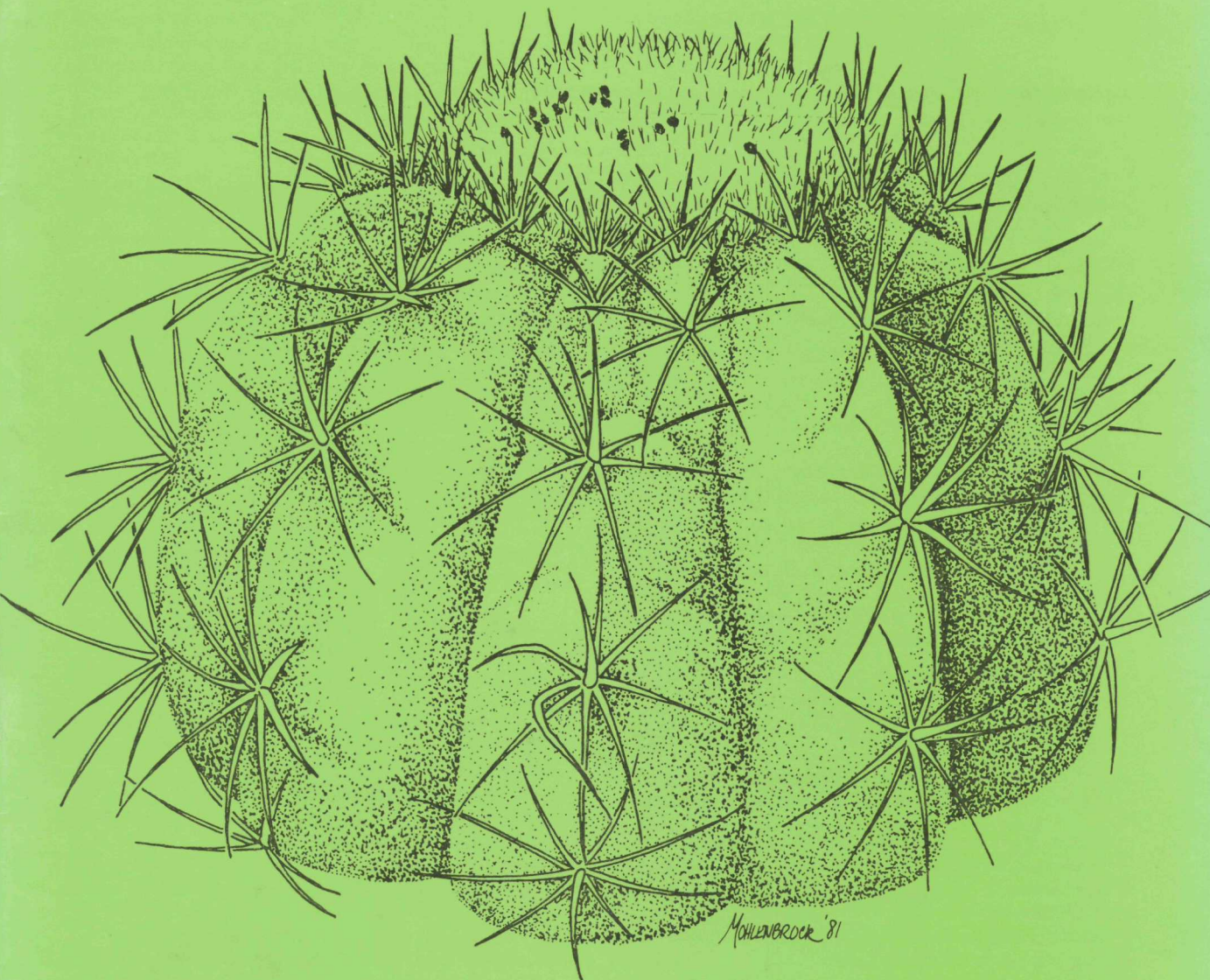


Volume 44/Number 1
February 1982

The Cactus and Succulent Journal of Great Britain



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Cover illustration: *Melocactus violaceus*, drawn by Mark Mohlenbrock from the photograph in this Journal, vol. 42, page 70 (1980).

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The Cactus and Succulent Journal of Great Britain

Volume 44 Number 1 February 1982

edited by David Hunt and Nigel Taylor

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A 50th Anniversary Greeting from America

We have received the following message from Miss Virginia Martin, Corresponding Secretary of the Cactus & Succulent Society of America:

'Our Society wishes to send you sincere Greetings and Congratulations on your historic Fiftieth Anniversary.

'Your current and past members through the years are to be commended for the very active organization you have maintained these many years.

'Your Journal with which we are well acquainted has covered a wide range of succulent plant material. The authors have presented their articles in a manner to appeal to all levels of growers of our fabulous plants—beginners, advanced collectors and scientific botanists.

'We wish you many, many more years of successful and fruitful operation.'

Annual General Meeting

(see next column)

We are very happy that Professor W. T. Stearn, the distinguished botanist and bibliographer, has agreed to give a lecture on the occasion of our 50th anniversary A.G.M. In 1938 and 1939, when he was Librarian of the Royal Horticultural Society's Lindley Library, he published a number of scholarly papers in our Journal which crowned its pre-war development under the editorship of the late Vera Higgins.

We also look forward to a lecture by Dr. E. F. Anderson, who has been studying the taxonomy of *Thelocactus* and its allies for several years, and whose visit to England fortunately coincides with our meeting.

CSSGB FIFTIETH ANNIVERSARY ANNUAL GENERAL MEETING & CONVERSAZIONE

to be held at the

**Jodrell Laboratory, Royal Botanic Gardens,
Kew on Saturday 27 March 1982**

PROGRAMME

- 09.30 Registration
- 10.00 Lecture: Aspects of Somali Succulents
Dr. Peter Brandham and Susan Carter
(Royal Botanic Gardens, Kew)
- 11.00 Coffee
- 11.30 ANNUAL GENERAL MEETING
- 12.45 Lunch interval
- 14.00 Short talks on exhibits
- 14.30 Lecture: The genus *Thelocactus*
Dr. Edward F. Anderson (Professor of
Biology, Whitman College,
Walla Walla, U.S.A.)
- 16.00 Tea
- 16.30 Lecture: Adrian Hardy Haworth
(1768-1833)—Grower and student of
Succulents
Prof. William T. Stearn
(President, The Linnean Society)

Admission to the A.G.M. itself is free of charge (members only), but tickets, obtainable at the door, price £2 will give admission to the lectures and refreshments (guests welcome).

A bar will be open for sales of beer, wine and soft drinks from 12.45-13.45 and 18.00-18.30. There will be an informal dinner in Richmond after the meeting costing about £8 per person including house wine.

The 'home team' will be represented by Dr. P. E. Brandham and Susan Carter, talking about the plants they recently collected in Somalia (see pages 9-16), and there will be some exhibits by other Kew staff involved with succulents.

Visit of Dr. E. F. Anderson

Besides his lecture at our A.G.M., Dr. Anderson, who is well-known for his studies of *Ariocarpus* and other cactus genera, will be speaking at several other venues in England during the latter half of March: Exeter NCSS (17th), North London CSSGB (19th), Luton NCSS (20th), Bromley NCSS (21st) and Birmingham NCSS (30th).

Warrington Weekend, 24-25 October, 1981

A resumé by Will Tjaden

Local one-day or half-day meetings are now quite a common event in the hobby, but weekend residential events under one roof permit a much greater exchange of views and hence enjoyment. After the CSSGB/IOS weekend meeting at Chichester in October 1979 it was difficult to foresee an equal success at Warrington, but the amenities and conference facilities at the Lord Daresbury Hotel proved fully on a par with those at Chichester. Disappointment was expressed that not more than about fifty members and guests attended, put down in part to the absence of overseas lecturers. Fewer participants were probably an advantage, however, in that it was easier to stimulate the audience to take part and fewer lecturers meant more time for discussion. The lecture programme was as briefly indicated in Vol. 43, page 29, except for Les Caruthers who could not be present. To report these fully would need much space, but if just one comment is permitted, it is astonishment at the variation in *Melocactus* in habitat shown by Chris Rodgers in an extended series of colour slides taken during his expedition to Curacao and Bonaire in 1980 (see also CSJGB 43: 33-36, 1981). The Anniversary Dinner on the Saturday evening was the usual success, and it especially pleasing to hear Clive Innes, Britain's leading succulent plant nurseryman and a considerable plantsman apart from succulents, proposing the toast to the Society.

The work of arranging the meeting was undertaken by Mrs Daphne Pritchard and the committee of the Warrington Branch, to whom the Society and those fortunate enough to attend are grateful indeed.

Library

Thanks to the valued help of unemployed graduate, Jonathan Clark, the Society's Library is now fully catalogued and open for viewing at the address shown on the inside front cover (a prior telephone call would be appreciated).

Beware the Euphorbia

Most textbooks on succulent plants make some mention of the dangers of *Euphorbia* latex, but none are so graphic as the account that recently appeared in the Quarterly Newsletter of the Aloe, Cactus & Succulent Society of Zimbabwe (no. 49: 13-15, 1981). The details, related by Dorothy Popiel, are really quite frightening.

While transplanting a specimen of *E. cooperi*, Voytek struck a root and the plant's white latex flew up into his eye. A tale of agony and blindness follows, with a recommendation for mother's milk as a partial remedy. *E. tirucalli* is probably equally venomous, while the diminutive *E. hirta*, it is speculated, may be an antidote. Care over the handling of food after contact with latex is also essential, in view of more tales of woe contained in this salutary document. With the repotting season approaching, beware you Euphorbiophiles!

Will they ever stop. . .

. . . describing new *Discocactus* 'species'? The latest is *D. crystallophilus* Diers & Esteves Pereira (in KuaS 32(11): 258-262, with figs. 1981), typified by *Esteves* E-84, from central Minas Gerais, Brazil. Like *D. latispinus* and *D. multicolorispinus*, which are mentioned in the above authors' discussion of their novelty, this plant is clearly another geographical form of *D. placentiformis* (Lehm.) Schumann, a species first described in 1826! See CSJGB 43(2/3): 37-40 (1981). (N.P.T.)

Nomenclature

The following new names are proposed by G. D. Rowley:

× **Carruanthophyllum hybridum** (Haw.) G. Rowley, **comb. nov.** Basionym: *Mesembryanthemum hybridum* Haw., Syn.Pl. Succ. 218. 1812; (*Carruanthus caninus* × *Machairophyllum albidum*).

Opuntia shaferi B. & C. R. var. **humahuacana** (Backeb.) G. Rowley, **comb. nov.** Syn. *Cylindropuntia humahuacana* Backeb. in Backeb. & F. Knuth, Kaktus-ABC, 119, 411. 1935; *Austrocylindropuntia humahuacana* Backeb.; *A. shaferi* var. *humahuacana* Kiesling.

× **Orbelia barklyi** (N.E.Br.) G. Rowley, **comb. nov.** Syn. *Stapelia barklyi* N.E.Br. in Hook. Icon. Pl. 20: t. 1909. 1890; (*Stapelia pulvinata* Masson × *Orbea namaquensis* Leach). (Vide Leach, L.C. in Excelsa Taxon. Ser. 1: 58. 1978.)

× **Orbeopelia tarantuloides** (R. A. Dyer) G. Rowley, **comb. nov.** Syn. *Stapelia tarantuloides* R. A. Dyer in Fl. Pl. Afr. 18: t. 717. 1938; × *Carapelia tarantuloides* G. Rowley; (*Orbeopsis caudata* Leach × *Stapelia gigantea* N.E.Br.). (Vide Leach, L.C. in Bothalia 11: 136, 1973-75.)

G. D. ROWLEY

The following name, ascribed to 'Hunt' in the bulletin 'Epiphytes' vol. 5: 69 (1981) but not published hitherto is here validated:

Disocactus amazonicus (K. Schumann) D. R. Hunt, **comb. nov.** Basionym: *Wittia amazonica* K. Schumann in Monatsschr. Kakt. 13: 117 (1903).

(The name *D. himantocladius*, also ascribed to Hunt, was published by Kinnach in Cact. Succ. J. Amer. 33: 14. 1961).

The generic name *Wittia* K. Schumann, l.c. is a later homonym, being preceded by *Wittia* Pantocsek (1889), named for a genus of Bacillariophyta.

D. R. HUNT

Another Anniversary

The Succulent Plant Society in Malta is 30 years old

by Len Newton

In the year when anniversaries of our Society and the Zurich Municipal Collection were reported in the Journal, another group of keen growers overseas were celebrating the 30th anniversary of their Society's foundation. The Cactus and Succulent Society in Malta was established in 1951, and I was happy to join the present members in their anniversary celebrations in July 1981.

Malta featured in the succulent plant world long before the formation of a Society there. For many years the main reference book for cactophiles in many countries was John Borg's 'Cacti', first published in 1937. Borg was Professor of Natural History in the University of Malta, and his plant collection still exists in a public garden, the Argotti Gardens, near the capital. Unfortunately the collection is sadly neglected, because the garden is under-staffed and official policy of 'the powers that be' is that more attention (and land) should be given to growing food—understandable perhaps on such a small island. The surviving plants (fig. 1) are crowded together in a small enclosure, are badly in need of repotting, and include many whose labels are lost.

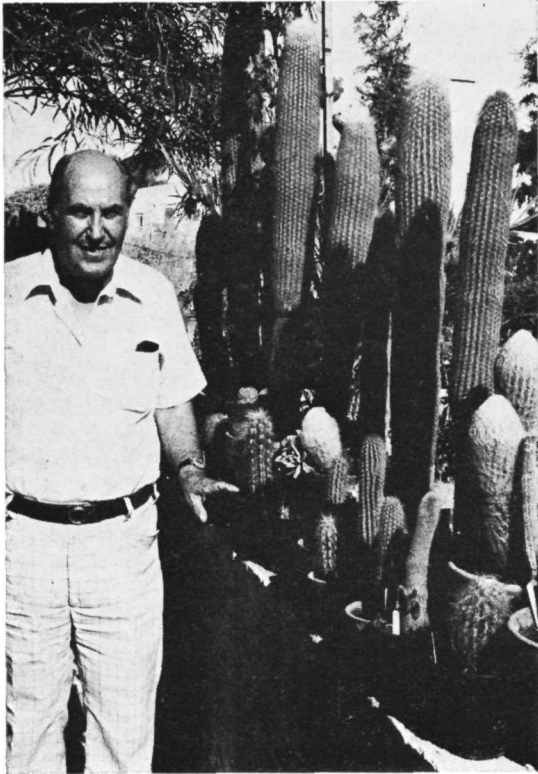
Readers of early volumes of our Journal will know of another Maltese grower, Andrew Bugeja (see Vol. 9: 62, 69. 1947; Vol. 16: 60. 1954). It was Mr. Bugeja who first started organizing what was to become The Cactus and Succulent Society of Malta (the words "of Malta" had to be dropped recently to comply with a new law). He is still an active member, with a greenhouse full of small plants, and with larger plants either bedded out or scattered around the garden in pots (fig. 2).

Today the Society has about a hundred members, including both beginners and experienced growers. Amongst the latter is the President, Mike Cassar, who also played a major role in the early days of the Society. The member best known outside Malta, because of his occasional publications in various succulent plant periodicals, is the energetic Secretary, René Zahra (fig. 3). Members are kept informed of Society affairs by means of a monthly Newsletter, and in addition an annual Magazine is produced. Whilst the Newsletter is for local consumption, being entirely in the Maltese language, the annual Magazine includes articles in English by some internationally known authors, and



Fig. 1. The late Prof. Borg's collection at the Argotti Gardens

(photo: Newton)



attracts subscribers from outside Malta.

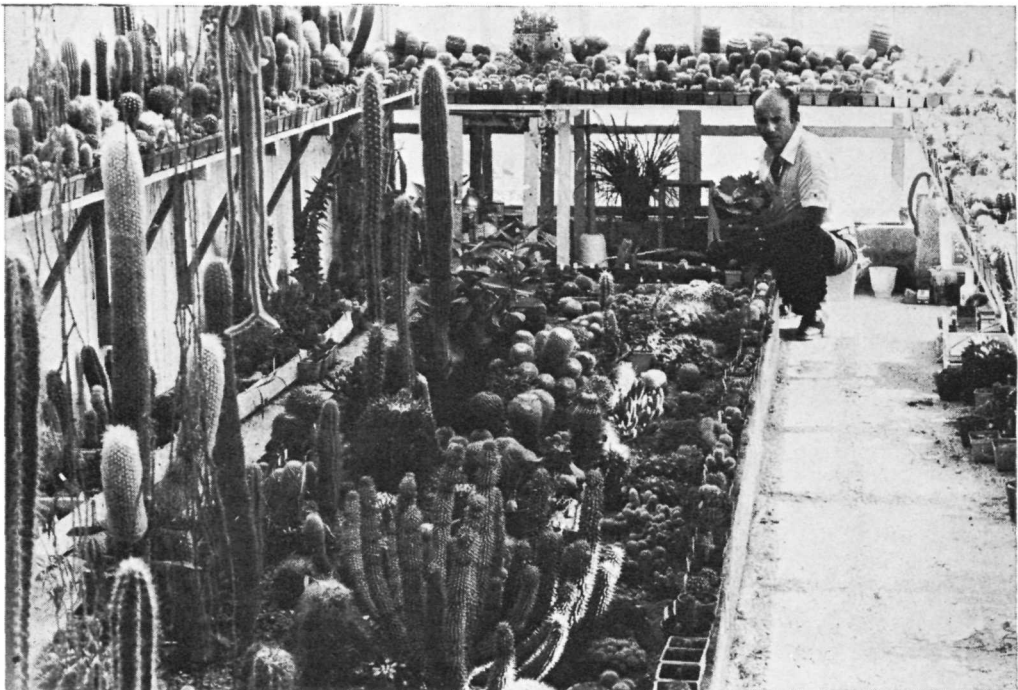
Malta has a few native succulents in the genus *Sedum*. There are also several succulent halophytes, one of which has been adopted as the national flower. This is the composite *Palocynus crassifolius* (syn. *Centaurea spathulata*), and as the specific epithet suggests it has succulent leaves. It occurs on cliffs near the sea around much of the island.

Although frost and hail storms are not unknown there, with its generally warm temperate climate Malta offers good growing conditions for succulent plants. It is also a popular holiday resort, and readers who book a holiday in Malta can make their holiday more interesting by contacting the Society there. If you can offer a lecture or slide show you will be assured of an interested and appreciative audience. (Secretary's address: Dar ix-Xewk, New Street in St. Philip Street, Ghaxaq, Malta.)

Fig. 2. Andrew Bugeja with his plants (photo: Newton)

Below

Fig. 3. Rene Zahra in his greenhouse (photo: Newton)



Memorable Mesems

chosen by Jonathan Clark and Nigel Taylor
photographed by Margaret Martin and Peter Chapman

1. *Faucaria britteniae*

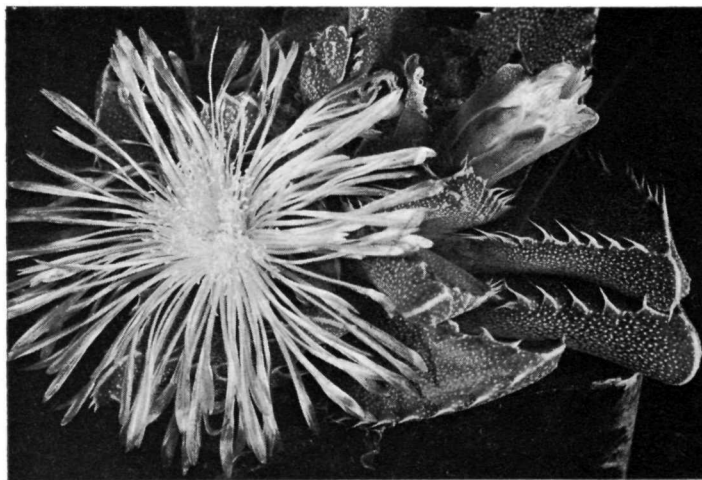
Faucarias are popular amongst mesem collectors as they are free-flowering and grow relatively quickly. As can be seen from the illustration, they are very attractive plants. This species, from Albany Div., Cape Prov., is clearly rather similar to the well-known *F. tigrina*, as is also, *F. felina*. In these species, the teeth on the leaf-margins complement the patterning of translucent dots on the leaf-surface very nicely. The reasons for the presence of this dentition are not clear, as the teeth are soft and not sharp like those of an *Agave*. When the young leaves develop, they remain closed together for some time, the teeth meshing together. One possibility is that this may serve to protect the inner surface in the case of developing leaves, and also, in the case of flowers, very young buds may be protected in this way.

Faucarias present little difficulty with regard to cultivation. They grow in the summer and may be watered freely during warm weather. It is recommended, however, to dry them off as usual as winter approaches, and this will ensure the production of numerous golden-yellow flowers late the following summer.

J.Y.C.

2. *Argyroderma delaetii*

Up till 1978 *Argyroderma* N. E. Brown was quite a large genus, with more than 45 species listed in Jacobsen's Handbook (vol. 3, 1960). Then Heidi Hartmann's important study was published (Mitt. Inst. Allg. Bot. Hamburg 15: 121-235, 1977, publ. 1978) and the number of species reduced to 10, along with *Roodia* N. E. Brown



Faucaria britteniae

(photo: Martin)

as a subgenus. Our illustration was received labelled *A. roseum* Schwantes, a name she eliminates in her monograph, since it was illegitimate when published. The correct name for the broadly defined species, to which this plant belongs, is *A. delaetii* Maass. Here are included many synonyms: *A. aureum*, *A. australe*, *A. blandum*, *A. boreale*, *A. brevitubum*, *A. carinatum* (pro parte), *A. citrinum*, *A. cuneatipetalum* (pro parte), *A. densipetalum*, *A. formosum*, *A. gregarium*, *A. latifolium*, *A. leucanthum*, *A. longipes*, *A. planum*, *A. productum*, *A. reniforme*, *A. rooipanense*, *A. speciosum* and *A. splendens*, all L. Bolus; *A. concinnum* and *A. schuldteii*, both Schwantes; and *A. lesliei* N. E. Brown.

A. delaetii was described by Maass in Zeitschr. f. Sukkulente. 3: 180 (1928), and typified by his fig. 1, loc. cit. It is found in quartz formations of the NE. Knersvlakte, Van Rhynsdorp Div., Cape Prov., S. Africa. Flower colour is variable, with shades of pink and violet, yellow or white encountered in the field. Sterile stems with their solitary leaf-pairs blend imperceptibly with the quartz surroundings, and like members of the genus *Lithops*, are difficult to spot in habitat.

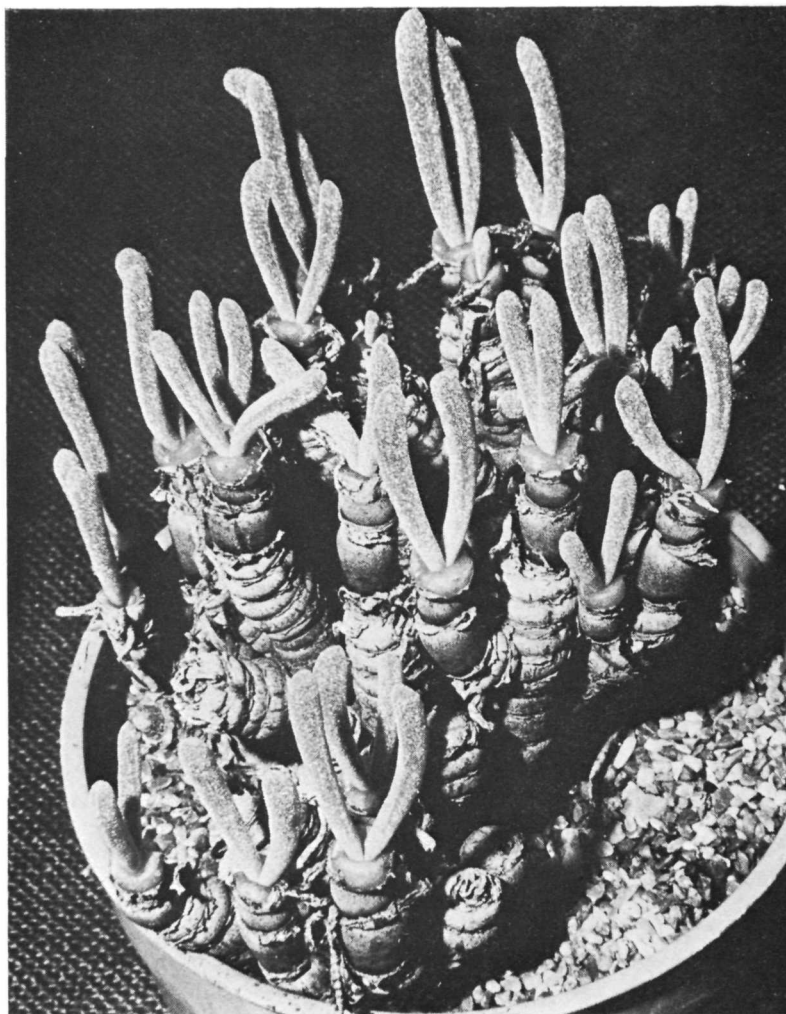
Argyrodermas are not easy to grow well. A very quick-draining compost containing a minimum of 60% coarse sharp sand is desirable, and waterings (between July and November) well-spaced so as to avoid unsightly rupturing that occurs when the plant has imbibed too much moisture. Some growers recommend waiting until the leaves just begin to shrivel slightly before showing it the watering can again. (The species illustrated is offered on our 1982 Seedlist, no. 1009, see p. 20.)

