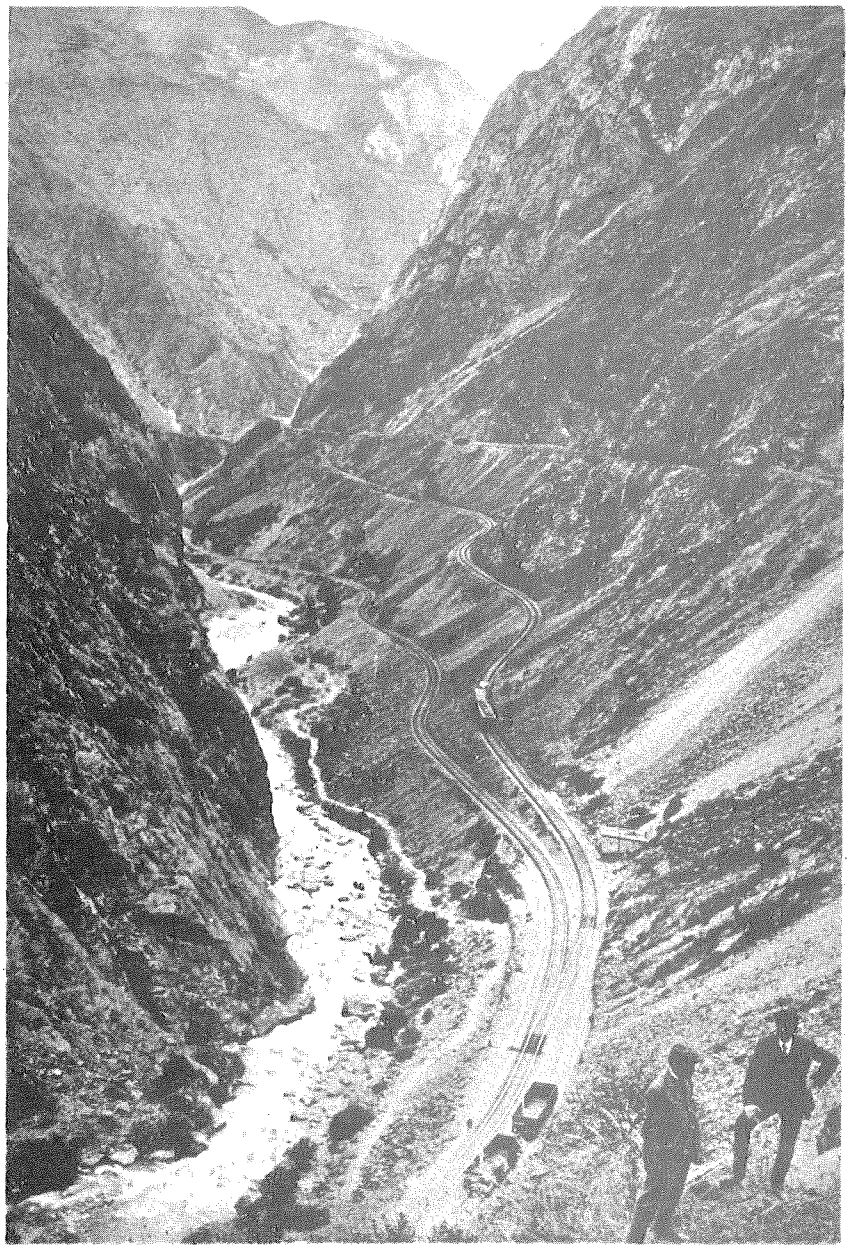
fairly close to the Rimac. There had been a storm higher up in the valley on that day and it had turned the river into a boiling torrent of muddy water about 60-80 feet wide, just below us as we sat there. On the other side of the valley, the vegetation — mostly scattered trees and bushes — ceased completely forty feet above the level of the river. But no — on a ridge a few hundred metres above the houses stood two or three solitary sentinels of Neoraimondia roseiflora. On scanning the hillside rather more closely, there were even a few Haageocereus to be seen.

Heading upriver along the road to Oroya for a kilometre or two to the east of Chosica, a left turn takes us along the valley of the Eulalia river. I recollect that we left this latter road after a further kilometre and meandered along a track which came back round the shoulder of the north side of that valley and towards Chosica again. Once above the thin green strip forming the valley-bottom vegetation, we came on to the brownish, stony ground that covered the hillsides in every direction, wherever we looked. On less severe slopes, great boulders lay strewn about or piled one against the other, with gravel, earth and stones covering the ground around. The cacti grew up from between the stones and rocks and much less frequently from the gravelly earth. Here Karel Knize showed me Melocactus peruvianus v. lurinensis, a Mila species — probably M. nealeana, Backeberg's "Pseudo" espostoa melanostele, Haageocereus chosicensis and also a Loxanthocereus which could be L. eulalianus — although it seems very close to L. acanthurus, (which we saw some days later at Matucana). We also found two plants of Neobinghamia climaxantha. Here, too, were Haageocereus comosus and H. seticeps together with H. pseudomelanostele. I confess that I had great difficulty in sorting out the Haageocereus although Karel Knize put names to all of them. Only two of them were in flower, both of which I photographed and one is fairly certainly H. albisetatus with its greeny-white flowers. The other one, with a pinky-red flower, Karel Knize identified as H. chosicensis. I am uneasy about the number of names in this genus Haageocereus as the plants in habitat seem to be continuously variable between species descriptions. There were many plants of Neoraimondia roseiflora in this locality. The floor of the Rimac valley lies at about 1000m altitude here and from where I stood on the shoulder above the confluence of the two rivers I would guess that I was about 150m above the floor of the valley. Lower down on the same slope I again found Mila species — this time closer to M. caespitosa on body morphology but the specimen which I brought back home with me has not flowered as yet.

Before I left for Peru I had been asked by Harry Middleditch to look out for possible pollinators in any cactus habitats. I did not see any insects visiting flowers in the Rimac valley. However, when we were near Chosica I observed what I at first took to be large moths visiting the flowers of Neoraimondia roseiflora and the various Loxanthocereus spp. The only thing visible was a small irridescent body — the wings were a blur — and my immediate reaction was to link them with the larger hawk moths of Europe. They were at 10-20 metres distance. The penny then dropped — they were humming birds! Tiny, lightning fast between plants, and never settling. I spent twenty minutes trying to include a bird in the photographs and each time the bird moved before I hit the shutter. These were the only plants I saw visited by possible pollinators in the Rimac valley.

Some days later we drove further up the valley and between Chosica and Matucana the road climbs slowly but steadily. East of Chosica the habitation dies out, just isolated homesteads appearing here and there. For most of the way from there up until Matucana is reached there is a fair amount of cultivated terracing even though almost all the hillsides are steep and also consist of much exposed massive rock and scree slopes. The floor of the valley is at most only a few hundred metres wide and the sides steadily close in on to the river all the way, until there is only room left for the river and the road. For most of the way the railway line is a few metres above the road, cut into the side of the hill. The road has to cross from one bank to the other at one or two points to suit the lie of the river banks. The cacti now begin to drop down to the river level. Many Espostoas, Haageocerei, Neoraimondias and Trichocereus peruvianus can be observed from the car and, with steadily increasing altitude, the surrounding slopes start to become greener as one proceeds up the river. Here in the afternoons there are thunderstorms and the vegetation reflects the increase in available water.

We stopped 1 km. west of Matucana, at about 2300m. altitude and on the south side of the valley. We clambered around on the hillside over an area which had been scoured by sliding debris after an earth tremor some time before. Here were plants of Matucana haynei, all small and none in flower, together with Loxanthocereus acanthurus, these latter plants being covered in blooms. Also in flower were the upright stems of Trichocereus peruvianus together with many sprawling stems which were lacking in blooms. I remember that when we discussed this particular locality at the Chileans Weekend, Phil and Mel Collins described how they had also been on the hills about 1 km. to the west of Matucana, but they had scaled the slopes on the north side and there they had found larger plants of M.heynei which carried flowers or floral remains. At the time, it was suggested that the difference in stature and frequency of the plants might be due to the north facing versus south facing slopes. But I believe that the reason for the difference was the rock slide which had occured on the southern side of the valley; all the plants which we found were in the lee of massive protrusions of rock which had protected the plants from the slide, or else had not been damaged because of their small size. I also found uprooted plants half-buried among the stones. We were very short of time and we had gone to this particular area only becuase a track allowed us to take the Datsun to within 200 metres of this spot on the hillside. We only stayed there for about 45 minutes. Perhaps the most striking difference in the surrounding landscape from that around Chosica, apart from the general greenness, was the appearance of lichens on the rocks, together with Tillandsias, and a plant which I am told is a Peperomia — probably Peperomia nivalis; there are some good pictures of this in the U.S.C. and S. Jnl. Vol. XLVII for September-October, 1975. (You may recollect that at the Chileans weekend I called this a Tradescantia and got some funny looks



RIVER RIMAC

YOUNG

South American Excursion

Haageocereus acranthus

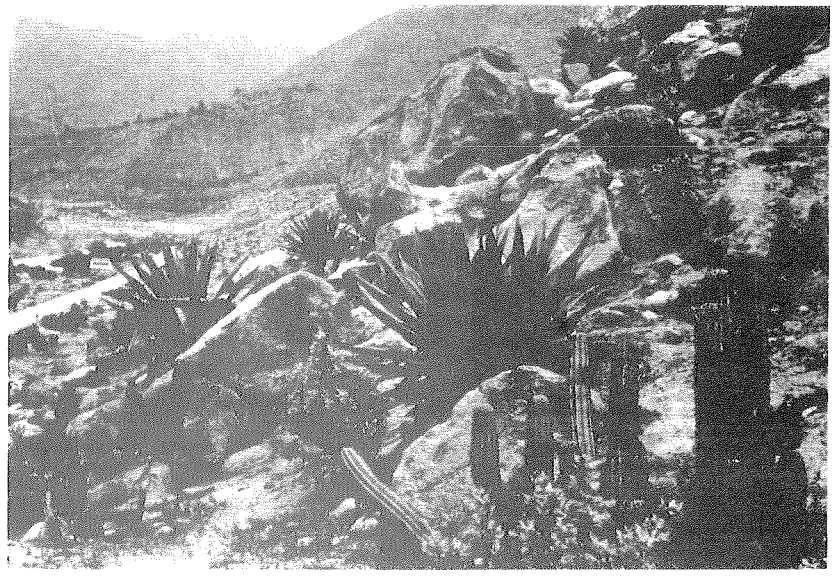
with

FOURCROYA OCCIDENTALIS

RIMAC VALLEY

1200 m.

RAUH – Beitrag zur Kenntnis der Peruanisch. Kakteenveg.



from the audience). There was also some coarse grass together with a yellow flowering shrub on which the bloom resembled the cultivated Jacaranda.

There are two other things to add, and again it appears from their comments at the Chileans weekend that Phil and Mel Collins agreed with my impressions. Many of the slopes of the valley sides are steep, and by that I mean with a rise steeper than one in one. One does not so much walk on the slope, as cling to it. With the surface being loose rock, especially in the drier areas around Chosica, it is also very hazardous climbing the slopes. It is very easy to start a rock slide and then go down with it. Also one finds, here and there, outcrops of clayey gravels frequently heavy with water and these crumble away under one's very feet. It can be like trying to cross a scree slope on the English Fells. Most of the rock appears to be crystalline — I would describe it as granite myself, but then I am not a geologist by any means.

Matucana was the only place where I got wet, (in a thunderstorm) in the whole of Peru apart from the Amazon jungle (where I was never dry). The soil in which the plants grew around Chosica-Eulalia was all mineral, sand and sandy-clay by texture. At Matucana there was also a proportion of organic remains. Botanising in this locality is fairly easy from Lima — about an hour and a half in a car on very good paved roads to Matucana, or the bus and train services are quite good. Beyond Matucana the train is more convenient, although the buses will drop you intermediately.

At no time would I call the valley of the Rimac a gorge in the strict sense of the word, as far as Matucana. Beyond Matucana and up to Oroya and beyond I am told that one drives around the edge of some heart-stopping holes and the Dodge Coronet saloons of the Cerro de Pasco mines have oxygen masks for the convenience of the passengers. This I have yet to experience — and up there are Oroyas, which I hope to see . . . . one day!

Comments

. . . . . from Mr. and Mrs. P. Collins

We saw a humming bird on two occasions when we were in Peru, but both times in hotel gardens — we saw none on the open mountain sides where we found cacti. We saw the first one near Huaraz in the Rio Santa valley — we did not see it feeding. The second was observed feeding from flowering shrubs in the courtyard of a hotel at Chosica in the Rimac Valley.

CACTI IN THE VALLEY OF THE RIVER RIMAC **By Karel Knize**

Translated from Kaktusy 4:69 by H. Middleditch

One of my first expeditions in Peru in search of cacti was the journey from the capital city of Lima to the nearby mountains which surround the small town of Chosica and further along the basin of the river Rimac. Here — still in the low land — the river has a peaceful appearance complemented by gently undulating banks of desert-like character.

Higher upstream however the appearance changes and turns from a peaceful river into a wild brook, no wider than five metres — which changes after a downpour into a raging torrent. I was convinced of this myself on the nights of the 5th and 6th of April 1969 when masses of water, confined to a defile by sheer mountain walls, were pouring towards the sea, taking along with them everything living or dead. Enormous quantities of soil and thousands of tons of stones rolled along with it. The dams near the town of Matucana broke up. The raging of the elements continued for more than two weeks. After calm had returned, the landscape was a pitiful sight. Roads were destroyed and there, where some poor looking huts of the local natives had stood, only holes gaped. Many of them — in trying to save their scanty possessions — lost their very lives. Those who survived and I — altogether unconcerned — thanked heaven that finally the earth had quenched its thirst and so there will again be something to eat and I shall have my cacti.

To talk about climatic conditions in the Rimac basin is very difficult and tedious. There are places here completely dry, where rain — as we know it — is very rare. Indeed there are some local natives who do not remember it at all. On the other hand, Chosica and Matucana itself, where by the way, is the furthest point of occurance of cacti, have a pleasant, healthy climate with continuous breezes and frequent rain. It is almost the rule that every morning the sky is cloudless and only in the afternoon do the first clouds appear and overshadow the scorching sun. When I was here for the first time at the end of Spring (in our November) even though there was vegetation to be seen, the whole area appeared dull and gloomy as if without life. Such was the drought. But when I came back to this very region four months later, a vast natural alpine garden appeared in front of me, blazing with green and other colours and above it the clear but lowering sky.

The red blossoms of large shrubs of a Euphorbia were the first I admired. I could not resist cutting several small branches covered in blossoms for the Botanical Garden at San Marcos, with whom I was collaborating. On my return I was puzzled by the fact that the local natives whom I met on the road paid exceptional attention to me this time. Their eyes were not unfriendly, rather did I detect in them a slightly ironical and knowing look. Later on my friend explained their behaviour to me. No harm will be done if I tell you something about it.

Many hundred years ago, the "Ruler of the Sun", the Inca Montezuma, fell in love with the red blossoms of Matucana and he ordered them to be delivered daily by quick Indian runners to Cuzco. Only much later did it come to light that it was not love for the flowers for which the Indians must bring the sprays every day from Matucana, but the desire of the ruler to rejuvenate

his feeble, ageing strength by drinking a tea from the leaves of this rare Matucana plant, or so the story goes. When the priests found out about the prince's sinful practices, they had all the shrubs in the surroundings destroyed and under threat of punishment forbade the use of the concoction. But as is usual, the forbidden fruit was even then the sweetest and so the tea was still brewed despite powerful prohibitions. That is why the natives smiled to themselves when I proudly carried a branch of this bewitching shrub. Right up to the present day the Rimac valley is flooded with red flowers.

Past Chosica (45Km. upstream from Lima) the gently undulating desert terrain gives way and mountains up to 1500m. high confine the river to a narrow gorge. The sandy riverbed is full of huge boulders and tiny pebbles. The further upstream one goes, the more desolate is the nature of the landscape, and also the fewer are the places where cacti might be able to grow. Only here and there does the defile widen out and here upland plateaux arise where habitations are more frequent. The bare cliffs of the surrounding gorges are enlivened only with Haageocereus chosicensis (Kz 234) occurring here in several forms; the most beautiful of them has yellow spines (Kz 254). The sight from a distance of a stand of these plants, is magnificent. Against the back-ground of the reddish-yellow-brown rocks the columns of the seemingly dead cerei are black, and only at close quarters can we admire the beauty of their stems.

Just above Chosica on the very top of the rocks, in cracks, blown with deposits of dust, grows Mila caespitosa (form of Kz. 243), one of the hardiest of its genus. Further north, upstream in places where the river gorge widens somewhat, is the real paradise and perhaps the most interesting place of the whole of central Peru. At the confluence of the rivers Rimac and Eulalia (at about 900m. above the sea) I found a handsome candelabra-like kind of Neoraimondia roseiflora (Kz. 240) with 5 to 7 ribs and areoles covered with brownish wool arranged in rows on the edges of the ribs, standing out conspicuously from the iridescent blue-green colour of the epidermis. Individual stems are massive, up to 35cm in diameter and from 3 to 5m. high. When I looked around I saw that even the sheer slopes of the surrounding rocks were blue with them. Flowers are symmetrical in shape, pink and from 3 to 4cm. in diameter; the pulpy fruits have whistish-yellow pith. However, I found even larger plants with needle-like spines and bigger fruits whose pith was pink; to this form I gave the field number Kz. 459. It occurs up to heights of about 1500m. above the sea.

Another easily confused plant from this area is Haageocereus acranthus (Kz. 458). Their bulky stems (as with the majority of the genus) of 10cm. in diameter creep over the fine scree and only the youngest of them are upright. The colour of the epidermis is green, spines are short, straight, and thick; the areoles are round and abundantly covered with short browny-grey wool. The flower has a greeny-white colour; it is very similar to Haageocereus salmonoideus (Kz. 444) which I collected at the 62km. point. The only — but substantial — difference is in the colour of the flower, which in salmonoideus in a rosy pink colour.

It was when I passed through the small town of Haynei that I met with the first midperuvian cacti. It was none other than the very well-known Matucana haynei (Kz. 275) growing here near the road. I then found, alternately, red-flowering tufts of Loxanthocereus acanthurus (Kz. 241) and these spiny heads of M. haynei. Some of the Loxanthocereus stems were so beautiful and so covered with blooms as to remind me of a columnar Matucana. When collecting M. haynei I found the three forms of it, but none of them seemed to me so distinct as to be considered as more than varieties. The first of them was the typical M. haynei as we know it from the collection of C. Backeberg in the thirties. The plant is short columnar with spines that were difficult to differentiate into radials and centrals, finer towards the top. The second form had projecting spines of different lengths, brownish in colour, and was commonly up to 25cm. in diameter and 45cm. high. It was evidently Ritter's Matucana gigantea. I collected smaller plants about 12Km. westwards from Matucana on the north side of the valley of the river Rimac. The third form could be compared with Rauh's new variety of M. erectopetala which I collected east of Matucana near Mina (2,700m. above sea level) as the last cactus before climbing to Tiglio at 4,400m situated fairly near Oroya. I could still find Trichocereus peruvianus (Kz. 242) near the town of Matucana, appearing in two forms, of which the stronger is suitable as a grafting stock. The tallest cactus of the mid-peruvian countryside will perhaps be Armatocereus matucanensis (Kz. 232) with fine spines and about 6 to 10 ribs, and having a white flower; while its variety floribundus (Kz. 236) has a creamy blossom and fine long spines.

One of the most beautiful plants of the valley is, of course, Pseudoespostoa melanostele (Kz. 244) with its whole body enveloped in cotton wool, lightening the valley. Its variety inermis (Kz. 244a) has longer spines reaching often to 10cm. in length. Pseudoespostoa differs only slightly from Espostoa. The first has shiny seeds and grows in central Peru (from Pisco 100km. south of Lima up to the Rio Santa in the north) whilst Espostoa — a warmth-loving plant of Northern Peru and adjacent Ecuador — has rather matt seeds. Therefore their geographical locations are well separated.

But let us go back to the basin of the river Rimac and Eulalia at the confluence of which I found another problematical genus, Neobinghamia. It is considered to be a natural hybrid of Espostoa, which it suggests by its habit; only after termination of the growing season do the stems narrow locally and form into segments of a kind. The most beautiful was Neobinghamia climaxantha (Kz. 237); it has fine, pale yellow radial spines and slightly longer honey yellow centrals. Both are supplemented by fine down. The small seeds are shiny and black.

At the foot of the mountains near the confluence of the two rivers I found Melocactus peruvianus (Kz. 228). In the rainy season the plants are so swollen that they have a spherical shape and only grooves indicate the ribs. Their cephalia reach 3 to 10cm. in height and have white or red spines. In certain forms the cephalium is unusually broad and not very tall; its colour is darker. Seldom did I see here a plant with a cephalium taller than 5cm. Melocactus peruvianus around San Bartolome (1500m. above sea

level) is shortly pyramidal having sharper ribs and appressed spines. Collecting the seeds or fruit is of great interest. The seeds can only be found on the plant in the afternoon — when there is sufficient sunshine on the plants and their surroundings. It happened to me in Lima that when I put cacti in a warm room, after three days about 20 fruits appeared all at once, each with a different number of seeds. The colour of the fruits was red to pink with black seeds.

Near Surco on a small flat area with grass and dwarf shrubs, near the river, I collected an interesting kind of Melocactus. These plants were of a rich green colour with broad ribs (7 to 9) and the biggest of them were up to 30cm. in diameter. On my wanderings I also found here Mila breviflora (Kz. 450) with a rather different form (Kz 450a).

Curious, uncommon, and very difficult to find is Melocactus amstutziae (Kz. 448) which was first collected by Professor Rauh in the valley of the River Rimac. It grows on steep hillsides covered with dust and small stones. The rocks are disintegrating and are very dangerous to climb. It happened to me several times that I had to abandon a climb and choose a longer but safer path, because I did not want to risk more grazes which are more paintful here than at home. I found the first plants about 12km. east of Chosica on the right hand side of the valley. Unfortunately there most beautiful plants grow just on the most inaccessible places. I also caught sight of a cristate form of cephalium but by technical equipment did not allow me to obtain it.

During my subsequent journeys I found more and more interesting and new cacti but I shall write to you about them some other time perhaps or when I have returned home.

Comments

. . . . . from Mr. and Mrs. P. Collins

Surely "the small town of Haynei" must have been an error in Knize's article — should it not have read "Matucana"? Although Knize says that "the Rimac valley is flooded with red flowers", there were none to be seen along the parts we visited at the time we were there.

THE RIMAC AND SANTA EULALIA VALLEYS: IMPRESSIONS OF THE CACTUS FLORA From Mr. and Mrs. P. Collins

During our stay at Chosica in early February, we explored two main areas: the valley of the Santa Eulalia which joins the Rimac from a north-easterly direction a few kilometres east of Chosica; and part of the Rimac valley just west of Matucana. Chosica itself (altitude 860m.) is above the limit of the "garua" mist, but is still within the dry coastal strip — rain is very rare. The mountains crowd close to the town, appearing to consist only of bare rock rubble. With the field glasses we could pick out patches of Neoraimondia and Haageocereus.

