

CHILEAN CACTUS COUNTRY - 2

In the first part of this article we covered the desert zone stretching along much of the western sea-board of South America, with its ribbon-like strip of garua or mist climate parallel to the coast. As early as 1579 we find this region described as follows by a Spaniard, Ramirez:- "In these plains, between the mountains (sierras) and the sea, there runs a cordillera that is quite high, which the Spaniards call Lomas, where the season of dew - or garua - produces much vegetation, with great freshness and a great variety of flowers and roses of many colours and forms. The Spaniards make use of these Lomas in the season referred to for their cattle, since there is then much good pasture. But when the dew fails, in eight days it is dry, without a sign to indicate that there had been plants or flowers and any cattle, which because of greed or because of neglect on the part of their owners, delay in getting out, perish of hunger and thirst".

One of the most striking features of the plant growth in the garua climate is that, despite the proximity of the desert, the great majority of species possess no equipment for retarding evaporation. This is not necessary because of the small amount of sunshine in the season of the Lomas. At the close of the season these plants die down until the following damp season, leaving the cacti to face the hot, dry, season.

On the higher margins of the garua zone where the mist is variable in persistence and extent and the supply of moisture less in amount and less reliable, only the cacti grow. On the lower margins of the garua zone, where seepage moisture extends plant life towards the sea, cacti also predominate.

Higher up the western slopes of the Andes, between the desert on the one hand and the snows of the extinct volcanic peaks on the other, we find another zone of vegetation which consists mainly of grasses, cacti, thorn bush, mosses, and xerophytic shrubs. Odd patches of reasonable grass pasture are even found on more level ground in hollows and on intervalley tablelands. In the more protected valleys there will be an evergreen band of trees, bushes, and reeds. In the more exposed places, there will be nothing except bare, broken, rock.

The transition from desert to pasture is gradual and varies in altitude. At Caraveli (about half way between Mollendo and Lomas) on the desert edge of the transition to highland pasture, at an altitude of 5,635 feet, the days with most cloud are about as dull as the days with least cloud at Mollendo - which is in the garua mist zone. For practical purposes there is no rain in the year. Unlike the garua zone, the afternoon uphill wind speed never exceeds a stiff breeze. From January to March a dense fog sweeps up with the day breeze every three or four days. It seldom makes even a sprinkle of rain, but carries condensed moisture and will wet a man on horseback within ten minutes. The occasional xerophytic shrub must survive on this moisture.

At Chosica, inland from Lima, at an elevation of 6,000 ft., we find an annual rainfall of some 6 inches and at Arequipa, in S.E. Peru, at an elevation of some 7,550 feet, the annual rainfall is some 5.4 inches. In the altos de Pica in northern Chile, the sparse grass commences at about 8,000 feet and above San Pedro de Atacama the exceedingly sparse vegetation commences at round about 10,000 feet. It is thus possible to draw a line from

central Ecuador to central Chile, along the Pacific flank of the Andes, dividing the barren rainless desert on the seaward side from the uphill pastures which enjoy a small - but regular - annual rainfall. This line also divides house construction between sun-dried mud brick walls and flat reed roofs on the dry side, and those with sloping slated roofs on the inland side.

Almost all the rain received by this zone falls in the summer months (December - February) when the North Atlantic trade winds sweep down through Brazil and bring the annual rains to the Peruvian and Bolivian highlands. Only in Central Chile, where the rainfall originates from the northward shift of the onshore Westerlies in winter, does the growing season differ in the uphill pastures. With this exception, the growing seasons are thus in opposite halves of the year in the garua climate (winter) and the uphill pastures (summer). A *Trichocereus* from Coquimbo will grow in winter (June - July) and one from Atacama in summer (December - February); a *Loxanthocereus* or *Haageocereus* from the Peruvian garua zone will grow in winter and one from the uphill area in summer.