N.P.T.



Argyroderma delaetii

(photo: Martin)



Monilaria moniliformis

(photo: Chapman)

3. *Monilaria moniliformis*

Among the mesems this plant has one of the most appropriate names. It is derived from the Latin *monile*, which means a string of pearls, referring to the characteristic shape of the stem after many years' growth. The leaves are opposite as in most members of the family *Aizoaceae*, but are somewhat peculiar in that each successive leaf pair differs in appearance. This is called heterophylly. During the growing season the plant bears both types of leaves for some time, as shown in this illustration. The long pairs of leaves are covered in glistening papillae, as are those of the well-known 'ice-plant' (*Claretum bellidiforme*). Towards the end of the growing period these leaves shrivel and eventually drop off, leaving the smooth split pea-shaped leaves to cope with the resting season. These smaller leaves, having a smaller surface area to volume ratio, are better

equipped to conserve moisture during the ensuing dry period. In habitat (Van Rhynsdorp Div.), these plants start to grow their long glistening leaves a matter of a few days after the rains come.

Heterophylly also occurs in other genera such as *Mitrophyllum*, to which the Monilarias are related. However, not every heterophyllous genus belongs to this group, as other characters must also be considered.

Unfortunately, these plants do not adjust properly to growth in the Northern Hemisphere as they will insist on growing during our winter. However, this should cause no problem providing they are grown in full sun. They should be given a little water during the summer, just to keep the roots alive. Employing this treatment, I have managed to flower *Monilaria pisiforme* despite this genus having a reputation for seldom obliging in this country.

J.Y.C.

Additional notes on E. Brazilian Melocactus

by N. P. Taylor

Royal Botanic Gardens
Kew, Richmond, Surrey

It is now possible to offer some indication on the relationship of the five, recently published taxa recorded as 'of uncertain affinity' in part 1 of 'Notes on the genus Melocactus' (CSJGB 42(3): 63-70. 1980).^{*} *M. acispinosus* Buin. seems to belong in the *M. oreas* complex and may be allied to the short-spined *M. bahiensis*. *M. ferreophilus* Buin. and *M. pachyacanthus* Buin. & Brederoo are no more than varieties of *M. azureus* and, from its description, the poorly known *M. kranzianus* should be placed here too. *M. rubrispinus* F. Ritter is also poorly known, but the description compares well with *M. diersianus*, itself only a dwarf variety of *M. levitestatus*.

On account of their pale fruits and smooth seeds *M. levitestatus* and *M. azureus* are a closely related species pair, but are not allied with *M. zehntneri* and *M. oreas*, as was suggested earlier (p. 63). From each other they differ in flower colour: bright scarlet in *M. levitestatus*, pink in *M. azureus*.

The broadly defined *M. oreas* and *M. salvadorensis* complexes can be resolved into more natural units. *M. deinacanthus* (syn. *M. longicarpus*, *M. mulequensis*) is a good species, distinguished from *M. oreas* by its more numerous central spines, and sinuate rib sinuses. The depressed-globose, short-spined *M. conoideus* may also be worthy of specific rank, but one wonders how long it will be before intergrades with *M. oreas* (s.l.) are discovered. Similarly, the *M. salvadorensis* complex is divisible into *M. salvadorensis* itself and the remainder, for which *M. brederooianus* Buining is the oldest name. *M. salvadorensis* differs from *M. brederooianus* in its pale, narrow fruits, while *M. brederooianus* (s.l.) is more closely allied to the *M. oreas* complex. The plant illustrated by Buining (in Succulenta 48(12): 189. 1969) under the poorly typified name, *M. melocactoides*, is a form or variety of *M. salvadorensis*, and may be growing together with the diminutive *M. violaceus* in the Restinga vegetation of the coast. (The unidentifiable *M. melocactoides* has been variously applied to either of the above species by recent authors and nurserymen.) The undescribed '*M. disciformis*' (HU 132) is a distinctive taxon related to *M. salvadorensis*, but with a dwarf habit and stouter spines including a porrect central. The status of *M. albicephalus*, earlier referred to the *M.*

salvadorensis complex, is uncertain. Habitat collected specimens I have seen exhibit an extraordinary range of variation, and combine the remarkable white-woolly cephalium of *M. glaucescens* with the fruit and spination characters of *M. oreas* (*M. erythracanthus*). It may constitute a hybrid between these contrasting but sympatric species.

The large-growing and highly variable *M. zehntneri*, with its robustly spined ally, *M. curvicornis* (syn. *M. giganteus*), seem to be at one end of a spectrum of geographical variation which extends to the small, depressed *M. macrodiscus* and *M. canescens*, and may even encompass the dwarf *M. concinnus* via *M. axiniophorus*. I am doubtful whether these taxa are adequately distinguished at specific rank. Recently, Willi Strecker (in KuaS 31(11): 330-33. 1980) has illustrated HU 482, collected near the lower reaches of the Rio São Francisco (Algoias-Sergipe), and has identified it as *M. depressus* Hook. (Bot. Mag. 65: t.3691. 1838). Although the type of *M. depressus* came from much farther north at Pernambuco (Recife) this identification seems in order, and Hooker's epithet should be removed from the synonymy of *M. melocactoides* (i.e. *M. violaceus*) where it was placed by Britton & Rose. *M. depressus* is a close relative of *M. zehntneri* and its immediate allies, having amongst them the oldest name. *M. glaucescens* and *M. violaceus* also show relationship with the above, but we need to know more about their variability in habitat before a reliable assessment of affinity can be made. The latter seems to vary considerably in stem size and spination, to judge from the few specimens I have observed.

The plants discussed in the last three paragraphs correspond with three distinct groups, recognised by the following fruit and seed characters:

1. Fruit white or very pale pink^{*}; seed-testa very smooth: *M. azureus* (s.l.), *M. levitestatus* (s.l.). An entirely inland group, from uplands to the east and west of the Rio São Francisco drainage system.

2. Fruit wine red at apex, ± flattened and not juicy at maturity, or paler pinkish-mauve, darkening in age, often > 20 mm long and usually remaining half-immersed in the cephalium; seed-testa smooth or weakly tuberculate: *M. deinacanthus*, *M. oreas* (s.l.), *M. conoideus*, *M. brederooianus* (s.l.), *M. salvadorensis*.

^{*}The publication of part 2, dealing with the Melocacti found outside E. Brazil, has been deferred until the correct names for certain long-known Caribbean species can be determined.

^{*}Red in the original description of *M. levitestatus*; however, its synonyms *M. diersianus*, *M. securituberculatus* and *M. rubrispinus* have pale pink or white fruits.

3. Fruit pale pink, not darkening, up to 20 mm long, $\pm$ terete, very fleshy and juicy at maturity, and then usually completely expelled from the cephalium and lying on top of it or falling down from the plant; seed-testa strongly tuberculate at end opposite to hilum: *M. depressus*, *M. curvicornis*, *M. zehntneri* (s.l.), *M. concinnus*, *M. glaucescens*, *M. violaceus*.

The placing of an E. Brazilian *Melocactus* into one of the above groups is relatively easy, but thereafter further identification to one of the included binomials may present difficulties. It is likely that intermediates will be found in the field to connect some of the

Classified list of E. Brazilian *Melocactus* species

GROUP 1

1. ***M. azureus***
 - Infraspecific taxa:
 - 1a. ***M. ferreophilus***
 - 1b. ***M. pachyacanthus***
 - 1c. ? *M. krainzianus*
2. ***M. levitestatus***
 - 2a. '***M. warasii***' (HU 456)
 - 2b. ***M. securituberculatus***
 - 2c. ***M. diersianus***
 - 2d. ? *M. rubrispinus*

GROUP 2

3. ***M. deinacanthus*** (syn. *M. longicarpus*, *M. mulequensis*)
4. ***M. oreas*** (incl. *M. ernestii*, *M. rubrisaetosus*, *M. longispinus*, *M. interpositus*, ? *M. horridus*)
 - 4a. ***M. cremnophilus*** (syn. *M. erythracanthus*)
 - 4b. ***M. florschuetzianus*** (syn. *M. azulensis*, *M. nitidus*, ? *M. montanus*)
 - 4c. ***M. bahiensis*** (? incl. *M. acispinosus*)
5. ***M. conoideus***
6. ***M. brederooianus***
 - 6a. ***M. amethystinus***
 - 6b. ***M. inconcinnus***
 - 6c. ***M. lensselinkianus*** (syn. *M. griseoloviridis*)
7. ***M. salvadorensis***
 - 7a. '***M. disciformis***' (HU 132)

GROUP 3

8. ***M. depressus*** (HU 482)
9. ***M. curvicornis*** (syn. *M. giganteus*)
10. ***M. zehntneri*** (syn. *M. pruinosis*, *M. helvolilanus*)
 - 10a. ***M. macrodiscus*** (syn. *M. robustispinus*)
 - 10b. ***M. canescens***
11. ***M. concinnus*** (syn. *M. axiniphorus*)
12. ***M. glaucescens***
13. ***M. violaceus***

(*M. albicephalus* is of uncertain affinity and possibly hybrid in origin. The name *M. melocactoides* (Hoffmannsegg) DC. is discarded for lack of typification.)

decidedly critical species listed here.

In the future it is hoped that a key to the E. Brazilian *Melocacti* can be written, together with a complete-as-possible checklist of relevant HU numbers with their botanically acceptable identity.

Acknowledgement

I am indebted to Herr Horst Sanger (Switzerland) for allowing me to study his fine, well-documented, field collected *Melocacti* on a number of occasions during February and March, 1981.

Book Review

John Pilbeam. *Mammillaria—A Collector's Guide*. 1981. Pp. 165, 32 coloured & 283 half-tone illustrations (mostly by Bill Weightman), 3 maps; hardback, 10×7½ inches. B. T. Batsford Ltd., London. Price £17.50.

A popular genus, a well-known writer, and attractive production assure this volume success, and the welcome it has received as a successor to the long out-of-date *Mammillaria Handbook* by R. T. Craig (1945) is already proved by the fact that the first impression has sold out within a few months of publication.

John Pilbeam writes and compiles in a concise and very readable way, while the layout of text (taxa are arranged alphabetically and each classified by Series and Group) and photographs is both attractive and easy to follow. One suspects that no small effort was required to amass such a comprehensive set of excellently reproduced photographs, which are the mainstay of the book. Author, photographer and publisher all deserve our congratulations.

For the Guide's systematic content, the author has drawn freely on the published opinions of my co-editor, but clearly does not accept his broader species-concept in every case. However, a criticism I would make does not concern delimitation of species, but rather the lack of source information for the individual plants illustrated. This is a great pity, since many clonotype and other field-collected specimens from Mr. Hunt's and other collections are depicted, and the documentary value of the work would have been enhanced had their authenticity been made clear. As it is, these illustrations must be taken at the same face value as those of plants of cultivated and/or dubious origin (which like-wise need to be appropriately labelled—and then considered with due caution). In effect, the book brings together in one place, and summarizes, the conclusions of Hunt's 'Review of *Mammillaria* Names in Current Usage' (published in *J. Mamm. Soc.* between 1967 and 1975) and other articles, hopefully with the result that numerous redundant epithets will now be forgotten and perhaps no longer clutter the nurseryman's list.

N.P.T.

Camel's Milk and Aloes

The travels of a Kew Expedition to Somalia

by Margaret Johnson

Jodrell Laboratory, Royal Botanic Gardens,
Kew, Richmond, Surrey

Our trip, from mid-January to mid-March 1981, was the first expedition to be sent by Kew to Somalia, and our team consisted of Dr. Peter Brandham (Jodrell Laboratory, leader), Susan Carter (Herbarium), Chris Bailes (Living Collections) and myself. Peter and I were to collect *Aloe* species for cytological, anatomical and biochemical research programmes, Susan was anxious to collect *Euphorbia* species for her taxonomic studies, and Chris was to do general collecting for the Living Collections Division. Whenever possible we would dry herbarium specimens, but all of us were mainly concerned with obtaining living material or seed.

For Chris and myself it was a case of 'jumping in at the deep end' since neither of us had been to Africa before, and even for Peter and Susan who had been on a previous expedition to remote areas of Kenya, it was difficult to know what problems we were likely to encounter in Somalia. We had been advised by Dr. Kazmi, the botanist in charge of the herbarium in Mogadishu, to take absolutely everything we would be likely to need with us, there being no guarantee that anything could be bought there. Some people living in Mogadishu advised us not to go at all, or at least fly in and not attempt to go overland from Nairobi. Even the British Embassy was not very encouraging. When we finally arrived in Mogadishu they could hardly believe we had arrived safely, and threw a party to welcome us!

For three years prior to our visit, Somalia had suffered a drought and much of the country was extremely dry. The Somali nomads with their herds of goats, sheep and camels had overgrazed what little vegetation there was, but fortunately for us the animals do not find *Euphorbia* or *Aloes* palatable. Somalia is relatively unexplored botanically compared with most other African countries although many endemic species are known to occur there. We especially wanted to go to the northern mountains which have a particularly rich flora and would also have liked to reach the remote N.E. region of the 'Horn' too, but in the event this proved impracticable because of petrol rationing.

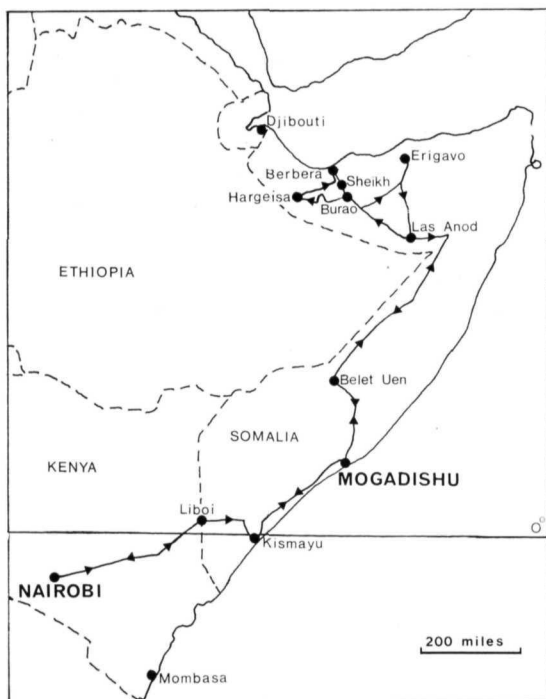
Before leaving Kew we had listed the type localities of the different species we wanted to find since many of the plants are confined to a very restricted area. Some species were only known from herbarium specimens with no living specimens available for study. We were also interested in some cases in making population samples. Whenever we stopped to botanize we made detailed notes on each plant we collected, and the local-

ity which was on some occasions a new locality for the species in question.

Two weeks' holiday in Kenya prior to the Expedition began to give me qualms about the journey to Somalia. The heat and humidity in Africa took some getting used to after the cold wet winter weather I had left behind in London just after Christmas, and a severe attack of food poisoning the first day I arrived hadn't helped acclimatization. Once away from Nairobi and large towns one was soon in very rural regions with petrol stations few and far between—as we were soon to discover when we ran out of petrol, and had to endure a long hot walk in the heat with a jerry can to the nearest pump! If things were this difficult in Kenya, a relatively developed African country, what was it going to be like in Somalia, one of the poorest countries, unable to feed its own people, let alone the hundreds of refugees who had fled across the border to Somalia during the trouble in Ethiopia?

My misgivings deepened when I saw the vehicle in which we were to attempt the 6,000 mile round-trip, Kew's ten-year old Toyota Landcruiser, veteran of several East African expeditions, which is looked after by kind friends at Lake Naivasha near Nairobi. Since the vehicle and all our camping equipment were already in Nairobi we had decided to drive overland into Somalia rather than fly directly to Mogadishu. By driving we were also able to take sufficient tinned food and other supplies with us from Nairobi to last two months, which as it turned out was just as well.

After many red-tape delays in Nairobi we set off for the border and had many adventures before reaching Mogadishu. The journey took five very hard days' driving, most of it with police escorts, armed soldiers or in armed convoys. In Mogadishu we were very grateful for the kind hospitality of Dr. Kazmi and his wife for several days whilst we negotiated permits to purchase petrol to fill our tank plus the auxiliary tank and seven jerry-cans. We were to be accompanied by a young Somali botanist and a Somali driver in a Land Rover. They would act as interpreters and liaise for us with the various offices of the National Range Agency situated throughout the country. They would also help us obtain fuel permits and find us places to sleep. Eventually we were able to leave Mogadishu on Sunday, February 1st, for the north. Because of our overloaded vehicle and the state of most of the tracks we were forced to travel slowly with the passengers hanging on

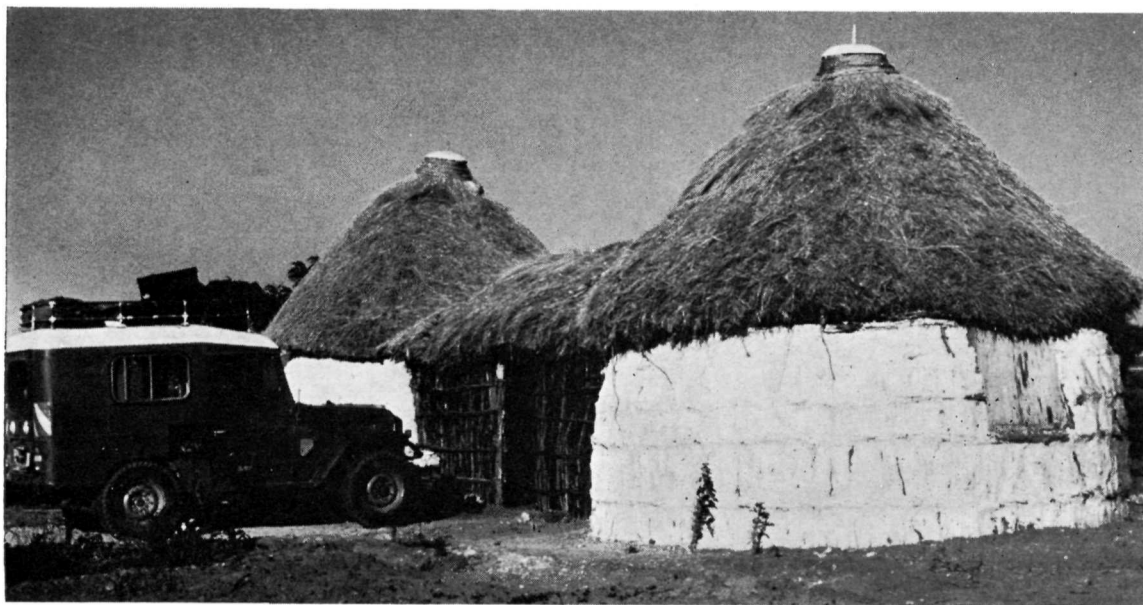


tight to avoid hitting their heads on the roof as the vehicle swayed from side to side and bumped up and down on the deeply rutted tracks. Fortunately there is one tarmac road (built by the Chinese) running for several hundred miles from Belet Uen to Las Anod

which speeded our progress. Usually we had to reach the next town before nightfall which sometimes meant getting up at dawn and driving all day. We took tents with us intending to camp, but we were not able to do so as it was not safe and stayed instead in a variety of places from good clean cheap hotels (with brand new sheets on one occasion) to the more frequent bare room, derelict police hut or typical African hut. On one occasion we had to put up our camp beds in the middle of a stockyard and slept beneath the stars to a noisy lullaby from the camels, sheep, cattle, goats and chickens.

On the first day, after a few hours travelling from Mogadishu, we made our first stop to see a large population of *Aloe microdonta* in full flower, and I was thrilled to see so many plants all flowering instead of the odd specimen in a pot in the greenhouse. Along the road we saw large clumps of *Caralluma russelliana*, up to 3 ft. high and occasionally in flower, growing in the *Acacia* scrub on bright red sand. There were also huge termite mounds sometimes 12 ft. or more high. Susan was very excited when she spotted several large specimens of *Euphorbia carteriana* which had been named after her by the late Dr. Peter Bally. At the same spot we also saw the beautiful pale green highly scented flowers of an *Adenia* species, probably *A. globosa* growing in a dense thorny bush. Later that afternoon we found large populations of *Aloe* aff. *trichosantha*, some of the inflorescences over 8 ft. high with attractive hairy green flowers and mottled leaves.

The next day we went to the type locality, near Buloburti, of *Monadenium stellatum*, where the whole hillside was covered with plants. There were plenty of



Overnight accommodation at Belet Uen

(photo: Johnson)

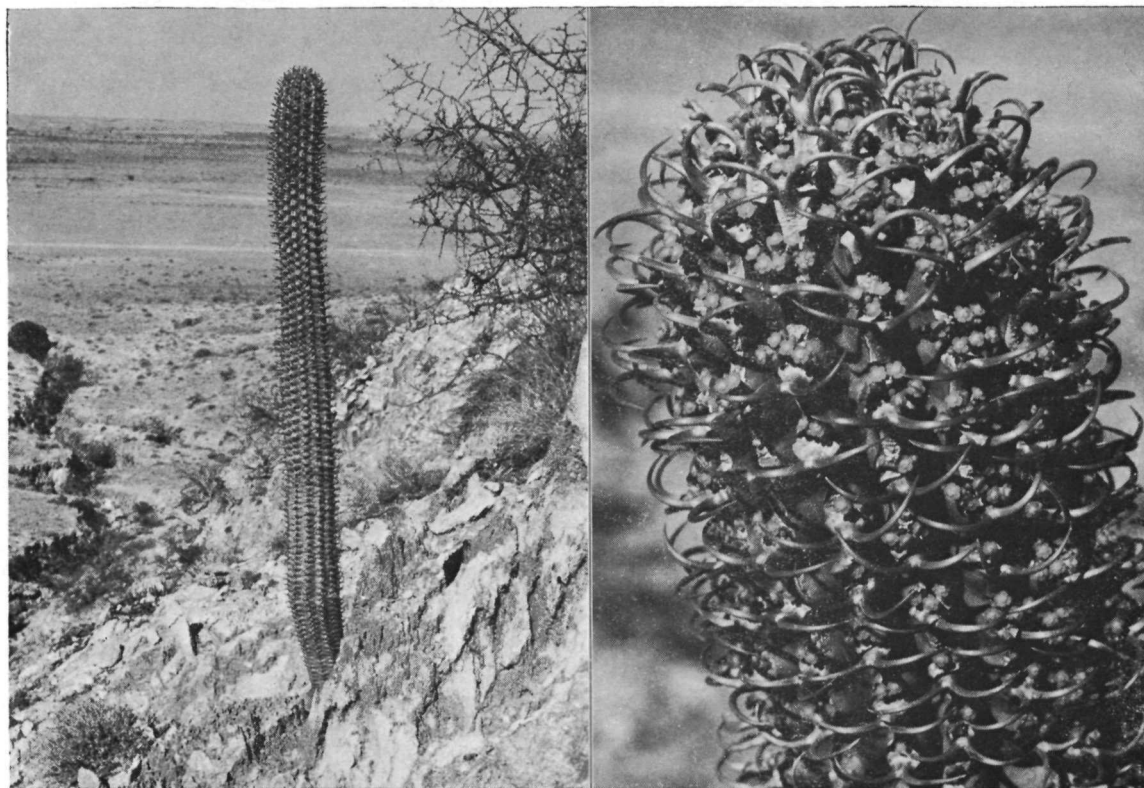
Euphorbias too, *E. schizacantha* and *E. longispina*, and further along the road *E. inaequispina* and *E. glochidiata*.