Santa Eulalia valley, Site A: west side, 1 km. north-east of village, 1,120-1,200m. altitude

We took a bus to the village of Santa Eulalia a short way up the valley and then continued on foot, following the road which here runs parallel to the river and north-west of it. The mountains on each side are of the same bare rubble, but the flat floor of the valley has been developed as a fruit-growing centre, and there are extensive orchards of avocado and banana. A short way out of the village we were able to leave the road and begin a laborious ascent of the mountain side, its surface almost wholly of loose rocks varying in size from 1m. or more across to only a few cm. The prevailing gradient was about 40°, shallower in the lower parts but becoming steeper as we climbed. There were no paths, and we soon found that the easiest way to proceed was to scramble up the gullies in which the larger boulders had collected as a result of the rock falls which take place almost constantly. In other places the mountainside was mainly of smaller rocks or scree which gave way underfoot, making it impossible to stand still without sliding downwards. When taking photographs or making notes it was necessary to sit or lie down with feet wedged against the nearest large rock. Here and there a patch of sandy soil was exposed, and it was in these places that the cacti were usually growing although sometimes the plants were entirely surrounded by rocks with no soil visible.

Growing just a few metres above the road (1,130m.) were clumps of a Loxanthocereus with orange-red flowers which turned out to be plentiful all over the area. A little higher up were some Neoraimondia roseiflora bearing buds and a few flowers. Some fruits proved on opening to be unripe and infested by lepidopterous larvea. Further up we came upon the first Melocactus peruvianus — a black-spined specimen — and then a large number of immature ones with brownish spines. We subsequently observed a complete range of spine colours in this population, from nearly white through pink to brown and black. Spine length varied from 1cm. to 3cm., the longer ones curved and intermeshing. There was also wide variation in the quantity of reddish bristles in the cephalium.

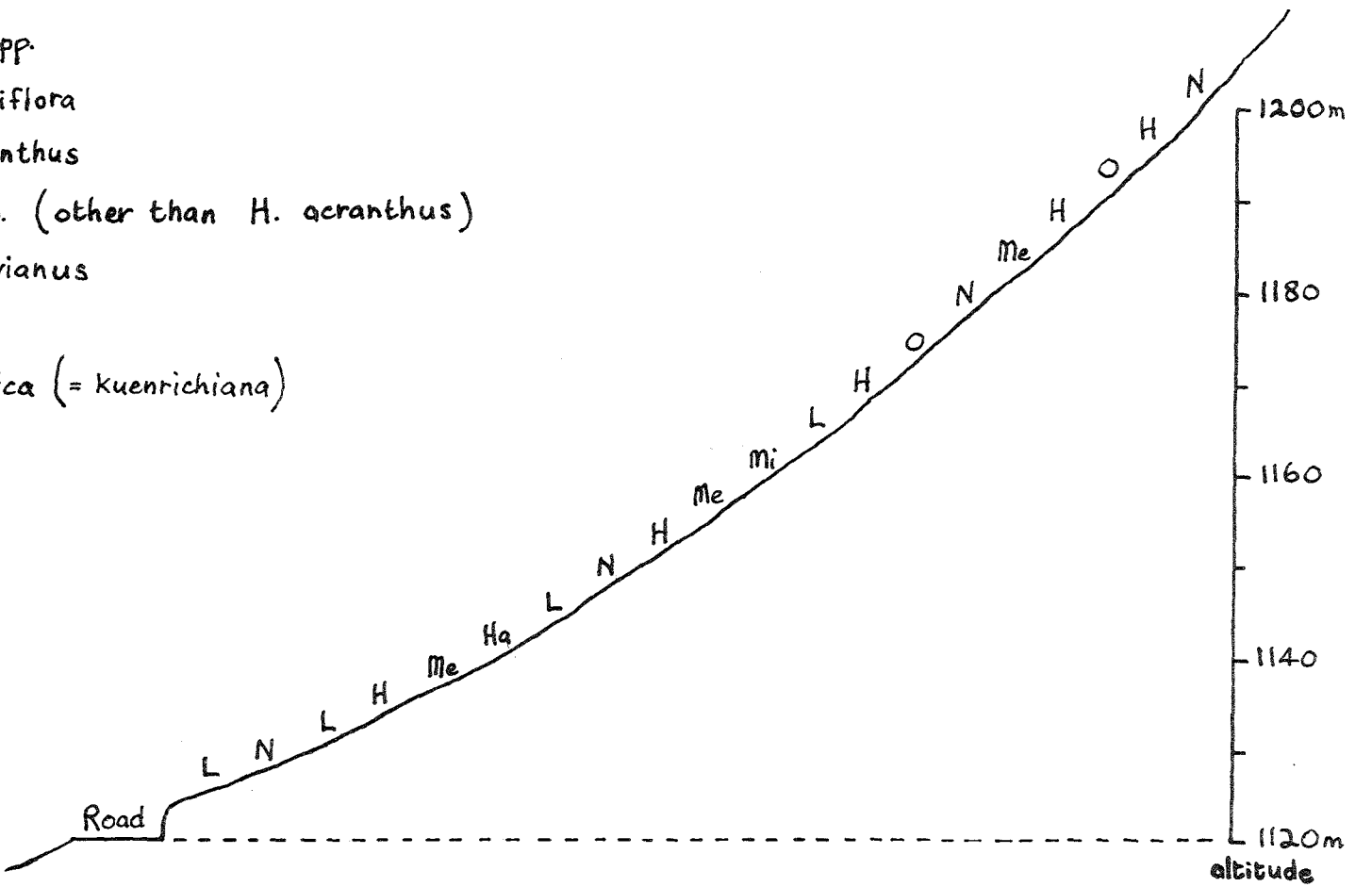
As we proceeded we became aware of a distinct zonation in the distribution of the cacti up the slope. Near the road there had been only Loxanthocereus and Neoraimondia roseiflora. Further up, Melocactus peruvianus and Haageocereus began to appear; then at about 1,160m. the first specimens of Mila and Opuntia sphaerica. (The name Opuntia Kuenrichiana was applied by Backeberg to the plants growing in this area, but they seem to be indistinguishable from O. sphaerica growing further south.) Higher still, the proportion of Neoraimondia roseiflora increased, while that of Mila and Loxanthocereus decreased. Haageocereus acranthus was no longer found at the higher levels, but other Haageocerei, Melocactus peruvianus, and Opuntia sphaerica remained numerous. The accompanying diagram may help to give a clearer picture.

Vertical distribution of cacti

Santa Eulalia valley, Site A

Key to symbols

L Loxanthocereus spp.
N Neoraimondia roseiflora
Ha Haageocereus acranthus
H Haageocereus spp. (other than H. acranthus)
Me Melocactus peruvianus
Mi Mila spp.
O Opuntia sphaerica (= kuenrichiana)



Non-cactus vegetation was extremely sparse. Occasional shrubs (including Jatropha sp.) and, on sheltered patches of soil (often round cacti) a few herbs, including Oxalis sp. There is no regular rainfall in this area, although there was some evidence that flash-flooding may occur, and it seems likely that dews constitute the main moisture supply. A high mortality rate even among the cacti was suggested by the many corpses — mostly of Loxanthocereus and Haageocereus; Melocactus peruvianus appeared vulnerable to rockfalls — several were found uprooted or partly buried by rubble.

At 1,200m. the increasing steepness of the slope and difficulty of the terrain forced us to return.

Santa Eulalia valley, Site B: west side, 7 km. north-east of village, 1,375-1,450m. altitude.

Our second site in the Santa Eulalia valley was reached after a walk of about an hour from the village. The road climbed gradually and we noticed that the level of cultivation too, was rising higher up the sides of the valley, so that when we left the road to strike upwards we had first to walk through cultivated fields. Crossing some irrigation ditches we came to the end of the fields and found ourselves in a small, steep-sided ravine. The terrain was quite different from that at Site A, for the sides of the ravine were of soft earth with relatively few embedded rocks. The gradient here was also much more gentle. We could see plenty of vegetation along the edges, including shrubs and small trees. The floor of the ravine, though dry, showed signs of having carried water at some time. Growing on ledges we found Loxanthocereus, and Haageocereus acranthus with fully-developed flower buds and ripe fruits — those at Site A had been at a much earlier stage. Quite suddenly the thicker vegetation ended, leaving only a sparse covering of occasional shrubs, herbs and grass patches, but still far more than at the previous site. As the ravine opened out and the ground became more rocky, there was a rapid increase in the number and variety of cacti. We soon found many Milas, some with flowers and fruits, and Melocactus peruvianus, including some of the largest we had seen — up to 15cm. in diameter — several with fruits. At about 1,400m. we began to find plants resembling an Espostoa, but which were actually the so-called "Neobinghamia climaxantha" — a natural hybrid between Espostoa and a Haageocereus. These became more frequent higher up.

By the time we reached 1,450m. the terrain was beginning to look more like that of Site A, although there was more exposed soil and consequently more non-cactus vegetation. However the cactus flora remained markedly different in composition. Only Loxanthocereus and Melocactus peruvianus were more or less equally represented. The Haageocerei and Neoraimondia roseiflora which had been dominant lower down the valley were absent here, and Opuntia sphaerica was represented only by two rather small specimens at about 1,425m. Here there were more Milas, and "Neobinghamia climaxantha" was much more numerous, only three very widely separated plants having been found at Site A.

Time was running out, and we had to begin retracing our steps. As we re-entered the deeper part of the ravine the path suddenly appeared unfamiliar, and we realised with a shock that a large part of the overhanging side had collapsed onto the floor of the ravine while we had been further up the mountain. During the rest of our walk back to the road we kept well to the centre.

Rimac valley: north side, 2-3 km. west of Matucana, 2,450-2,500m.

We made the journey from Chosica to Matucana in a "colectivo" — a communal taxi that picks up passengers at recognised stops. As the crow flies, the distance is about 42 km., but since at the same time we must climb from 860m. to 2,390m., the road travels much further, zig-zagging up the Andes alongside the Central Railway. Both road and railway continue on up the mountains past Matucana to La Oroya and beyond. On the journey we observed that more cacti appeared to be growing on the left-hand (i.e. south-facing) side of the valley, so from Matucana we walked back a short distance to where we had noticed a bridge across the river to a track leading up the mountainside.

Being both higher up and further inland in an area receiving regular rainfall, the vegetation was much more plentiful than in the Santa Eulalia valley. In addition to cacti there was an extensive covering of coarse grass and herbs with occasional shrubs (including Jatropha sp.) and bromeliads. However, once off the track it was if anything more difficult to move about on the slope for the ground was of loosely-packed soil with embedded rocks. Since the slope was very steep — 50° in places — it was necessary to make use of the narrow goat paths. Here, the rocks did not make safe foot or hand-holds, since most were easily dislodged, so that we sent small showers of earth and stones tumbling downwards with every step.

We had come here mainly to find Matucana haynei, and we soon saw quite a large specimen growing about 20m. above us. Scrambling up onto the edge of the slope we discovered some smaller plants growing near to the track that we had previously not seen, and nearby also was Loxanthocereus acanthurus in flower. Progress upwards was slow and laborious. Stumbling, Mel dislodged a rock and narrowly missed putting her hand on a scorpion that had been sheltering beneath it. Eventually we reached the large M. haynei and were lucky enough to find seed still on it. A little further up was a group of larger, columnar M. haynei some 20-30 cm. tall, growing with Loxanthocereus, and we collected more seed from these. Sharing the slope with M. haynei and Loxanthocereus acanthurus were many Espostoa melanostele, from seedlings of a few centimetres to mature cephalium-bearing specimens. Many of the smaller ones had obviously germinated beneath rocks, grown out horizontally and then made a right-angled turn upwards.

We were not aware of any obvious vertical zonation of the cacti here, but we were presented with a striking example of the effect of a change of aspect. On a subsequent visit we decided to move round the mountain to a slope facing more to

the west, staying at about the same level, After we had passed some fine stands of Espostoa melanostele and a huge Armatocereus, the cacti disappeared and there was a dramatic change in the vegetation. We found ourselves ankle-deep in spiny bromeliads (possibly Hechtia sp.) which added to the problems of moving around, but a conveniently placed outcrop of solid rock provided a welcome base. After much searching we found a low growing Corryocactus (Erdisia), its slender stems sprawling between rocks and among the Bromeliads. Apart from this, cacti were virtually absent.

Back at the original slope we found, higher up, a single clump of Mila with flower buds and unripe fruits. As it was now raining quite heavily, we quickly photographed it and looked around for a safe way down. The rain was doing nothing to improve the stability of the mountainside, and little cascades of soil and rock were tumbling down all around us. We no longer felt safe standing upright, so we scrambled on hands and knees to a small rock-filled gully and half-climbed, half-slid down the wet rocks to the track. Arriving back in Matucana in pouring rain, we were lucky to find a "colectivo" just about to leave. There wasn't really room for us, but the other passengers squeezed up to let us in, politely ignoring the mud we were transferring to their clothes.

Comments

. . . . . from H. Middleditch

Shortly before receiving the above article, I had spent quite a few winter evenings trying to prepare a diagram to show the distribution of various cactus genera over a vertical profile, for the slopes of the Andes in northern Chile. I found it rather difficult to convey the many individual observations in diagrammatic form with reasonable clarity and accuracy. Perhaps it is on account of this recent study that I look with a critical eye at the vertical profile of cactus distribution provided by Mr. and Mrs. Collins, and wonder just how it should be read. Where "L" appears, are there just Loxanthocereus, or is it Loxanthocereus which predominates relative to other cacti?

. . . . . from Mr. and Mrs. P. Collins

With respect to the distribution diagram, this is in the form of a transect profile, which theoretically is compiled by sampling at set distances along a fixed line, and so each record represents an actual plant. Because of the nature of the terrain, ours is based on a rather less rigourous method, but comes to the same thing. Nevertheless, the purpose of such a profile is to demonstrate how the composition of the vegetation changes over a given area, and can be interpreted thus. It is correct to assume, from the diagram, that Loxanthocerei were more numerous at lower levels than at higher, that Opuntia sphaerica was found only higher up, and that Melocactus preuvianus was spread fairly evenly.

. . . . . from J. W. Bagnall

Fortunately I have a copy of a photograph kindly sent to me by Phil and Mel Collins of the Tephrocactus which they found growing near Santa Eulalia at 1,300m. altitude. Some time ago I saw one of these plants in Tom Jenkin's nursery, a clump with about a dozen heads, presumably an imported specimen, and from this I obtained a single joint. It rooted down without any particular trouble, but it does not seem to have made any more growth even though it has had a full year now. At least it must have taken up water as it has become turgid and the upper half of the very topmost areoles have a fresh browny-grey appearance.

Both the habitat photograph and my own plant do show a remarkable resemblance to Backeberg's description of Tephrocactus kuenrichianus. He describes the segments as spherical to slightly oblong, up to 8 cm. long, having a grey-green epidermis with fine light dots. The description of the areoles however is sadly wanting and as to glochids, Backeberg only says "glochids light". The spines are given as 5 to 12, spreading and recurved, whitish grey, up to 3.5 cm. long. I wouldn't have said that my own small specimen showed signs of any glochids; the spines are about 2 cm. long, and stand straight out from the joint — quite the opposite from being adpressed. I have noticed that the spines have a pale brown band towards the tip.

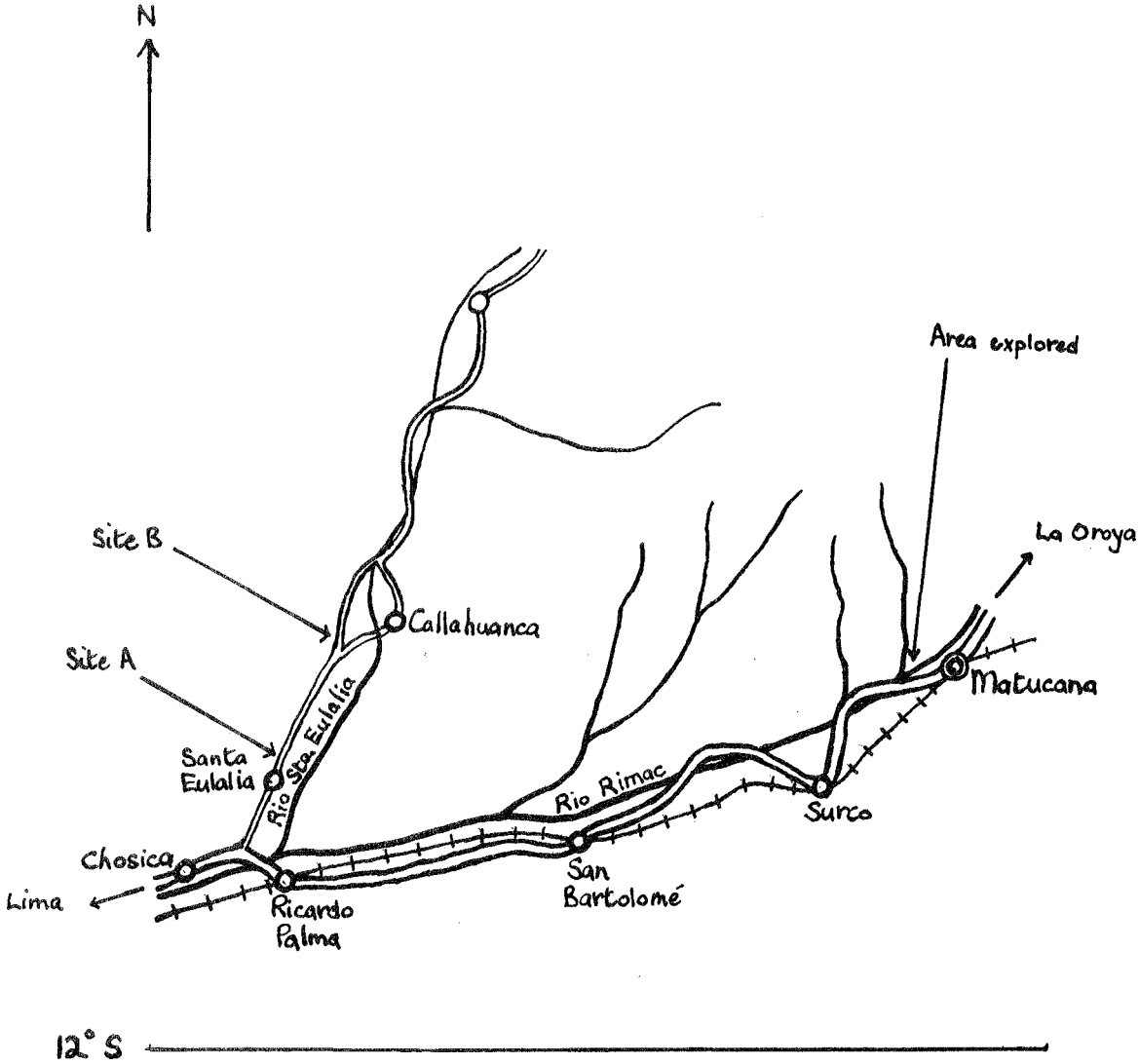
Tephrocacti are relatively slow growing plants for which full sunlight (in the U.K.) is desirable, but only for established plants. Composts should be rich and open. Generally Tephrocacti do not need a great depth of compost, preferring to send out roots laterally. They tend to be untidy plants spreading unevenly, rather than compact clumps. Winter temperature and water relationship is important. Ideally sufficient moisture to prevent shrinkage and root dehydration is desirable but this usually means a minimum winter temperature of 10° celsius. Given a free root run, I feel the plants can stand slightly lower temperatures.

Possibly a common cultivation problem with Tephrocacti is their tendency to put out pea-green offsets having a more elongated joint shape, pretty well spineless and with white wispy areoles. If I had any offsets like this appear on my Tephrocacti I would take the knife to them, but have not had occasion to do so yet. Perhaps this is because I have a tendency to grow mine hard. I would be glad to hear from collectors who have an interest in growing these plants or anybody with authentic material to spare, as there is no substitute for growing specimens side by side.

. . . . . from H. Middleditch

On looking to see what Backeberg may have to say about this plant in his Die Cactaceae, I find that there are several habitat photographs of Tephrocactus kuenrichianus; one plant has outstanding, straight spines perhaps as long as 3.5 cm.; other plants have curved spines more or less pressed back towards the body. The illustration from Rauh displays an almost spineless specimen of this species. It would appear that the spination is very variable in the wild.

Map of part of the Rimac valley showing sites visited February 1976



Three of our members co-operated to obtain some black and white prints from the colour slides which were taken by Phil and Mel Collins during their visit to Peru, but most unfortunately these were not suitable for reproduction. It is proposed to try reproducing black and white prints again, as their shots provided valuable information regarding local growing conditions.

SOUTH AMERICAN EXCURSION — THE RIMAC VALLEY by E. Young

Peru consists of three more or less parallel strips of territory of very different character. Far away to the east, on the other side of the Andes, is a dense tropical forest occupying more than half the area of the country. Down by the coast is a narrow plain; it varies from nothing to a hundred miles in width, but has an average width of thirty to forty miles. It is not all level, but there are wide stretches of level land between the low foothills that approach the coast. This low area, to all intents and purposes, has no rain.

Between the wet forest and the dry desert is a belt of high mountains from 200 to 250 miles wide; in these mountains rain falls from December to April and feeds a number of streams and rivers. At this period the streams have plenty of water, but during the rest of the year they may be mere tiny rivulets or even completely dry. It was to see something of life in such a valley that I made my one and only real excursion in Peru, up the valley of the Rimac, the river on which Lima stands. I packed myself and my luggage in a motor car and went to Chosica, twenty-five miles from Lima, situated at a modest height of 2,800 feet.

During the cooler months of the year, Lima lies under a blanket of damp fog. The fog bank is a low one and does not reach the height at which Chosica stands. Now the marvel of Chosica, as of all the irrigated valleys, is the contrast between the flat green floor and the absolute aridity of the mountains by which it is walled. I joined the railway line at Chosica, where the irrigated fields grow cotton, sugar, or alfalfa. Further up the line at San Bartolome (4,959 ft.), I left the cotton and sugar country for orchards and fruit gardens. Here the climb really began. We pulled out of San Bartolome, crawled backwards and forwards up a steep bank, saw the roofs of the town beneath us, felt as though the bottom of the valley was dropping through the earth, and reached the bridge at Verrugas.

Here at Verrugas at 6,000 feet we were in an area where rain occasionally falls. There had been rain three days before I went to Verrugas and in that short time the tops of the mountains had become as green as English meadows. In the gorge crossed by the railway there is always some water; this gives rise to a green streak that rises up the mountain side between rocks and stones whose only other vegetation consists of various kinds of cactus amongst which little grey lizards flash their animated courses. After a climb of another 1,000 feet, the line arrived at Surco. We continued to climb steadily upwards; we swung round bends that lay on shelves on the mountain sides and looked dizzily down into ravines hundreds of feet below us. The next stop was Matucana, half way up the Andes, and here I descended.