In Peru and northernmost Chile, the moisture precipitated in the Andean heights provides enough water for streams to cross the desert zone to the sea; the higher valleys are bright green bands of cultivated ground, meadow and trees; at places in the lower valleys where there is sufficient soil, willow, acacia and reeds grow and crops are raised by irrigation. There is less precipitation on the heights of northern Chile, where the snow line rises to 18,000 feet on the Pacific flank, from about 15,000 feet in Peru; there is less water for streams flowing towards the desert. Between Arica and Copiapo only the river Loa is able to reach the sea - all other streams from the Andes disappear into the desert sands - most of them only being visible at all in the showery season.

Melting snow from the high Andes usually seeps downhill below ground level so supporting tracts of scrub in valleys by natural sub-irrigation - sometimes over larger areas of flatter ground as at Calamas in the Loa valley and in the Pampa de Tamarugal. Here a small prickly mimosa - *Prosopis tamarugo* - grows on the east of the salars at the edge of the nitrate fields, together with clumps of *distichlis* grass up to 3 feet high; in this area the water table comes within $3\frac{1}{2}$ feet of the surface. Vast quantities of tamarugal have been used to make charcoal for the nitrate fields and the species is being gradually exterminated.

In other parts the chanar - *Gourleia decorticans* - and algabarro trees provide edible fruit for man and beast; chilca bush, acacia, or pingo-pingo appear in rate and isolated patches. In less exposed valleys a pepper, *Schinus molle*, and a willow, *Salix humboldtiana*, are found.

There is no difference in the quality of the sand or soil between the general barren desert and the few places where sub-surface water supports some tough vegetation. Around Capiapo there are occasional years with more than three showers, which result in luxuriant deep clover springing up in what is otherwise always bare surrounding hillsides. When Charles Darwin was travelling between Coquimbo and Huasco in 1832, he noted how a light shower had produced faint patches of green on the brown countryside.

The dwarf varieties of *Opuntia* - the *Tephrocactus* - are found on these higher flanks of the Andes, from northern Peru to almost as far as Cape Horn. The *Trichocereus* grow up to about 12,000 feet altitude in northern Peru; at about 10,000 feet in central Chile, the frost-killed columns of *Trichocerei* are one of the few sources of firewood and building material. In Peru and northernmost Chile the *Oreocereus* will occasionally reach about 14,000 feet altitude. On the borders of Chile and Peru, where the high pasture gives way to desert at about 4,500 feet, *Browningia* and *Arequipa* are found. In the middle reaches of Peru we find a wider range of succulent vegetation, amongst which are *Espostoa*, *Matucana*, *Melocactus* and *Oroya*.

(To be continued)

CACTUS SPECIES NEOPORTERIA

By Ing. Miroslav Voldan. (Translated by A. Pegrimék from the Czechoslovak Cactus Society 'Kaktusky' September - October 1965)

On the vast plains of central and northern Chile - from the lower slopes of the Andes and in places to the coast - interesting "Chileans" grow and collectors often overlook this plant life.

In their native land these plants have very hard living conditions, because they are found mainly among poor vegetation; they are in a dry climate where rain is very precious. On the outskirts of the desert regions the members of the species *Neoporteria* merely exist, their shrivelled up greyish bodies are dried up by the intense heat of the sun, and they bring forth only poor and stunted offspring. Because of their appearance they cause great interest among European collectors.

The species of *Neoporteria* which earlier belonged to the older genus of *Echinocactus*, became the independent genus described by Britton and Rose. Here belonged even those kinds of cacti which were later regrouped by Backeberg into further genera such as *Horridocactus*, *Neochilenia*, *Reicheocactus*, etc.

According to Backeberg the genus *Neoporteria* has the typical uniform disposal of seeds throughout the little tube (fruit? Ed.); furthermore, the outer petals of the corolla of the flower protrude and close inwards, opening out only when in full bloom. Their colour is yellowish-brown shading to red. The elongated, almost bent, fruit opens out from the bottom; the seeds are mainly black, shiny and medium sized.

The cultivation of these plants is not altogether easy. At the end of August it is recommended to reduce watering, because the transition from the growing period to the resting period with *Neoporteria* (as indeed with the majority of Chileans) is fairly gradual.