The following day we had our first sample of Somali tea. Some of the nomads manage to make a little money by selling refreshments to people in the occasional vehicle which stops along the road. The tea, sugar and spices are boiled for hours in a kettle on an open fire and the brew is usually drunk black or with camel's milk. It was always served in very dirty-looking glasses, but we found it very refreshing, and none of us seemed to be any the worse for drinking it. Our Somali friends often took the opportunity of a tea-stop to eat whatever was available and usually this was boiled goat which was very tough and tasteless. Sometimes there was rice or spaghetti or greasy sweet pancakes. We saw some Somalis drinking 'meat juice', the fatty liquid in which the goat had been boiled; it looked revolting. The camel's milk I found quite acceptable when fresh, but not so nice when it had been stored for a few days in dirty-looking wooden containers! It had a strong smoky taste reminiscent of kippers. We did all our own cooking on two small camping gas stoves and probably had a much more varied diet than the Somalis. However, it was very nice to supplement our tinned necessities with the occasional fresh tomatoes, cabbage (at vast expense)

and delicious fresh bread. We were careful to boil every drop of drinking water and always carried jerry cans to last several days as sometimes water was either unavailable or, having come from the gypsum rocks and strongly alkaline, was unsuitable for drinking.

On February 5th, a few days after leaving Mogadishu, we arrived at our first really interesting area near the small town of Las Anod, the gypsum hills around the town being particularly rich botanically. Here we found many populations of *Aloe inermis*, one of the very few Aloes with spineless leaves, the inevitable *Caralumas*, and *Dorstenia gypsophila* and *Euphorbia columnaris* both in their type locality. *E. columnaris* is a remarkable species which only grows in this small area. It has a single unbranched stem up to 4 inches in diameter growing up to 6 ft. high and looks more like a cactus than a *Euphorbia*. It was in full flower, the flowers being produced in clusters above each node, and although it was thought to be rare and on the verge of extinction, we saw plenty of plants of all ages and therefore do not think the species to be in any immediate danger. Nearby we also found what may be a new species of *Aloe*.

After two nights at the rest-house in Las Anod, we left for Burao, stopping on the way to look at some large specimens of *Aloe rigens* var. *glabrescens* growing on a



Euphorbia columnaris at its type locality near Las Anod, with a close-up of a plant in flower
(photos: left, Johnson; right, Brandham)



Aloe rigens var. *glabrescens* with dead inflorescences beside the Las Anod—Burao road

(photos: Johnson)

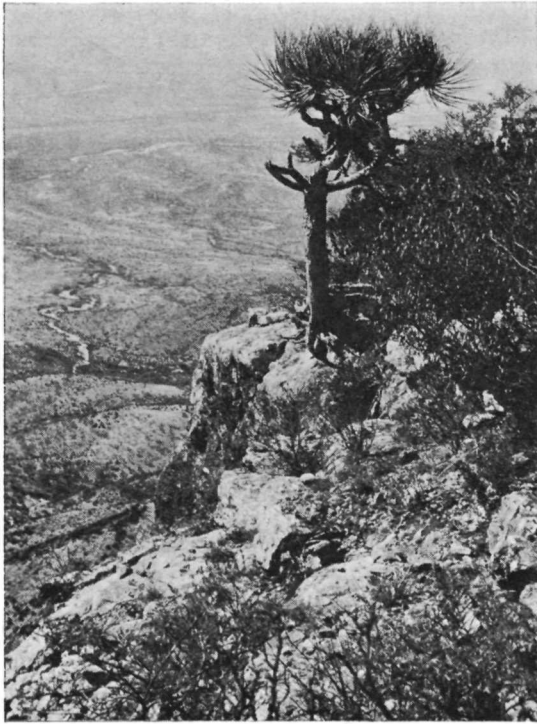
Caralluma speciosa flowering at the Sheikh Pass



particularly desolate plain and later *A. megalacantha*. A strong smell, which I at first mistook to be yet another rotting animal carcass, proved to be coming from a huge clump of *Caralluma speciosa* in full flower almost hidden in dense scrub. This was one of the few flowering specimens we saw and must have attracted the flies for miles around. Some close searching at this unlikely-looking spot revealed tiny plants of *Euphorbia phillipsiae* barely visible and very well camouflaged between the rocks. We also found another small *Euphorbia*, *E. hadramautica*, which has a fairly widespread distribution.

Mosquitoes were a real nuisance, but for some reason they didn't seem to bother me much. Before leaving Kew, as well as having practically every injection available, we had been supplied with all kinds of medical supplies including enough plaster of Paris to encase a whole body from top to toe. Fortunately we didn't need to use this, although we did find a number of things invaluable.

Our destination, after going to Burao for petrol, was the rest-house and so-called Forest Reserve at Gaan Libah on the edge of a steep mountain escarpment. In this area Peter Bally had discovered one of the most attractive small Aloes, *Aloe jucunda*, which readily reproduces vegetatively and is now common in cultivation. Several botanists had searched the area since 1953 when Peter Bally first collected the species, but with no suc-



The type locality for *Aloe jucunda* at Gaan Libah escarpment, with a *Dracaena* on the right (photo: Johnson)



Euphorbia hararensis (photo: Johnson)

cess, and so the species had been feared extinct in the wild. We were therefore delighted, when, on February 10th, with the aid of a local Somali who spoke a little English, we found numerous plants growing under Box scrub (*Buxus hildebrandtii*) along the edge of the escarpment.

The next day our Somali guide took us down a precipitous path to a lower plateau. Not having much of a head for heights I was thankful that it was so misty that I was unable to see where I could quite easily have fallen if I had slipped. As it was, my knees were shaking after the one hour's descent, and was very glad that at the end of the day we were able to ascend by a much easier route. We spent the day walking through the Box scrub and *Euphorbia hararensis* forest but never once saw any small seedlings of the *Euphorbia*, the goats having eaten every bit of ground-vegetation. We did find more plants of *Aloe jucunda*, however, including a triploid form which has a chromosome number of $2n=21$ instead of the normal diploid number ($2n=14$). There were also several *Kalanchoe* species, *Aloe hildebrandtii* and lots of *Echidnopsis*.

Hargeisa was our next stop, primarily for petrol which was becoming increasingly difficult to obtain, always requiring a permit from the District Commissioner. This often took hours and there was never any

certainly that there would actually be any petrol in the pump, or at the next town, so we always kept our tanks topped up at every opportunity.

Between Hargeisa and the port of Berbera we drove through huge populations of *Aloe megalacantha* stretching as far as one could see either side of the road for several miles. We also found another very different *Aloe* species of which the cut leaves produce a very unpleasant smell. This probable new species has tall, slender and graceful inflorescences with red flowers which make an attractive sight. We reached Berbera in time to enjoy a swim in the warm Gulf of Aden and it was nice to feel cool and clean again.

The following morning (February 14th) we were off for the Sheikh Pass. The notorious old road was so narrow it was normally one-way traffic only for vehicles, 'up' in the morning and 'down' in the afternoon. But when we arrived, a lorry had broken down on the pass and by special dispensation the new road which was still in the process of construction had been opened for traffic. This new road carves a completely different route through the mountains and we quickly realised the interesting botanical implications of this, since the area would not have been explored botanically. The construction engineers gave us permission to stop at intervals along the road and we had one of our best



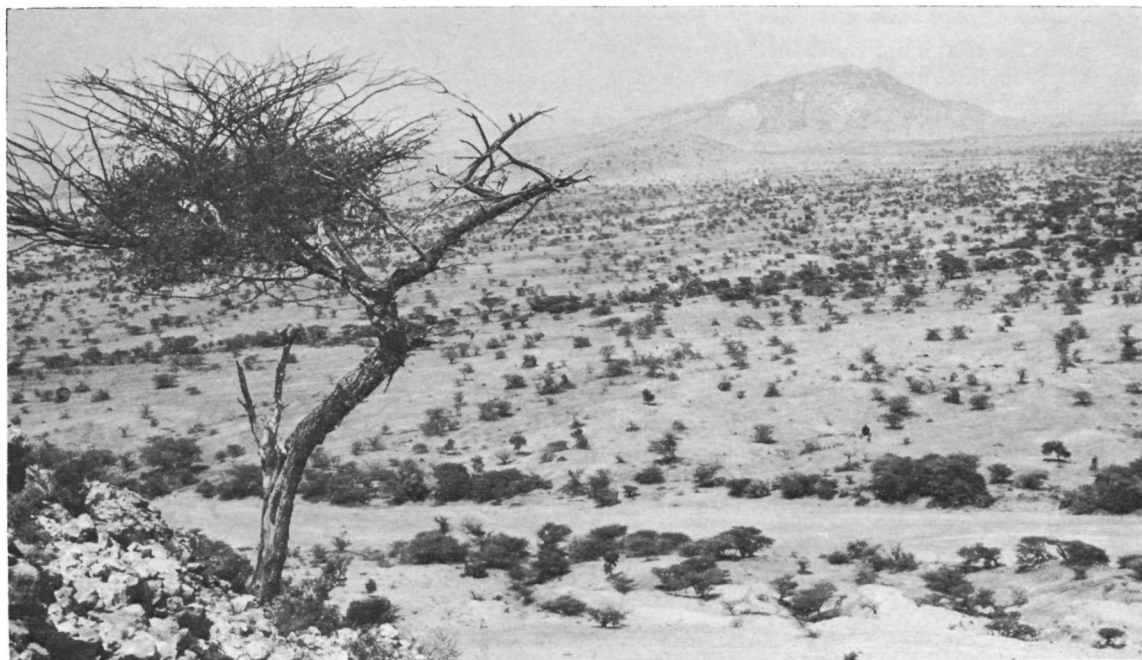
Euphorbia golisana in flower at Sheikh Pass
(photo: Brandham)

collecting days of the trip.

The first exciting find was *Euphorbia golisana*, previously thought to be extinct, growing between rocky clefts. Nearby we also found *Aloe hemmingii*, *Echidnopsis* aff. *bihendullensis* and *Edithcolea grandis*, one plant of which was in flower. Further down the pass we found a different species of *Echidnopsis*, an *Adenia*, a *Kleinia*, two different species of *Dorstenia*, and, in deep shade of the rocks, *Selaginella phillipsiana*. On reaching the base of the pass we managed to retrace the route of the old road to look for *Euphorbia inculta* (type locality) which we found along with some *Carallumas* and another *Stapeliad*, as yet unidentified. Further on we reached the type locality of the attractive *Monadenium ellenbeckii*, a branched species up to 3 ft. high resembling in its leafless condition a miniature *Carnegiea gigantea*.

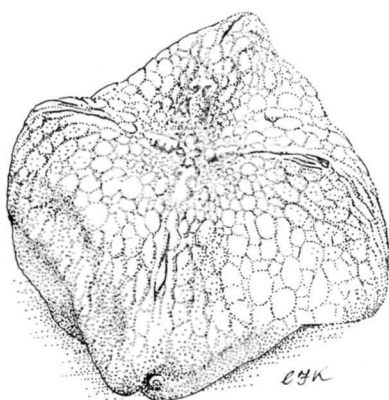
That evening the engineers invited us for a drink at their 'village', an oasis of beautifully equipped prefabricated houses a mile from the Somali village of Sheikh. It was hard to believe their fitted kitchens and spotless bathrooms with running water and flush-toilets were not a mirage, and we were suddenly aware of our scruffy appearance and heavy boots!

Not far from Sheikh is a barren stony hillside which is assumed to be the type locality of the remarkable stapeliad *Whitesloanea crassa*, discovered in 1914, not rediscovered until 1957 (see *Cactus & Succulent Journal of America* 31: 107. 1959), and subsequently thought to be possibly extinct (*Nat. Cact. Succ. J.* 30: 34. 1975).



The barren landscape near Sheikh, assumed to be the type locality of *Whitesloanea crassa*, and certainly a locality for *Pseudolithos*
(photo: Johnson)

We spent a whole morning searching for the plant, without success, but left a description of the plant with the engineers, who promised to pass the information on to the botanically-minded wife of a colleague who would be joining their team in a few weeks' time. We were delighted when, after we had returned to Kew and the rains had come to Somalia, a small parcel arrived containing one plant. For some time we nursed the belief that it was *Whitesloanea*, but later this gave way to doubts, based on the surface-appearance and rather indistinct ribs, and we realised that it must be *Pseudolithos cubiformis*! It is now safely re-rooted and we await flowers for final confirmation.



The plant from Somalia, now thought to be *Pseudolithos cubiformis* (drawn by Christabel King)

Near the rest-house at Sheikh we also sampled populations of *Aloe somaliensis*. We found to our surprise that this species varied enormously both in its colouring, the markings on the leaves and the spines on the leaf margins. Previously only one form of *A. somaliensis* had been introduced into cultivation. We also found *Kleinia gummisii* at its type locality and *Echidnopsis ciliata*.

The highlight of our trip was to go to Erigavo, a small village in the mountainous northern region and the type locality of many species. Everyone had talked about the terrible road to Erigavo and the awful dust. It took us twelve gruelling hours to drive there from Sheikh at an average speed of only 18 m.p.h. At times it was almost impossible to breathe for dust which seemed to get everywhere and when we arrived we were covered from head to toe. For once we all looked the same colour, British and Somali, all reduced to the same monotonous shade of brown! Luckily the rest-house at Erigavo had a shower which worked after a fashion, so we were able to clean up before rolling into our camp beds after a very tiring day. The dust had even got into our boxes of food, but after cleaning up as best we could, we set off the next day (February 19th) for the edge of the mountain escarpment to look for *Aloe crennophila*

which was growing right on the edge of the precipice. Nearby on the flat plains we saw numerous large clumps of *Euphorbia ballyi* both in flower and fruit growing with *Aloe scobinifolia*. We also found *Aloe peckii*, an attractively marked small *Aloe*, another *Huernia* species and more *Echidnopsis*.

We were off again at 8 a.m. the next day to go down the Tabah Pass for the type localities of *Aloe eminens*, *A. hildebrandtii*, *A. gracilicaulis* and an as yet undescribed new *Euphorbia* species which had been collected by Peter Bally. *Aloe eminens* is one of the least known of the tree Aloes, and when we found it growing 20 ft. or more tall in full flower with large black seed pods glistening in the sunshine it made a marvellous sight. All the other large, branched tree-Aloes such as *Aloe pillansii*, *A. dichotoma* and *A. bainesii* occur in southern Africa.

The scenery as we drove down the pass was awe-inspiring, the sheer escarpment rising vertically on one side of the track and a magnificent view down across the flat plain on the other. There was not enough time to go right down the pass, but at the last place we stopped at the end of an exciting and rewarding day we found Bally's new *Euphorbia*, and a second new species of *Euphorbia* with forked spines.

After three nights in Erigavo we had to leave for El



Flowers of *Aloe eminens* (Tabah Pass, Erigavo)

(photo: Brandham)

Afwein and began our return journey to Mogadishu. Soon after leaving we stopped to look for *Euphorbia multiclava* which Peter especially wanted to find, having long admired a plant of this small species growing at Kew. Its regular dichotomous nature makes it an attractive species. One plant which we found had sixty-four heads, indicating its considerable age. After some searching at the type locality we first walked over plants of *Euphorbia mosaica*, the plants being so well camouflaged and growing flush with the ground. Further along the track we found *Aloe tomentosa*, not in flower but with hairy dried corollas clearly visible on the dead inflorescences. Growing nearby was *Euphorbia balsamifera* ssp. *adenensis*. This species is a much branched spineless succulent bush with grey stems and when we found it, the tips of some branches had small clusters of green leaves surrounding the yellow flower. *Euphorbia balsamifera* is of interest botanically in being very disjunct in its distribution. The subspecies *adenensis* occurs in Somalia and the southern Arabian peninsula but the subspecies *balsamifera* is found thousands of miles away in the Canary Islands. On the Daloh escarpment near Erigavo we had found another example of disjunction, *Aeonium leucoblepharum*, a member of a genus which mostly occurs in the Canaries.

Our last stop was at an unlikely small gypsum hill where we found *Pelargonium christopheranum* and as yet unidentified succulent member of the Compositae. After this we drove for mile after mile across what even the map described as 'desolate plain'. There was virtually no vegetation at all, not even a termite mound to break the monotony of the flat landscape.

This was to be our last day searching for plants as we had to drive the rest of the way back to Mogadishu practically non-stop, taking three days. We stayed again with Dr. Kazmi and his family in Mogadishu, carefully repacking the boxes of plants and checking our herbarium specimens ready for the difficult drive we still had to make to Kenya. Eventually we returned to the civilization of Nairobi. We had found all the plants we hoped to find plus many others, including some new species, and in spite of all the hardship and discomfort from the intense heat, dust, insects and the terrible rutted roads it was the experience of a lifetime. I can't wait to return!

Some of the plants collected on the expedition will be on view at the Jodrell Laboratory at Kew on the day of the Annual General Meeting, 27 March 1982 (see page 1).



The author, centre, with Chris Bailes and Susan Carter, in Somalia

(photo: Brandham)

The 1982 Seed Distribution

The seedlist and order-form accompanied the 1982 subscription invitation. Paid-up members may order one packet of up to 20 items from the list. A nominal charge of 50p (\$1.00 US) is made to cover the cost of packaging, packing and postage. Orders will only be accepted on the proper order form which is valid to 30 June 1982. Initial demand has been very heavy and we regret that there will probably be insufficient seeds to meet all requests.

Notes on the species offered

by Nigel Taylor (Cacti) and Jonathan Clark (Other Succulents)

The names given below are as received from the suppliers and given on the packets. Species offered under unpublished or incorrect names are printed in italics after the order number. A 'status' code will be found at the end of the notes for each item, indicating that (o) the precise wild origin of the seed is not known, or (1) that a locality of collection has been recorded, or (2) that the locality recorded as the source of the seed is the type locality, or (3) that the seed is from plants of the type collection. (KK = Karel Knize, FR = Friedrich Ritter.)

CACTACEAE

362. *Acanthocalycium violaceum*. John Donald considers the members of this Argentinian genus to comprise only four species, closely linked to the *Pyrhocactus*—*Neoporteria* group, rather than to *Echinopsis* or *Lobivia*, as was once believed. He refers our offering to the synonymy of the type species, *A. spiniflorum*, from which it differs in its paler green stem and lilac to pale violet flower (cf. *Ashingtonia* 1(10-11):112-119, 124-25, 1975). (o)

363. *Ariocarpus fissuratus*. Perhaps the easiest to grow and flower of the 'Living Rock Cacti', but rather slow from seed unless it is promptly grafted. Flowers intense pink in October. Texas and NE. Mexico. (o)

364. *Ariocarpus trigonus*. Like the above this is one of the most curious of cacti: the large swollen tap-root supports a flattened rosette of leaf-like tubercles which remain half buried in its Tamaulipas environment. Intriguing, but very slow from seed. Flowers usually yellowish-white. (o)

365. *Astrophytum asterias* × *capricorne*. A cross between two cactus aristocrats, which should be easier to grow than its first named parent. (o)

366. *Astrophytum coahuilense*. A well-marked variety of *A. myriostigma* distinguished by larger flowers with red in the throat, and dense wool flecks on the stem. N. Mexico (Coahuila). (o)

367. *Astrophytum myriostigma* var. *nudum*. (NE. Mexico: San Luis Potosi.) A sought-after plant with the usual five ribs but devoid of the white wool flecks characteristic of this genus. We guess, however, that it will not breed true from seed. Please let us know what comes up! (1)

368. *Aztekium ritteri*. One of the earliest and most remarkable discoveries of Friedrich Ritter, first described in 1928 by Boedeker. The minute seeds and the stem's rock-hard exterior ally this species with *Strombocactus disciformis*, and both require much care and patience to raise from seed. Grafting the tiny seedlings on to *Pereskopsis* stock is one answer, but the resulting plants usually look too green and overfed. NE. Mexico, Nuevo Leon. (o)

369. *Cleistocactus azerensis*. KK 1584 (no further data available). Described from Bolivia in 1961 by Cardenas. Stem 4 cm diameter, greyish-green with about 23 ribs bearing brownish areoles. Spines 16-24, to 5 mm, white to pale yellow. Flowers

violet-pink, to 5 cm long: fig. 58 (left) in Backeberg's *Lexicon* (1977). (1)

370. *Cochemiea poselgeri*. A rewarding species discussed and illustrated as *Mammillaria poselgeri* in 1980's February issue. Baja California. (o)

371. *Copiapoa carrizalensis*. KK 38 (Chile, Prov. Atacama, Carrizal Bajo, 200 m). A synonym of *C. cinerea* var. *dealbata*, illustrated in last summer's *Journal*, p. 59 (centre right). Perhaps identical with the poorly known *Echinocactus malletianus* Salm-Dyck (1845). (2)

372. *Copiapoa cinerea* var. *'albata'* (? *albispinata*). KK 1692 (Chile, no further data available). A somewhat 'uncertain quantity' is offered here, but so long as it is the stunning *C. cinerea*, satisfaction is guaranteed. N. Chile. (1)

373. *Copiapoa coquimbana* var. *herreradura*. KK 1655 (as above). *C. coquimbana* and the allied *C. pendulina* are the southernmost members of this remarkable Chilean genus. Details of how best to cultivate them are to be found in CSJGB 43(2/3):56 (1981). N. Chile, Prov. Coquimbo. (1)

374. *Copiapoa fiedleriana*. KK 619 (Chile, Prov. Atacama, [inland at] Nicolasa, 600 m). According to the field data given above this plant could be either *C. vallenarenensis* or *C. cuprea*, both plants described by Ritter. (*C. fiedleriana* was originally described from the sea shore at Huasco, near the mouth of the valley in which Nicolasa is situated.) (1)

375. *Copiapoa* sp. KK 1656 (Chile, Prov. Coquimbo, Frai Jorge). This should be *C. pendulina* (s.l.), the southernmost occurring *Copiapoa*, which is illustrated in *Cact. Succ. J. Amer.* 44:239, fig. 2 (1972). Most Copiapos have very short-tubed, yellow flowers. (1)

376. *Coryphantha radians*. Britton & Rose were not sure about the exact identity of this 'old' species, described by De Candolle in 1828. Indeed the application of this name is difficult in the absence of a type specimen or original illustration. Probably from eastern central Mexico. (o)

377. *Coryphantha reduncispina*. Backeberg seems to have been confused about the origin of this plant: in *Die Cactaceae* 5:3024-26 he mentions Oaxaca city (the original location given by Boedeker), but in the *Lexicon*, p.119 (1977) changes this to 'Tamaulipas to (?) Coahuila,' and alters the description of the flower. It is closely related to *C. pallida*. (o)

378. *Coryphantha salm-dyckiana*. Described in 1850 by Salm-Dyck, who attributes the name to Scheer, a Kew resident to whom the type plant was sent by John Potts, from near Chihuahua City (Cent. N. Mexico). Britton & Rose illustrate a plant from near the type locality, with yellow flowers and one central spine: *The Cactaceae* 4: 40 (1923). (o)

379. *Denmoza rhodacantha*. A curious plant with a 7 cm long, red flower like a *Cleistocactus* borne on a short, stout stem to 16 cm diameter. Spines 8-11, to 3 cm long, reddish. Andes of N. Argentina. (o)

380. *Echinocactus polycephalus*. T. Smale 131 (USA, Nevada, 1 mile W. of Searchlight, 3,500 ft., low hills in Joshua Tree desert). Terry recommends removal from the propagator immediately after germination and use of a very open compost. Water sparingly—not easy from seed, but a challenge not to be missed! (1)

381. *Echinocereus brandegeei*. In the wild this is a fiercely armed species mimicking its Baja California compatriot, *Opuntia invicta*. The flowers are bright pinkish-red, but seldom seen in cultivation. See Gordon Rowley's illustration of these convergent plants in *Ashingtonia* 2(7): 148 (1976). (o)

382. *Echinocereus chloranthus*. Lau 1076. A small-growing, cold-hardy species with greenish to brownish flowers, allied to *E. viridiflorus*, and included under it as a variety by some. Easy from seed. Texas. (1)

383. *Echinocereus cucumis*. Probably a synonym of *E. gentryi*, and related to the attractive, orange to salmon-flowered *E. scheeri* and *E. salm-dyckianus*. Well worth acquiring. Sonora. (o)

384. *Echinocereus grandis*. A close ally, if not a geographical

variety of, *E. pectinatus*, from islands in the Gulf of California. Spines whitish; flowers white, smaller than those of *E. pectinatus*. A rather choice plant. (0)

385. *Echinocereus websterianus*. Golden-spined, but otherwise scarcely differing from the above, and from the neighbouring San Pedro Nolasco Island. (0)

386. *Echinocereus weinbergii*. This name has been applied to a plant of unknown wild origin related to the dwarf *E. pulchellus* and *E. amoenus*. It may be a hybrid of the former. (0)