I had my lunch in a little restaurant outside the station. Matucana is a fairly typical mountain village or very small town. It has one long, narrow main street lying between the steep mountains on one side and the brawling river on the other. At Matucana there is still the same green irrigated valley floor that we have seen all the way inland from Callao on the coast, but the tops of the mountains are greener. At this height, dews, mists and occasional rains supply some moisture, but vegetation worthy of the name is still sparse. The air at 8,000 feet was most invigorating.

As I sat in the square, grey clouds began to gather overhead and a wind, cool enough to stir me to action, began to ruffle the flowers.

THE RIMAC VALLEY NEAR LIMA By Prof. W. Rauh

Translated from "A contribution to the knowledge of the Peruvian Cactus Vegetation" 1958 by P. H. Sherville.

The upper boundary of the Garua fog lies slightly above the small hamlet of Chaclacayo at 650m. Here also the occurence of Tillandsias ceases, although they still cover an expanse of many a square kilometre on the level Rimac terraces near Cajamarquilla at 400m., and the severely weathered steep valley sides remain completely vegetationless there. Just above Chosica at 853m., where the valley begins to narrow, the first cacti appear, Haageocereus species and Neoraimondia roseiflora, a lovely pink-flowering low-growing species which attains only 2m. in height, and which is confined to central Peru. They are generally solitary in occurence and scattered so that the valley sides appear from a distance to be spotted. Above 1,000m. though, Neoraimondias increase in frequency and between 1100 and 1200m. they dominate the vegetation beyond the valley oasis. Of the Haageocerei, only H. acranthus shows a great frequency of occurrence, whilst the other species (H. chosicensis, H. salmonoides, H. rubrispinus and other species) do not appear in significant numbers. Of the truly scanty associated flora the following are to be mentioned: Cnidoscolus basiacanthus, Loase spec. (white flowered), Onoseris albicans, Encelia canescens, Cacabus prostratus, Monnina pterocarpa, Solanum lycopersicum, and Trixis cacalioides. Near 1100m. the existing cacti are joined by the outstanding and very decorative Espostoa melanostele. Their 2m. high stems, whose new basal shoots are enveloped in pure white hair-felt, discolour with age to a deep black at the base, giving the appearance of having been burnt. The species is distinguishable by the possession of long golden-yellow central spines. In the Rimac valley, in addition, there occurs the variety inermis, in which the central spine is absent, or only very short. Their stems exhibit, seldom clearly, ring-shaped zones arranged in tiers; by this means it

happens that sometimes a narrow thickly-haired zone follows a longer more weakly haired segment. We are surely not amiss in the assumption that, in these zone formations, a certain periodicity in the duration of growth is to be perceived. Also, the long-spined types do not allow this periodicity to be recognised; however it is evident here in the rhythmic formation of longer and shorter spines.

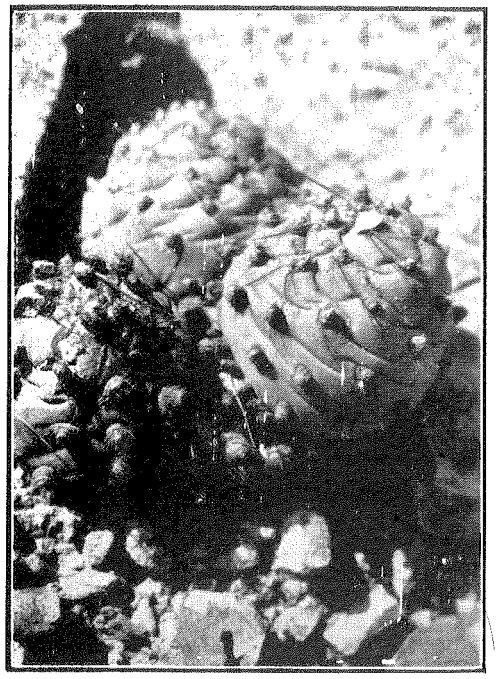
Espostoa is a representative of the Peruvian cephalium-bearing cacti. The solitary stems on reaching maturity, advertise the fact by the formation of a cephalium; the florally mature areoles, localised on only one side of the stem, proceed with increased wool-formation and form collectively a coherent woolly head extending from the crown downwards. In E. melanostele there is an intensive brown-coloured cephalium. Only rarely are double cephaliums to be observed, i.e. two mutally opposite woolly zones, both descending from the crown. Vegetative and fertile regions of a shoot are thus in sharp contrast with one another. Concealed in the cephalium, which is collected by the natives as "vegetable-wool" for cushion-filling, the flower components are formed, difficult to see until their development in complete. The opening of the flower is accomplished with the onset of darkness i.e. around 18.00 hours; they close shortly before sunrise — 06.00 hours. In the expanded condition they are visited by numerous small ants, which surely undertake the pollination. Attempts to extend the duration of flowering of the blooms themselves by a blackout came to nothing, so that the 12 hour nocturnal flowering time may be regulated by endogenous factors.

Should the crown of the cephalium-bearing shoot become damaged, a continuation-shoot develops from a vegetative areole situated below the injury. The shoot arranges itself in line with the injured stem and after a short period of vegetative growth immediately sets about forming a cephalium again and indeed on the same side as the original. Thus a plant having entered the stage of floral maturity, reacts with a cephalium, i.e. with increased formation of areole wool immediately, irrespective of whether it is a matter of the primary stem or of a side-shoot. What internal factors induce the formation of cephaliums still require clarification. Furthermore it seems to me worth mentioning the fact that, on some plants the cephaliums of all columns were preferentially orientated towards one side and indeed towards the side illuminated the longest i.e. aligned towards the west or west-south-west; especially vigorous examples can exhibit up to 20 stems of approximately similar length and indeed also of similar age. This arrangement is not only valid for E. melanostele but also for E. lanata and other cephalocerei. Whether the length of duration of sunshine in fact induces the formation of the cephalium on one of the sides of a stem, still requires experimental research. Such experiments can only be carried out in regions of intensive solar radiation. In the relatively poor light climates of central Europe, Espostoas only rarely progress to cephalium formation, whilst those in the Mediterranean regions with appropriate cultivation may attain them after only a few years.

The distribution of Espostoa melanostele is confined exclusively to the low rainfall cactus rock-desert of the western Andes; its upper habitat boundary at 2000 — 2400m. coincides with the lower border of the summer rain zone. It is not only one of the most beautiful, but also the most interesting cactus of the region. Together with it appears a second cephalium-bearer, Melocactus peruvianus, which is at the same time a representative of the globular cacti in the region of the cactus rock-desert. Whilst Melocactus are also encountered in the coastal zone in northern Peru, its habitat range in central Peru lies exclusively in the rainless Andean region. Here it is primarily the Melocactus among the cacti which occupy the most extremely dry locations and are often found with their root systems confined to the narrowest of rocky fissures, which are almost devoid of fine soil. Again and again one stands astonished before these unusual cactus-forms and asks oneself, how these plants secure their requirements of water and nutrients in this situation. In the valley of the more northerly Rio Fortaleza grows Melocactus fortalezensis (K 47) in narrow fissures on the precipitous granite slopes, which from before midday to the time of the strongest solar radiation attain a temperature of over 60°C! The central water-tissues thereby reach temperatures near to 45°C. If one cuts through such a plant, one is frightened and retracts the hands believing them to be burnt. The plants become in the truest sense of the word "baked", but nevertheless display full active life, flowering and fruiting profusely. In contrast to Espostoas, Melocactus form a terminal cephalium, which no doubt on the basis of its form and colour alone, but above all in the bristle and wool formation of the flowering areoles, contrasts sharply with the vegetative body. There the flowers occupy a lateral disposition arranged in ring-like zones on the cephalium, whose crown continues to grow constantly, and takes the form of a long dark-red cylinder which exhibits more or less annual growth rings.

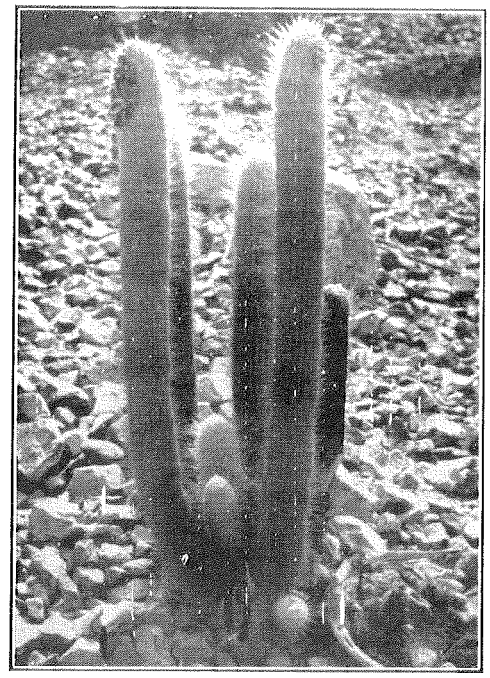
As a rule Melocactus are unbranched. It was however observed that the plants frequently harbour fly larvae, which not only eat away the body, but also frequently destroy the cephalium. This perishes, but leaves the body living, which restarts into growth out of the areole buds situated immediately at the base of the cephalium surrounding the withering cephalium like a circle, which even as small bodies start to form cephalia once again. Now the mother plant also rots off. Then the side-shoots, which are already capable of flowering, fall to the ground and serve as a means of vegetative propagation. However, they generally remain attached to the mother plant; now if the secondary cephalium on the offspring becomes destroyed, they themselves repeat the propagation procedure just described above, so that on occasions plants with 3-branch cephalium formations may be met with, a phenomenon not so far referred to in the literature.

Also belonging to the almost globular dwarf cacti of these high regions is Tephrocactus kuenrichianus, one of the globular Opuntias (Sphaeropuntias) at the lowest altitude at which they are to be found. They have their main habitat predominantly in the high steppes of the Andes. One can appropriately label T. kuenrichianus as "potato-opuntia", for they exist as sprouting heaps of globular joints resembling a tipped-out sack of potatoes. The individual generations of shoots remain only lightly secured to one another, so that strong winds and rock-falls are sufficient to separate them from each; they root down in other places and give



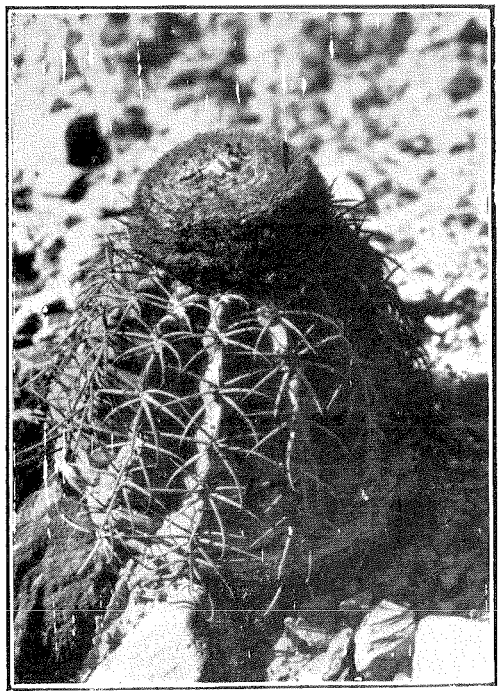
Tephrocactus kuenrichianus

RIMAC VALLEY
800 m.



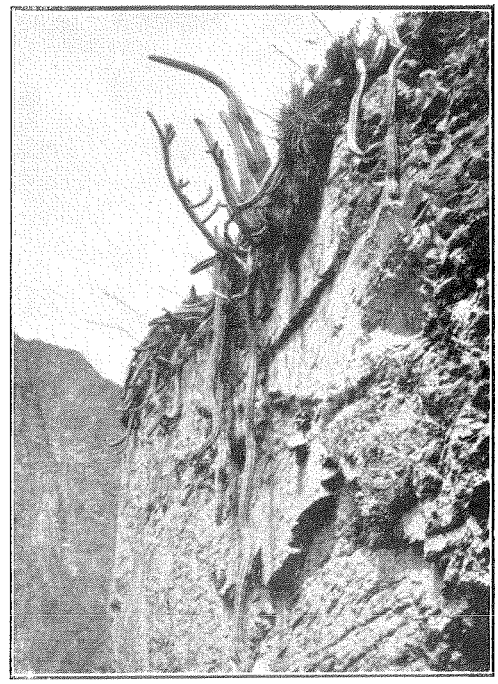
Espostoa melanostele

RIMAC VALLEY



Melocactus peruvianus

RIMAC VALLEY
1200 m.



Trichocereus peruvianus

RIMAC VALLEY near MATUCANA
2400 m.

rise to new colonies. In the vegetative condition, the plant is so insignificant, but its large brilliant yellow flowers are very conspicuous.

In addition, another interesting genus confined exclusively to central Peru, is to be found in these high regions. It is the Echinocereus-like Mila, whose thin low-lying abundantly branched stems unite into loose cushion-like colonies, which at the flowering time (February) form a glorious decoration of the cactus rock-desert with their large yellow funneliform to rotate flowers. For a long time only one species was known, M. caespitosa, from the region of Santa-Clara (Loma hills?). Backeberg found two further species, M. nealeana and M. kubeana in the Rimac valley, the latter above Matucana at an altitude approaching 2500m. Through the collecting activities of Akers and ourselves in the various valleys of central Peru, more new species have become known. Mila has a large vertical habitat range, and extends from 900 (500?)m. to about 3000m. in altitude.

The genus Neoraimondia attains its greatest density in habitat between 1000 and 1200m. and vanishes completely near 1400m. It is replaced by Espostoa melanostele, together with Haageocereus acranthus as the predominant vegetation. This Espostoa melanostele-Haageocereus acranthus partnership extends to around 2000m. altitude. With the start of the summer rain zone, the Espostoa becomes rarer, ascending as solitary examples to 2400m. In comparison with the Neoraimondia formation, the Espostoa-Haageocereus formation enjoys a significantly richer accompanying flora. We now find in greater numbers small (some rainy-green) shrubs mingling with them, like Cnidoscolus basiacanthus, Jatropha macrantha, Carica candicans, Yungia axillaris, Lantana scabiosaeflora, Aloysia scorodonioides, Abutilon species, Mentzelia cordifolia, Hoffmanseggia viscosa and others; in addition, the herb flora is abundantly developed, at least during the summer months. Near 1600m. the mighty rosettes of Fourcroya occidentalis appear. In other respects, however, the vegetation always creates a strongly xerophytic and open impression. The form of the vegetation alters first in this way between 2000 and 2500m., in that zone which no doubt lies in the range of the summer rain. In February 1954, however, the afternoon downpour was observed to reach down to 2000m. The slopes at this time of year are a lively green, all the shrubs are in leaf, many annuals are in full bloom, and grasses become increasingly abundant. Although the cacti are no longer the dominating vegetative elements, they by no means disappear, as above 2000m. succulents from other families are also still to be met with; thus the interesting window-leaved Peperomia nivalis, Pilea serpyllacea, Echeveria peruviana and Jatropha macrantha, which is still really abundant near 2400m. In the vegetation picture there now appears principally terrestrial Bromeliads, rooted in the soil, like Puya roezlii, Pitcairnia ferruginea, P. pungens; of these, especially the first, often forms dense exclusive stands on the steep valley sides and rock screes. Its intense green stands in sharp contrast to the yellow-brown of the remaining largely withered vegetation during the dry period. This Puya-formation which succeeds the cactus formation, reaches to the vicinity of 3000m. altitude. At the same time, irrigated cultivation ceases in this region; on the sides, as long as they are not too steep, terraces are to be seen everywhere, on which the cultivation of crops, predominantly corn, is practised during the rainy season.

Of the cacti in the Puya formation, the following are of note: Espostoa melanostele, which attains its upper limit on the hills above Matucana on the left bank of the Rimac. The richly varied forms of Haageocereus acranthus are very abundant; this Haageocereus especially occupies a particular places in ecological respects. Whilst most of the species of the genus — apart from the coastal forms — are extremely xerophytic and colonise only the rainless Andean region, H. acranthus occupies an extensive vertical habitat ranging up to the summer rain zone. It is also associated with recently evolved cacti, the large columnar cerei of the genera Trichocereus and Armatocereus, whose main habitat areas in central Peru are the central highlands of the Andean region. Trichocereus seems to be represented in the Rimac valley by two species. One always grows upright, and its thick, glaucous, 6-8 ribbed columns reach a height of 2-3 metres, whilst the other is distinguished through its generally low-lying growth (T. peruvianus). Its thinner main stems often hang in lengths of up to 8 metres, snaking or thick and rope-like, downwards from the steep rock walls. This species is a constant companion of the Puya formation, and attains its upper habitat boundary together with it.

On the other hand, Armatocereus matucanensis, the sole representative of the genus in the Rimac valley, is a stem-forming species 2-3 metres high, whose repeatedly branched columns, in conformity with other Armatocerei, are subject to a striking division into joints by waisting, whereby the individual segment really represents a single period of growth. Armatocereus matucanensis is abundant not only below Matucana in the Fourcroya stands, but also above this locality. Here is found also the type locality of Matucana haynei, which grows only on steeply sloping almost inaccessable rock walls on the west side of the Andes, like the remaining species of this genus. This may also be the reason why only a few representatives of this interesting Peruvian cactus genus have been found until now. First F. Ritter's new finds and now our own, in the valleys across the Andes, as well as on the high steppes, have shown that Matucana is a genus rich in species, and occupies a much wider habitat than has until now been acknowledged. Its range extends as far as is known from the valley of Nazca-Puquio in the south to the Cordillera Blanca in the north and even spreads to the eastern side of the Andes near Balsas on the R. Maranon with the citron-yellow flowered M. weberbaueri. The type characteristics of the genus are the sloping rimmed flowers, brilliant red in colour and with naked tubes, and the fruit dehiscing with four longitudinal slits, a mode of dehiscene which is not to be found elsewhere in any other cactus genus. The plants are solitary and widely separated — they are globular when young, becoming short-cereioid in age (bodies up to 60cm. in length) — or they unite to form groups and cushions. This is the case with the few species from the Puna and the Tola heath, which colonise not only very high locations but also mostly open expanses of countryside.

In the transverse valleys of the central Peruvian Andes, the Matucanas appear to reach down to a 2400m.

boundary. When they do occur they are evidently so precise in this altitude that one could calibrate the altimeter accordingly, and many of the new habitats locations we owe solely to the study of the boundaries of the vertical distribution zones of the cacti. The highest lying habitat of Matucana haynei in the Rimac valley has been recorded near 3400m.; in the south, in the Tola heath near Puquio, the genus gets above the 4000m. boundary, as indeed in the south generally the habitat boundaries are displaced appreciably further upwards in consequence of the diminishing amount of precipitation. In central Peru the Matucana is a typical member of the Mesophytic vegetation of the central Andean regions. Above the village of Matucana, Backeberg had in addition collected Mila kubeana and the red-flowered Loxanthocereus eriotrichus, which possesses the same zygomorphic flower as Matucana.

Between 3400 and 3700m. the Puya (Bromeliad) formation fades away as do the accompanying cacti. It becomes replaced by a formation of low, 1-2m. high shrubs extending up as far as the lower boundary of the Puna at 4000m. Lupinus paniculatus, a shrub with silvery-haired leaves, is dominant in the upper regions, and clothes the valley slopes densely above 3800m., and at the time of full bloom offers an indescribable sight. Of the accompanying flora there are to be noted: the bushy Ambrosia peruviana (sporadically abundant); the interesting member of the Compositae Mutisia viciaefolia, which is covered with orange-red flower heads over and over again during almost the entire year; semi-shrubby Calceolaria species; Clematis peruviana, the yellow flowering member of the Geraniaceae, Balbisia verticillata; Coreopsis, Bidens, the low-lying semi-shrubby Muehlenbeckia volcanica which over-runs most bare cliff-tops, Acaena, Alomsoa, the stately Bomarea involucrosa, bushy Eupatorium and Baccharis species, Loasa grandiflora and various other plants.

In the Lupin-zone there is also a reduction in the cultivation of the essential root-crops serving as nourishment for the highland Indians, like potatoes, Oca (Oxalis tuberosa), Ulluco (Ullucus tuberosus, Basellaceae) and Mashua (Tropaeolum tuberosum). This zone is poor in cacti; there is only the richly branched bush-forming Cylindropuntia exaltata. This, like O. subulata, is a regular component of the non-irrigated upper agricultural zone at 3000 to 3700 (4000)m. It forms sporadic, extensive and impenetrable thickets and its wide habitat depends not only on mankind, who employ it to enclose fields, but also on abundant vegetative propagation, whereby the shoots easily detach themselves from the mother plant and root down. At its upper boundary, the Lupin zone unites with the Puna, which in the Rimac valley as also in many other places on the western sides of the Andes, overlap. The cacti first recur as the dominant vegetation element above 4000 metres, beyond which they decrease to their upper limit.

To summarise: the Rimac Valley and land immediately adjoining revealed a remarkable zoning of the vegetation, delineated principally by the increase of precipitation with increasing height, and the simultaneous lowering of the average annual temperature. The following plant formations are to be distinguished:

Formation of the rootless Tillandsias and Lomaformation in the region of the Garua zone (0-500m).

Between 500 and 700m., completely without vegetation.

Formation of the xerophytic columnar cacti (800-2000m), with Neoraimondia roseiflora (800-1400m) and Espostoa melanostele — Haageocereus acranthus combination (1400-2000m.).

Cactus-rich Bromeliad formation (2000-3600m.).

Bush formation with Lupinus paniculatus association (3600-4000m.).

Grass tuft formation — Puma.

We are concious that some of the details concerning the vegetation at zoning of the Rimac valley repeat themselves with regard to the cactus distribution in other west Andean cross valleys, for these have similar formations.

Comments

. . . . .from H. Middleditch

In an earlier issue of The Chileans (No. 26 pp. 83-88) we presented Weberbauer's account of the flora of central Peru; since it covered a much larger area than the valleys of the Rimac and Eulalia, it was of necessity more generalised in its account of the various formations to be met with in ascending the Andes from the Pacific coast. It does however agree with other authors on the division of the western slopes of the Andes into roughly parallel zones; the coastal Lomas which consist of sparse vegetation scattered over the sandhills, followed at increased altitude by a completely vegetationless desert; at higher altitudes still comes the zone of summer rainfall, whose particular vegetation formations change gradually with altitude; and finally at the highest altitude of all, the Puma with its typical tuft grass formation.

However, it is noticeable that in summarising his discussion, Rauh defines a cactus-rich Bromeliad formation between 2000 and 3600m., whereas in his text he refers to a Puya-formation "up to about 3000m" which includes Espostoa, Haageocereus, Trichocereus and Armatocereus. Elsewhere in the same publication, the upper limit of Espostoa is given as 2400 metres, of Armatocereus as 2400/2600 metres, of Haageocereus as 2400 metres; by implication only, Melocactus are not found above 2400 m. Weberbauer states that between the desert and 2400m. above sea level, two-thirds of all herbs are annual. Rauh also defines the zone of summer rainfall as "over 2400m" but does record sparse rainfall down to 2000m. Hence the observation by Weberbauer that in the zone of columnar cacti "the differences between lower and higher elevations must be emphasised" must refer to a dividing line (perhaps at about 2400m?) below which the paucity of the rainfall favours the xerophytic cacti. Above this level, the amount and reliability of the summer rainfall, coupled with the lower average temperatures with increasing altitude,

supports only Mila, Trichocereus, Opuntia, Tephrocactus and Matucana. Indeed, the Matucanas are very clearly defined by Rauh as descending no further than 2400m. altitude. In addition, Dorst observes that "true forest covers certain more humid districts between 2500 and 3200m". This again indicates a marked changed in climate at about the 2400m. mark.