In the event of undesirable intensive growth of the plants during the whole winter - and sometimes they even bloom - this can lead to considerable weakness and deformed growth. In the winter they need a completely dry but not too cold a place in the light. Also, the awakening period of the *Neoporteria* in the spring is quite prolonged, which is also the reason for their reluctance to bloom. Some flowers - especially of new kinds - have not been recorded.

On their own roots they grow very slowly and they are very delicate; the correct growth of these roots is subject to their being kept in the greenhouse during the winter. The seeds germinate fairly easily - best in the second or third year. Should it be that the seedlings are growing well and fast, it is recommended to graft. Such graftlings then grow faster and the risk of them dying out is noticeably lessened.

The most suitable stock for good plants is a strongly growing *Eriocereus jusbertii* or *Echinopsis*, and even *Cereus peruvianus* or *Helianthocereus pasacana*. *Trichocereus spachianus* is suitable as a stock only for a short period, because it quickly becomes exhausted and reduces the spyness of the graftlings. In such cases it is recommended - after achieving the required size - to transfer the grafted plants on their own roots and this will prevent tall weak growth.

A typical plant of the genus is *Neoporteria subgibbosa* (Haw) Br. & R., which has been known longest and was first mentioned as early as 1831 as *Echinocactus subgibbosa* Haw. Their natural environment is spacious beaches lying close to Valparaiso, where their thick greyish -

green coloured bodies either lie along the ground or hang over the rocks. They grow up to one metre high with a diameter up to 10 cm. The reddish-pink flower is about 4 cm. long. The pale spines are often variable in shape, also in length and number and because of this it leads to a listing of several separate species such as *E. exculptus*, *E. acutissimus*, *E. crematus*, *E. rostratus*, etc. which are in fact, identical.

The true variety comes mainly from the widespread *N. subgibbosa* v. *intermedia* Ritt., which most likely forms the transition to the type *N. coquimbana* Ritt. Their close relation *N. nigrihorrida* (Bkbg) Bkbg is a native of the same valley of the Andes, south from Coquimba. Sturdy, with greyish-green body, it has sharpened ribs and its areoles are not reddish brown and spiky (?Ed.); the central spine reaches a length of up to 3 cms. Its variety *N. nigrihorrida* v. *major* (Bkbg) Bkbg has a smaller number of ribs and more robust areoles; var. *minor* (Bkbg) Bkbg is smaller in growth.

Practically in the same latitude but nearer to the coast is found *N. litoralis* Ritt, one of the more recently discovered plants: its spines are more abundant than those of the species previously mentioned. *N. castenoides* (Cels.) Werd with greyish-green elongated and well-spined body, spines variable in colour and length, belongs to the northern district of Copiapo. It was recorded in the year 1850 and this type of plant is one of those longest known.

In that same district - near to the Estancia Frai Jorge - lies also one of the richest discoveries of Neoporteria. Here are obviously ideal conditions for natural diversity, clearly confirming the succession of greenish bodied species, varieties and forms, some described and some undescribed.

Here grows *N. mamillaroides* (Hook) Bkbg, a strong plant with elongated brownish to greyish-green body, with strong rugged ribs, the greater number of spines being curved. Its flowers - up to 6 cms long - is the largest recorded up to the present time in this family. The plant was described in the year 1837 as *Echinocactus mamillaroides* Hook and is the second longest known Neoporteria. *Echinocactus centeterius* Lehm. agrees strikingly with this description and is most likely identical (assuming of course that both plants have the same habitat).

To this group belongs further the largest plant of the family, *N. clavata* (Sohr) Werd, reaching heights up to 1½ metres. Massive grey felt-like areoles bear strong straight spikes; the flower bud is a rich red. This species is often mistaken for the genus *Arequipa*. In the last season, too, was found a large flowered variety which was named *N. clavata* v. *grandiflora* Ritt. However, with its lengthy interlaced spines it resembles *N. Subcylindrica* (Bkbg) Bkbg, growing columnar from a young plant.