387. *Echinofossulocactus dichroacanthus*. A name of uncertain application, but usually used for one of the forms of *Ferocactus* (*Stenocactus*) ***crispatus***. Thin wavy ribs and purplish to pink-striped flowers can be anticipated. Mexico. (0)

388. *Echinofossulocactus tricuspidatus*. This is a form of the dwarf *Ferocactus* (*Stenocactus*) ***phyllacanthus***, with the upper central spines three-pronged. Flowers pale yellow, small. N. Mexico, San Luis Potosi. (0)

389. *Echinofossulocactus* sp. Lau 1365 (Mexico, Durango). Note the field data and Lau no. supplied—it could help with identification later. (1)

390. *Echinopsis cardenasiana*. First described as a *Lobivia* by Rausch, just 10 years ago. A beautiful, magenta-flowered species to judge from the Rausch photo published in Backeberg's *Lexicon*, fig. 472 (1977). Bolivia. (0)

391. *Echinopsis frankii*. Rausch 63 (Bolivia, Dept. Chuquisaca, Sucre). This is *Echinopsis calliantholilacina*, a synonym of the attractive *E. obrepanda*, also known under the unpublished name *Pseudolobivia frankii*. (1)

392. *Echinopsis hystricoides*. Rausch 308 (Bolivia, Dept. Chuquisaca, Camargo, Culpina). This is *E. mamillosa* var. ***histrichoides***, another member of the *Pseudolobivia* Group and, like the above, well worth having. (1)

393. *Eriosyce ceratistes* var. *illapelensis*. KK 1620 (Chile, no further data available). *Eriosyce* is a small genus of large Chilean echinocacti, related to the Neoporteria. (1)

394. *Ferocactus covillei*. T. Smale 108 (S. Arizona, 4 miles S. of Sells, 2,400 ft.). A real favourite of the writer. Young plants are grey-green and tuberculate, with large, woolly areoles and 7–10 stout red or white spines, including a ferocious hooked central. Slow-growing and sun-loving. (1)

395. *Ferocactus robustus*. An extraordinary, and perhaps ancient, member of the genus, resembling a clustering *Mammillaria* or *Echinocereus* in habit. Ribs c. 8, rad. sp. whitish, slender, centrals 4–6, brown. Flowers yellow, red without. Easy to grow. S. Mexico. (0)

396. *Ferocactus wislizeni*. T. Smale 111 (Arizona, Santa Catalina Mts., Mt. Lemmon, 4,200 ft.). Well-known species attaining impressive proportions in age, but this form is said to produce its yellowish flowers when only 20 cm diameter. (1)

397. *Gymnocalycium altagraciense* P 119 (Argentina, Cordoba, Alta Gracia). Said to be related to *G. leptanthum*, with a flattened green body, weak adpressed spines and white flowers. (1)

398. *Gymnocalycium hyptiacanthum*. A rather old name which has been applied to plants from Uruguay. Thought to be white-flowered. (0)

399. *Gymnocalycium onychacanthum*. Doubtfully distinct from *G. marsoneri*, a name which may include *G. tuda* and *G. megatae* too. Stem depressed-globose, spines 9, stout and pectinate; flower dirty white. Perhaps from Uruguay. (0)

400. *Lobivia breviflora*. A habitat form of *L. sanguiniflora* according to Walter Rausch; see his *Lobivia* book, vol. 2: 107, for an illustration of the plant in its native Argentina. (0)

401. *Lobivia famatimensis*. FR 459 (Argentina, Famatina). Previously known by the unnecessary name, *Reicheocactus pseudoreicheanus* Backeb., due to the misidentification of *L. densispina* with *L. famatimensis*. A beautiful, slow-growing species with very short, adpressed spines. From high elevations in the Andes. (1)

402. *Lobivia fricii*. Reduced to a variety of *L. tiegeliana* by Rausch in 'Lobivia' vol. 2: 92, and illustrated on the next page. Flowers crimson-red. N. Argentina. (0)

403. *Lobivia glauca*. Referred to *L. jajoiana* as a subvariety or

form by Rausch, a species which he also treats as a variety or subspecies of *L. chrysacantha* (some people just can't make up their minds!). See 'Lobivia' vol. 2: 112–115; 3: 179, 185. N. Argentina. (0)

404. *Lobivia hualfinensis*. Rausch 146 (Argentina, Prov. Catamarca, Andalgalá, Hualfin). Reduced to subvarietal (or varietal) status under *L. haematantha* by Rausch and illustrated in 'Lobivia' vol. 2: 119. N. Argentina. (3)

405. *Lobivia maximiliana*. Lau 254. This species grows around one of the most remarkable stretches of water in the world, the enormous high-altitude Lake Titicaca, on the borders of Bolivia and Peru. Illustrated and discussed in 'Lobivia' vol. 1: 24–25. (1)

406. *Lobivia tiegeliana* var. *uriondoensis*. See no. 402 above. (0)

407. *Lobivia zecheri*. Treated as *L. backebergii* var. *zecheri* by Rausch, whose illustration ('Lobivia' 1: 23) depicts a plant bearing a rich pink flower with a white centre. Highly recommended. From Peru. (0)

408. *Mammillaria arida*. May be an older name for the following plant (q.v.). (0)

409. *Mammillaria baxteriana* (Ser. Macrothelae). Belonging to the *M. petrophila* Group this plant is allied with *M. peninsularis* and *M. petrophila*, which are likewise found in the Cape region of Baja California. Stem flattened globular, spines whitish, sometimes brown tipped, radials 7–13, central 1. Flower 20 mm wide, perianth segments greenish-yellow with dark midstripes. See John Pilbeam's *Mammillaria* book, pp. 36–37 (1981). (0)

410. *Mammillaria casoi* (Ser. Polyedrae). A distinctive variant of the widespread, S. Mexican *M. mystax*, from Oaxaca. Flowers pinkish, numerous in rings around the shoulder of the plant. (0)

411. *Mammillaria crucigera* (Ser. Supertextae). Lau 1116 (S. Mexico, Oaxaca, nr. Cuicatlan). Lau gives a description and notes on the habitat in CSJGB 41(3):64(1979). David Hunt refers this collection to the *M. supertexta*—*lanata* complex, see l.c.66. (1)

412. *Mammillaria dixanthocentron*. Lau 060 (S. Mexico, Oaxaca, Tomellin Canyon). A beautiful species related to the above, but with two long central spines. Grows into a stout column in time. See CSJGB 41(3):65(1979). (1)

413. *Mammillaria glareosa* (Ser. Macrothelae). Closely allied to the familiar *M. brandegei* and perhaps only a geographical variety of it. Flowers pale greenish-yellow, fruit light pink. Baja California. (0)

414. *Mammillaria guerreronis* (Ser. Polyacanthae). This beautiful species is something of a challenge, even for the *Mammillaria* connoisseur, for it comes from warm regions of SW. Mexico and is rather cold-tender. A recommendation for 10° C winter minimum and a fine illustration can be found in John Pilbeam's 'Mammillaria—A Collector's Guide', p.67. (0)

415. *Mammillaria heidiae* (Subg. Dolichothele). This is still a very new and sought after species, and one of considerable botanical interest, described in KuaS 26:217, with colour fig. (1975). The present author suspects a closer relationship with *M. zephyranthoides* (no. 422 below) than with the six members of *Dolichothele* proper, which it resembles on account of the large yellow flowers. S. Mexico, Puebla. (0)

416. *Mammillaria macdougalii* (Ser. Macrothelae). T. Smale 113 (Arizona, 8 miles S. of Benson, 4,200 ft.). One of many forms of the wide-ranging, variable *M. heyderi*, and placed under its var. *meiacantha* by David Hunt. In time the stem can reach 15 cm diameter, and bears large (3.5 cm long) cream to pale yellow flowers. (1)

417. *Mammillaria magnifica* (Ser. Polyacanthae). A fine species easily raised from seeds, and growing into a tall white column bristling with yellowish-white, hooked centrals. Related to no. 414 in this list, but more cold tolerant. S. Mexico, Puebla. (0)

418. *Mammillaria microcarpa* (Ser. Ancistracanthae). T. Smale 116 & 118 (Arizona: 4 miles N. of San Manuel, and S. of Pinal Pass, nr. Globe, 3,600 ft. on limestone, resp.). This

pretty plant has a reputation for difficulty, but repays the successful grower handsomely with large flowers of a delicate pink. The hooked spines willingly attach themselves to pull-overs, so beware when repotting or showing visitors around your collection. (1)

419. Mammillaria microthale var. *superfina* (Ser. Leucocephalae). This is probably another name for the wide-ranging *M. formosa* of the N. Mexican limestone plateau. A compact plant with many adpressed whitish spines and pink-striped whitish flowers. (0)

420. Mammillaria stampferi (Ser. Longiflorae). Alias *M. longiflora* fa. *stampferi*, see CSJGB 41(4):97-98(1979) for discussion and an illustration. Flowering earlier than the typical form of the species, with uniformly, soft pink petals. Choice. (0)

421. Mammillaria wagneriana (Ser. Macrothelae). Lau 1073 (Mexico, Durango, Nazas). Probably, this is *M. zeyeriana*, a large solitary species, belonging in the *M. heyderi* Group and close to *M. grisonii*. (1)

422. Mammillaria zephyranthoides (Ser. Ancistracanthae). An unmistakable plant forming a large depressed-globose stem (if you can keep it alive for long enough) and bearing large tubercles with fine white radials. Central spines reddish brown, hooked. Flowers large white with emerald green stigmas. Very choice, but not easy. See John Pilbeam's 'Mammillaria—A Collector's Guide', p. 143. (0)

423. Matucana calliantha. Newly described in Ritter's *Kakteen in Südamerika* 4: 1490, colour fig. 48 (1981). Not specifically distinct from *M. paucicostata* according to Donald. (0)

424. Matucana herzogiana. KK 565 (Peru, Casma-Huaraz, 3,200 m). A rather poorly known plant—flower yet to be described. Referred to *M. yangaensis* by Ritter, loc. cit. 1506. The field data is of greater value than the name in this case. (1)

425. Melocactus matanzanus. The dwarf of its genus, this species should be in every collection. However, it needs a winter minimum of 7° C and still greater warmth lessens the time taken to reach cephalium-bearing maturity. N. Cuba. (0)

426. Melocactus pachyanthus. One of many recent Buining & Brederoo species, this plant seems to be a distinctive geographical variety of the well-known *M. azureus*. E. Brazil. (0)

427. Melocactus unguispinus. KK 287 (Peru, Olmos, 600 m). A synonym of the variable *M. peruvianus*. (1)

428. Melocactus sp. KK 1679 (no further data available). (1)

429. Mila caespitosa. KK 243 (Peru, Lima, Santa Clara, 900 m). The longest-known species in an interesting genus of disputed affinity: CSJGB 39(4):89-91(1977). (1)

430. Neoporteria divaricatiflora (Islaya Group). KK 1341 (Peru, Dept. Arequipa, Camana-Tambo, 300 m). This is *N. islayensis* var. *divaricatiflora* according to Donald & Rowley. Flowers greenish-yellow or reddish. Illustrated in Backeberg's *Lexicon*, fig. 174 (1977). (1)

431. Neoporteria geissei (Horridocactus Group). KK 1676 (Chile, no further data available). Referred to *N. curvispina* as a variety by Donald & Rowley; differing in the reddish and larger flower (to 5.5 cm long). (1)

432. Neoporteria glanduliflora (Horridocactus Group). KK 1655 (Chile, as above). Similarly a variety of *N. curvispina*, but with flowers even larger (to 7 cm), white to light yellowish with a broad red midstripe. (1)

433. Neoporteria setosiflora (Nichelia Group). KK 115 (Chile, Coquimbo, Totoralillo, 100 m). Stem flat to hemispherical, 4-6 cm diameter, supported by a turnip-like root. Spines yellowish, flower 4-6.5 cm long, yellowish tinged green to purplish. (1)

434. Neoporteria wagenknechtii (Nichelia Group). KK 110 (Chile, Isdon, 1,200 m). *Neoporteria* (s.l.) is a group that badly needs some botanical study in order that the true and distinctive species may be established. The raising of plants from seed of known origin, such as that offered here, can greatly help in this respect. (1)

435. Neoporteria sp. KK 1615 (Las Rojas). (1)

436. Notocactus muegelianus. Apparently not yet described. (0)

437. Notocactus purpureus. This plant, described 12 years ago, is little more than a variety of *N. horstii*, with purple flowers. Very attractive and well worth cultivating according to Tony Mace. Brazil, Rio Grande do Sul. (0)

438. Notocactus schlosseri. (0)

439. Notocactus schlosseri. Schlosser 157 (Uruguay, Dept. Maldonadenas, Garzon). A new plant, described in *Succulenta* 63: 10 (1974). Apparently a very spiny member of the *N. mammosus* Group, with reddish-spined young growth. (3)

440. Notocactus warasii. Ritter described this fine plant from central Rio Grande do Sul, Brazil, in 1973 as *Eriocactus warasii*. It is somewhat intermediate between the well-known *N. leninghausii* and *N. magnificus*. (0)

441. Notocactus werdermannianus (brown-spined form). Though described in 1942, this Uruguayan plant has remained rare in cultivation until very recently. It is illustrated in Tony Mace's 'Notocactus', p. 76. (0)

442. Oreocereus maximus. KK 882 (Bolivia, Tupiza, 3,000 m). A habitat form of *O. celsianus* according to Ritter. Good beginners' plant. (2)

443. Parodia compressa. KK 1193 (Bolivia, Rio Chico-Rio Grande, 1,800 m). Related to *P. ocampoi* and perhaps only a variety of it. Flowers to 3 cm long, carmine. (2)

444. Parodia miguillensis. KK 1017 (Bolivia, Miguillas, 1,200 m). Stem simple, pale green, 4 cm diameter, with 13 ribs. Areoles pale brown bearing 16-20 acicular, yellowish-white to pale brown spines. Flowers 18 mm long, pale yellow, white in throat. (2)

445. Parodia sp. KK 1652 (Bolivia, San Antonio). A mystery offering from Knize. (1)

446. Rebutia fiebrigii (Aylostera Group). An old, beginners' favourite, needing no introduction. Bolivia. (0)

447. Rebutia residua. KK 1517 (no further data available). I am unable to trace this name—note that KK no. 1 (1)

448. Rebutia rosalbiflora. FR 1115 (Bolivia, Prov. Chichas, Mal Paso). Described only five years ago by Ritter who places this species in the dwarf *R. pygmaea* group. (3)

449. Strombocactus disciformis. A very distinctive plant closely allied to *Aztekium ritteri* (see no. 368 in this list). Mexico, Hidalgo. (0)

450. Thelocactus bicolor var. *pottsii*. Easy from seed and (sometimes) free with its flowers. These are a rich purplish-pink with a beautiful sheen, and c.6 cm diameter. N. Mexico. (0)

451. Thelocactus leucacanthus. Like the above a very variable species, often seen in collections as *T. ehrenbergii*. Flowers large, yellow or red. N. Cent. Mexico. (0)

452. Thelocactus tulensis. The above two species are not closely related to this plant. They show closer affinity with the *Glandulicacti*, *Ancistrocacti* and *Hamatocacti*, which are better placed in *Ferocactus* (s.l.). However, *T. tulensis* is a true *Thelocactus*, allied with *T. bueckii*, *T. rinconensis*, etc., and in broader terms with *Gymnocactus* and *Turbincarpus* also. Mexico, Tamaulipas. (0)

453. Trichocereus pachanoi. KK 339 (Ecuador, Huigra, 2,000 m). Forming enormous, candelabrum-like, 6 metre high tree in the wild, but best used as grafting stock in cultivation, unless you like impressive specimens. (1)

454. Turbinicarpus klinkerianus. A variety of the variable, dwarf *T. schmiedickeanus* and easily flowered in a few years from seed. N. Mexico. (0)

455. Weingartia riograndensis. KK 507 (Bolivia, Rio Grande, 1,800 m). Described by Ritter in this Journal back in 1961; illustrated in the *Lexicon*, fig. 451 (right). (1)

456. Coryphantha vivipara. *D. Speirs s.n.* (Canada, Alberta, Bow City Bridge). The type variety of the wide-ranging *Escobaria vivipara* complex. Can survive low temperatures if kept dry in winter. Superb magenta flowers in spring. (1)

457. Opuntia polyacantha. *D. Speirs s.n.* (collected as above). Worth trying to overwinter this one outside, in well-drained

soil, after establishing the seedlings under glass. *Opuntia* flowers are very beautiful. (1)

458. *Ferocactus haematacanthus*. Seed collected by Lau, s.n. Not to be confused with *F. hamatacanthus*. SE. Mexico (1)

OTHER SUCCULENTS

1006. *Agave* sp. *Agavaceae*. T. Smale 104 (California, 10 miles east of Julian, in the Anza Borrego desert). This could turn out to be any one of about a dozen species (or perhaps even a new one). According to Terry Smale, it forms rosettes up to a metre in diameter of very narrow leaves without filaments. But don't worry, it would take many years to reach that size! Even so, Agaves are very easy from seed and soon form attractive plants. (1)

1007. *Aloinopsis orpenii*. *Aizoaceae*. Often called *Nananthus orpenii*. Like most others in this family, this small clump-forming plant is easy to grow from seed. For good germination the small seeds should be scattered on the surface of the compost. They should not be covered by even a thin layer of compost as mesem seeds often require light to initiate germination (see the paper by Brian Fearn in the February 1981 issue of this Journal). After 1–2 year's growth a good-sized specimen should result, somewhat reminiscent of *Titanopsis*. From Griqualand, Cape Province, South Africa. (0)

1008. *Anacampseros tomentosa*. *Portulacaceae*. This species is extremely easy to raise from seed. Just scatter the seeds on some moist compost and in a few months you will have quite attractive little clumps. The small leaf rosettes soon produce inflorescences bearing small pink flowers. These soon set seed, the sepals becoming a skeleton-like basket, holding the seeds for dispersal. From Gr. Namaqualand, S. Africa. (0)

1009. *Argyroderma roseum*. *Aizoaceae*. According to Hartmann, plants bearing this illegitimate name are referable to *A. delaetii*. However, whatever its correct name, this plant is a very attractive member of the 'silverskins', as the *Argyrodermas* are sometimes termed. It has rosy-violet flowers according to Jacobsen. Certainly well worth growing in any collection. From Little Namaqualand, S. Africa. (0)

1010. *Astroloba congesta*. *Liliaceae*. These plants are very similar to *Haworthia* in appearance, separated from this genus in possessing regular flowers rather than zygomorphic. In this species the leaves are arranged around the stem in a densely spiralled formation. From S. Cape Province, S. Africa. (0)

1011. *Euphorbia inermis*. *Euphorbiaceae*. (5 seeds). This is one of the caudex-forming *Euphorbias*, very similar to *E. esculenta*. It has numerous branches in three or more rows around the often depressed stem apex. As its name implies, the stems and branches are spineless, although the inflorescences are sometimes prickly. From Cape Province, S. Africa. (0)

1012. *Gibbaeum dispar*. *Aizoaceae*. This species grows quickly from seed and soon forms attractive clumps of grey-green bodies. The leaves have a somewhat velvety texture, caused by the presence of numerous tiny hairs or papillae. Like many *Gibbaeums*, this plant is a winter grower, although it is wise not to be too generous with the water during the colder months unless you are willing to supply extra light and warmth. On the other hand, give them a little water in the summer, just to keep the roots alive. Flowers violet-red, about 1 cm diameter in August to late autumn. From Ladismith Division, Cape, South Africa. (0)

1013. *Lithops lesliei* var. *albiflora*. *Aizoaceae*. Whereas *L. lesliei* normally has yellow flowers (subgenus *Xantholithops*), our form is unusual in possessing white flowers. This also occurs infrequently in other species of *Lithops* and is believed to be due to the absence of a single gene or sequence of genes. The real question is does this mutation reproduce true from seed? Try it and see. *Lithops* are very easy to raise from seed, so you will have plenty of plants on which to base a statistical survey. (0)

1014. *Lithops schwantesii* var. *marthae* (= *L. marthae*). *Aizoaceae*. This plant has a grey-green to ochre top to its leaves with blood-red lines and spots. Like all *Lithops*, this

species is easy from seed (see comment for No. 1013), so why not try it this spring? Flowers yellow. From Gr. Namaqualand, S. Africa. (0)

1015. *Nolina baldingii*. *Agavaceae*. *Nolinas* resemble narrow-leaved *Agaves* or *Yuccas* in appearance. They eventually grow into palm-like trees, but fortunately this takes rather a long time. (0)

1016. *Pleiospilos nelii*. *Aizoaceae*. This is one of my favourite mesems and no collection should be without it. *Pleiospilos* species, or granite plants as they are sometimes known, are very easy to grow from seed. They have relatively large seeds for mesems and are vigorous growers, and can even flower in their first year. Scarcely have the cotyledons come up and the mature leaves start to appear. This plant should be grown in a very sandy compost (at least 60%), or it may grow too many leaves and become atypical. Flowers salmon-pink to yellow. (0)

1017. *Puya* sp. *Bromeliaceae*. (Argentina, Matucana.) These members of the pineapple family soon form attractive pot plants. Such scarcely succulent plants are often found in succulent collections, mainly because they can tolerate the relatively dry conditions provided by the grower. (1)

1018. *Stomatium trifarium*. *Aizoaceae*. *Stomatiums* are rather like miniature *Faucarias*. They grow readily and quickly from seed, forming attractive clumps. The leaves have toothed margins and are covered with numerous translucent dots, or 'small windows'. The flowers are yellow, and very sweetly scented, opening during the evening. (0)

Supplementary items

Seeds collected and notes supplied by Derek Tribble.

These items, not included on the original list, will be sent as substitutes when supplies of the listed succulent species are exhausted.

1019. *Anacampseros baeseckei*. Small rounded leaves on stems forming heads about 15 mm diameter. Light white felt on leaves, and freely produced deep pink flowers. (0)

1020. *Anacampseros papyracea*. Produces elongated clustering stems, about 8 mm thick, and covered with long white papery scales. Older plants bear white flowers near the ends of the branches, where they then start rebranching. The tiny seedlings should be kept moist for the first year until the first true stem grows. (0)

1021. *Anacampseros retusa*. This offering differs somewhat from the original description. The attractive plant forms small clumps of dark blackish-green leaves, which are club shaped with a very rounded triangular top. Flowers are deep pink. (0)

1022. *Anacampseros telephiastrum*. (From Klaasvoogds, 5 km east of Robertson, Cape Province). Among the largest in the genus with leaves 20 mm long, green above and purple below. The stems are sprawling and it produces large satin-pink flowers. (1)

1023. *Anacampseros* sp. (From south of Calitzdorp, Little Karroo.) Another larger growing species with 10 mm long, light brown fat cylindrical leaves, tapering to a point. The stem is 50 mm long or more. (1)

1024. *Conophytum subglobosum*. (From Uniondalepoort, 3 km south of Uniondale, Cape Province.) Close to *C. truncatum*. Pale green cylindrical bodies about 10 mm diameter, which produce nocturnal cream-coloured 'shaving brush' shaped flowers. In habitat the plants grow in cracks on a steep cliff face and are a reddish-brown colour. (1)

1025. *Conophytum wettsteinii*. (From 12 km south of Kosies, Steinkopf, Namaqualand.) Large flat pale green heads, occasionally over 20 mm diameter and sometimes with a few spots. The spectacular large flowers are pale purple. (1)

1026. *Erepsia inclaudens*. (From Sir Lowrys Pass, east of Cape Town.) Low shrubby sprawling mesem, with triangular 20 mm leaves. Worth growing for its interesting pink 'centreless' flowers; the stamens being hidden by pink staminodes. It flowers in 18 months but is not hardy in the U.K. (1)

Your Letters

Collected Plants

from Paul Sherville

I was interested to read the comment in the editorial note on the British Cactus Sales Fair. The problem of field collected plants seems almost insoluble. I was not personally present at the fair, but whilst on honeymoon in the U.S.A. last year, I was quite surprised to find boxes of cacti on sale at Las Vegas airport. The plants were all neatly boxed up and 'gift-wrapped' in would-you-believe CLING FILM! Prices varied with the size of the box, but were generally in the range \$6.00 to \$12.00. The big surprise, however, was on finding an *Ariocarpus* in every box, mostly they were *A. fissuratus*, with a few *A. retusus*. These unfortunate *Ariocarpus* plants were typically accompanied by *Opuntias*, *Mammillarias*, *Coryphanthas*, *Thelocacti* and some really beautiful specimens of *Echinocereus rigidissimus*. Clearly, these specimens would stand little chance of survival in the hands of the sort of people at which they were directed, i.e. casual buyers on their way to their 'plane.