On the basis of the foregoing observations, the table summarising the formation zones should apparently read as follows:

Garua zone 0-500m., Tillandsias and Lomas formation.

Vegetationless desert 500-700/800m.

Almost rainless zone 700-1400m., Neoraimondia, Mila, Melocactus.

Low rainfall zone 1400-2400m., Espostoa, Haageocereus.

Summer rainfall zone 2400-3000m., Bromeliad formation with some Mila, Trichocereus, Matucana.

Summer rainfall zone, cultivation without irrigation 3000-3600m., Bromeliad formation, some Trichocereus and Opuntia subulata. (Not many cacti).

Summer rainfall zone, cultivation of root crops 3600-4000m.

Bush formation with Lupinus paniculatus, Opuntia exaltata (few cacti).

It is now more than half a century since Britton and Rose published the ill-fated genus Binghamia, which was subsequently the subject of discussion by many authors. Almost everything that has been written on this particular subject has been concerned with sorting out the taxonomic problem which Britton and Rose left in their wake, when they credited Binghamia with some characteristics of Espostoa and other characteristics of plants that eventually became Haageocereus. Nobody seems to have taken the trouble to explain how the confusion could have occurred in the first place. But this account by Rauh does help a great deal to explain the cause of the problem, for Rauh very clearly states, more than once, that Haageocereus and Espostoa are quite common components of the columnar cactus formation between 1400 and 2400 metres altitude. Not only that, but his photographs of the locality show that Espostoa and Haageocereus grow mixed together and not infrequently side by side — quite literally! If Dr. Rose visited the site outside of the flowering season, the persistent appearance of both the shorter and taller more or less hairy plants in close association may have led him to believe that they were juvenile and adult forms of the same plant. However, it would appear that when Backeberg travelled through this same habitat in the early 1930's, he did distinguish them as two quite different sorts of plants, and subsequently he established the genus Haageocereus for the shorter growing sorts.

Examples of Neoraimondia are far from common in cultivation; I have lost a seedling plant after a couple of seasons of cultivation and other growers tell me that they are not difficult to raise from seed, to grow on for a year or two, but do not often survive above about six inches in height. These plants grow in habitat below the true summer rain zone and so they must rely to a large extent upon seepage water from higher levels and upon dew, rather than upon rainfall for their water supply. So they are not subjected to low temperatures or even moderate surface water when they grow in habitat. It is to be expected from this, that they may grow better if treated like Melocactus, Micranthocereus or Pilosocereus and given higher than than averae cultivation temperatures.

At the next highest level are to be found Espostoas, Haageocereus and Armatocereus where there is a summer rainfall and the temperatures drop to a level lower than in the Neoraimondia habitat. Certainly these sorts do survive in my cultivation, despite two winter nights with a missing pane of roof glass, no heating, and outside temperatures well below zero, but being in clay pots the compost does dry out even with some peat in the mixture; under the same unfortunate circumstances, Haageocereus in plastic pots with a moisture-retaining compost suffered almost 100% losses. Fred Evans, the NCSS Librarian, commented to me that as custodian of a superb collection of large seed-grown Haageocerei which were overwintered dry, in a cold garage, he found most plants to be just empty shells at the start of the following season. Due care in cultivation would therefore seem to be a need with the cacti growing in the 1400-2400m. altitude zone.

The highest altitude at which the columnar cacti occur in habitat would seem to be the lowest level at which Matucanas are to be found; certainly the Matucanas do appear to be more tolerant of damp and cool conditions in cultivation. The afternoon thunder-shower is referred to so frequently by travellers in these parts, that a regular dose of water in the summer growing season would seem to be a suitable recipe for Matucanas in cultivation. But what causes Matucanas to go so corky round the base in cultivation? If they are growing on almost inaccessible rocky slopes, as Rauh states, are they accompanied by other low-growing vegetation around their base; or is it the other Matucana species from the more level grassy areas which grow corky at the base, both in the wild and in cultivation?

NOTOCACTUS WERDERMANNIANUS & NOTOCACTUS VANVLIETII By G. J. Charles

(Discussed at Chileans Autumn '78 Gathering)

At a previous meeting at Brooksby when N. wedermannianus was being discussed, it was observed that this species had much in common with N. vanvlietii. Since that time, an article dealing with the habitat collection of N. werdermannianus had appeared in Chileans No. 33. On this occasion, the opportunity was taken to compare both species by means of plants brought along by members to the 1978 Gathering.

In his article about N. werdermannianus (reproduced in Chileans No. 33), Van Vilet had confused the two species, but plants on view at this Gathering were clearly separable by the difference in spine colour. The N. vanvlietii possessed dark red-brown spines and N. werdermannianus had the yellow spines usually associated with this species. The body colour was also in contrast, dark green in the former plants and pale green in the latter. Regrettably no plants of N. vanvlietii v. gracilis had been brought along for us to see; this variety is described as having yellowish-white to pink spines.

In his article in Chileans No. 33, Schlosser seems to be quite clear about the differences between these plants, for in his penultimate paragraph he describes how he found them growing together. In the light of this observation, taken together with the differences in spine colour, it seems surprising that Van Vliet confused them when he first discovered N. vanvlietii. Hopefully, observations of the flowers will confirm the differences between the flower sizes and the petal shapes.

Further discussion followed concerning body shape — the "inverted pear" — shown in the photograph which accompanied the original description of N. werdermannianus. Some photographs which had been sent over to the Chileans by Schlosser were passed round the audience; they showed plants in cultivation in Uruguay. The inverted pear shape certainly did not appear to be a consistent characteristic of cultivated plants of this species.

There are plants to be found in collections under the name of Notocactus werdermannianus which have red-brown flecks in the spines, rather than the clear yellow of the original description. A specimen of this type of plant was on view and R. Mottram commented that he had received collected material looking just like that plant. This would go against the view that plants with such features are hybrids from cultivated specimens. Incidentally, if Schlosser saw both species growing together, why do they not hybridise in the wild?

. . . . . from R. Haas, K.u.a.S. 24.1; 1973 (About werdermannianus)

The collector of Notocacti could rejoice in the summer of 1970 when there were some plants available. A large number of imported plants of this species arrived at the Uhlig nursery. They had been found by Hugo Schlosser, a German living in Montevideo. In this consignment some plants attracted attention by their red central spines — Notocactus werdermannianus has only pale yellow spines.

. . . . . from P. A. Smart

The discussion on Notocactus werdermannianus, following on from Chileans No. 33, is most interesting. My plants have been puzzling me for a while. Some time ago I disposed of a plant grown from Sargant seed in 1971; the body and flower were of the N. floricomus type and it was obviously wrongly named. The two remaining plants both fit the description tolerably well. Their flowers are practically identical in size and morphology — only differing in the colour of the wool and bristles on the receptacle. The plant from Hollygate has pale yellow spines on the body, also long wavy pale yellow bristles (some tipped reddish) and greyish-white wool on the tube. The plant raised from Uhlig seed sown in February 1972 has pale yellow radial spines, with more brownish tips; in older areoles the radial spines have a pale reddish colouring for about half the length; the central spines mostly have reddish bases and tips; Areoles that have flowered sometimes have many more bright red-brown rather curly centrals; the flower tube carries brownish wool with long straight bright red-brown bristles. To the eye the plants are far from similar, the colouration of the spines on the Uhlig plant being far from obvious.

. . . . . from R. Moreton

A few years ago I raised a batch of Notocactus werdermannianus from seed; when they were about two years old there were not only yellow-spined plants and reddish-spined plants, but numerous gradations between.

. . . . . from H. Middleditch

The photographs received from Schlosser show seedling plants of N. werdermannianus growing in his own nursery, raised, one supposes, from collected seed. Most plants are growing globular, only one exhibits an inverted pear shape. A fair number of plants have spines standing out from the body to the usual length, and there are also just as many plants with very short spines, seemingly less than half the expected length. There are a number of plants with dark bristles projecting from the wool which covers the flower tube, as observed in cultivation here. Jim Gooch had commented previously that the stigma lobes remained bunched and did not open out, but one photograph from Schlosser showed three wide open flowers with the stigma lobes opening out like spreading fingers on a hand — but not open flat. Has anyone in the U.K. seen stigma lobes opened out that far.

NOTOCACTUS VANVLIETII Rausch sp. nov. By Walter Rausch

Translated from K.u.a.S. 21.5:1970 by H. Middleditch

Simplex, inverse-pyriformis, ad 10cm altus et 6cm diametiens, apice depresso, albo-tomentoso; costis ad 30, perpendicularibus, in gibberes mentiformes ca. 3mm long et 5mm latos divisis; areolis rotundis, ca. 2mm diamentibus, in concavis partibus gibberum sitis, albo-tomentosis, postea glabrescentibus; aculeis marginalibus 13-15, ad 8mm longis, accumbentibus, circa corpus contextis; aculeis centralibus 1-4, imo deorsum arcuato, ad 15mm longis, aculeis omnibus setoso mollibus, rubinginosis ad pullis basi obscuriore. Floribus 50mm longis et 55mm diamentibus; ovario et receptaculo flavido, squamis roseis et setis fuscis tecto; phyllis perigonii lanceolatis, flavis et sub-roseo-marginatis; fauce aurantiaca, filamentis albis, stylo flavo,

stigmatibus rubris; fructu et seminibus N. werdermanniani modo, omnibus partibus minoribus. Type plant: Rausch 376 in Herbario Natur-historisches Museum Wien.

Solitary, inverted pear shaped, up to 10cm high and 6cm diameter, crown depressed, white felted; ribs up to 30, vertical, divided into ca. 3mm long by 5mm broad humped-chins; areoles round, ca. 2mm diameter, located in the clefts between chins, white felted, later becoming bare; radial spines 13-15, up to 8mm long, appressed, intertwined around the body; central spines 1-4, the lowermost curved downwards, up to 15mm long, all spines bristle-supple, red-brown to black-brown with darker base; flower 50mm long and 55mm diam; pericarpel and tube yellowish with pink scales and brown bristles, flower petals lanceolate, yellow and margins somewhat pinkish, throat orange, filaments white; style yellow and stigma red; fruit and seed: same type as N. werdermannianus, only smaller in all respects. Habitat: Uruguay, Cuchilla de los Once Cerros.

This species complex occurs in company with Notocactus werdermannianus Hert., distinguishable from it however on account of its smaller growth and smaller flower as well as by the red-brown to blackish spination. I name this colourfully spined species after my worthy travelling companion Dirk van Vliet.

Notocactus vanvlietii var. gracilis Rausch var. nov.

Simplex, late-globosus, ad 4cm altus et 5cm diametiens; costis perpendicularibus ad 25, in gibberes mentiformes 3mm longos et 5mm latos divis; aculeis marginalibus 13-15, ad 6mm longis, setosis, circa corpus contextis; aculeis centralibus 3-4, tribus inferioribus arcuatis et asepe involutis, paulo firmioribus, ad 8 mm longis; aculeis omnibus mollibus, arcuatis et saepe involutis, circa corpus crispatis, ochroleucis et roseis. Floribus, fructu, seminibus typi modo, paulo minoribus. Type plant: Rausch 375 in Herbario. Naturhistorisches Museum Wien.

Solitary, flattened globular, up to 4cm high and 5cm diameter, vertical ribs up to 25 in number, divided into 3mm long by 5mm broad humped-chins; radial spines 13-15, up to 6mm long, bristle-like, intertwined around the body; central spines 3-4, the lower three curved and often curled, more or less stronger, up to 8mm long; all spines supple, curved and twisting, curled around the body, yellowish-white to pink; flowers, fruit and seed as for the Type plant, but somewhat smaller. Habitat: Uruguay, between Minas de Corales and Ansina.

This group of forms remains much smaller than that of the species and has white to pink-coloured and twisting spines.

NOTOCACTUS VANVLIETII Rausch. By D. J. van Vliet

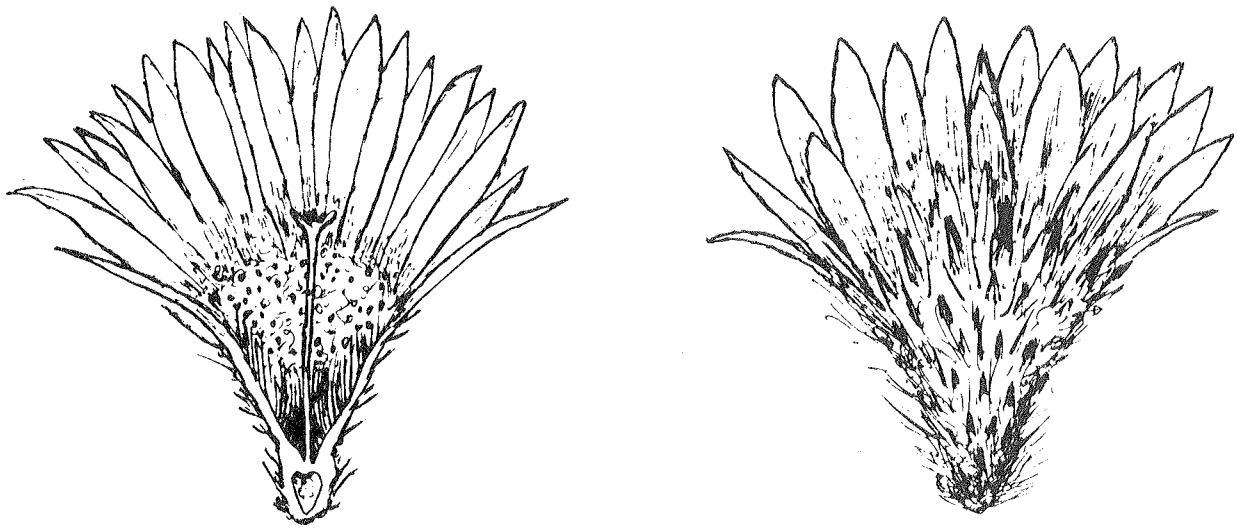
Translated from Succulenta 51.5:1972 by W. W. Atkinson.

In my article dealing with N. werdermannianus Herter (Succ. 1971) (reproduced in Chileans No.33 — H.M.) I promised to return to the subject of N. vanvlietii. As is evident from that article, arising out of the impressions acquired during my trip to Uruguay, the latter species is not only allied with N. werdermannianus but it is also closely related to it. After the publication of N. vanvlietti by Rausch (K.u.a.S. 1970) and the fact that numerous seeds had already been passed on by me for some years, such as through Clichefonds, I think it would be as well to go more fully into this species. The designation used by me for the type variety (N. vanvlietii van. vanvlietii) refers to N. vanvlietii with the exclusion of N. vanvlietii v. gracilior. Where N. vanvlietii is spoken about, as may be supposed, all varieties and forms will be included.

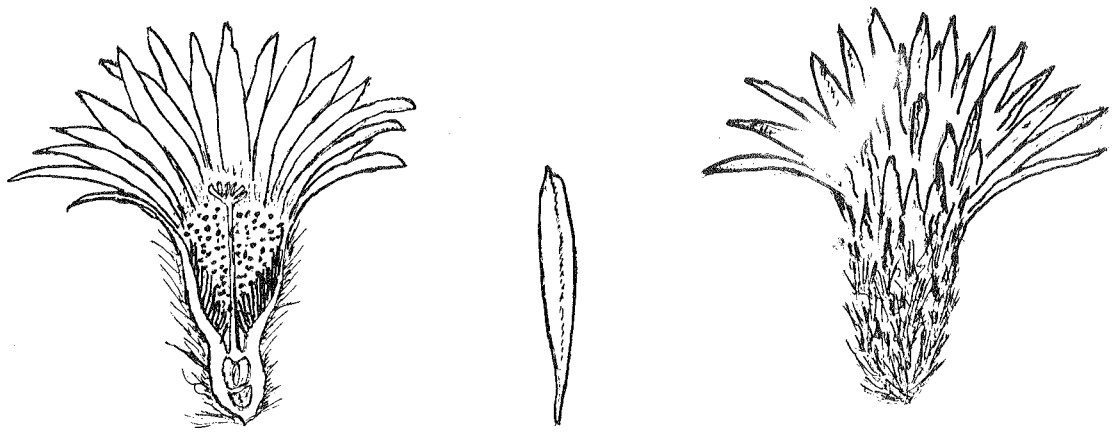
The proper description by Rausch, which is accompanied by first-class photographic illustrations, scarcely requires amplification. I will make an exception in respect of flowers, fruit and seeds in connection with my studies concerning the relationships of the Uruguayan species of the genus Notocactus. One may read about the circumstances under which the plants were found, included in the article concerning N. werdermannianus as quoted above. The descriptions of the above mentioned three parts of N. vanvlietii v. vanvlietii now follows:

Flowers disposed wreath-like all round the top, not self-fertile, up to 50mm long and up to 57mm diameter; outermost and innermost petals (perianth) mostly lanceolate, sometimes spathulate, somewhat denticulate, pale shining citron yellow, at the tip a pink medianstripe, towards the throat becoming tinged greenish; flower base (receptacle) greenish exterior, furnished with grass green and darker green scales with brown points, pale brown to brown wool and dark brown bristles; tube interior broad funnel-shaped, yellow, becoming tinged orange-yellow towards the style, completely occupied by stamens, sunk down to the foot of the style (nectary?); ovary (pericarpellum) oval-shaped, up to 11mm long and 7mm diameter, sometimes divided into two parts by a white wool-like membrane, covered like the exterior of the tube however with white wool; ovules hanging inwards, attached by thin funicles, sometimes only at the top. Innermost stamens quite close to the style, up to 9mm long, pale yellow; outer ones speading away from the style, up to 12mm long, pale yellow; anthers yellow; style up to 20mm long, 1mm diam., pale yellow; stigma lobes 11, flat, lilac to purple-red exserted above the inner anthers.

Fruit berry-like, round, fairly thick-walled, pale green, covered with light brown wool and dark brown bristles, the wall of the berry drying up and disintegrating under the flower remains and eventually splitting open here; contents more or less 300 seeds. Seeds irregularly bell-shaped, seed skin (testa) shining, black oval-shaped humps, arranged in rows lengthwise facing the hilum; hilum irregularly shaped, somewhat elevated towards the margin, slightly undulating, pale brown to ochre yellow with black

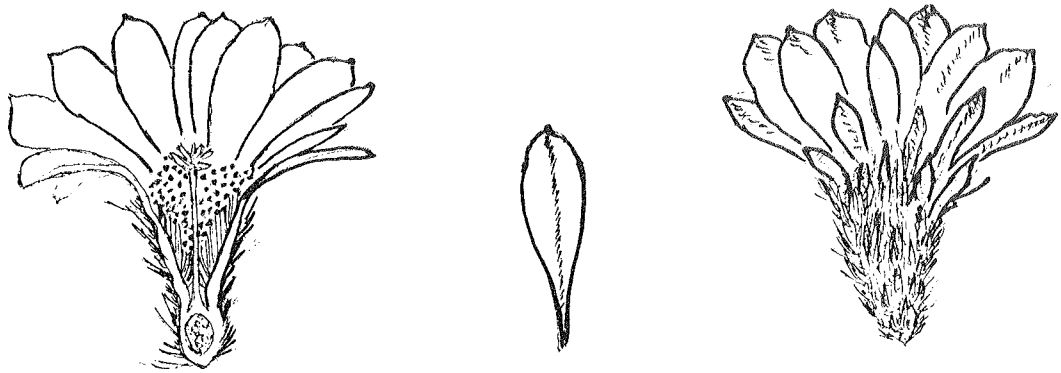


Notocactus werdermannianus



Notocactus vanvlietii v. vanvlietii

SUCCULENTA 51.5.1972



Notocactus vanvlietii v. gracilis

spots, rising up around the small opening (micropyle) up to a caruncle; point of attachment of funiculus barely perceptible.

As far as the fruits and seeds are concerned, N. vanvlietii v. gracilior agrees closely with N. vanvlietii v. vanvlietii. In N. vanvlietii v. gracilior the spathulate flower petals predominate; the flower petals are fewer in number and moreover these flowers are smaller than those of the type-species. The description runs thus: Not self-fertile, up to 45mm long and up to 50mm diam., flower petals (perianth) mostly spathulate, sometimes lanceolate, somewhat denticulate, shiny citron yellow, a pink median stripe at the tip, becoming greenish coloured towards the tube; flower tube exterior greenish and covered with grassgreen and pink scales, grey to light brown wool and brown bristles. Tube interior funnel shaped, yellow, becoming tinted orange-yellow towards the style, completely occupied with stamens, sunk down to the base of the style: ovary (pericarpel) oval-shaped, up to 8mm long and up to 6mm diam., furnished like the exterior of the tube; inner stamens directed towards the style up to 7mm long, pale yellow; outer ones spreading away from the style, up to 10mm long, pale yellow; anthers yellow; style up to 20mm long, 1mm diameter, pale yellow; stigma lobes 11, flat, lilac to purple red, exserted above the inner anthers.

The remarks made by Rausch regarding relationships of this species appears to be quite correct to me. I will also add to this, that in view of the flower form, N. vanvlietii v. vanvlietii stands between N. vanvlietii v. gracilor and N. werdermannianus. In its turn, N. vanvlietii v. gracilior exhibits a relationship with N. concinnus. Both the foregoing belong in the group around N. concinnus and N. scopa. The seeds for example of N. vanvlietii v. vanvlietii, N. vanvlietti v. gracilior, N. werdermannianus, N. concinnus, N. scopa, N. tabularis, N. bommeljei and even N. caespitosa agree so markedly with one another that one cannot separate them once they are mixed together. Among all these seeds one finds the selfsame variation in form and structure.

The plants of N. vanvlietii v. vanvlietii and N. vanvlietii v. gracilior are just as variable. By reference to the table below, one will be able to distinguish between them and compare N. werdermannianus, in which I only make use of those features which clearly exhibit differences.

	NOTOCACTUS WERDERMANNIANUS	**NOTOCACTUS VANVLIETII v. VANVLIETII**	**NOTOCACTUS VANVLIETII v. gracilior**
Body			
Colour	Grass green	Deep green	Grass green
Height	± 20 cms.	± 10 cms.	± 7 cms.
Diameter	± 13 cms.	± 8 cms.	± 6 cms.
Spines			
Shape	Needle like	Bristle like, curved and straight	Bristle like, curved and randomly directed
Colour	Yellow to brownish yellow	Darker to black-brown, becoming greyish, red at the top	Tip pale brown to pink, becoming grey to white
Flowers			
Length	± 60 cms.	± 50 mm.	± 45 mm.
Tube interior	Funneliform, yellow to pale yellow	Broad funneliform, yellow to orange yellow	Funneliform, yellow to orange yellow
Diameter	± 70 mm.	± 55 mm.	± 50 mm.
Petals			
Shape	Lanceolate	Lanceolate, sometimes spathulate	Spathulate, sometimes lanceolate
Colour	Citron yellow	Pale yellow	Pale yellow

Both varieties are plants for cactophiles cramped for space, and they are grown and flower easily. When new spines appear in the crown in the spring, they are scarlet in N. vanvlietii v. vanvlietii and present a particularly pretty picture against the darker brown to black spines and the dark green body.