A further group to be found in the district of Ovalle, forms plants with typically long and interwoven spines. First of those belonging here is *N. gerocephala* Y Ito, known by the name *N. senilis* (Phil) Bkbg. Its soft body, slightly elongated, covers itself with long weak mutually interweaving spines; their colour - from white to almost black - is just as variable as their length and thickness. The flower is up to 5 cms long. *N. senilis* is reckoned among the prettiest plants of this group.

With a stronger and shorter growth of spines is *N. taltalensis* Hutch, which by the shape of its flower belongs rather to the family *Neochilenia* (*N. hankeana* v. *taltalensis* Bkbg). A further representative of that group - *N. nidus* (Sohr) Br. & R. - is one of the most sought after plants of the family with its own individual spines, making a wild impression and intertwined like a birds nest. Their colour, length and number is varied, likewise the number of ribs, the size of areole and colour of body. They are plants well known for their yellow-brownish to black spines and green-grey to chocolate or dark-brown body. Their growth is from the beginning globular, later on gradually like a column.

Neoporteria multicolor Ritt with mainly yellow spines is perhaps one of the varieties of the preceding species, similar to *N. thiebautiana* (Bkbg) Y. Ito with spines raised upwards (this is undoubtedly one of the natural hybrids). The varieties and shapes of all these plants are numerous in nature although their habitats are identical.

The plant group around *N. villosa* (Monv) Berg has its own habitat northwards of the district of Huasco. Fully grown specimens are elongated in shape, greyish-green and changing as they age to blackish purple, with wool in the crown. New growing felt-like areoles are not straight with sharp spines. The comparatively large flowers are white inside. *Echinocactus villosus* v *niger* Hart. has an even darker body and longish spines. There is little difference in the growth of the spines of the *N. polyraphis* (Pfieff) Bkbg; this was recorded two years later (1846) than its predecessor, *N. villosa*. As far as these particular *Neoporteria* go they are so alike that the question arises as to which variety is which. From northerly collecting parts comes the *N. atrispinosa* (Bkbg) Bkbg, which differs from the previous species, mainly in having a strong and beetroot-like root, changing in the part just above ground to a narrow neck.

N. heteracantha (Bkbg) Bkbg maintains its rounded shape even when old. Its dark body grows to the size of approximately 10 cms; the flower is reddish pink but white at the base; by its appearance it could be taken for the species *Neochilenia chilensis*. Its close relation *N. coimasensis* Ritt. is considerably richer in shape and we are looking forward with certainty to a description of this species.

Dwarfed growth is maintained by *N. cephalophora* (Bkbg) Bkbg, a coastal plant with beetroot-like root, known under numerous other names (*Chilenia bicolor*, *Ch. depressa*, *Ch. macrogona*, *Ch. varians* and so on).

The family also includes numerous novelties, mainly of Ritter's collecting, but many are still not described. Amongst these there are FR 236 - *N. castanea* Ritt, FR 481 - *N. crassispina* Ritt, FR 536 - *N. microsperma* Ritt, FR 716 - *N. procea* Ritt. (which is designated as a variety of the known *N. clavata*), FR 714 *N. rapifera* Ritt with orange-red projecting spines, FR 715 *N. wagenknechtii* Ritt, which is close to the species *N. coquimbana* etc.

The *Neoporteria* family with its specific varieties continues to be so abundant and widespread (it was necessary gradually to separate the sections *Neochilenia*, *Horridocactus*, etc.) that in our conditions defies possible completion. Even so, our growers recommend us not to be afraid to vary our collections with some available kinds of this interesting Chilean family which occupies, with its own individual character, the position of one of the foremost among South American cacti.

CULTIVATION OF CHILEOREBUTIA

By Dr. E. Priessnitz (Abstracted from the Austrian Cactus Society Newsletter. Translated by R. Moreton)

The genus *Chileorebutia* has found a home in many collections in recent years, as their limited number of species and small bodies can be accommodated in the most unpretentious space. Only one species had already for many years been on the inventories of our collections - *Chileorebutia napina*. The name of this plant (*Napina* means having a tuberous root) is in fact using a characteristic common to the whole genus of these subterranean dwarf cacti which show marked root succulence.