I was under the impression that the American authorities were amongst the most efficient when it comes to discouraging illegal trading in protected species, but clearly they were not interested in these particular plants—oh yes—they were in the duty-free zone! Now Las Vegas is an international airport, we ourselves had arrived direct from London, and one can take flights to most destinations, both national and international from this airport so it would be relatively easy to take these plants out of the U.S.A. without even having to take them through the customs!

Propagation of very many of the cacti from seed is relatively easy and reliable these days—I have seen seed-raised *Ariocarpus* and *Obregonia* flower in England in about 11 and 8 years from seed respectively. So there is no real requirement to acquire habitat-collected material except for study purposes, and if one really wishes to see the plants in their habitat form, then in my opinion it is best to visit them in their habitat. Perhaps the societies could do more in this direction by fostering guided field trips as the ornithological world does very successfully at present.

Paul Sherville
52 Blackbush Spring,
Harlow,
Essex, CM20 3DY.

from L. J. Batchelor

Since I started collecting cacti about a year ago I have become more and more worried about the dangers of taking certain cacti from the wild, especially Mexico and South America, rather than keeping nursery-grown specimens. Quite often on nursery lists I have seen habitat specimens of e.g. *Ariocarpus* and *Turbinicarpus*

for sale to the general public. Surely something should be done to (a) stop this illegal trade, and (b) let collectors know which plants are endangered in the wild. Perhaps it would be a good idea to publish a list of endangered species in your Journal. This would be a great help, especially to collectors who have recently started out.

L. J. Batchelor (3296)
43 Chester Road,
Seven Kings,
Ilford, Essex IG3 8PT.

Calibanus hookeri

from Harold Gaulton

I have two plants. One is a fairly large collected plant which grows well but has never flowered while in my possession. I put it outside in all weathers during the summer months. The other plant I got in August 1971, an ISI seedling (ISI 688) no more than $\frac{3}{4}$ inch in diameter. Now it is about 3 inches diameter. In 1979 it put out one flower spike, almost horizontal, and I got it on record with a couple of slides. In 1980 it had a rest, but made up for it in 1981 by producing three flower spikes. As to the sex of the plant, I cannot say what it is. In the days when I was brought up we did not speak so freely on sex and really I've no idea what to look for!

Harold Gaulton
11 Milton Grove,
Sale,
Cheshire M33 1LJ.

(The pollination we reported in the last issue was successful. Nearly twenty seeds developed, of which about sixteen have germinated. A feature on the sex-life of *Calibanus* is planned for a future issue!—Eds.)

Simple cactus spine removal

from Thomas Vogl & Katherine Long

Since readers of this Journal, their families, and their pets are particularly prone to untoward encounters with spines, a simple method for the removal of such spines from the skin is certainly most welcome. The following letter to the editor of the *Journal of Pediatrics*, reprinted here in its entirety with permission of the author, describes such a method.

We have been in touch with the author of the letter to inquire whether she could identify the genus of cactus involved in this particular encounter; unfortunately this information is unavailable. Since it is difficult to generalize from a single experience of this kind, we would very much appreciate it, if readers who try this method of spine removal would write to us and let us know what success (or failure) they have so that we can establish how well the method works for various kinds of spines. When you write, please supply as detailed information as possible about the plant, the patient, and the method of treatment. Any personal information supplied will be kept strictly confidential and no names or other means of identification will be used in any forthcoming publication reporting on trials of the method.

Letter from Marian H. Putnam, M.D., which originally appeared in the *Journal of Pediatrics* 98: 333 (1981):

'A 22-month-old boy fell into a household cactus plant, and, as a result, several thousand spines were embedded in the skin at the chest, abdomen, arm, forearm and hand. His mother tried tweezers and tape to remove the spines, but this quickly proved to be a painful and tedious process. Intense local erythema developed in the areas of the spines.

'Avon's Aloe Smooth Peel-off Facial Mask was applied to all areas in which the cactus spines were embedded. To enhance the drying of the facial mask, the patient was placed in front of a large fan. Every 20 minutes we peeled the mask and removed several hundred spines. The child smiled throughout the procedure; apparently, the procedure was painless. Most areas were cleared after eight applications. After each application the erythema became less intense.

'In a telephone conversation two weeks after the incident, his mother stated that the child's skin remained clear without dryness, chafing, or irritation. Most of the erythema had resolved within three days of the incident. About two dozen spines remained, primarily in the child's hand, and in these areas there was some erythema.

'This is apparently a noninvasive and painless way of removing cactus spines.'

Thomas P. Vogl,
Katherine C. Long
4857 Battery Lane,
Bethesda,
MD 20814, USA.



Whitestone Gardens has everything for cactus fanatics or beginners. A large stock of plants, books, and sundries is available for inspection, and the nursery welcomes visitors, any day of the year.

We specialise in **literature**, and stock the widest range of publications offered anywhere in the World.

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PLANT AUCTION

Tuesday 15 June, 6 for 6.30 p.m.,

at the R.H.S. New Hall, Westminster

At this popular annual 'bring and buy' event, the Chairman will auction the surplus plants and seedlings you bring and guarantees an enjoyable evening with bargains for all who attend. (There is also an R.H.S. Flower Show to see in the New Hall on 15-16 June).

Merger progress

Talks with the National Cactus & Succulent Society are making good though unhurried progress. It is hoped that detailed proposals for ratification by ballot of all members will accompany the next journal in order that, if the proposals are approved, the merger can be completed later this year.

Next issue of Journal

The next issue of the Journal will be published not later than the middle of June. Items for inclusion in the Calendar (see next page), small ads., etc., should reach the editors not later than 16 April.

Whitestone

Whitestone 1982 Catalogue 52 pages of plants, seeds, books, and sundries, with 36 illustrations. A great reference manual, listing over 1200 species of plants and seeds, and no less than 210 book titles. Free to existing clients (sent automatically).

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Branch & Affiliate Activities

March—June 1982

compiled by Daphne Pritchard

MARCH

Date	Branch	Topic & Speaker
1 Mon	St Helens NCSS	Continental Nurseries <i>Harry Mays</i>
2 Tues	North Surrey CSSGB Southport & Lancs CSSGB	Unusual Succulents <i>Joan Smeaton</i> IOS in Mexico (2) <i>Alan Hart</i>
3 Wed	Yeovil NCSS	To be announced <i>Brian Fearn</i> <i>Echeverias</i> <i>E. Hargreaves</i>
4 Thurs	Ashford NCSS	Continental Collections <i>D. Castle</i> <i>Echeverias</i> <i>John Hughes</i>
10 Wed	Warrington CSSGB	Seed-raising and Grafting: Discussion <i>Ariocarpus</i> <i>Dr Ted Anderson (USA)</i>
16 Tues	Bromley NCSS	
18 Thurs	Wirral CSSGB	
19 Fri	North London CSSGB	

APRIL

1 Thurs	Ashford NCSS	Table Show
5 Mon	St. Helens NCSS	Mammillarias of Merit <i>John Mullard</i>
6 Tues	North Surrey CSSGB Southport & Lancs CSSGB Yeovil NCSS	Seed-raising <i>John Pilbeam</i> Our Hobby, Shows and Showing <i>H. Gaulton</i> To be announced <i>Graham Charles</i> Baja California <i>John Henshaw</i>
14 Wed	Warrington CSSGB	History of Cacti <i>J. Arrowsmith</i> Namaqualand <i>Derek Tribble</i>
15 Thurs	Wirral CSSGB	South Africa cont'd <i>Derek Tribble</i>
16 Fri	North London CSSGB	
20 Tues	Bromley NCSS	

MAY

2 Sun	North Surrey CSSGB	Outing to Westfield Cactus Nursery
4 Tues	North Surrey CSSGB Southport & Lancs CSSGB	Plant Auction Spring Table Show: Cacti
10 Mon	St. Helens NCSS	Journeys in Bolivia <i>John Medway</i>
12 Wed	Warrington CSSGB	Euphorbiaceae <i>Susan Carter</i>
13 Thurs	Ashford NCSS	Thelocactus Group <i>Robert Holt</i>
18 Tues	Bromley NCSS	IOS in Mexico <i>Keith Grantham</i>
19 Wed	Yeovil NCSS	To be announced <i>Derek Tribble</i>
20 Thurs	Wirral CSSGB	Plant Auction
21 Fri } -23 Sun }	North London	Annual Show at Capel Manor
22 Sat	Bromley NCSS	Open Show at Hayes Village Hall

JUNE

1 Tues	North Surrey CSSGB Southport & Lancs	Restricted Branch Competition N-Z of Cacti <i>P. Bint</i> Melocacti & Discocacti <i>J. Arnold</i>
2 Wed	Yeovil NCSS	

7 Mon	St. Helens NCSS	Annual Show
9 Wed	Warrington CSSGB	Strangers in Paradise (1) <i>Doug Rowland</i>
10 Thurs	Ashford NCSS	'Aristocacti' <i>John Pilbeam</i>
12 Sat	Ashford NCSS	Open Show at Wye Community Centre
15 Tues	CSSGB	Plant Auction at R.H.S. New Hall, Westminster
	Bromley NCSS	Cactus People and their plants <i>Bill & Yvonne Tree</i>
17 Thurs	Wirral CSSGB	Annual Show Judge: <i>Dr R. Allcock</i>
18 Fri	North London CSSGB	Baja California (2)
27 Sun	Warrington CSSGB	<i>Doug Rowland</i> Annual Show at Padgate Community Centre

CSSGB members will be welcome at all the above events.

Venues and contacts for more information :

Ashford NCSS

Secretary: Mrs. D. M. Nelson, Parnassus, Etchinghal, Folkestone, Kent, tel. Lyminge 862340.
Meeting Place: Furlley Hall, Maidstone Road, Ashford.
Time: 1st Thursday of month, 7.30 p.m.

Bromley NCSS

Secretary: J. W. Pilbeam, 51 Chelsfield Lane, Orpington, Kent BR5 4HG, tel. Orpington 37781.
Meeting Place: Hayes Village Hall, Hayes Street, Hayes.
Time: Usually 2nd Thursday of month.

North London

Secretary: Roger Day, 50 Admiral's Walk, Hoddesdon, Herts. EN11 8AG. Tel. no. Hoddesdon (STD code from London: 61) 69521.
Meeting Place: Octagonal Room, Bishops College, Cheshunt, Herts.
Time: 3rd Friday in month, 7.30 p.m.

North Surrey

Secretary: W. F. Maddams, 26 Glenfield Road, Banstead, Surrey SM7 2DG.
Meeting Place: Adult School, Benhill Avenue, Sutton.
Time: 1st Tuesday in month, 7.45 p.m.

Southport & Lancs.

Secretary: J. L. Henshaw, 43 Southport Road, Eccleston, Chorley, tel. Eccleston 542555.
Meeting Place: St. Johns Hall, Scarisbrick Street, Southport.
Time: 1st Tuesday in month, 7.45 p.m.

St. Helens NCSS

Secretary: G. A. Hedgecock, 142 Mill Lane, Sutton Leach, St. Helens, Merseyside WA9 4HF, tel. Marshalls Cross 811988.
Meeting Place: United Reformed Church Hall, Beaufort Street, off Sutton Road, Peasley Cross, St. Helens.
Time: Usually 1st Monday of month.

Warrington & District

Secretary: Mrs. D. Pritchard, 81 Birdwell Drive, Great Sankey, Warrington, tel. no. Penketh (092572) 4699.
Meeting Place: Meeting Lane Leisure Centre, Penketh, Warrington.

Wirral

Secretary: Mrs. I. Boote, 110 Mount Pleasant Road, Wallasey, Merseyside L45 5HU, tel. no. Wallasey (051639) 4305.
Meeting Place: The Grange, Grove Road, Wallasey.
Time: 3rd Thursday in month, 7.45-10.30 p.m.

Yeovil NCSS

Secretary: Mrs. D. Raffill, New Chapter, Middle Chinnock, Crewkerne, Somerset TN18 7PN, tel. Chiselborough 294.
Meeting Place: Astley Motors, Oxford Road, Yeovil.
Time: 3rd Wednesday of month, 7.30 p.m.

Reference List of Periodicals

Part 1. Titles currently or until recently received

The thirty periodicals listed below are received by the CSSGB Library on a complimentary (C) or exchange (E) basis, or personally by the editors (P). They are listed under countries of publication. The run is complete unless otherwise noted. The information given is: Title. Year of first publication. Periodicity. Name and address of publisher. Editor. Subscription price (if known). Parts 2 and 3 of this list will include other current periodicals and defunct periodicals respectively.

United Kingdom

The Cactus and Succulent Journal of Great Britain. 1932. Quarterly. The Cactus and Succulent Society of Great Britain, 67 Gloucester Court, Kew Road, Richmond, Surrey TW9 3EA. *Editors:* D. R. Hunt & N. P. Taylor. £6.50. (C).

The National Cactus and Succulent Journal. 1946. Quarterly. The National Cactus and Succulent Society, 8 Stonehouse Close, Cublington, Leamington Spa CV32 7LP. *Editor:* W. C. Keen. £5. (E). Incomplete.

Repertorium Plantarum Succulentarum. 1951. Annual. International Organization for Succulent Plant Study, 47 Heron Dale, Addlestone, Surrey KT15 2JS. *Editors:* G. D. Rowley, L. E. Newton, N. P. Taylor. £3. (P).

The Journal of the Mammillaria Society. 1960. Bi-monthly. The Mammillaria Society, 26 Glenfield Road, Banstead, Surrey SM7 2DG. *Editor:* W. F. Maddams. £3. (P).

IOS Bulletin. 1961. Annual. International Organization for Succulent Plant Study, 7 Marlborough Drive, Tytherington, Macclesfield, Cheshire SK10 2JX. *Editor:* N. E. Wilbraham. (P).

Succulent Plant Trust Newsletter. 1962. Four-monthly. The Succulent Plant Trust, 72 Church Lane Avenue, Hooley, Coulsdon, Surrey CR3 3RT. *Editor:* E. W. Putnam. £1. (P).

Essex Succulent Review. 1963. Quarterly. Formerly published by the Essex Branch of the Cactus and Succulent Society of Great Britain. *Editor:* D. Hooker, 8 Alwyn Avenue, Shenfield Essex. (E).

Epiphytes. 1968-73; 1981. Epiphytic Plant Study Group, 126 Hatherton Road, Cannock, Staffs. WS11 1HH. *Editor:* J. F. Horobin. £1.80. (UK). (P).

Ashingtonia. 1973. Irregular. Holly Gate Nurseries Ltd., Billingshurst Lane, Ashington, Sussex RH20 3BA. *Editors:* J. Donald, R. C. Holt. (P). Discontinued? (Set lacks vol. 3.)

Asklepios (formerly Asclepiadaceae). 1974. Four-monthly. The International Asclepiad Society, Dept. of Microbiology, School of Agriculture, University of Edinburgh, West Mains Road, Edinburgh EH9 3JG. *Editor:* C. C. Walker. £4. (P).

The Xerophyte. 1976. Quarterly. Barleyfield Succulent Plant Nursery, Southborough, Thetford, Norfolk. *Editor:* V. Graham. £3. (C).

West Germany

Kakteen und andere Sukkulanten. 1949. Monthly. Deutsche Kakteen-Gesellschaft, Ahornweg 9, D-7820 Titisee-Neustadt. *Editor:* D. Hönig. DM34. (E). German. (Various issues prior to vol. 23 missing from our set.)

Mitteilungsblatt des Arbeitskreises für Mammillarienfreunde. 1977. Bi-monthly. Arbeitskreis für Mammillarienfreunde e.V., Klaus-Stürmer-Strasse 13, D-4500 Osnabrück. *Editor:* I. Adamczyk. DM30. (C). German.

East Germany

Kakteen/Sukkulanten. 1966?. Quarterly. Kulturbund der DDR, ZFA Kakteen-Sukkulanten, Hessische Strasse 11-12, 1040 Berlin. *Editor:* W. Spanowsky. (E). German (Set begins at vol. 12. 1977.)

Informationsbrief der Zentralen Arbeitsgemeinschaft Mammillarien. 1975. Quarterly. Kulturbund der DDR, ZFA Kakteen-Sukkulanten, Hessische Strasse 11-12, 1040 Berlin. *Editor:* B. Hofmann. DM8. (C). German.

Literaturschau Kakteen. 1977. Quarterly. Kulturbund der DDR, ZFA Kakteen-Sukkulanten, Hessische Strasse 11-12, 1040 Berlin. *Editor:* K. Neumann. DM15. (E). German.

Belgium

Cactus [Tijdschrift. . .] 1969. Bi-monthly. Cactusweelde etc., Kasteellei 11, B-2110 Wijnegem. *Editor:* E. van Hoofstadt. (C). Discontinued? (Set lacks vols. 1-5, ends with vol. 11.) Later vols. in Dutch, earlier in French.

Cactus [Périodique. . .] 1976. Bi-monthly. Assoc. française pour amateurs de Plantes de Serre et d'Acclimatation, Avenue Victor Gilsoul 33, B-1200 Bruxelles. *Editor:* P. Bourdoux. Belg. Fr. 70. (E).

Italy

Piante Grasse. 1981. Frequency? Assoc. Italiana Amatori delle Piante Succulente, 33095 Provesano (PN). *Editor:* L. Battaglia. L.10000. (E). Italian.

Czechoslovakia

Kaktusy. 1965. Bi-monthly. Zpravodaj ZO CZS Klub kaktusaru Astrophytum Brno, PS 19. 656-18 Brno. *Editor:* V. John. (E). Czech. Set very incomplete.

Aztekia. 1978. Six-monthly. Klub kaktusaru Praha, Nejedleho 861, 289-22 Lysa n.L. *Editor:* J. Riha. (E). Discontinued? Czech.

India

Succulenta. 1975. Indian Succulent Society, c/o Mrs. A. K. Sharma, 1354 Sukh Ram Nagar, Ludhiana (Pb). *Editor:* Mrs. A. Serohi. (E). Apparently discontinued after vol. 4 (1978).

Australia

Cactus and Succulent Journal. 1957. Quarterly. The Cactus and Succulent Society of New South Wales, 43 Edwards Road, Wahroonga 2076. *Editor:* Mrs. J. Deane. Aus. \$6.00. (E). Set incomplete.

The Four C's. 1979? Irregular. Australian Confederation of Country Cactus Clubs, 195 Plumpton Road, Wagga Wagga, New South Wales. *Editor:* J. Eldridge. (C). From vol. 2(3).

New Zealand

New Zealand Cactus and Succulent Journal. 1948. Bi-monthly. The Cactus and Succulent Society of New Zealand, 164 Massey Street, Frankton. *Editor:* Mrs. A. B. Carlton. NZ \$5.50. (E). Set incomplete.

Zimbabwe

Excelsa. 1971. Annual. Also, **Excelsa Taxonomic Series.** 1978. occ. The Aloe, Cactus and Succulent Society of Zimbabwe, P.O. Box 8514, Causeway, Salisbury. *Editor:* M. J. Kimberley. Z \$5.00 (£4.50); taxonomic series Z \$6.00 (£5.00). (E). Missing Excelsa no. 1.

Aloe, Cactus and Succulent Society of Zimbabwe Quarterly Newsletter. Quarterly. Address and Editor as for Excelsa. (E). Set very incomplete.

Canada

Cactus and Succulent Information Exchange. 1968? CSIE, 5512 Clinton Street, Burnaby, British Columbia, V5J 2L8. *Editor:* Grace Rollerson. Canad. \$5.00 (overseas \$6.00). (E). Incomplete.

United States of America

Cactus and Succulent Journal. 1929. Bi-monthly. The Cactus and Succulent Society of America, Abbey Garden Press, 1675 Las Canoas Road, Santa Barbara, California 93105. *Editor:* C. Glass. US \$15.00 (overseas \$16.00). (E). Nearly complete.

Mexico

Cactaceas y Suculentas Mexicanas. 1955. Quarterly. Sociedad Mexicana de Cactología, 2a Juarez 42, Col. San Alvaro, Mexico 17, D.F. *Editor:* J. Meyran. US \$7.00. (E). Set very incomplete.

Small Ads.

Members may advertise here free of charge
Apply to the Editorial Office

For sale. A number of cacti and succulents, including choice and specimen plants. Available from late April. For list, send SAE or 'phone Bob Baker, Saguaro, 11 Irons Way, Collier Row, Romford, Essex RM5 3RJ, tel. Romford 60695.

For sale. *Stapeliae Barklyanae*, N. E. Brown (1890). In original paper wrapper. £16. *The Succulent Euphorbiae*, White, Dyer & Sloane (1941). 2 vols, v.g.c. £130. Apply to Editorial Office.

Wanted. *Echinopsis longispina*, *Stenocactus crispatus*, *Opuntia paediophila* and *O. platyacantha*. G. Ralphs, 32 Meaford Road, Barlaston, Stoke-on-Trent, Staffs. ST12 9EB.

Gardener's Sunday. The 1982 edition of the booklet 'Gardens to Visit' will be published end of March. Price 40p from book-sellers or 60p by post from Mrs K. Collett, White Witches, 8 Mapstone Close, Glastonbury, Somerset BA6 8EY.

Nursery List

For free listing (members only), send
particulars to the Editorial Office.

North & South Yorkshire

Cruck Cottage Cacti (Dorothy & Ronald Wood), Cliff Road, Wretton, Pickering, North Yorkshire YO18 8PJ. Tel. no. Pickering (0751) 72042. Open daily except Sat. morning. No lists. Nursery in garden setting.

Whitestone Gardens Ltd., The Cactus Houses, Sutton-under-Whitstonecliffe, Thirsk, North Yorkshire YO7 2PZ. Tel. no. Sutton (08456) 467. Open daylight hours every day throughout the year. Send 4 × 8p stamps (UK) or 3 international postal reply coupons for list. Everything for the cactophile; plants, seeds, books, sundries; substantial stocks and extensive collection on view.

Oak Dene Nurseries, 10 Back Lane West, Royston, Barnsley, Yorkshire S71 4SB. Tel. no. Royston (022670) 2253. Open every day, April–Sept. 9–6, Oct.–March 10–4 (closed for lunch 12.30–1.30). S.A.E. for list. Seed, plants, books and sundries.

Merseyside & Lancashire

Jim Bolton, Southview, 39 Altcar Road, Formby, Liverpool L37 8DR. Tel. no. Formby (07048) 73187. Open all day Sundays, advisable to telephone for weekday visits. Large selection of seedlings, etc., all at reasonable prices. No list.

Cruston Cactus (J. L. Henshaw), 43 Southport Road, Eccleston Chorley, Lancs. PR7 6ET. Open evenings and weekends. S.A.E. for list. Choice Mexican cacti, occ. Tillandsias and other bromeliads.

Harry Mays, Woodsleigh, Moss Lane, St. Michaels on Wyre, Preston PR3 0TY tel. no. St Michaels (09958) 295. Surplus seedlings for sale to visitors only. Prior 'phone call essential.

Derbyshire

Abbey Brook Cactus Nursery, Old Hackney Lane, Matlock, Derbyshire. Tel. no. Matlock (0629) 55360. Open every afternoon 2–6 except Tuesday (closed all day). List free on request, stamp appreciated. Mail order catalogue illustrated in colour lists over 1700 species of nursery-grown cacti and other succulent plants.

South Humberside & Lincolnshire

Jumaney Cacti (June & Tom Jenkins), St. Catherine's Lodge, Cranesgate Road, Whaplode St. Catherine, Nr. Spalding, Lincs PE12 6SR. Tel. no. Holbeach St. Johns (040634) 373. Open 9–5 Sunday–Friday, closed Saturday. S.A.E. for list.

Norfolk

Richard & Wendy Edginton, The Vines, 2 Green Man Lane, Kirstead, Norwich, Norfolk NR15 1EP. Tel. no. Brooke (0508) 58113. Open most mornings and weekends. S.A.E. for list. Seedling cactus plants 35p upwards.

Barleyfield Succulent Plant Nursery (Victor & Heather Graham), Southburgh, Thetford, Norfolk. Tel. no. Dereham (0362) 820457. Nearly always open, but telephone call appreciated. S.A.E. for list. 'Other' succulents, handmade plant pots. (0362) 820457. Stamp for list. Open Sundays only. Best to 'phone for directions. Very large selection of succulents including some cacti.

Warwickshire

Rod & Ken Preston Mafham, 2 Willoughby Close, Kings Coughton, Alcester, Warwickshire, tel. no. Stratford (0789) 762938, invite members to see their collection at weekends or during school holidays—please 'phone first. Surplus seedlings.

Gloucestershire

W. G. Geissler, 1 Lyefield Road, Charlton Kings, Cheltenham GL53 8BA. Tel. no. Cheltenham (0242) 517846. Open weekends and evenings. No list, no orders by post, but visitors very welcome in Cotswold country.