Notocactus vanvlietii grows among mosses, ferns and grasses in the full sun in cracks in the rocks, that fill up with mineral detritus and organic matter. This mixture guarantees on the one hand a thorough drainage and on the other a ph of 4.8, whilst the situation between rocks does not dry out too quickly. The seeds supplied by me of N. vanvlietii v. vanvlietii carry my field number DV 18; of N. vanvlietii v. gracilior DV 18a, which supercedes the old field number DV 36 for this variety.

. . . . . from G. J. Swales

I am a little puzzled over the terminology used in one or two places in these descriptions. When he is describing the flower of N. vanvlietii v. vanvlietii, D. J. van Vliet notes that "the ovary (pericarpellum) is oval-shaped, furnished like the exterior of the tube." However the ovary consists of the cavity containing the ovules together with the immediate surrounding tissue, but excludes the external (often greenish) surrounding tissue. The pericarpel, certainly, could be furnished with scales, or hairs, but not

the ovary. In addition, the ovary is stated to be divided into two parts by a white wool-like membrane. I do not understand just what is meant by this phrase; I am not familiar with flower cross sections of Notocactus, but Gymnocalycium I have never come across an ovary divided internally into two chambers in the manner indicated in this description.

At the end of the article by Rausch, he describes N. vanvlietii v. gracilis as "this group of forms". How can a variety be a group of forms?

. . . . . from F. Fuschillo

I am having a little trouble in translating some German from Die Kakteen, where the word Fruchtknoten is used. Is this really fruit knobs? It also appears in an old Sukkulentenkunde.

. . . . . from R. Moreton

Fruchtknoten is a German word which I have come across quite often in articles by Ritter, who uses words and phrases which I would personally describe as "Old German". Ritter appears to use the word to describe the ovary together with its outer covering; that is, the part of the flower which remains as the fruit when the upper parts have withered.

. . . . . from H. Middleditch

Apart from the style and stamens, I have usually regarded a flower as having three principal parts: the petals, the tube, and the ovary. However, in browsing through Strasburgers's "Textbook of Botany" I find that the ovary strictly speaking is only the internal sac and excludes the (often greenish) thick outer wall. It appears that the outer wall of the ovary is really part of the tube; that part of the tube which surrounds the ovary is called a pericarpel by various writers (not by Strasburger). The German word fruchtknoten and the Dutch word vruchtbeginsel would appear to describe that part of the flower which consists of the ovary together with its external covering. So far I have not been able to find an equivalent term in English. Hence Geoff Swales appears to be perfectly correct in questioning the translation of "vruchtbeginsel" into "ovary. But what do we call it?

The "group of forms" is our old friend "Formenkreis", which seems to be used in Continental Journals to cover a variable breadth of meaning. Here it seems to cover the extent of the variation to be found in one variety, whereas when a group of more or less closely related species are involved it is used to mean "species complex".

THE GENUS PSEUDOLOBIVIA By B. R. Adams

Discussed at the Chileans '78 Autumn Gathering.

In 1922 Britton and Rose published the genus Lobivia, placing therein 21 species of globular to short-cylindric plants from the high Andes of Peru, Bolivia and Argentina. These, they noted, produced diurnal, short tubed and mostly brightly coloured flowers from old areoles and they felt that they could not be "properly referred to any described genus". Whilst several were new and others had been described as Echinocactus, a strictly North American genus in the view of Britton and Rose, the largest number had been included in Echinopsis by earlier authors.

Unfortunately, their fragementary knowledge of the cacti of the Andean region did not permit them to go far beyond recognising that the plants in question did not fit very happily into the genus Echinopsis, of which the type and majority of species produce nocturnal, long tubed, white flowers, resembling those of Trichocereus. This led to a rather vague generic description and to the inclusion within Lobivia of a number of diverse elements i.e. a "dustbin of misfits". Britton and Rose themselves obviously recognised that their new genus would probably not prove entirely satisfactory and anticipated later removal of some of the species to other genera. They wrote that "it is questionable whether (all species are) congeneric" and "further knowledge of (some little known species) may lead to a different arrangement."

Britton and Rose thus separated Echinopsis from Lobivia largely on the basis of flower differences and seemed confident that, using such characters as tube length, species could be reliably assigned to one or other genus. In this however, and in describing Echinopsis aurea, a species with comparatively short tubed, diurnal, bright yellow flowers, they set the stage for a problem that has troubled authors ever since, namely, one of seeing clearly where Echinopsis ends and Lobivia begins.

With an avalanche of new species in the succeeding twenty years (the number described had more than tripled by 1941 when Marshall and Bock's "Cactaceae" was published), and the removal of the most anomalous of Britton and Rose's original 21 to other genera, a somewhat clear picture of the genus began to emerge as well as a realisation that the majority of species could be distinguished from Echinopsis by their body form as well as their flower characters. This in turn, though, highlighted a number of species which did not possess the combination of characters typical of either genus, and a growing number at that, as more plants were described. There were for instance two species retained by Britton and Rose in Echinopsis, E. obrepanda and E. ancistrophora with long tubed white flowers on Lobivia-like bodies. Also there were Lobivia ferox and L. longispina with a similar combination, or at least with flowers white and rather longer than usual for Lobivia; in addition, Echinopsis aurea had essentially Lobivia-like flowers on an Echinopsis-like body; all with diurnal flowers or at least with flowers remaining open by day as well as night. In addition to these, other species such as Echinopsis kratochviliana, E. polyancistra and E. potosina were appearing.

These misfit species clearly bothered Backeberg and to accomodate them he published Pseudolobivia in 1934 as

a subgenus of Echinopsis. He then transferred Lobivia ferox and L. longispina to Echinopsis but strangely did the opposite with Echinopsis aurea, moving it to Lobivia. He was not content with this solution for long, though, and in 1942 he raised his subgenus Pseudolobivia to the rank of genus, a genus generally considered to be amongst his most ill founded. Included here were Echinopsis/Lobivia aurea and all the other species so far mentioned. In his Kakteenlexikon he says: "The founding of Pseudolobivia proved necessary because the genus clearly stands halfway between Echinopsis and Lobivia and is an essential justification for the existence of the latter; in other words if Pseudolobivia is not accepted, the Lobivia as a valid genus would also disappear, and Trichocereus likewise." In view of the great diversity of habit, his desire to avoid these three genera being lumped together was, I think, laudable enough, but there seems little to commend his solution to the problem. Instead of trying to ascertain the natural relationships of the various species before deciding on the generic limits, it would seem that he looked at the bodies, measured the flower tubes, and on this basis consigned to Pseudolobivia any that he could not confidently place in either of the older genera.

Unfortunately for Backeberg, it now seems clear that there is no one line of transition between Echinopsis and Lobivia, the relationship being a great deal more involved than that. As a result of his approach he thus included in Pseudolobivia several distinct elements, whilst at the same time omitting a number of closely related species. Result: another dustbin genus, and an exceedingly ill-defined one at that. Herein lies the great weakness of Pseudolobivia. Were it otherwise it might perhaps have endured longer for I think many people have found it to have its uses.

Let us consider the various species that Backeberg did transfer to Pseudolobivia and, according to my present understanding, the groups they more or less naturally fall into. In this I largely follow the lines mapped out by Rausch:

1, Ancistrophora group:

Pseudolobivia ancistrophora, hamatacantha, kratochviliana, leucorhodantha, pelecyrhachis, polyancistra. Distribution: North Argentina — Jujuy and Salta.

Mostly rather small plants with depressed-globose bodies, often solitary. The ribs are numerous, usually rather thin and somewhat tuberculate but the areoles are not offset. Spines thin, sometimes almost bristly and often with one or more of the centrals hooked. The flowers are slender and, apart from P. kratochviliana, mostly rather long tubed, always white, frequently with a pink tinge and often sweetly scented. The species seem to be very similar and I suspect that they may not all be worthy of recognition.

Subsequent to Backeberg, Rausch has added to this group Lobivia cardenasiana from Tarija in southern Bolivia (magenta and red flowers), L. pojoensis (red flowers) and the yellow to red flowered L. arachnacantha and varieties, both from central Bolivia. If correctly placed in this group, these greatly increase the flower colour range and give the group a much wider and strangely disjunct distribution. Perhaps Lobivia pojoensis, at least, is closer to the following group.

2, Obrepanda group: Pseudolobivia boyuibensis, callichroma, calorubra, carmineoflora, frankii, obrepanda, rojasii, toralapana. Distribution: Central Bolivia (Cochabamba) to the Argentinian border south of Tarija.

Bodies again depressed-globose but generally larger than in the ancistrophora group and most species caespitose. Ribs fewer and broader than in the previous group, more or less divided up into tubercles and with obliquely offset areoles. Spines mostly stout, frequently curved but not hooked or at least never consistently so. Flower tubes stouter than in the previous group and varying greatly in length, the complete flower being from 7 to 20cm. long. Flowers very variable in colour (white, orange-red, magenta, carmine, pink), sometimes scented.

Rausch has added to this group the recently described Lobivia aguilari and L. mizquensis and in addition there are several species, described by Cardenas and left by Backeberg in Echinopsis, which seem to belong here. This would thus seem to be quite a large group but many of the species are poorly defined, and in view of Rausch's remarks concerning the great variability of populations in the field, their distinctiveness must be in doubt.

3, Aurea group: Pseudolobivia aurea, luteiflora. Distribution: North Argentina, Salta to Cordoba.

Bodies spherical to elongate, generally caespitose (sometimes solitary?). Ribs fairly numerous, straight, hardly tuberculate and with the areoles not offset. Spines all straight, stiff, sharp and needle-like. Flowers comparatively short tubed to 9cm. long, yellow, ?unscented.

Donald has suggested that P. luteiflora is no more than an aberrant form of the widespread and variable P. aurea.

4, Ferox group: Pseudolobivia ferox, lecoriensis, longispina, potosina, wilkeae. Distribution: Western Bolivia to north Argentina, Oruro to Jujuy.

Bodies quite large, spherical to elongate-spherical, solitary. Ribs more numerous and thinner but otherwise much as in the obrepanda group. Spines robust and much longer than in the other groups, the centrals often curved upwards and hooked. Flowers up to 10cm. long, funnel shaped and lacking the narrow tube found in the other groups, white, ?unscented. Seemingly a close knit group, but Rausch's reduction of all five species, together with others, to three varieteis of Lobivia ferox would seem somewhat excessive.

Outside the four groups already mentioned, there remain three species which do not seem to fall readily into any of them. These are Pseudolobivia kermesina, P. orozasana and P. torrecillacencis.

It is not at all unusual to be able to distinguish more or less natural groups of species within a genus, so

Pseudolobivia is not suspect on this account alone. It is when the apparent relationships of the various groups are examined that anomalies come to light and the edifice starts to crumble.

At first things go reasonably well for Backeberg since general morphology and other evidence would suggest that the ancistrophora and obrepanda groups are closely allied. Included in this evidence is the finding of John Hopkins that they have very similar seeds. Unfortunately, though, neither the aurea or ferox groups seem at all close to these two, or to each other for that matter. Pseudolobivia aurea is no doubt very close to L. shaferi and L. cylindrica and perhaps related through them though rather more distantly, to the L. densispina complex. Certainly it would seem nearer to Lobivias of this type than to any species of Echinopsis of which I am aware. The recent discovery of plants of variously intermediate character (Lobivia larae, L. aguilari, L. mizquensis) and, again, seed evidence suggests a close relationship between the obrepanda group and the species around Lobivia cinnabarina. It would be hard to find two apparently more unrelated Lobivias than L. densispina and L. cinnabarina.

An interesting point is Backeberg's suggestion that the Pseudolobivia aurea group may be close to Acanthocalycium, with P. luteiflora as the "missing link". The evidence is equivocal but certainly the seeds are virtually identical and P. luteiflora has spiny scales on the flower tube.

To return to the Obrepanda group; despite the apparent link to the Lobivia cinnabarina group, Backeberg, as already mentioned, left in Echinopsis several species which seem to very much of this affinity. These are, according to Rausch, Echinopsis coronata, E. pseudomamillosa, E. roseo-lilacina and E. tapecuana. In Kakteenlexikon he even remarked on the similarity of E. tapecuana to Pseudolobvia obrepanda and said that this species would probably be better in Pseudolobvia. Yet he did not make the transfer! Could it be that by the time this species had been published, Backeberg — notwithstanding all his efforts to defend it — had become disillusioned with his own creation?

I find it hard to understand why he felt it necessary to remove the ferox group from Lobivia in the first place since the plants are somewhat atypical of this genus only in their largish (though not long tubed) and white flowers. Allied species with coloured flowers (L. aureolilacina, L. claeysiana) he left in Lobivia. Though uncommon, there are other white-flowered Lobivias, e.g. some forms of L. lateritia. This species from southwest Bolivia may be a near relative. Despite the clearly lobivioid characteristics and affinities of this group, one apparent member, Echinopsis cerdana, even found its way into Echinopsis in Backeberg's scheme, and this even though he remarked upon its similarity to Pseudolobivia wilkeae!

Of the three "odd men out" recent authors seem to agree that Pseudolobivia kermesina and P. orozasana should be placed with Echinopsis mamillosa and here we have another most interesting small group from the Tarija area of southern Bolivia and adjacent northern Argentina. Although, in many respects it seems reasonably placed in Echinopsis, Rausch says that the seeds are unique whilst the flowers are apparently more or less diurnal, varying from white to pink in colour or, in the case of Pseudolobivia kermesina, even red. I, incidently, harbour doubts that the photograph of P. orozasana in Kakteenlexikon is in fact this species at all. The plant depicted doesn't fit the description and looks as though it could be a member of the obrepanda group.

It seems to be generally agreed today that Pseudolobivia torrecillacensis is very closely allied to and probably no more than a well marked variant of Lobivia aracnacantha, a distinctive and not easily placed small species though I suspect that Rausch is probably right in suggesting it is closest to the ancistrophora group. The tangle which Backeberg managed to get into with these plants, retaining one in Lobivia and transferring the other to Pseudolobivia seems a clear indictment of his method, further highlighting both the weakness of the latter genus and the pitfalls of relying essentially on one variable characteristic i.e. flower tube length, for generic distinction.

Having thus disposed of Pseudolobivia sensu Backeberg, we return to the vexed questions we started with:

a) Where can a line be reliably drawn between Echinopsis and Lobivia?

b) Should the two in fact be kept separate or merged?

A third question is perhaps worth asking:

c) Would an amended Pseudolobivia be acceptable and serve any useful purpose?

A satisfactory solution to this problem is probably still some way off whilst a better understanding of the genus Echinopsis, which to this day remains poorly known and little studied, would no doubt be very helpful.

Throughout Lobivia, Echinopsis and related genera, as with Pseudolobivia, more or less natural groups of species can be discerned. The work of several recent authors, Rausch and John Hopkins in particular, has greatly helped to clarify these at the Lobivia end. The trick will be to aggregate them together into the necessary larger groups in the most meaningful and useful way. The apparently complex interrelationships of many small groups do not make this task any easier; nor do the limited usefulness of many of the more obvious characters, ribbed versus tuberculate bodies being one such. Plants with ribbed bodies occur, apparently independently, in several groups within Lobivia. If the ribbed-bodied L. aurea, densispina and arachnacantha groups are to be regarded as best placed in Echinopsis, then what about L. minuta and L. miniatiflora?

An omnibus genus would probably be the easiest way out but would it be the most generally useful solution? I am inclined to suspect not.

Comments

. . . . .from H. Middleditch

In the pages of Rausch's beautifully illustrated books on Lobivia one may find page after page of species of Lobivia, Echinopsis, Trichocereus, Helianthocereus and Soehrensia transferred to new names. At the 1974 I.O.S. meeting Friedrich produced a somewhat similar exercise but with different synonyms. It is an open question whether either author adds anything of use or interest to the exceedingly complex relationship of these genera, by this synonymy. By comparison we were presented with information about the plants at the 1978 Chileans Autumn Gathering. We were treated to a series of slides of Pseudolobivia together with an indication of their apparent grouping and their relationships, which are discussed above. By means of flower sections, the insertion and attitude of the stamens in Pseudolobivia was shown to be similar to that found in Lobivia and (mostly) differing from that found in Echinopsis.

It is pointed out that Britton and Rose themselves recognised their new genus Lobivia as largely a dustbin of misfits, but in the course of time and the results of more study, the anomalies have been largely removed and a reasonably coherent genus has emerged. In looking at the groupings within the Pseudolobivia, it is pointed out that three species are left which "do not fit easily into any group." A dustbin of misfits again, perhaps? Our author then proceeds to indicate how the apparent misfits and anomalies can be largely dissipated by closer examination and comparison. In just the same way there are some Psudolobivia which could be placed elsewhere to most people's satisfaction, leaving an acceptable genus Pseudolobiva apart from some difficult species. Comments and observations from members cultivating these problem species will naturally be very welcome.

. . . . .from J. Medway

The plants which I have grown from Rausch seeds still remain in trays and have made little growth. Of the four "odd ones out" I have only a small plant of Echinopsis coronata acquired from Holly Gate last summer. In Bolivia we saw some of the Obrepanda group on the ground, unfortunately none in flower, but Roberto Vasquez identified Pseudolobivia callichroma, obrepanda and calorubra and I have two small plants of P. toralapana which I picked up at Karel Knize's nursery on the way back through Lima. All of the field material which we collected between Cochabamba and Comarapa/Chilon and also along the road between Sucre-Yamparaez-Tarabuco is still at the time of writing in Bolivia awaiting export permits.

THE GENUS PYRRHOCACTUS By R. Ferryman

Discussed at the Chileans '78 Autumn Gathering

I have been doing a fair bit of research recently on Pyrrhocactus but there is very little in print, particularly with regard to fruit. I believe Pyrrhocactus have small globular fruits, very thin walled, like Austrocactus and Brasilicactus, not the elongated fruit of Neoporteria proper. Alas, the literature is not very forthcoming. I do not have any imported material here, and much of the seed offered, what little there is, seems to have been mixed up somewhere. If you have any contacts in Argentina who could supply seed or information, particularly with regard to fruits, I should to be very pleased. There is a great deal of confusion over this group and I believe several new species have been described all due to general ignorance about what's what.

It would appear to me that Pyrrhocactus are very close to Austrocactus, but are they also close to Neoporteria and Acanthocalycium as John Donald has suggested? I would ask whether the Austrocactus sp. from Santa Cruz (Castellanos in Opuntiales vel Cactales), Ritter's FR9, Pyrhhocactus setosiflorus Back, and Neochilenia andreanum, may perhaps be all one and the same plant, possibly synonymous with Pyrrhocactus strausianus.

There was the case of the infamous Knize Pyrrhocacti, which were indeed actually Lobivia lateritia. Knize collected these plants under KK 587, 590, 836, and latterly as KK 1351. Actually S.P.I. were offering these in 1973 as Lobivia lateritia and Pyrrhocactus in one and the same list! — KK 587 as P. tupizensis n.n., KK 590 as P. sp. derbgelbbraun bestachelt and KK 836 as P. sp. lobivioides. I have several of these Bolivian "Pyrrhocacti" — two I received from Sargant as P. tupizensis, one from Hollygate also as P. tupizensis, and four from S.P.I. of which two came as P. tupizensis, one as Kz 638 and the last as Neochilenia paucispina! The two plants ex Sargant are identical but the others all differ. Apart from Kz 638 they have all flowered yellow and are growing, though not at a spectacular rate. Apart from some of them necking at the junction between habitat and cultivated growth, I cannot say that I have had too many problems with them.

. . . . . from H. Middleditch

At our Chileans' 1977 week-end we looked at some slides taken by F. Fuschillo of a number of seeds of Austrocactus; when projected on to the screen, each seed would be about 10ins. across so that in addition to their basic shape there was no difficulty in seeing a fair amount of detail. Particularly striking was how remarkably thin these seeds appeared to be — so much so that one suspected that they had not been formed properly and could be non-viable. Was this perhaps a common occurrence with Austrocactus and hence the cause of the repeated comments about poor germination?

However, on perusing the Buxbaum-Krainz "Die Kakteen" it appeared that a number of species of Pyrrhocactus also have seeds which are very much thinner than they are broad or tall, to judge by the sketches. Perhaps if we could get together some seed of one or two species of Pyrrhocactus we could ask F. Fuschillo if he would take us some comparison slides to show at our 1978 Chileans week-end.

. . . . . from F. Fuschillo

Some of the "seed" which I received for this project proved to be a little more than seed husks and dust, but I have been able to salvage some undamaged seeds and prepare a few slides, to show both a view on the hilum and a view on the side of the seed. Normally I have no great difficulty in balancing a seed hilum-way up on my graticule, but most of these seeds were so thin that they proved much more of a problem to stand up in this way than any other seed I have photographed.

. . . . . from R. Ferryman

The slides of Pyrrhocactus seeds from F. Fuschillo which we saw at our 1978 Brooksby week-end, suggested a fair degree of similarity between the seed of Austrocactus and Pyrrhocactus umadeave. This likeness was far more evident than between P. umadeave and P. bulbocalyx — this latter appeared to have the more common bulbous form and was also rather a different colour. The distribution of Pyrrhocactus is from the provinces of Salta and Jujuy in the north — P. umadeave — to the Rio Colorado in the south — P. vollianus. This last plant was described by Backeberg in 1956 without a definite habitat and I would question whether this could be an Austrocactus. The overlap of habitat with Acanthocalycium in the north and with Austrocactus in the south, has brought about the question of affinity with either of these genera. However, after hearing Roy Mottram discussing Acanthocalycium it appears that there is no direct relationship between Pyrrhocactus and Acanthocalycium. The sparsity of material prevented further worthwhile observations being produced at the Chileans' week-end. Nevertheless it is hoped that any members fortunate enough to obtain flowers or fruit on Pyrrhocactus would contribute any comments and so help our knowledge of this very interesting group of plants.

GROWING MELOCACTUS AND DISCOCACTUS By J. Arnold

Discussed at the Chileans '78 Autumn Gathering.

I have been interested in Discocacti and Melocacti for some years now and have quite a number of plants. Most of them emanate from two trips I made to the Continent — the first one being about nine years ago and the second about five or six years ago. In the main the plants were obtained from Uebelmann's nursery. They were so inexpensive then that I acquired a number of different plants. They tended not to be in quite as good a condition as the plants one now sees for sale — at Tom Jenkins nursery, for instance. However, they have all settled down well, and all flower regularly. A Discocactus patulifolius came from my first continental trip. It was an imported plant, about 4 inches across and has now grown up to about 5½ across. This particular plant and Discocactus horstii are the only species which have flowered before April.