I have Chileorebutias which have been in cultivation for many years, may I therefore tell you of their peculiarities and suitability for keeping in our collections. To start with, the foggy climate of the areas where they live gives us a general but very essential guide to their culture. Their habit has the stamp of their environment, as they are small plants which during their rest period, shrink back into the ground. Above all, due to their succulent roots, they are able to withstand extremely long dry periods, buried beneath dust and sand. If one wants to see their natural appearance to some extent maintained in ones collection, attention must be paid to the dreadful poverty of their habitat. It cannot be our objective to aim at luxuriant growth brought about by heavy feeding, or to increase the food intake by using an oversize *Trichocereus* as a wet-nurse. I have seen these plants growing just as formless masses, up to 20 cm. diameter, but these have nothing to do with the usual elegant form of a Chileorebutia.

Yet we are unable to dispense with grafting for most species in cultivation as, although they get on alright on their own roots in an open porous compost, the resulting growth is somewhat less satisfactory and growing from seed a test of patience lasting for many years. Good success I have had in seed raising only with Chileorebutia *odierii* FR 499 which, in a few particularly vigorous examples, have attained a diameter of about half an inch in three years. Chileorebutia *napina* seedlings do rather better on their own roots and I was able to keep 100% of a large sowing of these growing satisfactorily, so that their size well surpassed that of *Ch. odierii* of similar age. Their habit of growth corresponded largely with that of wild plants as we know from imports and habitat photographs.

Of Chileorebutia *esmeraldana* which, when grafted, produces numerous offsets and which only by previous extreme dryness is made to flower, I tried to root a large offset. The first success was flowers, probably because the 'drive' of the stock no longer concealed the plants own normal rhythm of growth. However, further observations must confirm this, before we jump to the conclusion that grafted Chileorebutias are poor flowerers while those on their own roots flower well. I have experimented with *Ch. reichii* and *Ch. aerocarpa* on their own roots, but the results were not satisfactory.

Within the genus there are cerioid and globular growing species. The cerioid types show their previous habit of withdrawing into the ground by forming a constriction near the base of the scion in grafted specimens, hence from the aesthetic point of view the globular types are to be recommended. These have excellent attractive bodies and, with reasonable treatment, retain their natural appearance. A weak growing stock is of course necessary.

Less interesting are columnar species. Grafted or not, they soon become thin growing cerei which flop over on to their sides. *Ch. duripulpa* after growing 30 cm. long reached the limit of my patience so I beheaded it and now it grows as fingers, not unlike *Opuntia clavaroides*. Moreover, it is on a *Jusbertii* stock. Plants on their own roots remain, it is true, columnar and small, but are not really satisfactory. While not exactly unhealthy, they steadily decline in number. I have obtained similar results with *Ch. reichii*.

The bodies of Chileorebutias are very sensitive to standing damp, as are all Neoporterias. The parts of the body away from the sun, the slight hollow in the apex, the woolly buds and flower remains, where water is apt to collect easily, let fungus diseases in. It is desirable, as far as possible, to time the watering according to the weather. Water only when you can at the same time spray the plants over. Even in summer only in extremely warm weather should you spray in the evening, since with lower temperatures only dry plants are protected. It is recommended to use a fungicide regularly. A few precautions, as with any cactus connection pays off, but especially so with Chileorebutias.

NEWS AND VIEWS

The article on *Pyrrhocactus* by Ritter (The Chileans No. 3) is very important but, in places, not strictly correct (writes J. D. Donald). He is right in saying that the stigma lobes and pistil generally are not always constant in colour but, by and large and certainly in cultivation, *Pyrrhocactus*, sensu Backeberg, seems to have only yellow styles.

I do not agree with Ritter that his *P. garaventai* from the Chilean coast is necessarily the same as *P. subainus* of Backeberg, but it does seem on reflection that they might be. Both are heavily spined and the spines themselves are light in colour. The difficulty lies in spotting the habitat; both are given as Cerro de la Campana which I cannot locate (the only Cerro de la Campana I can find is on the Chile/Argentine border south of Santiago, hardly on the coast!) Similarly, I cannot locate Horan de Piedra or Chicaoma from the same area where more of the Chilean *Pyrrhocactus* were found by Kraus. In view of the ambiguity and the difference in the floral descriptions given by Ritter and Backeberg, they are kept distinct in the re-union into *Neoporteria* (Jnl C&SS of G.B. August '66). However, if they are the same, there is a delicate decision to be made on priority. *B. garaventai* in October 1959, *P. subainus* in ? 1959 depending upon the publication date for Volume III of the *Die Cactaceae*.