P. Strong, Green Mead, Green Lane, Chedworth, Cheltenham GL54 4AR. Tel. no. Fossebridge (028572) 581. Surplus seed-raised plants.

Bedfordshire

A. & V. Parker, 31 Southill, Nr. Biggleswade, Beds. SG18 9HU. Tel. no. Hitchin (0462) 814022. Open evenings and weekends ('phone first). No list. Seed-raised plants.

Hertfordshire

R. F. S. & B. R. Dale, Thurnlea, 14 Buttondene Crescent, Old Nazeing Road, Broxbourne, Herts EN10 6RH. Tel. no. Hoddesdon 63234. Open almost any time but write or 'phone. No list. Full range B.E.F. pots, labels, top dressing, etc.

Essex

M. L. Fussell, 29 The Readings, Harlow, Essex CM18 7BT. Tel. no. Harlow (0279) 23246. S.A.E. for list. Service by return of post.

The Cactus Place (David & Barbara Brewerton), 33 Bridge Avenue, Upminster, Essex RM14 2LX. Tel. no. Upminster 29911. No list. Open 9 till dusk, but 'phone first. Large and medium sized specimens.

H. Guirl, Glenholme, Nursery Road, Nazeing, Essex. Tel. no. Hoddesdon 62291. Visitors and parties welcome. A prior telephone call would be appreciated. No list.

East & West Sussex

Ernest Hepworth, Mira Mar, 133 Ambleside Avenue, Telscombe Cliffs, Sussex BN9 7LG. Tel. no. Peacehaven (07914) 3260. Open by appointment; closed Sundays. Send 12p stamp for list. Lithops, Mesems, Sempervivums.

Holly Gate Nurseries Ltd., Billingshurst Lane, Ashington, Sussex RH20 3BA. Tel. no. (0903) 892439. Open 9–5 every day, incl. weekends and Bank Hols. Send 25p for current catalogue of plants and seeds. Reference collection, entry 25p each.

Dorset

Pine Ridge Cacti (Joan & Dick Smeaton) 197 Ringwood Road, Verwood, Wimborne, Dorset BH21 6AG. Tel. no. Verwood (020123) 2796. Open 10–6. Closed Saturday and Monday. Choice and rarer 'other succulents'.

Somerset

John E. White, 64 Bath Road, Ashcott, Bridgwater, Somerset TA7 9QJ. Tel. no. Ashcott (0458) 210256. Open daily except Mondays. Uncommon Succulents.

Devon

Phil Goodson, 1 Marsh Lane, Chudleigh, Newton Abbot, Devon. Tel. no. Chudleigh (0626) 852309. Collection open, plants usually for sale. Between the scenic Teign Valley and Haldon Hills, five miles from M5. 'Phone for directions and convenient times.

G. N. Short, Greenshaws, 7 Reabarn Road, Brixham, Devon TQ5 9DU. Tel. no. Brixham (08045) 2878. Open by appointment. The Devonian Collection of Cacti & Succulents; over 4000 species. Surplus plants for sale or exchange.

Westfield Cacti (Ralph Northcott), 10 Shillingford Road, Alphington, Exeter, Devon EX2 8UB. Tel. no. Exeter (0392) 56925. Nursery grown cacti and other succulents, books and sundries. S.A.E. for list. Visitors, including coach parties, welcome, by appointment, please. Collections bought.

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Volume 44/Number 2
June 1982

The Cactus and Succulent Journal of Great Britain



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Cover illustration: *Stapelia gigantea*, from the engraving in *Gardeners' Chronicle*, 1888, vol. 4 p. 728. The flower is pale yellow with reddish lines.

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The Cactus and Succulent Journal of Great Britain

Volume 44 Number 2 June 1982

edited by David Hunt and Nigel Taylor

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Merger Ballot

Agreement has been reached between ourselves and the National Cactus and Succulent Society on the terms for a merger of the two Societies and on procedure for its ratification by ballot of all members. Your ballot paper is enclosed with this issue. Please cast your vote and send the ballot paper to the Hon. Secretary (Mr. R. H. I. Read) without delay.

Annual General Meeting

There was a total attendance of 85 at the Society's 50th Anniversary A.G.M. and *Conversazione* at the Royal Botanic Gardens, Kew, on 27 March and (apart from having hurriedly to find another venue for the evening meal when we discovered, at lunchtime on the day, that the restaurant which had taken our booking had closed for refurbishing!) the programme all went according to plan (see previous issue, page 1). Besides the lectures (all excellent) and formal business (rapidly despatched), there were a number of exhibits by Kew staff and a display of paintings by Mel Roberts, Curator of the Bates Collection.

The exhibits were: Plants collected on the Kew Expedition to Somalia (Peter Brandham & Susan Carter), Scanning Electron Microscopy of Crassulaceae Seeds (Miss Marie Bywater), The genus *Kleinia* in Arabia (Patricia Halliday & Susan Zmarzty), SEM pictures of *Ferocactus* Seeds (Nigel Taylor & Jonathan Clark), Studies on *Calibanus* (Margaret Johnson), Fringe Succulents in the Mint and *Tradescantia* families (Ray

Harley & David Hunt), Illustrations of Succulents from recent issues of Curtis's Botanical Magazine.

Our new President and Council

Congratulations to Mrs. Muriel Stillwell who was elected President of the Society in succession to Mr. Arthur Boarder at the A.G.M. Mrs. Stillwell has been a Vice-President since 1968, and is well-known as a judge at our Shows and as the author of the long-running series in the Journal on the 'Cultivation of Succulents' which she contributed regularly for over 20 years. The first of Mrs. Stillwell's articles appeared in July 1953. It is as interesting and helpful for beginners now as it was then, and we have pleasure in reprinting it in this issue.

Dr. R. B. Pearce returns to Council along with newly-elected Dr. P. H. Dangerfield and Mr. D. Tribble.

Wedding Bells

Congratulations, too, to co-Editor and Librarian Nigel Taylor and his bride Ruth, who were married on 17 April at Bramhall, Cheshire. It was Betty Maddams, I think, who punned that bridal couples in our hobby should be called 'prickly pairs' but I can't imagine a less prickly couple than these two. We wish them every happiness together in domestic synonymy.

Two apologies

First, to those who ordered seeds and were disappointed to receive them crushed in the post. It seems that since last year the Post Office has been installing automatic sorting machinery which may be responsible, and we are taking steps to improve packaging for the next distribution.

Secondly, for failing to come up with the promised new booklet on cultivation. Terry Smale completed the text some months ago, but Council has decided to postpone publication pending the outcome of the merger ballot.

PIMLICO SHOW Saturday 16 October

at St Saviour's Hall, St Georges Square, Pimlico, London S.W.1, 11 a.m.-6.30 p.m.

For Schedules, please apply to the Show Secretary or Publicity Officer (addresses on inside front cover of the Journal).

FROM THE PRESIDENT

I am indeed very proud to be elected your new President, and will do my best to follow in the footsteps of our former President and founder-member Arthur Boarder who gave me so much help and advice in my early days, both in growing and later in judging these interesting plants.

I joined the Society in 1947 but had my first cactus (a *Mammillaria*) at the age of seventeen. It is still with me and flowers regularly.

I wish the Society success and prosperity in the future.

MURIEL STILLWELL

Plant Exchange

Bill Richards of Letchworth, who tells me he is approaching retirement and looking for a project that will occupy him and be of service to the hobby, has launched a scheme called 'Plant Exchange' (see advert, p. 48). Using a small computer, he hopes to maintain a file of who has what for sale or exchange and to put subscribers in touch with others who can supply their wants. Such a scheme will clearly depend on quick and up-to-date listing by Mr. Richards and on sufficient supply and demand from collectors. It's certainly an idea worth trying.

ISI 1982 Offering

As in previous years the International Succulent Institute, based in California, have an interesting and diverse selection of nursery grown plants on offer. Of the 60 different items available most are accompanied by field collection data, while the few plants of garden origin are clearly labelled as such. Many of the species are rare or difficult to propagate in cultivation, such as *Ferocactus diguetii* and *Peniocereus marnierianus*. Others such as the curious *Selenicereus imesii* are recently described and as yet little known horticulturally. Lovers of the other succulents have the chance to obtain some recently talked-about subjects, e.g. *Euphorbia wakefieldii* and *Stapeliopsis saxatilis* (see CSJGB 43: 6-8 & 77-78. 1981), while the very new '*Euphorbia taruensis*' will hopefully receive a proper christening soon. The full list has been published in the Cactus & Succulent Journal of America and is also available from Mr. N. E. Wilbraham, 7 Marlborough Drive, Macclesfield, Cheshire SK10 2JX, who is U.K. agent for ISI. Prices range from U.S. \$2.50-6.50 + 20% handling and airmail; minimum order \$15.

Editors' holiday

The Editorial Office and Library will be closed for the month of August as we shall be taking some holiday prior to attending the IOS Congress in Vienna.

The next Journal will be published at the end of September.

Cultivation of Succulents

by Muriel Stillwell

(originally published in our July 1953 issue)

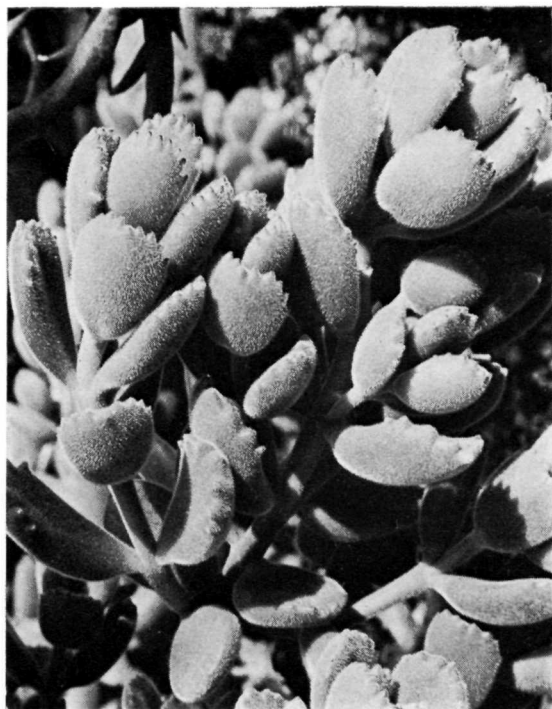
We are now in the month of July when the majority of our plants are looking at their best. *Lithops*, which incidentally, should have been re-potted where necessary in May, will be in their full glory and can take a fair amount of water providing the soil is really porous. I sift all the dust from mine and use only the coarse compost, sand and limestone chips. It is fatal to have a waterlogged soil. Do not be tempted to re-pot your *Lithops* after May or you will probably interfere with their flowering.

Conophytums should be ready for watering towards the end of the month when their skins will become papery dry and the new bodies will emerge once more. That is the time to re-pot and to clean up large clumps by removing all the old skins; if these are left on they are liable to encourage pests.

I have a very nice pan of *Titanopsis* including *calcareaschwantesii*, *luckhoffii*, *setifera*, etc. These are difficult plants to bring through the winter and also survive the cold weather. Here is what I have experimented with and found very successful:— one part John Innes (all dust removed), one part Cornish sand, one part limestone chips. They can be transplanted into this mixture this month with safety. Do not disturb the roots more than is necessary, it will not matter if a little of the old soil still adheres to them. Water very carefully round the plants and never wet the leaves. Place them in full sunshine and they will soon reward you with their true beauty.

Stapelias should now be well budded. Watch out for what I believe is known as the Sciara Fly. It seems to prefer *Stapelias* to any known succulent, at least that is my experience. It is a very harmless looking insect, very like a miniature housefly. It flies very quickly from pot to pot and burrows into the base of the plants. Its larvae will, in a very short time, completely hollow out a *Stapelia* stem. The next time you find a *Stapelia*, *Huernia* or *Caralluma* collapsed, do not always think it was caused by over watering, have a look at the base and roots and, nine times out of ten, you will find the Sciara Fly has been active. They are also known to attack seedlings and can often cause more damage than damping off disease. I do not know of any real remedy except to catch and kill them, which is a job that requires both skill and patience as they are so quick. Last year I hung a fly paper near my *Stapelias* where I had seen activity and in this way caught quite a number.

From pests let us get back to our plants. *Cotyledons* will provide you with a fine show of flowers this month. If your greenhouse is in the ideal sunny position they may have been a few weeks earlier. Two of the nicest and easiest to flower are *C. decussata* and *C. teretifolia*,



Cotyledon ladysmithiensis (photo: Peter Chapman)

the former with beautiful heads of scarlet bells which will remain out for several weeks, and the latter with orange flowers. The true beauty of the genus is undoubtedly *C. undulata* with its beautiful wavy edged leaves. I like to pinch out all the flower buds as they appear as I feel it blooms at the expense of the leaves which, to me, are far more worth while.

Pleiospilos should soon be ready to water. Make sure the bottom pair of leaves have been completely absorbed and are quite dry. I would recommend the same soil as for *Titanopsis*.

Now is the time to look a long way ahead to Christmas and the winter months. Try to prepare a few nice plants that can be used for table decoration when flowers are so scarce. I strongly advocate a well grown *Kalanchoe granata*, sometimes also known as *K. petitianna*. It develops beautiful red leaves if given full sun and will keep in perfect condition indoors and retain its colour all through the winter. It can be put back in the greenhouse in the spring, looking none the worse for its experience. I have a large pot of *Crassula montis-draconis* which rewards me with a mass of pink bloom at Christmas, this also comes indoors. Do not forget the much despised *C. lactea* which also provides a fine show of white flowers for the festive season. A little forethought now will provide you with a few flowers to cheer you up and your friends when you most need them. *Trichodiadema densum* is another very attractive plant that will greet you with its lovely show of bright pink

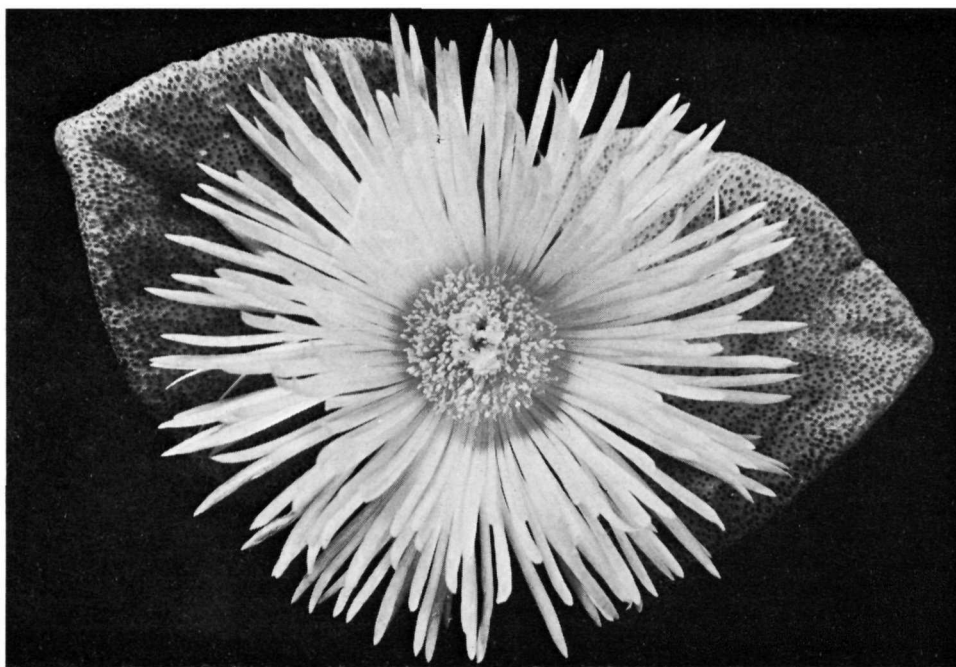
flowers in December. Have a look round your greenhouse now and make sure that you have got a nice, well grown plant of each of these winter bloomers and you will be rewarded later on. All these plants I have just mentioned like plenty of sunshine. I find the more they are ripened, the better crop of flowers will result.

Give your *Haworthias* a little shade during these hot days, they will keep their fresh green colour better. I do not like to see a bronzed *Haworthia*. The *Gasterias* also appreciate a little shade.

Some of our more hardy types of succulent plants benefit greatly by being placed out of doors during the months of July and August. They make astonishing growth and develop a rich colouring. A few who enjoy this treatment are:— *Crassulas argentea, tetragona, lactea, socialis, anomaloe, corymbulosa, multicava, sarcocaulis* and *schmidtii*; *Aloes arborescens, aristata, distans, brevifolia, variegata, mitriformis*; *Agave americana*; *Aptenia cordifolia*; all *Bryophyllums*; *Billbergia nutans*; *Delosperma echinatum*; all *Drosanthemums*; *Orostachys spinosus*; *Monanthes muralis*; *Othonna crassifolia*; *Oscularia deltoidea*; a number of the *Echeverias* and most of the *Sedums*. Do not place outside any plant that has a delicate bloom on the leaves or any of the more tender plants that cannot stand the heavy rains which they would, no doubt, be subjected to from time to time. On no account trust the stemless *Mesembs.* out of doors as they make a tempting meal for the birds. While the plants are out of the greenhouse and more room is available inside, it is a good chance to clean all the interior glass. Our plants benefit so much from the ultra-violet rays which are greatly lessened by dirty glass. This time of the year the stemless *Mesembs.* particularly need every bit of sun available to prepare for their autumn show of flowers.

July is an ideal month for rooting cuttings. Have a look round your plants and trim up those rampant growers whose branches are beginning to overlap everything else. Make this a careful operation so that the plant does not look mutilated when you have finished.

Echeverias, such as *gibbiflora, metallica*, that have grown leggy, may be cut off just below the head and re-potted. Do not discard the old stump, but place it under the staging, still in its pot, and keep watered when it will soon provide several offshoots. These, in time, can be taken off and rooted when large enough. Tall growing *Euphorbias* may also be beheaded if grown too high, but cut surfaces must be treated at once with powdered charcoal, or flowers of sulphur. In fact, it is a wise precaution to make a practice of treating all cuttings in this way to prevent rot attacking the base. I need hardly remind you that all cuttings should be allowed to dry and callous over before being placed in the rooting medium. Vermiculite is, without a doubt, the finest thing for rooting the most difficult plants. Often a plant can be induced to root by just placing a thin layer of Vermiculite on the top of the pot of soil and the plant just stood on it, not actually planted. The



Pleiospilos simulans

(photo: Peter Chapman)

roots will pass through the Vermiculite into the soil beneath and thus avoid the necessity of re-potting and disturbing the delicate, newly formed roots. Vermiculite is also very good mixed with your seed compost as it prevents the soil from drying out too quickly. I have a 4 ft. by 1 ft. bed of sharp sand under the staging in a shady position in my greenhouse which I keep damp by daily spraying. In it I place all my odd cuttings of the more common kinds that I know will root easily. Also any odd leaves from *Echeverias*, etc., are just laid on the sand. I would not advise this method for the more delicate types, such as the stemless *Mesembs.* or the *Euphorbias*, for these I prefer Vermiculite, but I have found the sand very useful for all odd cuttings and bits and pieces which would otherwise have been discarded. It is always nice to have a few rooted cuttings to pass on to one's friends. Many an ardent collector has sprung from those few cuttings given to him by a fellow enthusiast. I myself started in this way soon after I left school when I became the proud possessor of one single stem of *Kleinia articulata*. My joy was complete when the little bunch of leaves appeared from the top. I was well and truly under the spell of cacti and succulents. It is a disease from which one never recovers. Who wants to?

For anyone who has a greenhouse that does not get its full quota of sunshine, *Haworthias* and *Gasterias* would be ideal plants to grow. It is well worth looking out for some of the rarer species, such as *H. bolusii* which has incurved leaves edged with beautiful white silky hairs. A similar plant, *H. setata*, has not quite such pronounced

teeth on the leaf margins. The windowed *Haworthias* are also very attractive and fairly easy to obtain. *H. pilifera* has almost transparent leaves and will soon form a good cluster. *H. retusa* is a fine example of a window leafed succulent, the upper part appears to turn over at right angles to the lower part. The upper part forms the window. In their native haunts they withdraw into the soil in the hot dry weather and just their windows are left exposed to the strong sunlight. The two real gems are *H. truncata* and *maughanii*, but the average person finds these more difficult to cultivate. For the beginner, I would recommend some of the easier growing species, such as *H. attenuata* var. *clariperla*, which has large white pearly tubercles on the backs of the leaves, or *H. fasciata* which also has the white tubercles arranged in rows across the leaves. Two other attractive plants which will grow tall with age are *H. coarctata* and *chaluinii*. I like to re-pot my *Haworthias* once a year and remove all the old dead roots which crowd the pot unnecessarily. Each plant makes a set of new roots annually. Remove the bottom row of leaves and the fresh roots will be seen pushing through. Use a good open soil as the tender types rot easily.

Beginners would do very well to start with some of the *Gasterias*. They throw a good flower stalk every year and are very easy to cultivate. *G. maculata* is a very nicely marked variety. *G. verrucosa* is crowded with rough silvery tubercles and *G. armstrongii* is one of the small growing ones. *Gasterias* make very suitable indoor plants and require very little attention.