I grow my Melocacti and Discocacti together in a makeshift wood and polythene propagator with a soil warming cable embedded in sand. They are grown in a very acid compost and I have had little or no difficulty in rooting them, with odd exceptions. Sometimes you see a plant of a species you want which is very shrivelled but the only one available — I find that plants in this condition seldom make reasonable specimens. They are a real gamble. I have just such a plant of Discocactus rapirhizus HU 200, which is very shrivelled and still rootless after two years. I grow these genera together with others such as Buiningia. They are very liberally watered in Spring (starting early February) through to Autumn and contary to what I have heard from others, they are kept absolutely dry in winter. However, I do give D. horstii a few light waterings over winter as this one can dry away.

I root my plants straight into the compost in which they are to stay, feeling that it is best not to disturb them after becoming established with new roots. Some plants have now been in the same soil for 5 years and when I repotted most of them this Spring I found that they all had well developed primary root systems. Most of them soon showed signs of growing well again, despite the lengthy spell of rather poor weather. I find that Discocacti are very slow growing from seed and are very sensitive to all kinds of cultivation lapses.

I think that Melocacti — both imports and seedlings — are much easier than Discocacti. I have imported plants of M. azureus, M. levitistatus, and M. warrasii n.n. under a field collection number. The M. levitistatus I have now had for about 8 years. I also have some Melocacti grown from seed which are now starting to form a cephalium — M. matanzanus, M. ferriphilus HU 217 and M. neryi; this last plant has reached 6ins. across in six years of growth and is a really fast grower. However, I am fairly sure that the HU 217 is wrongly named; the plant is blue-bodied, some 4ins. across. I think that it is probably M. concinnius HU 214 as it certainly fits that description.

Personally I do not think that these plants mind temperatures below 55° for odd days, once they are well rooted. Mine have certainly been below 50° on a number of occasions without coming to grief.

. . . . . from G. Charles

My Melocacti and Discocacti spend most of their time in a propagator with soil warming cables below and glass panes overhead. These panes are partly removed in summer and replaced as colder weather approaches. The actual amount of ventilation is varied according to the prevailing temperature and also with how much water they are getting. I feel that if their roots are kept warm, air temperatures below 50° on occasions will do no harm. When I moved house this February, we had a really cold spell down to – 6° at night. During this time when the propogator was not assembled, the plants spent a week in an unheated house which killed many house plants on the window ledges. I cannot say how much cold the plants had to stand, but the only casualty was an Arrojadoa which had one stem badly marked. All the Discocacti and Melocacti came through unmarked.

I do water all these plants very slightly in the winter months and I do believe that this helps to keep the roots in good

condition. Some Melocacti seem to be quick growing and will respond to liberal watering in the summer. I grow all these plants in Arthur Bowers ericaceous mix, which is acidic in nature, about pH 5.5. My only worry about this soil is its rather fine structure which has less air than the more fibrous Levington's compost, which I prefer for other cacti. On repotting the plants this year, I found that they all had a very good root system, possibly due to the use of soil heating cables. The imported specimen of D. placentiformis, in an 8 ins. pan, had a superb root system after one year in cultivation and on six occasions it has produced a pair of its large flowers. I consider that grafting is a good way of raising Discocactus from seed and the young plants grow quickly and in character.

I was interested to read that Discocactus tricornis is self-fertile. Has anyone set seed on this or on any other Discocacti (without making a hybrid cross)? If true, this could certainly lead to an increase in the number of young plants available. The new D. estevesii is very beautiful with a dark green body and long brown spines. Collected by Waras, this plant should prove very popular. A few years ago, I can remember seeing huge Discocacti at Uebelmann's nursery which were labelled under HU collection numbers somewhere near HU 400. They had very large tubercles and spines, the bodies being up to 12 ins. in diameter. I have not seen any Discocacti like this from Waras, yet.

. . . . . from R. Moreton

With regret, I must add my name to the list of those losing Discocacti in cultivation — three imported plants have expired of late. On the other hand I have a selection of seedlings and grafts which seem to be coming on O.K.

. . . . . from A. W. Craig

My own experience in growing large imported plants of Discocatci has not been a happy one, despite having taken great care by cultivating them in a propogator. One or two imported cephalium-bearing Melocacti which I tried subsequently, also expired. But Melocacti grown from seedlings have fared very well by comparison and I now have two different cephalium-bearing Melocacti grown from seed. First signs of the cephalium began to show themselves in the very depths of winter, which seems to be rather an odd time of year for this to happen. These plants usually stop in the propagator over the winter, but they are now indoors for a while, which is perhaps just as well since the average temperature over the whole of the month of January (1979) has been below freezing point, in the north-east of England.

. . . . . further from J. Arnold

But I have not been without problems. On my very first trip abroad, I can remember seeing hundreds of specimens of Discocactus of all sizes at Uhlig's nursery in beautiful condition. I bought a very small one then and could not get it going. But the Discocactus placentiformis which I bought four years ago is now 7 ins in diameter and very stoutly spined — to me it is one of the most beautiful of this genus and also one of which is a little more difficult to grow.

. . . . . from B. J. Chudleigh

I have had some good results with growing Discocacti — I have even had self-sown seedlings round the base of the parent plant like more common fare, but they are kept in polythene bags for heat and humidity conservation.

. . . . . from W. W. Atkinson

A few years ago I paid a visit to De Herdt just after he had completed his showhouse. I gave in to purchasing a couple of seedling Melocacti. I have always resisted collecting cacti which require winter warmth as the vast majority are happy at 40° minimum, or even less. However, through a near disaster in the construction of his new show house, De Herdt found that they needed some moisture and were not demanding of high temperature. So it was cool and moist, not warm and dry, according to him at the time. This all adds weight to various ideas which knock our old fashioned belief in dry winters. Trouble is the plastic pots of course. In the clay age I used to administer a little water in winter. But in plastic it is difficult to ensure that the compost doesn't remain soggy for far too long into the winter period.

CACTUS (MELOCACTUS) PLACENTIFORMIS Lehm. By J. G. C. Lehmann

Translated from Nov. Act. Phys.-Med. Acad. Leop., 16 (1): 1832 by G. J. Swales

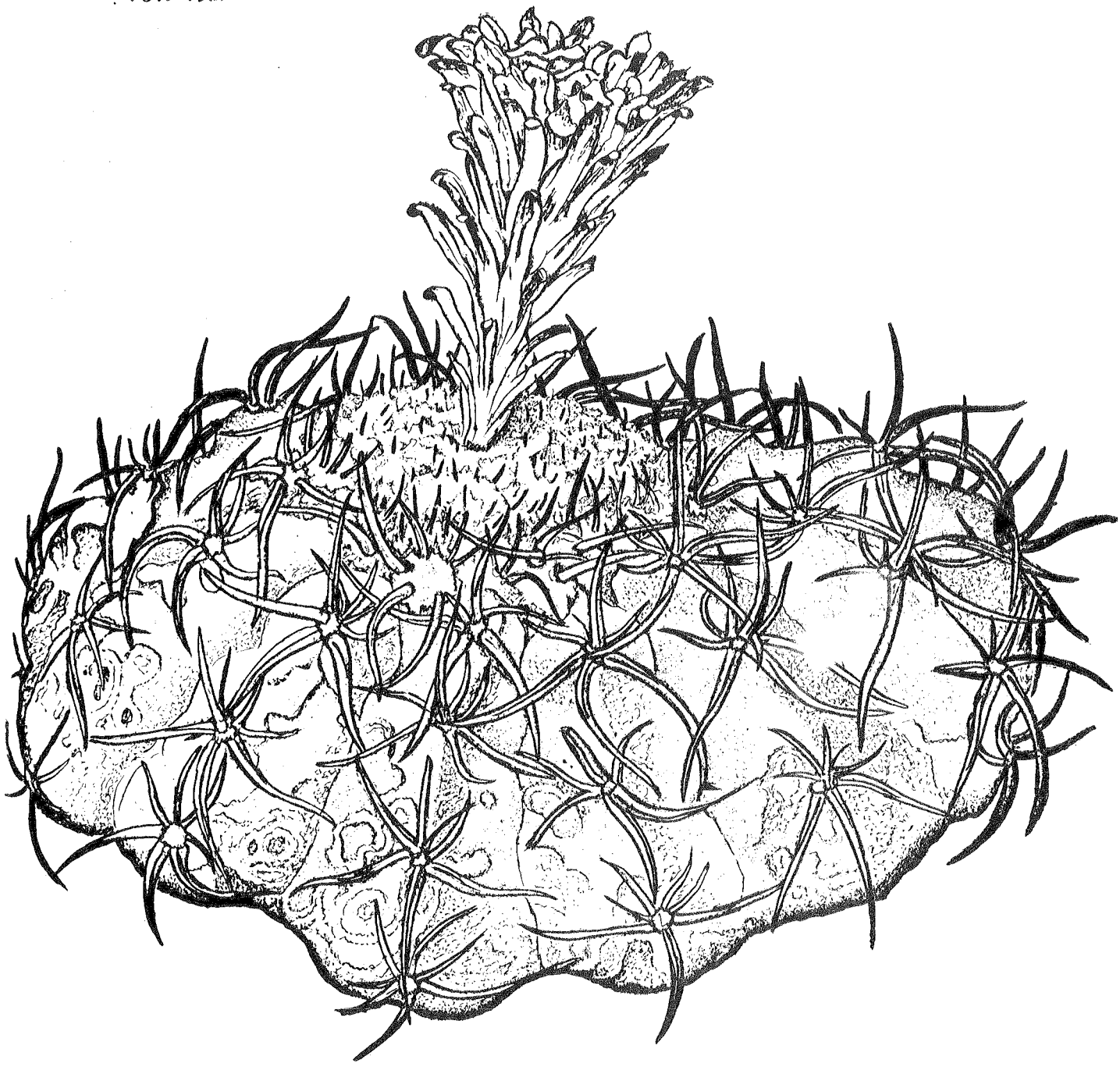
Cactus hemisphaerico-depressus 12 angulatis, spinis crassis sulcatis inaequalibus patentissimis, vertice florifero (cephalio) distincto hemisphaerico-depresso spinuloso. Ind. semin. hort, Hamburg 1826 p.17. Habitat in Brasilia meridionali.

Plant florifera hemisphaerico-depressa, 12 angulata, saturate-viridis. a basi usque ad medium fusco-maculata, 3″ longa, 7″ crassa. Costae distantes, convexae, 8-10‴ prominentes, ad basin 2″ ad apicem 9‴ latae. Fasciculi spinarum 3-4 in unaquaque costa; spinis crassis supra involutis profunde sulcatis, centrali unica pollicari, lateralibus septem inaequalibus, patentissimis: superioribus brevioribus. Cephalium hemisphaerico-depressum distinctum, densissime lanatum, spinulosum. Flores 3-4 suavelentes, e cephalio prodeuntes. Calyx tubulosus laxe imbricatus 2½ pollicaris: squamis lineari-lanceolatis, obtsissimis, untegerrimis, glabris, patentibus, apice reflexis rebescentibus. Petala numerosa, albida, lineari-lanceolata obtusa.

Obs. Planta memorablilis ob formam Melocacti floribus Cerei. A Melocacto Besleri (Link et Otto tab. XXI) praeter alias notas spinis profunde sulcatis diversa.

A cactus, flattened-hemispherical, 12 ribs, with thick grooved spines of unequal lengths very widely spreading, and having a clearly defined, flattened-hemispherical cephalium at the top. Ind. semin. hort. Hamburg 1826 page 17.

Habitat — Southern Brazil.



Cactus placentiformis Lehm.

H. a. Meyer del. Lith. d. J. D. Grüson in Breslau.

DISCOCACTUS PLACENTIFORMIS

NOVA ACTA PHYSICO-MEDICA
ACAD. LEOP. 16 (1) 1832

Flowering specimen depressed-hemispherical, 12 angled, deep green, the lower half blotched with greyish brown, 3ins in height, 7ins broad. Ribs standing apart, convex, 8-10 lines in height, 2ins wide at the base, 9 lines wide at the top. Spine clusters 3-4 in each rib; spines thick with a deep furrow on the upper surface, with a single central spine 1ins long, with seven laterals of different lengths, very widely spreading, with the upper ones shorter than the lower. Cephalium depressed hemispherical clearly defined with most dense wool and having small spines. Flowers 3-4, sweetly scented, appearing from the cephalium. The calyx is tubular, loosely imbricate, 2½ inches (in length? — G.J.S.) having linear-lanceolate, most blunt, absolutely entire, glabrous, spreading scales, reddish at the tips and reflexed. Petals numerous, whitish, linear-lanceolate and blunt.

Observation. The plant is reminiscent, by reason of its shape, of a Melocactus, with the flower of a Cereus. Differs from Melocactus besleri (Link & Otto plate 21) apart from other features because of the deeply furrowed spines.

Comments on Discocactus placentiformis.

. . . . . from G. J. Swales

In the above translation I have assumed that the symbol ′ represents feet, the symbol ″ represents inches, and the symbol ‴ represents lines. As indicated previously, an English line is one twelfth of an inch, or 2.1mm. At seven inches broad, the plant which forms the subject of the description is a fairly large imported specimen. The lower half of the plant is described as being "blotched with greyish-brown" — this was probably the typical corkiness at the base of a mature plant which is frequently found in imported specimens of various genera.

A comparison of the illustration accompanying this article with that of Discocactus insignis (Tab. XV) which appeared with Pfeiffer's description of 1839, certainly seen to depict reasonably different plants. Do later authors put forward any reasons for describing the two species as synonymous?

. . . . . from H. Middleditch

This description of Discocactus placentiformis was used a few years later by Pfeiffer to distinguish it from his Discocactus insignis. The existence of the central spine and the groove in the spines would appear to be the primary features which distinguish Discocactus placentiformis from Discocactus insignis. There also appear to be a difference in the form of the flowers; although the flower depicted on the Plate of D. placentiformis apprears to have started to wither, it seems to have more sepals near the base of the flower than on D. insignis. Just what are these grooves in the spines which may be seem on the plate accompanying the original description? Does the author mean that the spines are crescent shaped in section like a split bamboo cane? Or are they just fine grooves running most of the way along the outer face of the spines?

. . . . . from G. J. Swales

Or could it be that the spines are more or less circular in section and hollow and the "groove" is where the older spines have split longitudinally from some cause or another?

. . . . . from J. L. Arnold

I was delighted by the very beautiful plates of Discocactus placentiformis and D. insignis. They are magnificent in their execution and leave no doubt that they are drawn from well grown live plants and not from dried plants. Having studied them, there is no doubt in my mind that the two plates show different species and not two plants of the same species, if it were very variable. Indeed, if this were not the case, I feel you could then justifiably say there were only two Discocactus species — D. horstii and then all the rest as just one species. I am certain that the two plates are showing distinct entities.

I am also most interested to see that the descriptions give body colour as I would have expected D. insignis to have a yellow-green or light green body and D. placentiformis to have a blue-green or dark green one. This is a somewhat overlooked feature and I think an important one where these two species are concerned.

The plate depicting D. placentiformis is a very accurate representation of the plants one more often than not sees under this name. To me it is one of the most easily recognised and my particular favourite. It clearly shows (as H. Middleditch quite rightly observes) a withered flower just before it collapses sideways. It is a large growing species — the Plate must be life size — dark green in colour with (generally) black spines, sometimes pinkish when emerging and fading later to grey. Sometimes they are much paler, as in a plant of G. Charles which I have seen. My own plant does exhibit longitudinal grooves on several spines and sometimes they even look like splits. I would not think that the spines are hollow — they do not appear to be so to me.

The description from H. Middleditch of the spines as "just about meeting across the plant body" and clearly shown on the Plate, closely matches both my own plants and others I have seen. Most interesting are the "spine tips" showing in the cephalium. Only one species so far (D. cephaliaciculosus) shows true spines in the cephalium. Most show bristles — strong as in D. boomianus and D. horstii and weak as in what I think of as D. tricornis. Most show some strong spines at the edge of the cephalium. I have looked at the plate many times and feel that the artist was endeavouring to show bristle development and this fits the bill and so would not alter my view of the identification. I have no reason to think that scattered spines develop out of the cephalium in species other than D. cephaliaciculosus. Certainly I have never observed it.

Now in regard to the sepals at the base of the flower, all the Discocactus which have flowered for me and do have long tubes, also have petals right down the tubes. These are usually not paired or grouped, but alternating. Exceptions are D. albispinus and D. araneispinus.

This particular species is also shown in Chileans No. 23 p. 106 as "Discocactus tricornis" but it is a classic D. placentiformis. Plants sent by Karel Knize as this species under a variety of field numbers are not correctly named and could be D. tricornis — whatever that might in fact be!

. . . . . from D. Rushforth

All my Discocacti are smallish plants grown from seed, together with a rather larger D. zehntneri. I have D. horstii, heptacanthus, tricornis v. deflexispinus, carasolensis HU 324, grossoanus HU 325, and a few others. None, as far as I can see, has any groove on the spines when examined under x6 lens.

Incidentally I have tried an interesting experiment with tricornis v. deflexispinus, which has since been repeated on Uebelmannia and other plants. Having only one seedling, instead of grafting the top two-thirds and discarding the rest, I cut it in half and grafted the top normally and the bottom root upwards. After a few weeks the latter started to produce offsets.

. . . . . from Mrs. L. Teare

I have seven grafted specimens of Discocati and also three plants on their own roots. The temperature rarely drops below 5°C here in winter, so for most plants protection from the wet, wind and hailstorms is all that is needed, but I keep the Discocactus heated (along with the Uebelmannias and Melocacti). The Discocacti would survive without heat but the growth slows down too much.

A keen collector is in a difficult position in this country: importing has become a luxury and moreover few cacti on their own roots survive the harsh treatment they receive in quarantine. So virtually everything has to be raised from seed, but I have seen Discos here raised from seed and no bigger than a walnut at four years old, through being allowed to go bone dry in the middle of the summer. I put some seeds of Discocactus horstii and 26 seedlings came up, but it was too hot for them and now I have only 6 left. One has to try and get seedlings sturdy enough before December; with temperatures between 90° – 100°F at that time, or even over, the atmosphere is so hot and dry, small seedlings do not survive. I am now having to learn to grow cactus all over again!

'I have had a look at the spines on my plants but I cannot see any furrows or grooves on them, at all.

. . . . . from R. Moreton

Some time ago I acquired a plant of Discocactus W. 10, presumably collected by Warras; it was in a rather shrunken condition and it took me about two years of encouragement before it really became established. After seeing an illustration of D. cephaliaciculosus (what a mouthful!) in K.u.a.S. No. 5 for 1975, I gave it this name. The spines in the cephalium are indeed very real, but several other illustrations of Discocactus in K.u.a.S. and in the U.S. Journal also seem to show spines growing in the cephalium. Since seeing the illustration of D. tricornis (K.u.a.S. 1977 No. 9 p. 206) or even Discocactus HU 232 (C. & S. J. of America 1978 No. 3 p. 116) I begin to doubt this identification of my W. 10. More to the point, I begin to doubt the validity of the new names which seem to have been spawned by the hundred recently. I feel very strongly that many of them are not justified, although I think it must be accepted that there are a few new species.

The colour of the plant body is emphasised by J. Arnold; in W. 10 it is a dark green, possibly bluish-green, so would appear to be of the D. placentiformis group. I cannot say that I have noticed any particular grooving on the spines of W. 10.

DISCOCACTUS INSIGNIS **By Dr. L. Pfeiffer**

Translated from Allgemeine Gartenzeitung No. 31, 1837 **by E. W. Bentley**

For me a most interesting event in the first weeks of July 1837 was serveral successive flowers on a plant in the collection of Herr Schelhase that has been known for some time under the vague name of Cactus melocactus and up to now considered as appertaining to Melocactus placentiformis Lehm.

The most exacting investigation of the flowers shows the positive need to separate the plant from the genus Melocactus; but since the flower structure differs distinctly from that of other genera of cacti, it, along with some related species, form a new genus, to which I found myself bound to give the name Discocactus. While I shall later make known a more exact description and characterisation of this new genus and express myself in more details on the relationship of Discocactus insignis to Melocactus placentiformis, and Melocactis besleri Link & Otto, a note on this rare event might provisionally find a place here.

Already in the previous summer the 2" high and 7" diameter plant began to form a pale yellowish tuft of wool in the crown, which had some resemblance to the early cephalium of a Melocactus, but yet seemed to be much looser and not to have the lumpy build of a true cephalium. The wool had rather a resemblance to the brownish tuft formed initially by the buds of Echinocactus corynodes, but it remained unaltered all through the winter. This spring the apparent tuft became enlarged by the growth of new wool in the centre, so that at the beginning of July it was about 1½" in diameter and 1" high in the middle and therefore soft, almost fluffy, quite like a piece of sheepskin and surrounded by solitary, very sharp, blackish spines.

In this cephalium-like region there now showed itself one day — not right in the middle — a dark blood-red smooth shining bud, ½" in diameter, composed of tightly closed sepals. This bud reached a length of two inches within three days and opened on the evening of the fourth day. It began to open at about 6 p.m., reached its full expanse about midnight and closed again in the early morning, then drying up completely after a few days to fall off, the seed-case remaining hidden in the wool.

The completely formed flower exhibited the following appearance. From the wool emerged a 2″ long, ¼″ thick, smooth, dirty pink or flesh-coloured tube which is quite naked below, but one inch above the wool, is covered with calyx-scales. The lowest scales are five-sixths to 1″ long, one-eighth broad, brownish pink and bent back, the next progressively paler and longer, up to 2″, grooved, obtuse at the tip and bent back. Then follow the true flower leaves in two rows, the outer pale red on the back, the inner snow-white, 1½″ long, ¼″ wide, pointed, forming a funnel of 2″ diameter. The mouth of the tube is five-twelfths ins. wide with the rim surrounded by a ring of emerging stamens; the inner stamens are shorter and fixed further down in the tube, which they quite fill with their anthers, and are all very small, white, with quite small whitish anthers. The style was not visible in the open flower, was much shorter than the tube, ending ½″ below the rim, and thread-like below, becoming thicker above, brownish-flesh colour, with five very thin, pointed, ¼″ long flesh-red stigmas. A strong scent like orange blossom was noticeable while the flower was open. In appearance the latter was most comparable with that of Cereus flagelliformis.

About eight days later there appeared, just as quickly, a second flower of similar structure. Whether they will produce seeds, only the future will tell.

Comments

. . . . . from E. W. Bentley

In this article the writer uses two words which do not seem to appear in recent cactus literature written in German — "Kelchblatter" for sepals, and "Kelchschuppen" for the scales on the tube, which translates literally as calyx-scales. He also applies the term "rinnenformig" to the sepals, a word which translates literally as channelled. However, it is difficult to see quite how sepals can be channelled; the term used in the Latin description which appeared two years later in a Scientific Journal, is "canaliculata".