My own thoughts on *garaventai* are that it belongs to the *curvispinus* group, and this is where Gordon Rowley and myself placed it in the re-union into *Neoporteria* (loc. cit.).

One north-eastern Branch Member who visited the Riviera in 1966 brought back several fine specimens of *Neoporteriae*; we are looking forward to being able to obtain more fine specimens for our collections during our 1967 Continental Tour to the Riviera which will be June 4th to 18th, flying out and back, stopping at Bordighera. Full details available from H. Middleditch, 5 Lyons Avenue, Hetton le Hole, Co. Durham.

AN INTRODUCTION TO THE NOTOCACTINAE

by K. H. Halstead

The name *Notocactus* was originally used by Karl Schumann to designate a subgenus under the collective genus *Echinocactus*. In 1922 Britton and Rose raised many of Schumann's sub-genera to generic status, but included under their new genus *Malacocarpus* the plants which we now place in *Notocactus*, *Brasilicactus*, and *Eriocactus*, it being left to A. Berger to establish *Notocactus* as a full genus in 1929.

1959 Backeberg separated *Brasilicactus* and *Eriocactus* from *Notocactus*, and *Notocactus* was divided into two subgenera:-

1. *Notocactus*; fruit fleshy, more or less spherical, splits at the side; type plant *N. ottonis* (Lehm) Berg.
2. *Neonotocactus*; fruit elongates as it ripens, becoming dry and hollow, opens at the base. Type plant *N. mammulosus* (Lem) Berg.

The closely associated genus *Malacocarpus* S. D. (*Wigginsia*) is separated from *Notocactus* principally by the characteristics of a soft fruit and a more or less woolly crown. In 'Die Kakteen' of July 1966, Krainz and Buxbaum transferred many species from *Malacocarpus* to *Notocactus*.

In the same publication, *Parodia bueneckerii* was also transferred to *Notocactus*; lacking clarifying details, it is difficult to envisage any transition from *Parodia* to *Notocactus* in view of the appreciable difference in seed characteristics of these two genera. The seed of *Notocactus* and *Malacocarpus*, on the other hand, exhibit distinct affinity.

Backeberg's division of Berger's *Notocactus* is based mainly on floral characteristics, as follows:-

	<u>form</u>	<u>flower</u>	<u>pistil</u>	<u>fruit</u>
<u>Brasilicactus</u>	globular	red or green very small	yellow	globular spiny and bare
<u>Eriocactus</u>	elongated becoming cylindrical with age, crest heavily felted and slanting to one side	yellow without noticeable stem	yellow	globular, solid and heavily woolled splitting at base with numerous seeds
<u>Notocactus</u>	globular slightly elongated with age	mostly yellow rarely red with noticeable stem	violet	elongated covered with wool and becoming hollow

A division by floral characteristics can be unsatisfactory to the average collector, unless the plants bloom when quite young, as do *Notocactus* and *Brasilicactus*. The *Eriocacti* do not flower until mature, but are readily identifiable by body characteristics.

Some authors suggest that certain species of *Notocacti* can be grouped as polymorphic varieties of a single species, responding to changes in habitat; thus we have the *muricactus* - *concinus* - *apricus* - *tabularis* group. *N. tabularis* was originally described by Cels in Forster in 1886 as *Echinocactus concinns tabularis*. If this group was to be classified under one species, *muricactus* must take precedence, having been named in 1837.

Likewise, the group around *N. mammulosus*, which was itself discovered in 1838. Already *N. pampeanus* (Speg) Bkbg has been reconsidered by Backeberg as *N. submamulosus* v. *pampeanus*; *N. submamulosus* (Lem) Bkbg also appears as *N. mammulosus* v. *submamulosus* (Lem) Y. Ito, so it is feasible that all could be classified as varieties of *N. mammulosus*.