Connoisseurs' Cacti

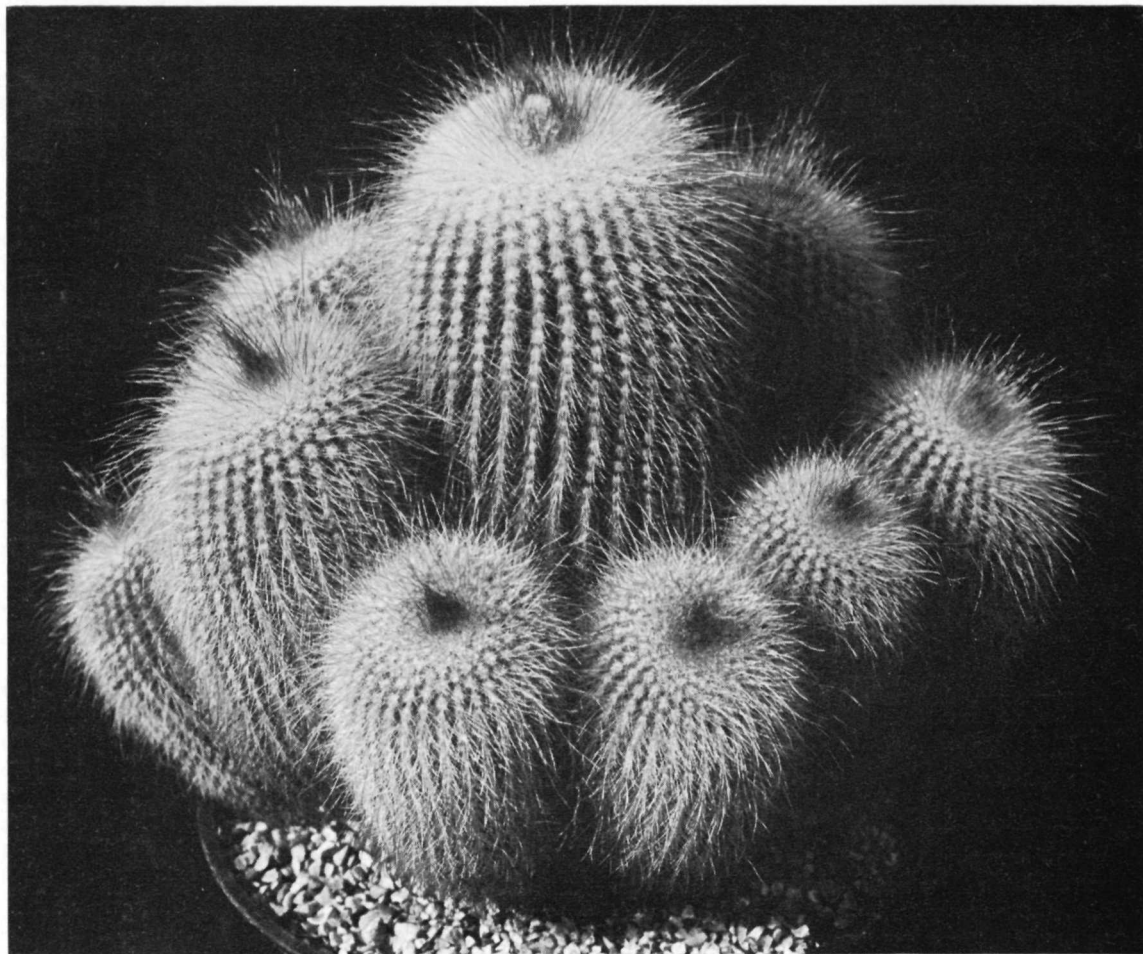
chosen by Nigel Taylor

17. *Notocactus leninghausii*

The best and longest-known of the Eriocacti, *Notocactus leninghausii* is one of a few dozen cacti which fulfill all that is asked of them in cultivation. It's a good, easy beginners' plant and very attractive as a youngster, but in time (and how long that is depends on the size pot you give it) it will reach impressive proportions, offsetting freely at the base as in our illustration. The clear yellow flowers often obscure the head of the plant and then soon give rise to fruits bursting with tiny, eager-to-germinate seeds. The stem height at which flowers can be expected is a little uncertain. I have seen plants only three inches high in bloom, but suspect these were a bit starved and rather old for their size. Six inch specimens frequently flower, although one sometimes hears complaints about nine or twelve inch

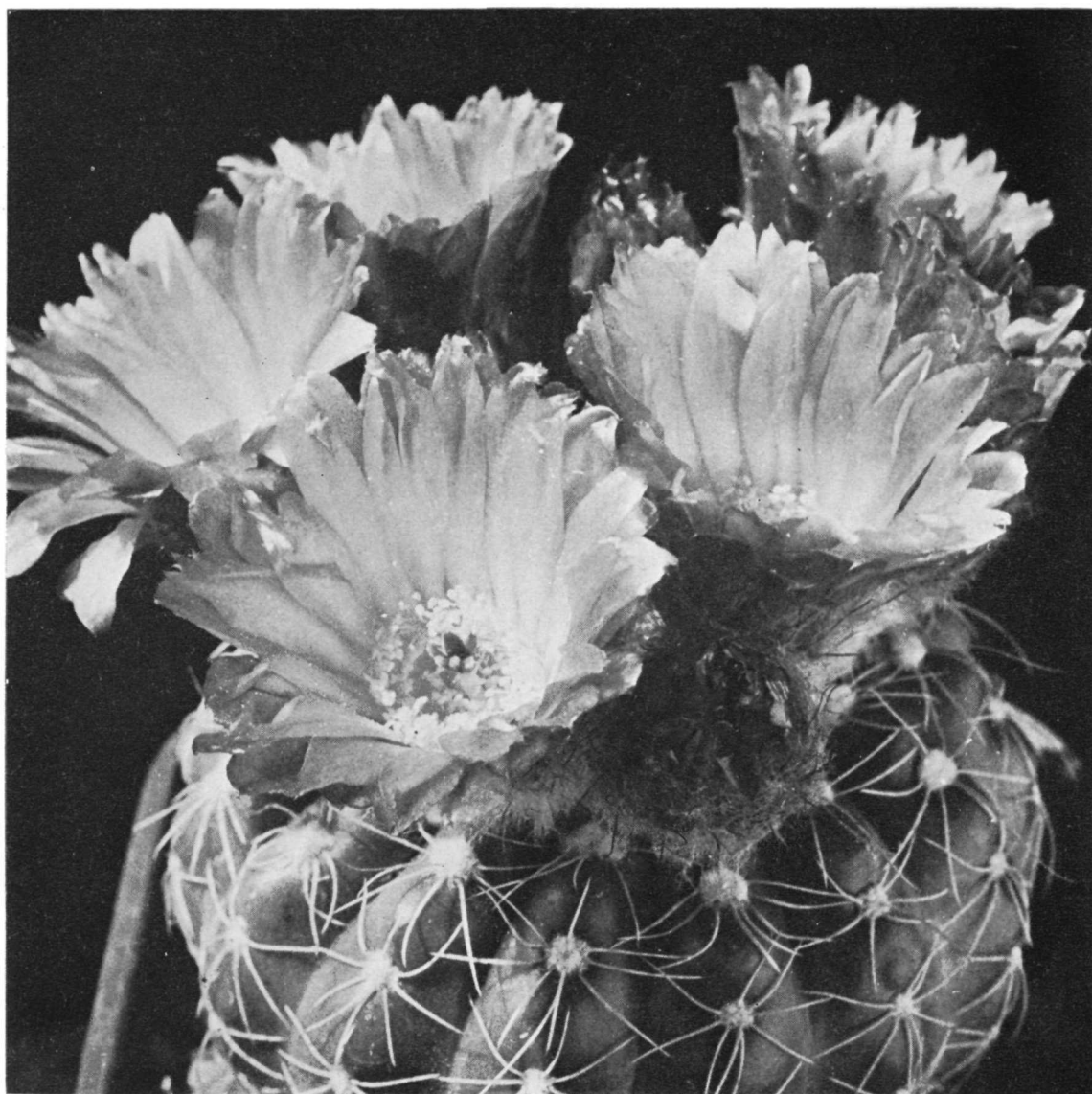
ones that have not. Planting in a bed in the greenhouse really makes them get a move on.

When first introduced to cultivation, just before the turn of the century, some thought it to be a *Cephalocereus* (*Pilocereus*). This is understandable, for like other Eriocacti, it eventually grows quite tall (to 1.2 m) and has numerous, somewhat woolly, well-defined ribs. Of course the flowers quickly show their *Notocactus* affinity, but the seeds make this natural group seem distinctive and certainly suggest that *Eriocactus* is as good a genus as *Notocactus*, *Parodia* and *Frailea*. The most recent notes to be published on the group are in Ritter's *Kakteen in Südamerika*, vol. 1, pp. 152-157 & 253-256 (1979). He lists *E. claviceps*, *E. magnificus*, *E. leninghausii* and *E. warasii* from Brazil (Rio Grande do Sul); and *E. grossei*, *E. amplicostatus* and *E. nigrispinus* from Paraguay. *E. schumannianus* connects these two areas, occurring in Misiones, Paraguay and in neighbouring NE. Argentina. All are worth having!



Notocactus leninghausii

(photo: Jackie Panter)



Notocactus uebelmannianus

(photo: Peter Chapman)

18. *Notocactus uebelmannianus*

The large, bright yellow, red or purplish flowers of the *Notocactus uebelmannianus-crassigibbus-arachnitis* complex leave no doubt as to why the genus should currently have its own special society of enthusiasts. East German fans have recently brought out a fine colourful booklet on the subject, while Tony Mace's 'Notocactus' has been available for some time now. Indeed, a thorough botanical study ought to be possible with so much documented material currently available. Wisely, most people prefer just to grow and flower them. In general

Notocacti are easily grown and readily raised from seed. They seem to thrive in an acid, well-drained compost, which, if winter temperatures don't fall too low, is best not allowed to become absolutely bone dry. However, most will stand drought and moderate cold in winter, if necessary, though a little warmth and water keeps the roots alive.

This species was described by Buining in KuaS in 1968 and is figured in colour in *Succulenta* for February 1970. Like our first connoisseurs' offering it comes from Rio Grande do Sul, but attains more modest proportions.

Whatever happened to Conservation?

by D. R. Hunt

Royal Botanic Gardens, Kew,
Richmond, Surrey

I make no apology for bringing up the topic of Conservation again* because it's one which seems to have gone off the boil in cactus circles in this country since the heated arguments of a few years ago and it is time to ask what, if anything, has happened in the period of nearly a decade since the Stockholm Declaration on the Human Environment set out what everybody ought to be doing. What has happened, that is, in our own particular sphere of succulent plants?

It is definitely not my purpose to preach to you on the evils of imported wild plants or to prophesy the extinction of *Ariocarpus* by 1984 but rather to ask such questions as 'Do we now have some idea of the number of wild cacti being imported to Britain annually?' or 'Do we now have reliable information on the overall distribution of *Obregonia denegrii* in the wild, the number of individuals and to what extent it is on the decrease (or increase) and why?'

The short answer to both those questions is, I'm afraid, 'No' but there are quite a lot of others to which one can respond more positively. With the help of my Kew colleague Sara Oldfield, who is a member of our Conservation Unit, I have prepared a kind of rhetorical question and answer session which will I hope give some idea of what has been done and what is in progress.

No one can seriously doubt that many of the world's animals and plants face extinction in a relatively short time if the destruction of natural habitats continues at its present pace. I am not going to catalogue all the threats or the reasons for wanting to conserve what is left. The two great problems for conservationists are (i) securing direct action by governments and other agencies that have effective action within their power; and (ii) obtaining objective, factual information on what species are threatened, in order to make defensible recommendations to those that take the decisions.

Most plants (and animals, for that matter) are not threatened in any way by the activities of collectors, but for some groups there is the additional hazard of international trade, which has caused and is causing the depletion of individual species in the wild. Orchids, succulents and cycads are the chief plant groups affected, and again it is essential to have proper information on the extent of trade and which species are being damaged in order to deal with the problem sensibly.

The need for information is one of the principal justifi-

cations for introducing legislation, such as we now have affecting trade in succulents, not just the desire to control. But since succulents are one of the special groups whose import and export is subject to licensing, and the topic is a controversial one, I think it is important that we should all know what is going on.

1. When did laws affecting trade in succulents come into force in Britain?

The import of all plants has been subject to phytosanitary controls for many years and some groups have been prohibited because of the risk of introducing disease. Controls on trade per se were not brought in until 1976, five years ago, when the Endangered Species (Import & Export) Act was passed. This was the first British legislation for international plant conservation purposes and incorporates so-called enabling legislation for Britain to ratify the Washington Convention which came into force the previous year.

2. What is the Washington Convention?

The Washington Convention represents an attempt to conserve wild animal and plant species threatened by international trade. Its full title is the Convention on International Trade in Endangered Species of Wild Fauna and Flora. It was agreed in principle and signed by numerous countries in Washington in 1973 and came into force on 1 July 1975. At that time, 17 countries had ratified or acceded to it, and that total has now risen to 74 (Sept. 1981). In order to ratify, each country has had to pass its own enabling or implementing laws.

The Convention, now usually known as CITES for short, was partly designed to help the countries, many of them developing countries, which are the richest reservoirs of wildlife, to prevent poaching and smuggling and to reinforce their national conservation policies. The Convention works by licensing wildlife trade so that documentation can be used to monitor its extent and check the legality of transactions by importing countries.

Each signatory country to the Convention is required to have a Management Authority and a Scientific Authority. The Management Authority issues licences and prepares annual reports with trade statistics required under the terms of the Convention. The Scientific Authority advises on the issue of licences, taking into consideration whether trade transactions will be detrimental to the survival of the species in the wild. The Management and Scientific Authorities of different

*Transcript of a talk given at the CSSGB 50th Anniversary Weekend, Warrington, 25 October 1981.

countries communicate directly or via the CITES Secretariat at Gland in Switzerland which has a co-ordinating role.

The Convention has three appendices listing the species protected by this international agreement. Commercial trade is effectively banned for species listed in Appendix I, unless in the case of plants they are horticulturally propagated. Movement of Appendix I specimens requires an export licence from the country of origin and an import licence issued by the importing country.

Species on Appendix II require an export licence from the country of origin. These species are not considered to be endangered by trade but may become so without controls.

Appendix III covers species considered to be endangered in a particular country, from where trade must be controlled. It has not yet been widely used.

3. Which species of succulent plants are covered by the CITES Convention?

When the Convention came into being, five species of *Aloe*, including *A. polyphylla*, were on Appendix I. All other Aloes, *Anacampseros*, cacti, *Didiereaceae*, succulent Euphorbias, and *Pachypodium*, were listed in Appendix II.

Since the lists were originally drawn up, the signatory countries have held three meetings. At the second, in Costa Rica in 1979, *Ceropegia* was added to Appendix II, together with *Frerea* or *Caralluma indica*.

At the third meeting, in New Delhi in 1981, seven species of cacti were transferred to Appendix I. They are: *Ariocarpus agavoides* and *A. scapharostrus*, *Aztekium ritteri*, *Echinocereus lindsayi*, *Obregonia denegrii*, *Pelecyphora aselliformis*, and *Pelecyphora* or *Encephalocarpus strobiliformis*.

Further meetings will be held every two years and any party to the Convention may propose amendments to the Appendices. The text of such amendments must be circulated 150 days in advance and the comments of other states are circulated 30 days in advance. For adoption, an amendment must get a two-thirds majority in favour.

4. Have all countries with native succulents ratified the Convention?

Not all. The most notable gap is Mexico, but this is probably only a matter of time. Mexico is collaborating with the United States and Canada in a review of North American CITES species.

5. What about the principal importing countries?

The most important countries who have still failed to ratify are Holland and Belgium. Germany, Switzerland and Japan, and of course Britain and the United States all have. If the Convention is to be effective where cacti are concerned, it is of course important that Holland and Belgium ratify. In fact, their hand is going to be forced as they are both members of the EEC.

6. What is the EEC doing?

The EEC decided as long ago as 1977 that the whole Community should accede to the Convention but is still discussing how to implement the decision. Measures currently proposed relate only to trade with countries outside EEC so as not to affect the free movement of plants within the Community. When approved the EEC Regulation will supersede national laws, so countries like Holland and Belgium will have to toe the line, but on the debit side there is some concern that individual countries such as Britain will not be able to retain legislation that goes further than that of the EEC as a whole. Fortunately, in one important respect, EEC legislation is likely to follow Britain's example. We require import licences not only for the species on Appendix I of CITES but for those on Appendix II also, enabling our trade to be monitored more effectively. This requirement will probably be adopted by EEC.

In Denmark, a phytosanitary certificate is acceptable as CITES documentation for horticulturally propagated material in certain instances, and this idea is also being considered for the EEC as a whole.

7. What is happening in the USA?

Where plants are concerned, implementation of the CITES Convention in the USA has lagged behind that for animals, partly because of the inherent problems of plant identification and partly because of public reaction to the legislation.

In the United States, the Scientific Authority and Management Authority (Wildlife Permit Office) are both part of the Fish & Wildlife Service of the US Department of the Interior. The Animal and Plant Health Inspection Service (APHIS for short) enforces CITES for plants. APHIS has prepared draft regulations on ports of export and import and on licensing traders in CITES plants. It is preparing to place inspectors trained in plant identification at the designated ports.

Until recently, the US government funded an independent body known as the International Convention Advisory Commission (ICAC), but this has now ceased operations. One of its most recent published reports is entitled *US Exports and Imports of Cacti 1977-1979*, a 65-page document full of statistical analyses. This brings us to the next question:

8. What information is now available as a result of licensing?

If we take the United States data first, we now have lists of plant species imported or exported and the quantities involved. The number of documented imports in 1979 was nearly 1,000,000 and exports (other than seeds) only 1600. But the ICAC report states that the actual plant trade volume may be up to 10 million cacti per year, implying that as yet 90% of the US cactus trade is undocumented. Moreover, less than 5% of the imports were identified to genus or species, the remainder simply as 'Cactaceae'. Even so, the figures for individually named species show over 15,000 specimens for the one

genus *Ariocarpus*, which gives some idea of the scale of trade.

As I mentioned earlier, British legislation goes further than CITES requires in that not only Appendix I but Appendix II species must have an import licence. As a result, the annual reports published by our Management Authority, the Department of the Environment Licensing Section, provide more detailed information on plant trade than those of any other country. Having said that, one is bound to observe that the data is in fact very primitive and takes rather too long to see the light of day. The most recent published report is that for 1979. What it records is licence applications rather than what was actually imported in the year in question; it does not distinguish between wild-collected and horticulturally propagated material; and the data is at generic level only, making no distinction between *Mammillaria prolifera* and *M. pectinifera*, for instance, whose conservation status is obviously quite different.

Besides giving figures, the report lists the destination country for exports and the exporting country for imports. Sometimes one can safely infer from this that the material will have been nursery grown, but not if the genus is, say, *Ariocarpus* and the exporting country Belgium, Germany, Mexico or the USA.

The names and addresses of the traders are not published in the report, but of course the DOE does have the information as a result of the licensing procedure.

For imports, a follow-up procedure is now in operation which tries to record what has actually come in. Import licences are valid for nine months and are supposed to be returned to the DOE if not by HM Customs then by the importer himself. The data from these returned licences has not been published. However, I understand from our Conservation Unit at Kew, which performs Kew's role as Scientific Authority for CITES, that in 1979 less than 20% of the material for which licences were issued was accounted for. On this basis, one might infer that the level of trade is only one-fifth of what the licence figures imply. On the other hand, one hears of consignments coming in without permits, in other words smuggled in, and these of course don't appear in the statistics at all.

9. Are licence applications ever refused?

The Conservation Unit do not know of any case of a licence being refused to a British importer or exporter. Kew's role as Scientific Authority is to advise the DOE, and in some cases we may suggest they make sure the requisite export licence from the source country is available, or enquire whether the plants are nursery grown or wild-collected.

10. Have there been any prosecutions?

In this country, no cases relating to plant trade have been taken to court but HM Customs are seizing more and more plant material illegally imported. In Germany there was the well-publicized case involving the Ehlers

Reisen tourists and others whose suitcases filled with plants were seized at Frankfurt airport in April 1979. The eventual outcome of this was that one of the offenders was fined a fairly derisory amount.

11. How effective, then, is all the legislation?

There are two aspects to this, the effectiveness of the CITES Convention in principle and the effectiveness with which it is implemented. Implementation is becoming more effective through increasing understanding of the plant trade, through the development of identification manuals and through advances in computerization for recording purposes. It is also clearly essential that countries like Mexico ratify. Problems of enforcement still remain and these may need more legislation.

The Convention itself can only back up national legislation and will never replace the need for conservation measures in situ. For example, if plant-collecting restrictions and export laws were rigidly enforced in Mexico, few habitat specimens would be available in trade. Ultimately, however, it is all a question of supply and demand. While there is a consumer demand in the USA, Europe and Japan for habitat-collected plants, the trade will no doubt continue to supply. And, of course, the more endangered a species is, the more a certain type of collector will want to possess it. As one cynic (or realist) writing in the strongly pro-Conservation magazine 'Desert' fifty years ago observed a propos new US State laws: 'Prohibition against amateurs and those interested in gathering desert plants will not work a hardship on commercial dealers. It will be a blessing. For every plant the law protects, ten will be torn out because the law has placed a money value on their heads.'

Let us now leave the subject of the CITES Convention and legislation, and move on to consider some more general aspects of information-gathering on threatened species. The first question might well be:

12. Whatever happened to the Red Data Book?

The International Union for the Conservation of Nature and Natural Resources (IUCN) has produced a series of 'Red Data Books' for various groups of animals. The original Red Data Book for plants was compiled by Dr. Ronald Melville at Kew from 1968 onwards and issued in loose-leaf form, one sheet per endangered species. It was the first attempt to compile information on endangered species. About 117 data sheets were published by 1971, but since estimates of the number of threatened species were already around 25,000, it was realised that a much more rapid appraisal of the world's flora would be needed. In 1974, IUCN set up the Threatened Plants Committee under the chairmanship of the then Director of Kew, Professor Jack Heslop-Harrison. In addition to the other work of the new committee, it produced another edition of the Red Data Book in 1978 with 250 monographs of plants which are

seriously at risk or thought to be extinct. A proportion of the plants included were in Dr. Melville's version, but many of the additions were selected to illustrate particular types of threats, habitats, distributions, plant groups and protective measures, with the emphasis on species that are of particular interest or importance to mankind. The four succulent species which were in the original version are included, namely *Aeonium nobile*, *Aichryson bollei*, *Aloe polyphylla* and *Euphorbia handiensis*, plus 15 other species of cacti and other succulents:

<i>Ancistrocactus tobuschii</i>	<i>Caralluma distincta</i>
<i>Ariocarpus agavoides</i>	<i>Caralluma tubiformis</i>
<i>Cereus (Cephalocereus)</i>	<i>Whitesloanea crassa</i>
<i>robinii</i>	<i>Dorstenia gigas</i>
<i>Obregonia denegrii</i>	<i>Dudleya traskiae</i>
<i>Pediocactus knowltonii</i>	<i>Euphorbia abdelkuri</i>
<i>Agave arizonica</i>	<i>Euphorbia cameronii</i>
<i>Aloe squarrosa</i>	<i>Euphorbia wakefieldii</i>

All the 'Red Data Sheets' are held in Kew's computer data bank and will soon be revised. Another edition of the Red Data Book is scheduled for 1983.

13. What is the Threatened Plants Committee and what is it doing?

As already mentioned the TPC was set up by IUCN in 1974 to speed the process of gathering data on threatened plants on a worldwide basis. It is based at the Royal Botanic Gardens, Kew, where it has a full-time secretariat funded largely by World Wildlife International with help from the European Science Foundation. Apart from its honorary Chairman, the Director of Kew, and its honorary Secretary, Mr. Grenville Lucas, the staff consists of five Research Assistants each specializing in a different part of the world, plus a specialist typist. The TPC relies on a network of botanists worldwide to provide information used in drawing up lists of threatened plants. Draft lists are drawn up at Kew from whatever literature such as Floras and Monographs is available and with the help of botanists on the Kew staff. These preliminary lists are then circulated to the botanists with field-knowledge for annotation with IUCN Conservation categories, which I'll come back to in a minute.

The first major report produced by TPC was a 'List of Rare Threatened and Endemic Plants in Europe' (1977), which was produced on contract for the Council of Europe. A list for North Africa and the Middle East was issued in 1980, and other lists for the Caribbean, Central America and tropical Africa are well under way. In general, this regional work is undertaken where botanists are too thin on the ground to compile their own lists. Countries like South Africa, Australia and of course the USA have also published lists in recent years.

TPC keeps in touch with its network of helpers through a Newsletter produced once or twice a year.

Besides the regional lists, TPC is also compiling information on the special groups covered by the CITES Convention, especially cycads, tree-ferns, palms and

succulents, again with the help of specialists on the Kew staff.

TPC works closely with Kew's officially funded Conservation Unit consisting of Mr. Lucas (wearing one of his other hats; he is also Deputy Keeper of the Herbarium) Ms. Sara Oldfield and a clerical assistant. As I mentioned earlier, the Conservation Unit are responsible for carrying out Kew's official function as Scientific Authority under the Endangered Species Act.

TPC now has a Wang VS computer with word processing facilities purchased by the World Wildlife Fund and installed at Kew. This has the capacity to deal with the rapidly expanding data-base and has been proving itself absolutely invaluable in the six months it has been operational.

TPC also recognizes the important role of Botanic Gardens in conservation and has itself launched a new organization called the 'Botanic Gardens Conservation Coordinating Body', about which I'll say a few words later. Let's move on to another question:

14. How do TPC researchers decide whether or not a species is endangered?

IUCN has a standard set of conservation or Red Data categories which are used for all groups of organisms, animals as well as plants. In the initial stages of preparing regional or special group lists, the researchers will be guided by information on rarity, endemism and so on in the basic references they consult. The Red Data categories are as follows:

Extinct (Ex) Species believed extinct in the wild, though not necessarily so in cultivation. *Whitesloanea crassa* may be in this category.

Endangered (E) 'Taxa in danger of extinction and whose survival is unlikely if the causal factors continue operating'. In the case of *Whitesloanea crassa*, listed as 'Endangered or Extinct', the chief causal factor is the goat, which not only eats it but is generally degrading the vegetation in NE Africa to the extent that desertification will result in the extinction of anything it misses.

Vulnerable (V) 'Taxa believed likely to move into the Endangered category in the near future if the causal factors continue operating'.

Rare (R) 'Taxa with small world populations that are not at present Endangered or Vulnerable but are at risk'.

The three categories Endangered, Vulnerable and Rare are degrees on a scale of risk and are bound to be somewhat subjective, but there is an IUCN leaflet explaining how to use them in some detail, taking into account extent of distribution, population size and so on, and giving several examples in each category.

There are also two further categories for species where there is too little information to make a reliable assessment. These are:

Indeterminate (I) 'Taxa known to be Extinct, Endangered, Vulnerable or Rare but where there is not

enough information to say which of the four categories is appropriate'.

Insufficiently Known (K) 'Taxa that are suspected but not definitely known to belong to any of the above categories because of the lack of information'.

The final two categories are:

Out of Danger (O) for taxa formerly included in one of the threatened categories but considered relatively secure because effective conservation measures have been taken or the threat to survival has been removed.

Not threatened (nt) for species which are neither rare nor threatened.

This is an appropriate point to ask:

15. *What is actually being done on the ground to save threatened and endangered species?*

A great amount of effort is nowadays being put in all over the world to set up nature reserves of various kinds. Well over 100 protected areas of more than 1000 ha. have been established in the drier vegetation zones of the world in the past five years. To catalogue all these developments, IUCN has recently set up another small unit at Kew called PADU, the Protected Areas Data Unit, which is compiling a world directory with the help of the Threatened Plants Committee's computer.