. . . . . from G. J. Swales

The Latin term "canaliculata" means longitudinally grooved, according to W. T. Stearn's "Dictionary of Botanical Latin", and I suppose that the German word "rinnenformig" will have a similar meaning. By longitudinally grooved I take it that the writer means that the two halves of the sepal are folded up slightly from the central vein. Are the sepals on some Discocacti folded in this fashion?

. . . . . from H. Middleditch

When Pfeiffer wrote his description of Discocactus, prompted by seeing the flower on Schelhase's plant, he noted that the plant had been in that collector's possession for some years. It must surely have been a very early example of this genus in a European collection, for Brazil had been virtually closed to botanical exploration prior to the emigration of the Portugeze Royal Court to that country in 1808. Yet the plant described and illustrated by Besler in 1613, later known as Melocactus besleri, is given as a synonym of Discocactus insignis by Britton & Rose in The Cactaceae. How did it come about that a Discocactus came out of Brazil at that time — i.e. about 1613?

This particular date falls outside the period 1624 to 1654 when the Dutch were in occupation of the north-east coast of Brazil. Does the original description by Besler offer any indication of the source of this plant? If so many authors have been prepared to accept that Discocactus insignis and D. placentiformis are synonymous, despite the clear distinction between the two illustrations of the original plants, how certain can we be that Melocactus besleri is a Discocactus? Is it not far more likely that Melocactus besleri is a Melocactus from the West Indies and has nothing to do with Discocactus?

Pfeiffer compares the external appearance of the Discocactus flower with that of Cereus flagelliformis. I would be inclined to agree that there are similarities both between the lengthy flower tubes and the reflexed scales which are distributed at intervals along the tube.

Although the official description of the genus Discocactus and of Discocactus insignis appeared in Nova Acta Physico-Medica, Naturae Curiosorum in 1839, a note accompanies that article to say that the Academy received the manuscript on August 20th 1837. The article by Pfeiffer which is reproduced above, appeared on August 5th 1837.

. . . . . from G. J. Swales

It is not altogether clear what Pfeiffer intended to convey in his 1839 article by the use of the word "receptaculo" — from which the flower remains eventually fall off. The current usage of this word may now differ from that intended by the writer. I suspect that he would be using this term as an equivalent of Buxbaum's pericarpel i.e. the structure surrounding and fused with the ovary. The Latin description of the genus would then indicate that the flower remains eventually fall off the fruit. Do we know whether or not the flower remains normally stay on the fruit in this Discocactus?

. . . . . from H. Middleditch

In the Cactaceae the flower remains are normally retained on the fruit. Few and far between are those plants from which the dead flower remains fall and leave only the fruit on the plant. In addition, the Discocactus boomianus (Chileans No. 28) is quoted by Buining as "flower remains attached to the fruit". Other fairly recent descriptions of new Discocati which are accompanied by illustrations of the fruit, also show the dead flower remains still attached. In Britton & Rose's "The Cactaceae", one finds neither reference to the flower remains being retained or being deciduous. Is it significant that any reference which may have been made by Pfeiffer to flower remains falling off the fruit, has been deleted by later authors who have the advantage of time and a longer experience of the normal habit of the plant?

DISCOCACTUS INSIGNJS

NOVA ACTA PHYSICO-MEDICA
NATURAS CURIOSORUM 1S,(1).1839

It is most fortunate that Pfeiffer himself has provided us with an explanation of how he came to describe Discocactus as having a fruit from which the dead flower remains fall. Perhaps it may be as well to recall that most European cactus writers of repute at that time would be reasonably familiar with the flowering and fruiting characteristics of Melocactus, where the fruit only appears outside the cephalium long after the flower has died off. Here we are dealing with a plant which had previously been looked upon as a Melocactus. At that time when Pfeiffer was writing his first description of Discocactus, it would seem that he was not aware of the type of fruit which it carried. What more natural than for him to assume that it would produce a fruit from out of the cephalium at some month's distance from the flower? Let us remember that there was no knowledge in Europe at that time of Micranthocereus, Austrocephalocereus, Espostoa, or any other cephalium-bearing plant other than Melocactus and the new Discocactus. Thus when the flower died and dropped off the plant, Pfieffer interpreted this as the dead flower having dropped off the "seed-case". One must assume that he opened a flower in order to examine and describe the stigma, which cannot be seen very clearly from an external examination of the flower alone; but perhaps he did not section a flower and hence find out that the ovary was long and thin and occupied a part of the flower which projected above the cephalium, unlike the ovary on the Melocactus flower. Did botanists go in for sectioning flowers at that time, I wonder?

The flower looks extremely odd on this Plate. How can the artist be looking into the mouth of the flower from his angle of view? Can it be artists' licence? And what an odd centre to the flower — surely the inner petals will not be that short when the flower is open? If I remember correctly some tall flowers on Gymnocalycium denudatum have shorter inner petals, but the difference in length is much less than shown here. I cannot think of any other Cactus flowers which exhibit this feature. Do we take any notice of this?

. . . . . from J. L. Arnold

The mystery surrounding D. insignis is fascinating and to me is tied up with the identity of D. tricornis. If you ever have a copy of the first description and picture of this, I would love to see it! I tend to agree with the author of the article in K.u.a.S. (dealing with this genus) that the species HU 347 represents a re-collection of D. insignis. It was called D. tricornis var. deflexispinus n.n. It is light yellow-green plant with spines exactly as shown in the Plate. The photograph in K.u.a.S. is a very good one. In consequence one does not have to use much imagination (if any) to consider all those similarly coloured forms which have been distributed as D. tricornis to be relatively minor variations of D. insignis. The spines are very similar in type and layout and most forms of the plant are not quite as spiny. Whilst I do not have a D. tricornis v. deflexispinus, I do have a flowering plant which fits the D. insignis spectrum. Acquired as D. tricornis, light green and fitting the drawing well, it is longer spined and these are also straight.

Now in addition to the foregoing there is another powerful reason for believing all these plants are part of a range and H. Middleditch has put his finger right on it — the flower. The flower on the Plate is identical with my D. "tricornis". It is indeed unique in having a flower where the petals are noticeably shorter towards the centre. It was something I noticed immediately my plant first flowered and no other plant has such an arrangement. I have two other yellow green D. tricornis but neither has yet formed a cephalium so I cannot say whether their flowers do indeed fall into this range, but I would be pleased to hear if anyone else has flowered it. Provided it is a plant that I consider to be D. tricornis, I am prepared to bet that the flower would be similar.

DISCOCACTUS nov. gen.

Translated by E. W. Bentley from Nova Acta Physico-Medica, Naturae Curiosorum, 19 (1); 1839 by Dr. L. Pfeiffer.

In the seed catalogue of the Hamburg Botanic Gardens for 1826, Prof. Lehmann described a Cactus placentiformis, and later offered a more precise description along with a figure in Nov. Act. Acad. Leop. XVI P.I. p. 318. In a paper published by Link and Otto on the genera Melocactus and Echinocactus in 1827 in the Proceedings of the Horticultural Society for the Prussian States. Vol. 3, may be found Plates XXII and XXIII followed by the description and figure of a Melo. besleri to which Cactus and melocactus Besl. H. Eystet and Cactus placentiformis Lehm. are attached as synonyms. However, closer study of the Besler picture makes it seem without doubt that this is not the same species that was to be found in the Berlin Botanical Gardens. Also, between the Melocactus besleri and the Cactus placentiformis are to be found several differences — both in the descriptions and the figures. However, since the old plants were later lost these differences could not be adequately confirmed and the name Melocactus placentiformis has been accepted for both. In addition, the Berlin plant with its solitary observed flower — of which no picture exists unfortunately — seems to correspond with the Hamburg one.

If one compares the two descriptions:

Cactus placentiformis hemisphaerico-depressus, 12-angulatus, spinis crassis sulcatis inaequalibus patentissimis, vertice florifero distincto hemisphaerico-depresso spinuloso.

Melocactus besleri caule depresso viridi, costis 14 obtusissimis, spinis 8-12 inaequalibus, recurvis, validis outset.,

It emerges first of all that the far larger specimen in Hamburg had only 12 ribs but the smaller in Berlin had 14, while in a given species it is more usual to find that in a larger specimen there grows a larger number of ribs. Then the eight spines in Cactus placentiformis according to Lehmann are deeply grooved, which is not observable in M. besleri which has 8-12 of them; finally the wool in the crown of M. placentiformis is spread out and flat, according the the drawing almost as in Echinocactus platyacanthus, whereas it is roundish in Melo. besleri.

Besides these forms there now exists in Herr Schelhase's collection a plant still living, which up to now has been considered to be Melo. placentiformis. This has now, in July 1837, flowered for the first time and from its flower structure gives rise to a new genus of the cactus family, which stands between Melocactus and Echinocactus. I call it DISCOCACTUS.

Calycis tubus ovario adhaerens, basi nudus, indivisus, e sepallis apice liberis connatus. Petala numerosa, corollam formantia infundibuliformem. Stamina filiformia, extima petalis aequalia, intima breviora tubo calycinali affixa; Stylus clavatus. Stigmata 5 elongata lineria.

Fructices simplicissimi, disciformes, costati et aculeati. Cephalium in vertice spurium, e lanugine molli, nec e tuberculis pilosis (uti in Melocacto) constans. Flores e lana verticis proveniumt, tubo glabro longe prominente, nocturni, decidui receptaculo remanente.

Characteristics of the genus: Calyx tube adherent to the ovary, naked at the base, undivided, consisting of fused sepals free at the tips. Petals numerous, forming a funnel-shaped corolla. Stamens thread-like, outermost equal in length to the petals, innermost shorter attached to the calyx tube. Style club shaped. Stigma lobes 5, elongated and linear.

Completely unbranched shrubs, disc-like, bearing ribs and spines. False cephalium at the growing point, consisting of soft down, not of hairy tubercles as in Melocactus. Flowers arise from the wool at the top, the glabrous tube projecting a long way, night flowering, the flower remains eventually falling off from the receptacle.

Discocactus insignis Nob.

D. pallide virens, infra lignosus, disciformis, costis 10 obtusis repandis; sinubus profundis acutis; areolis tomento flavescente instructis, mox nudis; aculeis 7-8 rigidis, adpressis, rectiusculis, nascentibus diaphane atrosanguineis, dein nigricantibus, tandem griseis, valde inaequalibus, supremis 2-3 parvulis gracilibus, 4 lateralibus maioribus, infimo deflexo, rigidissimo, dorso carinato.

Habitat in India occidentali?

Planta florifera 2 poll. alta, 8 poll. diam. Costae 1½ poll. latae. Areolae 8 lin. distantes. Aculei valde inaequales, supremi 3 lin., laterales 6-8 lin., infimus 10-12 lin. longus. Aculeus centralis in uno tantum totius plantae fasciculo reperitur.

Cephalium e lana molli densa, albida, pelli ovino simili, constat, ad margien spinis solitaris nigris acutissimis instructum, 1¾ poll. diam., medio 1 poll. altum.

Flores plures, vespere aperti, per unam noctem durantes, suaveolentes, albidi, corolla infundibuliformi (2½ poll. diam.) tubo basi glabro (2 poll. longo) adnata. Sepala carnea, linearia, canaliculata, apice obtusa, reflexa. Petala lanceolata, biserialia, nivea, exteriora dorso rubella. Stamina alba, antheris minutis albis. Stylus staminibus multo brevior, clavatus, fusco-carneus, stigmatibus 5 acutis elongatis.

A pale green Discocactus, woody below, disc-like; having ten blunt ribs with slightly wavy margins; the sinuses between deep and acutely angled; areoles with pale yellow wool, soon becoming bare; spines 7-8 rigid, adpressed, fairly straight, at first translucent dark blood red, then blackish, finally grey, distinctly unequal in length, the upper ones 2-3 in number, slender, very small, 4 larger laterals, the lowest one bent downwards, very rigid, keeled below.

Habitat — West Indies.

Flowering plant 2ins. high, 8ins. diameter. Ribs 1½ins. wide. Areoles 3¾in. apart. Spines markedly unequal, upper ones ¼ins., laterals ½in.-⅔in., the lowest ⅝-1in. in length. A central spine is found in only one spine cluster on the whole plant.

The cephalium consists of a dense, soft, whitish wool, similar to sheep's wool, and bears around the edge very sharp solitary black spines. The cephalium is 1¾ins. diameter and 1in. high at the centre.

There are several flowers, opening in the evening, lasting for one night, sweetly scented, whitish, corolla funnel-shaped (2½ins. diameter) fused into a tube at the base and glabrous (2ins. long). Sepals flesh-coloured, linear, longitudinally grooved, blunt at the tip, reflexed. Petals lanceolate, in two whirls, snow-white the outer ones reddish on the back. Stamens white, the very small anthers also white. Style much shorter than the stamens, club-shaped, brownish-flesh coloured, with 5 acute elongated stigma lobes.

Discocactus lehmanni Nob.:

Cactus placentiformis Lehm. l.c.

Differt a praecedente auleo centrali et sulco profundo aculeorum, praeterea cephalio plano et floris tubo ad basin usque squamis calycinis instructo.

Syn. Cactus placentiformis Lehm.

Differing from the preceeding plant in having a central spine and a deep groove in the spines, and in addition to this, a flat cephalium and flowers with tubes bearing calyx scales right down to their bases.

Discocactus linkii Nob.:

Melocactus Besleri Link et Otto l.c.

Differt a Discocactus insigni costis numerosis, obrepandis, obtusis, aculeis magis curvatis, supremis multo maioribus, centrali nunquam deficiente.

Syn. Melocactus besleri Link and Otto.

Differing from Discocactus insignis on account of the numerous blunt, obrepand ribs, the more curved spines, the

uppermost of which are much larger, and the consistent presence of centrals.

From what has been said, it cannot be doubted that these species can in no way be reckoned as Melocactus, since the main characteristic of this genus — the true, tuberculate cephalium — is lacking. One is perhaps reminded by the external appearance of the flower and its nocturnal, short, duration, as also by the orange-blossom-like scent, of the spherical Cereaneae; that they do not belong to that group is proved by the flower position in the crown and by the position and structure of the inner floral-parts. The new genus remains most nearly related to Echinocactus from which however it differs in the solitary nocturnal-flowering and the falling-off of the withered flower from the seed-case, as well as in the points detailed in the description of the genus.

Comments on the original description of Discocactus

. . . . .from Dr. G. Pabst. (Rio de Janeiro).

Can you please obtain the original first description of the Brazilian Discocacti, for use in the Herbarium Bradeanum?

. . . . .from E. W. Bentley

The original diagnosis for Discocactus insignis gives the habitat as the "West Indies", to which is appended the following footnote: "Herr Schelhase received some years ago several plants under the collective name Cactus melocactus, among which were found a few Melocactus communis, one Melo. meonacanthus and this Discocactus."

. . . . .from G. J. Swales

The original diagnosis for Discocactus insignis would appear to be in two parts, the first part perhaps being the diagnosis proper, which is then followed by a somewhat more detailed description. This is rather after the manner adopted by one or two present-day authors who give the requisite Latin description for a new species which they are describing, then follow with a rather more "chatty" description in the vernacular. However, in the case of D. insignis, Pfeiffer wrote both the diagnosis and the extended description in Latin.

I am not too happy with the word "thread-like" as a translation of the Latin description of the stamens in the genus Discocactus. Again, although the original does indeed state "hairy tubercles . . . in Melocactus" I would have thought that "hairy areoles" would have been more appropriate.

At first sight, the use of the word "shrub" would seem to be rather out of place in a description of a cactus plant. However, many botanists are inclined to divide all living plants into three basic types — herb, shrub, or tree. The word "shrub" is therefore used by Pfeiffer to distinguish this plant from a herb or a tree. Although it could hardly be considered as a tree there is the observation "woody below" in the description of D. Insignis, so there would be a tendency for a botanist to regard it more as a shrub than as a herb.

Under the heading of Discocactus insignis, the writer describes the "sinuses" between the ribs as deep and acutely angled. Here he is referring not just to the groove right at the base of the ribs where two ribs come together, but to the furrow between adjacent ribs, which includes the lower part of the sides of the adjacent ribs.

There has been a previous comment on the use of a "line" (appearing as "lin." in the Latin) as a mode of measurement and the difference between an English line (twelve to an inch) and a French line (ten to an inch). The linear measurement poll, pollexis, which is strictly the length of the last joint of the thumb, but when used in botanical descriptions is equivalent to one inch.

Under the description of D. linkii the ribs are described as "obrepand". There is no amplification of this term in Stearn's "Dictionary of Botanical Latin" and I find considerable difficulty in conveying the meaning of this particular term with any other word or phrase.

In his description of D. insignis. Pfeiffer observes that "there are several flowers"; this would suggest that the plant or plants which he had seen to flower or had known to flower, produced more than one flower together. Do Discocacti usually have more than a single flower out at one time?

. . . . .from H. Middleditch

The term "thread-like" would seem quite appropriate to apply to the stamens of Discocactus, particularly if one recalls that Buining noted exactly the same sort of feature in his own description of D. boomianus (Chileans No. 28). However, it may be that this term would apply to certain of the Discocacti which are in cultivation today but not to all of the present day species of this genus.

Finally the "obrepand" ribs on D. linkii. My copy of Marshall and Woods "Dictionary of succulent plant terms" tells me that obrepandus means "reversely repand". This does not make me very much wiser, so I look further under repand, which means "having a gently wavy or fluted margin: undulate". Does this help?

. . . . .response from G. J. Swales

Regarding "obrepandus", I am not quite clear how one can have a "reversely wavy margin".

. . . . .further from H. Middleditch

I trust Dr. Pabst will find the original description of the Brazilian Discocactus of value, but we are left with one or two unresolved queries and problems. Precisely what did the author have in mind when he described the Melocactus as having "hairy

tubercles"? Why did he describe Discocactus as having a "false" cephalium? And as for the "deep groove" in the spines of D. lehmanni, was this a longitudinal groove? Or was this some peculiarity of an individual plant, never to be seen again, so that eventually all authors from Schumann, through Britton and Rose, to Backeberg, placed both D. insignis and D. linkii as syonymous with D. placentiformis?

SOME NEW REBUTIAS By P. A. Smart

Having taken a good long look at the twenty seven new Rebtuia species described by Ritter in the German Cactus Journal Ku.a.S, for April 1977, I view them with mixed feelings. On the one hand it is great to have information with which to identify various names and numbers at last. On the other hand, I suspect the motives behind this fearsome mass-production of "valid" species. For quite a while I have been concerned about the number of new names being erected for what — on the surface — seem to be merely flower colour (or, more accurately, shade!) variants on Digitorebutia pygmaea. I have only made a detailed examination of the translations of a few of the new Ritter diagnoses so far, but there seems to be some new "pygmaea" here too! As a cynic, I am forced to wonder whether Ritter — who has kept us all in the dark about his discoveries for so long — has simply made an attempt to beat Rausch in the publication of new names. I am sure that they have collected the same "new species" somewhere in their travels. I have not had an opportunity yet to compare habitats but even this research may not be conclusive; for example, R. pygmaea seems to have a very wide distribution area anyway.

It is not easy to assess the distribution pattern of the Rebutinae in any case, for there is much overlapping even though the groupings of the Buining and Donald classification look orderly on a small map. In particular, the Aylostera and Digitorebutia habitats appear to have a very extensive north-to-south span. It is only to be expected that some species characteristics will overlap the artificial classifications which we invent.

Most of the names listed by Ritter (or the field numbers) have been around for a while; I have plants bearing over half of these names or numbers, so I should now be able to weed out the wrong 'uns. Or shall I? Some of the descriptions are inadequate, to say the least! On the other hand I am always a bit wary of translations — I get the strong impression that some words and phrases are literal translations of colloquial expressions. Perhaps some of our dictionary translations from the Latin are not quite what the original author had in mind?

Anyway, here goes with a few preliminary observations on a few of these new Ritter names. Rebutia violascens does appear to be a new species and pretty well matches the plants which I have grown from Uhlig seed and other sources. Rebutia roalbiflora var. amblypetala — the description is so close to the species that I wonder whether a minor difference in the petal shape is a justified excuse to present another name. However, I have not grown it, so there may be other more significantly different characteristics. My own seed-grown R. roalbifloras do not have exactly broad-obtuse tipped petals — but they are not far off! Some argument is liable to revolve around FR 757a, R. odontopetala. John Donald has expressed the view that this is a variety of R. patericalyx FR 757 and also said that it has "pink" flowers. My own plant was bought as FR 757a as a graft of continental origin, some years ago now. It has a flower form and colour within reach of both this description and that of R. patericalyx. It is surprising that with these adjacent field numbers, Ritter does not give any indication of relationship between the two sorts!

Pretty common in collections are two varieties of R. mamillosa, FR 341a v. australis and FR 1138 v. orientalis, but I don't seem to remember seeing any variation in the plants behind the labels. I have long since considered them to one and the same sort. However, the strange habitat locations and the varietal relationship to R. mamillosa prehaps pose a new problem: I have not grown R. mamillosa and so I cannot compare it with these two Ritter plants, but I have read the description of R. mamillosa and from that I never suspected any connection with my FR 341a and FR 1138. Another plant which I have had for some years is FR 1108, R. mixticolor; one obvious point of similarity between the description and my plant is the word solitary! It took at least 3 to 4 years for my plant to offset — and then it only produced a solitary one, which is now detached and rooted down. Looking at the description of FR 1106, R. colorea, I suspect that it is just another R. pygmaea flower variant.

I do have a few seedlings of R. tarvitensis FR 773; they exhibit a strong similarity with the very weak Ritter description except (again!) in the flower colour. John Donald refers to it as pink and the photograph in Ashingtonia verifies this. The flower on my plant is a deep purplish red, which could just fit Ritter's R. miniata. For what seems to be a very distinctive species, the description is pathetically short! Unfortunately I haven't yet obtained a plant of R. melachlora which Ritter uses as the basis for comparison, in his description. Then FR 768 is now described as R. nogalesensis, and every time I have seen this name in print alongside the number FR 768 it has been spelt R. mogalesensis. Which is correct? If Ritter is correct, can he change it back to nogalesensis on the grounds of it being a typographical error, or must it stand under ICBN Rules? If the plant which has been available for some time under this name and number is correct, then I can only marvel at Ritter's inability to flower it and set seed!

Another plant which has been around for some time as FR 762b R. kupperiana v. spiniflora, usually as R. spiniflora FR 762. I heartily agree that it is related to R. kupperiana — so closely related, indeed, that I do not see any justification for varietal status. I have always considered it to be R. kupperiana, but as I have never done a feature-by-feature comparison I am not so sure whether the floral spines are common to both. Also quite common in collections is FR 761, R. albiareolata, but at least two sorts of

plants appear under this name and number! I have noticed a distinct change in outward appearance as the plant gets older and am beginning to wonder whether the really white (wooly?) areoles are more obvious on very mature specimens. They are certainly not very obvious on young seedlings. I think that my oldest plant is probably 5 to 6 years old from seed and is just beginning to justify the name — but only just! Because I have always doubted the authenticity of the plants I have not studied them too closely — yet.