For useful comparisons and deductions to be made it is essential that plants studied must originate from habitat or habitat collected seeds, having regard to the possible hybridisation arising from home collected seeds.

The following check list is based upon the Backeberg classification, with additions from the recent discoveries of F. Ritter:-

Brasilicactus

- elachisanthus* (Web) Bkbg
- graessneri* (K Sch) Bkbg
- v. *albisetus* Cull
- v. *flaviflorus* Bkbg
- haselbergii* (Hge) Bkbg
- v. *stellatus* HU 39

Eriocactus

claviceps Ritt FR 1283
grossei (K Sch) Bkbg
leninghausii (Hge jnr) Bkbg
f. apelii W. Heinr
v. longispinus Ritt
magnificus Ritt FR 1270
schumannianus (Nic) Bkbg

Notocactus

apricus (Ar) Berg
caespitosus (Speg) Bkbg
concinus (Monv) Berg
floricomus (Ar) Berg
v. flavispinus Bkbg
v. rubrispinus Bkbg
v. spinosimus Fric & Buin
v. velenovskyi (Fric ex Bkbg) Krainz
herteri Werd
Horstii Ritt FR 1269
mammulosus (Lem) Berg
= hypocrateriformis (O & Dietr) Hert
megapotamicus Ost ex Hert
= ottonis v. megapotamicus
minimus Fric & Krzg
mueller-melchersii Fric ex Bkbg
v. gracilispinus Krainz
mueller-moelleri Fric
muricatus (O) Berg
ottonis (Lehm) Berg
v. alkispinus Backbg
v. arechavaletai (Speg) Buin
v. brasiliensis (Hge jnr) Berg
v. elegans Backbg & Voll
v. linkii (Lehm) Berg
= N. linkii (Lehm) Hert
v. multiflorus Fric ex Buin
v. paraguayensis (Heese) Berg
v. schuldtii Krzgr
v. stenogonus Bkbg
v. tenuispina (Lk & O) Berg
= N. tenuispina (Lk & O) Hert
v. tortuosus (Lk & O) Berg
v. uruguayus (Ar) Berg
= N. uruguayus (Ar) Hert
= N. araneolarius (Reichb) Hert
v. villa-velhensis Bkbg & Voll
rubriflorus Kol
rutilans Dan & Krnz
scopa (Spreng) Berg
= scopa v. ruberrima
= scopa v. candidus
v. daenikerianus Krainz
v. ramosus (v. Ost.) Bkbg

Notocactus (Continued)

submammulosus (Lem) Bkbg
= *N. mammulosus*
v. submammulosus (Lem) Y. Ito
v. pampeanus (Speg) Bkbg
= *N. mammulosus*
v. pampeanus (Speg) Cast & Lelong
= *N. pampeanus* (Speg) Bkbg
tabularis (Cels ex K. Sch) Berg

The recent Horst - Uebelmann expedition claims the following new species and varieties:

<i>N. arichnites</i>	HU 9	<i>N. succineus</i>	HU 26
<i>crassigibbus</i>	HU 3	<i>tenuicylindricus</i>	HU 34
<i>fuscus</i>	HU 29	<i>uebelmannianus</i>	HU 78
<i>megapotarnicus</i> v. <i>horstii</i>	HU 31		

The forthcoming joint expedition to Southern Brazil and adjoining territories by Messrs. Uebelmann, Buining, Vliet, Horst and Rausch, could well result in an extension of this list.

THE CHILEANS NO. 3 - CORRECTIONS

Despite a check on the proof copy, the following errors slipped into our No. 3. issue:-

for *N. floccosa* read *N. floccosa*
N. napina v. *larrigera* read *N. napina* v. *lanigera*
H. curvispinus v. *cimbarbalensis* read *H. curvispinus* v. *combarbalensis*
H. garaventi read *H. garaventai*
N. clavata v. *parriflora* read *N. clavata* v. *parviflora*

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