The description of R. fusca is most appropriately timed as I have recently been discussing this plant with correspondents. Prior to seeing this description I had assumed that R. fusca and R. fuscata were just spelling variations of the same name, although there are indeed two distinctive plants going round under each of the two names. The last batch of seed produced plants like Ritter's description of FR 940 R. fusca. The plant which came to me from the continent identified as R. fuscata, bears some resemblance to R. torquata. This latter is a distinctly puzzling plant, with the habit of a Digitorebutia, spination of an Aylostera or Digitorebutia, and bright orange Aylostera flowers. The flowers are not of the albiflora/muscula/complex either!

In general terms, a lot of Ritter's new descriptions are too sparse to be of any real value, although sufficient to show up many anomalies between the descriptions and plants in cultivation under those names. More comparative studies are obviously required. Meanwhile, I would like to hear from anyone who has a plant of either FR 757, FR 757a, Digitorebutia patericalyx or R. patericalyx var. odontopetala.

THE PLANT CLOCK From J. Hughes

During March 1975, I collected a number of cacti when visiting Peru and these were duly planted up in early April, on my return to England. The performance of one plant, a Lobivia from Puno, the major city on the Peruvian side of Lake Titicaca, interested me. Rooting and growth of this plant (approx. 4ins. diameter) commenced almost immediately, and continued throughout the summer. I was surprised to see buds on the plant in the October of 1975. I was fortunate in making a trip to the reference collection as Ashington at the end of October and was interested to compare my plant which was then flowering with plants of the pentlandii complex which were also in flower. I was informed by Terry Hewitt that these plants had been recently imported from the Lake Titicaca area. The flowers of my plant and those in the reference collection both had very characteristic red and yellow bicoloured flowers (perhaps these were L. maximilliana?)

In the spring of 1976, I was surprised to find buds developing again on this Lobivia, which commenced opening in early May. On visiting the reference collection in mid-May, I was able to locate the pan of imported plants I had studied some six months before and was surprised to see that these, too, were flowering. It seems clear to me that the buds on my plant were not undeveloped buds left over from the autumn and it raised in mind the question, just how long does it take plants to readjust their blooming cycles when moving from the southern hemisphere to the northern? Now I wonder if any one is able to give me an answer to the following questions? When do plants flower in habitat, and in which particular season? Is the rainy season the controlling factor? Which species alter their flowering clock to norther hemisphere summers? I believe for example that Matucana aurantiaca typically flowers in the autumn, whilst Matucana currundayensis flowers in the spring. Why? Are their flowering times different in habitat, and if so, why is this?

. . . . .from J. R. Gooch

I am particularly interested in this observation, as I too purchased two of the plants from S. Peru from Clive Innes. They are indeed of the maximilliana group. Unfortunately mine did not flower that season, but did flower freely in the following spring. They did, however, make appreciable growth. All the imports I have had seem to settle down very quickly to our season, i.e. I cannot recollect any import potted up in our spring, failing to establish and grow with the arrival of warm weather, and these would be predominantly plants from the Southern hemisphere that might be expecting a period of rest.

There are none-the-less one or two species that do appear to have a recognisable surge of growth later in our summer and persist in producing flowers at that time. The foregoing observations on Matucana aurantiaca and M. currundayensis are borne out by my experience also. Many other Matucanas seem to be less certain when to flower and will often produce a flush of bloom in the spring and then again in the autumn — a very welcome bonus for us. When do the plants in habitat under what conditions?

Another example of what I might casually refer to as an incomplete adaption can be witnessed with my own extensive collection of Lobivias. As far as is practical, the plants are set along the staging in order, north to south as they occur in habitat. Those plants originating in central Peru invariably being first in flower. Then, very broadly, flowers appear in sequence through Bolivia and finally to central Argentina. Naturally one can find exceptions, but this general pattern is quite clearly discernable. While I can understand well enough that the climate will warm up from north to south as the season progresses over the countries concerned, it is a puzzle why the plants should not bloom more or less simultaneously under the identical conditions in my greenhouse.

. . . . .from J. Hopkins

Regarding the "plant clock" I think that the questions posed by J. Hughes are very relevant. We don't know enough about precise flowering times and the climatic effect, if any, on these flowering times. Thus many seed raised Neoporterias can be seen flowering in our collections in November/December (irrespective of their treatment during the rest of the year), while others

flower in June or earlier. My own Lobivias all flower in May/June, but sometimes a few plants will continue to push out the odd flower or two in later months even to as late as October. Imported Sulcorebutias, Weingartias, and Parodias seem to flower in June whilst some Matucanas often develop flowers later on, around August/September. So I would endorse Jim Gooch's comments that most plants seem to settle down very quickly but Matucanas and Neoporterias may be somewhat aberrant. I have no imported Neoporteria material to compare with seed-raised plants.

. . . . .from R. Carter

I find that almost allmy South American cacti seem to grow quite well during the early part of the summer and also in early autumn, but growth seems to come to a halt in the hottest part of midsummer. Having tried giving my plants rather less water at the height of the season, I now give them little or none for about a month or so in the middle of summer. But they get plenty of water when they are in active growth up to, and after, that period. Perhaps this is the way they grow in the wild — after all, it must be pretty hot in the middle of summer where the cacti grow in South America.

. . . . .from R. Ferryman

I think that a fair number of cacti rest during the summer — or at least during part of it. Whether one should withold water depends on prevailing conditions — as does the length of the rest. The very fine summer of 1976 saw several plants taking a nap, but as the greenhouse was constantly burning up I continued watering or at least putting the pots in trays of water to keep the roots cool. Those that dried out did scorch, Copiapoas and Matucanas particularly. It was quite different in 1977, being fairly cool and I did notice several plants took far longer to dry out than normal.

I have had a fair number of imports to establish and have had very little trouble in getting them away no matter when they came in. Many Neochilenias that have arrived during the summer fail to flower next spring, but the following spring are flowering along with the rest. Now with regard to flowering times graduated over the season, the Neochilenia grow in a long, narrow band arranged in a fairly straight north-to-south direction; however plants from Arica in the north (N. aricensis) flower at the same time in cultivation as those from near Santiago in the south (N. andicolus, etc.) I cannot say that I have seen any graduation in flowering times which could be related.

. . . .from H. M. Middleditch

But the coastlands of Chile from around Santiago as far north as Arica enjoy a most remarkable uniformity of climate for such a great spread of latitude on account of the Humboldt current flowing close to the shoreline. On the other hand, the high Andes enjoy no such ameliorating influence and the season will advance southwards with the annual migration of the sun. Hence we might reasonably expect more signs of seasonal response from Lobivias from the high Andes than from Neoporterianae from the coast of Chile.

If the "Plant Clock" was responsive only to day (or night) length, we would expect to see growth or flowers in cultivation in accordance with the calendar. If the "Plant Clock" is responsive to factors such as day (or night) temperatures, or daily heat intake, which are largely controlled by the march of the sun in the wild, then the plants will respond when that threshold is reached in cultivation, irrespective of the calendar. It is probable that both factors influence plant response.

BOOK REVIEW Friedrich Ritter. A 40 Year Life of Adventure and Understanding Nature. By G. Raz

Translated by E. W. Bentley from G.O.K. Bulletin (Austria) Feb. 1978.

"Ritter's Book" — foreshadowed for so long in discussion amongst cactus growers and in articles on cacti. Now it is here. For me, as a collector of cactus literature, a must.

During my first trip to Holland in 1973 I heard that the book was finally printed. In 1977 it was the same. But is it even now the "Ritter Book"? After all one expected a series of first descriptions of plants that circulate under FR numbers, possibly only briefly mentioned in various cactus publications. Only they are not here. Also photos of cacti are missing except for three or four. He who interests himself in "Culture of the Indians in their environment" and racial explanations and anthropological matters is not often disturbed by reading gleanings of other observations, when in this place or that place a cactus is collected which is later named after it (without any description) or fruits are gathered.

The use of the original diary text chops the book into short travel episodes. The style of writing is not attractive, the use of the old fashioned "e" in the third case (auf dem Dache . . .) is uncalled for. The print make-up of the book is equally off-putting. For the experts: Petit Helvetica, Borgis taper, 24 Cicero wide; for laymen: 11cm long line of letters of the sort that are used in the inside cover of K.u.a.S. for the "Frontispiece" column. A type and type-size that is suitable for technical descriptions and scientific papers, but not for a 315-page "adventure book".

It must not be denied that since the year 1921 Herr Ritter has performed very great physical feats, that much courage must have been required for his journeys and that he has made known and available to us many species of cacti as a result of his industry. But I am still waiting for a cactus book. Will it come?

I have had bound in a book all the Winter seed lists from 1954 to 1962. The descriptions and pictures in it are a comprehensive cactus work in comparison with the "Ritter Book".

Comments

. . . . . from E. W. Bentley

Disappointed to hear that Ritter's book really isn't — after all that waiting! This just confirms what I have always thought of him.

. . . . . from H. Middleditch

When I first started to try and find out something more concerning South American cacti, I expected that a nice complete set of cut and dried names, pictures, and descriptions was the ultimate objective. It took me a long time to realise that this would be quite useful, but would tell me little more about the plants. It has taken me longer still to realise that most collectors in the field have very little idea of the identity of the plants when they dig them out of the ground — many are identified later, at base camp, or much later when back in Europe by checking with descriptions and with other specimens in cultivation. Furthermore, few collectors tend to correlate their findings with those of other collectors — the correlation work is usually the province of an "armchair" collector who studies the notes and material from various field collectors.

In just this way, when Lawrence Bruner decided to correlate existing descriptions and speciments of the Bee genus Andrena, he "soon ascertained that the various authors who had established the already recorded species had used different characters upon which to base their descriptions. The use or choice of distinct characters by the various authors when describing their species made it very difficult to decide upon the principal features of the proposed synoptic key. After several vain attempts at employing structural characters for the separation of the main groups, secondary characters were employed instead. This choice was made necessary because various authors when characterising their new species had overlooked many of the structural characters now used in the limitation of forms" (Trans. Amer. Entym. Socy. XXIX 1903).

Hopefully there could be more useful information in the "long awaited Ritter Book"; but for correlation with other collectors' material, there is no viable alternative to studying plants now in cultivation and digging in the available literature. To this end, I find my copy of Ritter's Book quite useful in its own way, like many others standing beside it on my bookshelves.

. . . . . from G. J. Swales

With due respects to members' opinions expressed above, I really cannot see any point in publishing the translation of this so-called "book review". I would suspect that in the true spirit of European camaraderie it was written by Ritter's arch-enemy who took great delight in doing a "hatchet job". In speaking of the book, the reviewer says that "the style of writing is not attractive", a remark that could well apply to parts of this review. The type and type size is criticised as unsuitable for an adventure book; why then should it be "suitable for scientific papers"!? I feel compelled to observe that the "review" is not much better than rubbish.

. . . . . from The Editor, G.O.K. Bulletin, April 1978

Comments have poured into the Editorial office of the Bulletin about the Book Review by Herr Gunther Raz, regarding the new publication of Friedrich Ritter. It all seems to be a hornet's nest again and before I am ready to enter the fray concerning this contribution accepted for the bulletin, I must draw attention to the following.

In the February issue of K.u.a.S. there appeared under the heading of New Publications, the announcement of Friedrich Ritter's "40 Jahre Abentteuerleben und die wilde Weisheit" with the words "Expectantly awaited. After an account of his adventurous experiences as a mineral surveyor in the wilds of Mexico, the well known cactus authority writes in detail about his adventures on the hunt for cacti from North America to Patagonia". These words were omitted from the repeat announcement which appeared under the same headline in the March issue of K.u.a.S.

Concerning the February issue I am inclined to believe that the latter part of the small print wouldnot come from Herr Friedrich Ritter in any case, but the word "Cactus-hunt" was accepted unintentionally by some other person in ignorance of its significance, at most perhaps for advertising ends. In regard to the Banner Headline, as it appeared literally in the March issue of K.u.a.S., one can in no way deduce from it that it is representing a Cactus Book, i.e. that it must be the long awaited publication of Friedrich Ritter's book about cacti.

Before any further comments are published on this theme, may I request pertinent contributions to the discussion on the subject concerned.

CHILEANS' '79 AUTUMN WEEKEND

We have heard from our member in Buenos Aires that he will be able to join us at our '79 Autumn weekend when he will talk about cacti in Argentina and also show us some slides of plants in habitat. This will afford an opportunity to discuss Trichocereus, a genus well represented in reference works but seldom featured in Cactus Journals.

Our member from Buenos Aires has not confined his field studies to Trichocerei — we have Rebutia gonjianii Kiesling sp. nov; in the original description there are comments that this plant would fit into Mediolobivia sensu Backeberg and at the suggestion of P.A. Smart we propose to discuss the Mediolobivia group of plants. We would like participants to bring along plants and slides, together with observations of the fruits and roots of plants within the genus Mediolobivia Backeberg, especially the Fric Cylindrorebutias with specific names such as: einsteinii, karreri, rubriviride, steineckii, nicolai, Lau 476, Lau 477, gonjianii, smiedcheniana, R 578.

Other plants of Backeberg's Mediolobivia, often to be found in collections as Digitorebutia, would be of interest, e.g. M. aurei flora and its forms, M. pygmaea, M. pectinata, M. euanthema/costata, M. ritterii and Mediolobivia brachyantha.

We hear from M. R. Holland that he intends to try some time lapse photography on flowers — we look forward to hearing how this was tackled and we may also be able to see some of the results. Should his Discocacti again be forthcoming with flowers this season, J. L. Arnold anticipates that he will be able to make observations and talk about his findings; slides of Discocacti flowers and especially flower sections will be welcome, to support the discussion. G. J. Swales has been busy examining a host of Gymnocalycium seed from the Microseminae group and expects to be able to tell us whether or not the size and shape of the seed is similar throughout this group.

Conerning the group of Notocactus to be featured this year, Graham Charles observes: "About the group of Notocacti around N. Mueller-melchersii, if we are to think of flower form, then I should say that N. rutilans, mueller-melchersii, mueller-moelleri, orthacanthus and allosyphon all have "mammulosus" type flowers. Now both N. herten and N. buiningii have flowers with a different stamen disposition and I would be inclined to miss out these last two. We really cannot exclude N. mammulosus, submammulosus, and pampeanus (whatever they all are!) We may also be able to include N. schlosseri here. Perhaps we should ask Jim Gooch to bring along slides of his N. roseoluteus flower which is supposed to have a flower like mammulosus. So I feel the list should read: N. mammulosus, submammulosus, pampeanus, rutilians, allosyphon, orthacanthus, sichlosseri, mueller-melchersii, mueller-moelleri, roseoluteus (also N. Winkleri and veeniamus — H.M.).

"Please encourage everyone to bring lots of plants of these species, so we can see variation, wrongly named plants etc.; I also much enjoyed the floor map used for Sulcorebutia at the '78 weekend and I should like to see this featured again for Notocactus. Regretfully, the precise localities are often not clearly defined, especially for the older names, and I also imagine that many species are widely distributed. We will need as many original descriptions as possible to hand to prepare for that side of it.

"I have never seen any yellow stimga lobes on any of these plants, but other members may come up with some. Harry Middleditch commented about "the neatly wrapped" buds on many of these plants in my collection, this may be a common feature. I like the idea of looking at seed and will try and acquire representatives examples and approach Francis Fuschillo to ask him to prepare some of his slides for us to look at. But, above all, we should ask other members to take photographs and bring them to Brooksby together with their plants — the more the better."

Naturally we also hope to hear from our two members who were out in Bolivia late in 1978 to see some of their habitat slides. We also look forward to participants bringing along plants of Copiapoa to lay on the one inch to one mile floor map of northern Chile.

Booking or enquiries to Mrs. M. Collins, 11, Tudor Gardens, Upminster, RM 14 3 DE. An S.A.E. would be appreciated.

SCENTED CACTUS FLOWER

. . . . .From P. A. Smart

So, someone has been telling you that they could discern a scent on Sulcorebutia flowers? At first I thought that you were pulling my leg, but after considering the possibility I have to admit that my nose is not all that good! I will certainly check this feature this year. I usually rely on the really sweet scented flowers such as some of the Pelagonium species, Glottiphyllum fragrans and Echinocereus chloranthus to remind me that some of our plants have scented flowers, but I have never dreamed of sniffing a Sulco flower! Your comment does, however, make me think. What causes the scent in a flower? As a breeder of bloodhounds I know that "scent" is the product of the vapourising of certain oils exuded by the human body. What aromatic essences exist in flower organs, though? There must surely by some, as I believe that it is these hydrocarbons which are distilled as the basis of many perfumes. Can anyone shed some light on this?

. . . . .From J. R. Gooch

Scent on Sulc rebutia! I have never managed to detect any on a Sulcorebutia or Weingartia flower and I believe most forms have been close under my nose at one time or another. This will be a difficult one to tie down as where one person will find scent another will find nothing and their roles may be reversed with another plant.

. . . . .From M. J. Boote

On entering the greenhouse of a local collector we were assailed by a quite distinct scent. There were several plants out in flower so we started to give each of them a sniff, quickly finding that the source was a Notocactus Uebelmannianus. This carried four widely open flowers of the purple variety. There were five of us in the greenhouse and everybody could detect the scent without any difficulty.

. . . . .From B. Plunkett

Although I have been able to flower the purple-blooming sort of Notocactus uebelmannianus I have never ben aware of it producing any scent.

. . . . .From Mrs. L. Teare

I have been able to detect a scent on Copiapoa scopulina, although it is difficult to give it an identity. On the other hand, the scent from flowers of Weingartia multispina was reminiscent of lilac blossom.

. . . . .From P. H. Sherville

Following on from the article about Eriocacti in Chileans No. 30, I can now amplify my comment on the scent of Eriocacti. I have checked both E. Claviceps and E. Leninghausii and neither were scented; but E. Magnificus was quite well scented — a sweet lemony scent. So it is quite possible, if E. warasii is between these last two, that it would have some scent, which would of course suggest a different pollinator, or more competition for then then-existing pollinator from other plants. The E. leninghausii has produced a total of 81 flowers so far this year; they seem to open in batches much like the Matucanas and Submatucanas do. There are nine out together as I write and the best so far is 38 out simultaneously!

. . . . .From G. J. Swales

The source of scent in flowers is the essential oils, which are most probably contained in the petals. It is very likely that these oils are emitted by the flower in the form of vapour and it is the vapour which we are able to smell. There seems to be very little information about flower scent, whether or not there are any special glands to excrete it, or where they may be situated.

THOSE BLACK PATCHES AGAIN

Following previous discussion in the pages of The Chileans, the Commonwealth Mycological Institute at Kew was approached and they offered to examine and comment upon any specimen exhibiting this rather peculiar black patch. This disfigurement is usually only skin-deep and is suspected of being a fungus. After hearing from the Institute, those members who had reported the problem were contacted, only to find that they had burnt or otherwise eradicated the complete offending specimens and some time elapsed before a further sample became available. This was sent to the Mycological Institute who reported that it was a penicillium species.

. . . . . from G. J. Swales

I would be rather surprised if the offending black patch was indeed a penicillium species. It would seem far more likely that the penicillium identified on the plant body had simply arrived there adventitiously and was not directly associated with the black patch.

. . . . . from P. Bourdoux

It may be interesting to know what this "black fungus disease" really is but I would think that it is far more important to know an efficient cure. Although I do not have this same trouble in my own collection, I would suggest trying one of the following remedies which are harmless to the plants: 1, Potassium permanganate $KMnO^4$. A dilute solution in water-one or two crystals sufficient to colour a small flask of water to a deep purple colour. Paint the black spots with a soft brush 3 times at intervals of 3-4 days. 2. Mercurochrome: solution in water, treatment as the foregoing. 3. Mercurochrome: solution in alcohol, again the same treatment. 4. Iodide: one or two crystals of Iodine diluted in alcohol, methyl alcohol or surgical spirit to obtain a pale brown solution. Never used diluted Iodine tincture which contains Potassium iodidate KI, which could harm the plants. Treatment as before. 5. Hydroxymercuridibromofluorescein: dilute one gramme in 50cc and apply in the same way. 6. Pimafucin which is a medical dispersion of notamycinum-pimaricinum at a concentration of one gramme in 100c.c. of water. 7. Mycolog which is an ointment of a type similar to "vanishing cream". Apply once in a very thin coat with an artists paint brush (not too soft) and rub gently. 8. One other very efficient method of cure would be Nobecutane produced by by AB Bofors Nobelkrut, Bofors, Sweden which is a spray containing efficient antiseptics forming a thin impermeable skin on the sprayed place. The mycelium itself cannot live without air and the conidiophores would be encased by the applied skin which dries in about one minute.

Should my own plants be attacked by this ugly disease, I would apply the following treatment as quickly as possible: apply iodine solution with a soft brush and then after one hour spray on Nobecutane! All the treatments given above are orthodox medical remedies used to cure human mycelium diseases.

. . . . .from A. W. Craig

I find that using a fungicide called Benlate is quite effective in preventing the spread of this black patch disease.

PLANTS FROM URUGUAY

. . . . . from Mr. and Mrs. P. Collins

The plants which we were able to collect in the wild arrived from Uruguay about three months or so after we left Montevideo. Most are in very good shape and already looking quite healthy. The only apparent casualties were two Gymnocalycium leeanum which were very dehydrated to start with. All the Frailleas (several no more than 1 cm. in diameter) seem to have survived unscathed, and seedpods on two of them produced seed which has germinated quite well.

STUDY GROUPS/REFERENCE COLLECTIONS

Cleistocacti	T. Lavender, 62, Finchdale Avenue, Billingham, Cleveland, TS23 2EB.
Frailea	J. Forrest, Spring Garden, 2 Darngaber Road, Quarter, Hamilton, Scotland.
Gymnocalycium	G. J. Swales, 5 Hillcrest, Middle Herrington, Sunderland, Tyne & Wear.
Lobivia	J. Hopkins, Primrose Cottage, Monks Lane, Audlem, Cheshire, CW3 0HP.
Matucana/Borzicactinae	P. H. Sherville, 51 Park Road, Enfield, Middlesex, EN3 6SR.
Melocactus/Discocactus	J. Arnold, 11 Greenbank Drive, Middlebank, Lincoln, LN6 7LQ.
Neoporterianea	R. Ferryman, Nichelia, The Street, Stonham Aspal, Suffolk, IP14 6AH.
Notocactinae	G. J. Charles, 138 Whitehouse Common Road, Sutton Coldfield, Birmingham, B75 6DT.
Opuntia/Tephrocacti	J. W. Bagnall, 22 Perlethorpe Avenue, Mansfield, Notts.
Photographing Cacti	A. W. Craig, Davela, Forest Lane, Kirklevington, Nr. Yarm., Yorks.
Rebutia	P. Smart, 5 Tomlinson Avenue, Gotham, Nottingham, NG11 0JU.
Sulcorebutia & Weingartia	J. R. Gooch, 51 Bourn Avenue, Hillingdon, UB8 3AR.
Trichocereus	N. T. Hann, The Retreat, 28 Beckenham Road, West Wickham, Kent.

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