Reserves are not usually set up to protect individual plant species, unless like the saguaro they are a conspicuous feature of the landscape—hence the foundation of the Saguaro National Monument in Arizona back in 1933. The intention is normally to conserve as much as possible of the whole plant and animal community and its habitat, whose complex interaction and interdependence is termed an ecosystem. UNESCO has played an important part in recent years through its 'Man in the Biosphere' programme and the sponsorship it has given to the development of so-called Biosphere Reserves, which are protected areas forming a network representing as many ecosystems as possible.

One example of such a Biosphere Reserve is the Mapimi Basin Reserve set up in 1977 on the borders of the Mexican states of Coahuila, Durango and Chihuahua. The species-list for the area includes 24 species of cacti (and is probably incomplete); all these will obtain a degree of protection by virtue of being in the designated area, some of which is open to research scientists only.

16. *What are Botanic Gardens doing?*

The short answer here is that Botanic Gardens are becoming very much more aware of their functions and responsibilities where conservation is concerned, and getting more geared up to this relatively new role.

Since the IOS held a Conservation Symposium at Kew in 1973 as part of its biennial congress, two international conferences on the role of botanic gardens in conservation have been held at Kew. The first, in 1975, was on the theme 'The Function of Living Plant Collections in Conservation and in Conservation-Orientated

Research and Public Education' and the second, in 1978, was on 'The Practical Role of Botanic Gardens in the Conservation of Rare and Threatened Plants'. The proceedings of both meetings have been published in book form, but perhaps more important has been the setting up of an effective coordinating body, known as the Botanic Gardens Conservation Coordinating Body under the auspices of the Threatened Plants Committee. This was launched in December 1979 and already has some 118 institutional members. Its principal activity at present is circulating lists of rare and threatened species in order to ascertain what is being grown and where. The resulting information, including which gardens have surplus material of a species, which have material of documented origin and so on, is then sent to all participants.

Several lists have already been circulated, including one for Madagascan succulents and one for cycads as well as for European threatened plants, Canary Island species and so on, and the returns have been encouraging.

Within the next couple of years it is hoped to produce a 'Botanic Gardens Green Book' as a register of who has what and as a companion to the 'Red Data Book'.

17. *Finally, what are specialist Societies, nurserymen and individual collectors doing?*

Although, as I said at the outset, conservation as an issue has rather gone off the boil in our hobby, I think it is also true that attitudes are more enlightened nowadays. There is at least a silent majority in favour of restricting the digging-up of wild plants, advertising wild plants is not permitted in our British journals, and imports do not get the admiration they once did at Shows. They do, however, still command the attention and finance of those for whom the instinct to collect is perhaps more developed than the instinct to grow. To some extent the plants have only themselves to blame, I suppose, since being slow-growing and difficult to propagate tends to make them desirable.

The 'Code of Conduct' which IOS produced after the Reading Congress in 1973 received wide publicity in several languages and has been the model for others, including that adopted by the Cactus & Succulent Society of America. Other IOS initiatives have been hampered by lack of funds and of willing volunteers, but it does give effective support to the very important reserve collection of succulents run by the City of Zurich and has nominated various other collections as reserve collections to which to give its moral if not financial support.

There has also been the IOS British Section's initiative in compiling a list of specialist collectors of succulents in this country. The first list was published in 1975 and now needs reworking. Again the problem is one of time and money for those who have the enthusiasm to carry such projects through. For such a scheme to be really effective, individual collections must be catalogued, preferably using a system common to all.

Mexico's problems and programmes monitoring trade in common and endangered Cacti

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The threat to the survival of cacti in Mexico grows in an alarming way day by day. The relentless destruction of natural habitats and the excessive and careless collection of plants for commercial purposes are undoubtedly the two main causes.

Commercial overcollecting is principally a menace to the small terrestrial cacti, specially to the less common species, while habitat destruction threatens the survival of all forms of life in the area. In relation to cacti, habitat destruction endangers the survival principally of epiphytes and of those species that grow in lands that can be reclaimed for agricultural or grazing purposes, sometimes rapidly reducing once plentiful species to a few surviving populations, and as those species become rare, their demand causes an increase in commercial value which incites a more active trade.

Unfortunately very few Mexicans realize and appreciate the natural value of cacti or are aware of the threats to their survival; most others, regrettably, do not seem to care much for them. Their relative abundance and their scant practical utility is responsible for a strong popular belief that cacti are but a nuisance and that all grow in endless numbers—an attitude that does not favour conservation. Nor are most Mexicans aware of the commercial value of cacti and the potential benefits of organized trade with nursery-grown stock. Yet, commercial cactus trade in Mexico attains high proportions. This trade is carried out by a few nationals that do know about the commercial value of cacti, and by a more numerous group of foreign traders that make big profits with it. Sadly, both national and foreign traders do not seem to be the least interested in conservation.

But with a single exception, there are no commercial growers of cacti in Mexico, and this sole nursery is rather small and unreliable. The great international demand is therefore, most unfortunately, supplied with habitat-collected plants.

Quite commonly the plants are collected in the field in a most devastating way. Many commercial collectors go to the habitat of the most rare and valuable species, where, in the nearest settlement, they gather together the villagers showing them samples of the species they want and offering to buy as many specimens as they can get. To these villagers, those useless cacti suddenly become a source of unexpected and quite needed in-

come, and the whole village—men, women, children and even decrepit old people—go out hunting for those plants, uprooting any specimen they see, regardless of size, age or appearance. The collecting goes on for a few days and the specimens are piled by the roadside, where a few days later a big truck will come to load them to its full capacity, and many times piles of excess plants just rot away.

Of course this kind of indiscriminate overcollecting depletes the whole area of those species and usually not a single specimen is left to reproduce itself.

It would seem, from the tremendous amount of trade in field-collected cacti, that there are no laws in Mexico to protect them. However, there are laws, Federal laws, that prohibit the collection and export of cacti unless a special permit is granted by the Mexican Department of Agriculture, the *Secretaría de Agricultura y Recursos Hidráulicos*. Sadly these laws are frequently disregarded and most of the Mexican trade in cacti is unlawful. Either for lack of concern or due to corruption of Government officers, the illicit cactus trade in Mexico is greater than ever. Illegal 'permits' are issued by all kinds of Federal and State Government agencies that are not empowered to grant them, but nobody—in Mexico, or in other countries—seems to even question their validity.

For unknown reasons Mexico as yet has not signed the Convention on International Trade in Endangered Species of Wild Fauna and Flora, but Mexican conservationists had high hopes that the illegal trade of cacti with countries that are parties to the Convention would be stopped. Those hopes, however, have somewhat vanished. One has only to glance through the advertisements of commercial cactus dealers of the southwestern United States to see that, in spite of CITES, many species that are advertised for sale are marked 'Field collected plants' or 'recently received from Mexico' (Cact. Succ. Journ. Amer. 53(2): 98 & 53(3): 148-150. 1981). In one of those ads there are three species listed which are included in Appendix I: *Pelecypophora strobiliformis*, *Aztekium ritteri* and *Ariocarpus scapharostrus*.

Enquiring how it is possible for this illicit trade to continue, we reviewed the permits granted by the Mexican Agricultural Department. They are rather few and mostly for scientific purposes only, but if you would check on the American side, you would find that there

were many imports of Mexican cacti which were treated by the US authorities as perfectly legal.

Some of those imports were covered by illegal permits issued by Mexican Federal, State or Municipal Government offices that are not empowered to grant them, but are, however, readily accepted by the American authorities. There is one rather recent case, denounced by the American Cactus and Succulent Journal (53:147, 1981), where one of these invalid permits was issued by the Chief of Forestry Programs of one of the States of the Mexican Republic, which covered 300 kilograms of cacti, and which didn't specify or mention number, name or status of the species, but which was accepted, without question, by the officers of the US Department of Agriculture.

Other imports were covered by what the US officials interpret to be acceptable documentation in lieu of permit, which can be any piece of paper, signed by anybody, just saying that the export is authorized. Some forms, acceptable in lieu of permit, were even printed in accordance with the requisites established by subparagraph b), paragraph 14 of Section 23 of CITES, and as far as I was told, are distributed by US border officials to anybody interested in importing cacti from Mexico.

These forms can be filled out by the interested person and signed by anyone who is available, and are accepted as legitimate documentation.

When I was told about it, I just could not believe it. However, from a close American friend I obtained a few of them—some printed in English, others in badly translated Spanish, and I decided to try them out for myself and see whether they really worked or not. Taking advantage of two American friends that wanted to take a few Mexican specimens to the US, I filled in and signed a couple of these forms, typing out, in the place reserved for title of responsible officer, 'In charge of cacti'—just that single phrase. There was no mention whatsoever of any institution or Government Agency, no mention of the status of the species, not even a seal to make it look official. In both cases these papers were accepted without a single question being raised about their validity.

It is necessary, therefore, to make perfectly clear, that the only acceptable documentation, as referred to in Section 23-14 of CITES, in the case of Mexico, is a legal export permit, and that in accordance with Mexican Federal laws, the only authorized Agency to issue those permits is the Dirección General de Economía Agrícola of the Secretaría de Agricultura y Recursos Hidráulicos. These permits are always typed out on official letter-headed paper and signed by the head of this office. No other documentation should be accepted, none whatsoever.

A pre-requisite to obtain an export permit, is, in the case of field-collected plants, to have a collection permit, which may only be validly issued by another office of the Mexican Department of Agriculture, the Dirección

General de Aprovechamientos Forestales. Unfortunately, as in the case of the export permits, many unauthorized Government agencies currently issue illegitimate 'collection permits'.

The difficulty of identification of species seems to be another problem to be faced in monitoring cactus trade. It seems that some species of cacti listed in Appendix I have been exported from Mexico under false names. Since it is not possible to expect every official to be a cacti specialist, a practical solution must be sought. One idea would be to furnish each port of entry with good photographs of the species listed in Appendix I.

Perhaps one of the more difficult problems confronted by CITES in relation to Mexican cacti is the assessment of their biological status. The scant scientific knowledge and the almost complete lack of reliable information relating to the extent of distribution areas, density of populations and effects of habitat destruction and over-collection makes it impossible to determine the true status of many species.

Sometimes we can detect some populations of certain cacti that have been greatly depleted or destroyed, but we do not know whether or not there are other populations that could assure the survival of the species. When this happens to species whose trade status is known and whose known area of distribution is small, we presume them to be at least threatened, but we really lack the necessary scientific information to determine whether they are endangered. Under such conditions, to suggest the inclusion of those species in Appendix I could be quite embarrassing, but the failure to do so would be a crime.

The only way to evaluate the true biological status of any species is through sound field ecological studies which, although urgently needed, nobody seems to be interested in financing, unfortunately. Hence, we must assess their status based on any available report, and often we later find that the information was unreliable.

Would it be possible to obtain the patronage of the World Wildlife Fund or the International Union for the Conservation of Nature to undertake such studies with those species we have reason to believe are threatened?

In relation to the currently listed cacti in the appendices of CITES, I am personally in complete agreement with the point of view expressed by the US Fish and Wildlife Service in the circular letter of August 19, 1981 in regard to Appendix II. Cactaceae, as a whole family, should definitely be deleted from it. It is quite obvious that there are many species of cacti, at least Mexican species, that are in no way endangered currently or potentially. I would suggest leaving only a few species that are potentially endangered, which in my opinion are the following:

Ariocarpus kotschoubeyanus

Ariocarpus trigonus

Astrophytum, all species (except *A. asterias*, in Appendix I)

Cephalocereus senilis
Echinocereus delaetii
Echinocereus knippelianus
Echinocereus pulchellus var. *amoenus*
Mammillaria carmenae
Mammillaria heidiai
Mammillaria herrerae
Mammillaria humboldtii
Mammillaria plumosa
Mammillaria saboae, all varieties, i.e.: var. *goldii*,
 var. *haudeana*, var. *saboae* & var. *theresae*
Mammillaria schiedeana
Mitrocereus fulviceps
Nopalxochia (Lobelia) macdougallii
Wilcoxia schmollii
Pterocereus foetidus

As to the currently-listed species in Appendix I, it is evident that all seven are currently endangered or soon would be if they weren't protected, and although I am glad that they are included I am sure that some people might disagree in relation to *Aztekium ritteri*, *Pelecyphora aselliformis* and *Pelecyphora strobiliformis*.

Aztekium ritteri is a rare and much valued species endemic to a very restricted area—just one single narrow canyon—in northeastern Mexico, where it grows bountifully on the almost vertical, sheer mountainsides. Thousands of plants have been collected there, and most of the accessible areas have been depleted, but there are still thousands of plants left growing in inaccessible areas. It could be argued that the remaining population is quite large enough to assure perpetuation.

In regard to both species of *Pelecyphora* included in Appendix I, although some populations have been exterminated, there are still some others that as yet have not been touched by collectors. The argument that these two species are currently not endangered is valid, but if they aren't protected now, when the virgin populations are found they will certainly be depleted in a very short time.

There are several other species that I would like to see included in Appendix I since, as far as I know, they are severely endangered:

Astrophytum asterias
Echinocactus grusonii
Echinocereus pulchellus var. *pulchellus*
Lophophora diffusa
Mammillaria pectinifera (*Solisia pectinata*)
Mammillaria sanangelensis (*Mammillaria dealbata*
 sensu B. & R.)
Melocactus dawsonii
Melocactus delessertianus
Normanbokea (Pelecyphora, Turbinicarpus)
pseudopectinata
Turbinicarpus, all species

As to the Mexican Government's plans to monitor

trade in cacti, I am sorry to say that little is being done. There are, however, three encouraging points:

1. I believe that the Mexican Department of Agriculture has realized that it is necessary and convenient for my country to become a party of CITES. I suspect that they will recommend the prompt signing of the Convention.

2. The Mexican Department of Agriculture is trying to put an end to the issue of illegal collection and export permits by unauthorized agencies.

3. The Mexican Department of Agriculture has restricted collecting and export permits, specially those for declared trade purposes.

Unfortunately, the over-zealous efforts of the Mexican Department of Agriculture to monitor trade in cacti has had some negative effects:

In restricting trade in general, trade for scientific purposes now demands a long and tedious ordeal. Scientists that apply for permits have now to meet cumbersome pre-requisites and conditions with which it is difficult to comply.

In restricting trade for commercial purposes, no permits are issued at present to collect or export cacti for propagation purposes, not even to Mexicans that would like to obtain a basic collection to start a commercial nursery.

I truly believe that these excessive restrictions are encouraging illicit trade. If the Mexican Government does not facilitate cactus trade for scientific purposes, foreign scientists will have to acquire their material in the black-market. I also believe that the Mexican Government should grant a limited amount of permits to *bona fide*, well known, responsible nurseries, for commercial propagation purposes. If this is not done, and nurseries in Mexico are not set up, illegal trade will never be stopped, even if we accede to the Convention.

This paper was read at a meeting on the cactus trade held in Tucson, Arizona, on 7-8 December, 1981 under the auspices of the United States Fish and Wildlife Service. A report of the meeting by Dr E. F. Anderson has appeared in the Cactus & Succulent Journal of America, vol. 54(2), pp. 82-85 (1982).

Sr Sanchez-Mejorada will be visiting England later this year and will be lecturing at Warrington on Sunday, 5 September.

Cactaceas y Suculentas Mexicanas

Copies of the complete volume 26 (1981) of the Mexican Society's Journal have now arrived and are available from the CSSGB editorial office, 67 Gloucester Court, Kew Road, Richmond, Surrey TW9 3EA, price £5.50 including postage. Advance subscriptions to vol. 27 (1982) can also be accepted, price £6.50. Please make cheques payable to D. R. Hunt, not to the Society.

Link & Otto's 'Melocactus und Echinocactus'

by Nigel Taylor

Royal Botanic Gardens, Kew,
Richmond, Surrey

The facsimile reproduction of historic cactus and succulent texts seems to be a growing hobby, or business, at present. Martius's fine *Beschreibung einiger neuen Nopaleen* and Schumann's account of the Cactaceae for *Flora Brasiliensis* are just two examples of relatively inexpensive items offered recently. For those collectors with much deeper pockets there is Jacquin's *Stapeliarum in horti Vindobonensis culturarum*, now available as a high quality colour reproduction from South Africa. Less well-known (at least in the UK), and newly published in facsimile, is Link & Otto's *Ueber die Gattungen Melocactus und Echinocactus**, which first appeared at Berlin in 1827. Botanically this is an important historic work, for it represents a significant step towards the development of the generic framework needed to accommodate the great diversity of cacti that were then reaching Europe from Mexico and S. America.

J. H. F. Link (1767-1851) has been described as a German natural philosopher and botanist (cf. Stafleu & Cowan, *Taxonomic Literature*, ed. 2, 3: 65, 68, 1981). He was trained as a doctor of medicine but devoted much of his time to botany and horticulture. Between 1811 and 1815 he directed the botanic garden at Breslau and subsequently fulfilled a similar rôle at Berlin, where he was professor of botany up to his death. The horticulturist C. F. Otto (1783-1856) worked at the Berlin garden between 1801 and 1843, and is best known amongst cactophiles for his collaboration with L. C. G. Pfeiffer in the preparation of volume 1 of their beautifully illustrated *Beschreibung Blühender Cacteen* (cf. Stearn in CSJGB 8: 39-46, 1939). From 1833 up to his death he was also coeditor (with A. Dietrich) of the *Allgemeine Gartenzeitung*, and occasionally described new cactus species therein.

Melocactus und Echinocactus was based on a study of living material growing at Berlin. It begins with a review of literature from the time of L'Obel (1581) up to Haworth and Salm-Dyck, followed by some

interesting remarks on cultivation and on propagation by seed. Apart from a catalogue of cacti in the Berlin collection, which ends the text, the remainder is devoted to the first descriptions of the genera *Melocactus* and *Echinocactus* and lists their included species, each illustrated by a fine Röthig lithograph. In total 18 species are described and figured: 4 as *Melocacti* and 14 as *Echinocacti*, though the authors remark that certain of the species referred to the latter may be better housed in *Cereus*. For some reason all the plates are labelled with *Melocactus* names: it is possible that they were prepared before Link & Otto had decided to recognize the genus *Echinocactus*. In any case it seems that Link was not satisfied with the delimitation of genera so adopted, for soon after the paper was published, he offered a corrected extract to Schlechtendal, the editor/publisher of the journal *Linnaea*, in which it quickly appeared (vol. 2: 490-95, 1827). This emended version seems to have been overlooked or ignored, but is rather important for two reasons. Firstly, Link transfers five of his *Echinocacti* to *Cereus*, and makes new combinations which have hitherto remained unrecorded in the *Index Kewensis* and do not appear in *The Cactaceae* of Britton & Rose. Secondly, the publication of the emended version, in the same year as the original paper, suggests that *Melocactus und Echinocactus*, containing the first descriptions of various new species, was in print by the middle of 1827. (The emended version appeared in the third of four parts constituting volume 2 of *Linnaea*, apparently all published in 1827.) The dating of Link & Otto's paper is important in respect of at least one species recognized today, namely *Notocactus ottonis*, first described as *Cactus ottonis* by Lehmann, also in the year 1827. According to both Schumann (*Gesamtb. Kakt.* 391) and Britton & Rose (*Cact.* 3: 195) *Echinocactus tenuispinus* Link & Otto, l.c., 421, is a synonym of *Cactus ottonis* Lehm., and to judge from Link & Otto's description and figure this is quite reasonable. However, which name was published first? Lehmann's *C. ottonis* was described in the index of seeds of the Hamburg botanic garden for 1827. Stafleu & Cowan (op. cit. 2: 821) do not indicate exactly when in 1827 this seed list appeared, but they are able to date the issue of the same list for 1829 as having appeared in November or December 1829. Furthermore, the lists for the years 1822 & 1823 appeared in 1823 & 1824, respectively, and thus the suspicion must be that these seed lists were distributed at the end of each year, or at the beginning of

*Pp. 21+17 plates, quarto, paperbound. Available from Urs Eggli, Lerchenbergstr. 19, CH-8703 Erlenbach ZH, Switzerland or from the CSJGB editorial office. Price £5 post free.

The full title is 'Ueber die Gattungen *Melocactus und Echinocactus*, nebst Beschreibung und Abbildung der im Königl. botanischen Garten bei Berlin befindlichen Arten'. It was first published as pages 412-432, plates 11-27, of vol. 3 of the 'Verhandlungen des Vereins zur Beförderung des Gartenbaues Kon. Preuss. Staaten', seventh Lieferung (1827). It also appeared as a repaginated reprint (pages [1]-23) in the same year.

the next, in readiness for the following spring. Although it cannot be proved conclusively at present, it does seem likely that *Echinocactus tenuispinus* Link & Otto was published before *Cactus ottonis* Lehm. (The combination *Notocactus tenuispinus* (Link & Otto) Herter was published in *Cactus* (Paris) 10(44): 177. 1955.)

Since some of the names employed by Link & Otto in *Melocactus* & *Echinocactus* may be unfamiliar to purchasers of the facsimile, I append the following commentary:

MELOCACTUS

1. *M. communis*. This is the present day lectotype of the genus *Melocactus*, and is generally assumed to be the legitimate renaming of *Cactus melocactus* Linnaeus (1753). The name should be applied to the Jamaican member of the genus, though it has been used for various other Caribbean species in the past.

2. *M. macracanthus*. This name, first published by Salm-Dyck, covers the extraordinarily variable melocactus complex from Curacao, Bonaire and Aruba; see CSJGB 43: 33-36 (1981).

3. *M. pyramidalis*. A synonym of the above.

4. *M. besleri*. The plant illustrated was collected by Riedel in Brazil and appears to be a *Discocactus*, perhaps *D. placentiformis*. The earlier-published *Cactus placentiformis* Lehmann (1826) was included as a synonym thus making Link & Otto's name illegitimate.

ECHINOCACTUS

1. *E. tenuispinus*; *Cereus tenuispinus* Link in *Linnaea* 2: 493 (1827). As noted above, this may be the correct name

for *Notocactus ottonis*. The plants illustrated were collected in Rio Grande do Sul by Sellow.

2. *E. tephrecanthus*. As treated by Britton & Rose this species (now usually placed in *Wigginsia*) includes two other Link & Otto names, *E. acutatus* and *E. sellowii*. These synonyms were based on Sellow collections from Montevideo, while *E. tephrecanthus* came from Rio Grande do Sul.

3. *E. poliocanthus*. Another *Wigginsia*, but perhaps not distinct from *Cactus erinaceus* Haworth (1819). Once again based on a Sellow collection from Rio Grande do Sul.

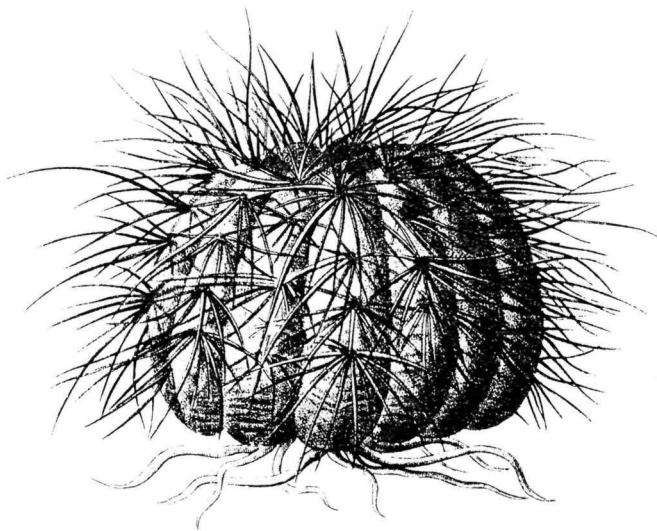
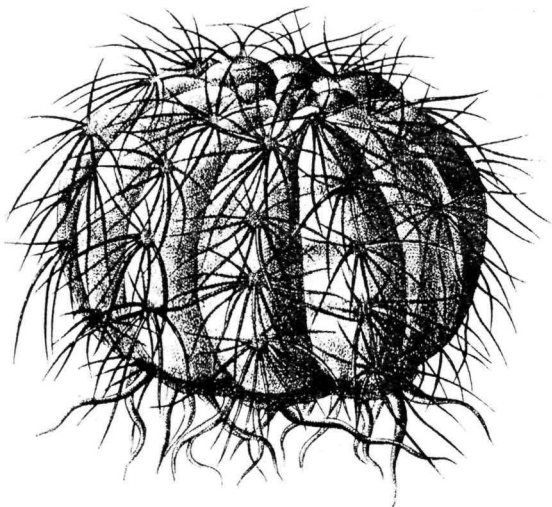
4. *E. salmianus*; *Melocactus* ? *salmianus* Link in *Linnaea* 2: 494 (1827). Based on a plant from Curacao, this is another synonym of *M. macracanthus*.

5. *E. platyacanthus*. The lectotype of the genus *Echinocactus*, and also the oldest name for the widely distributed Mexican species better known as *E. ingens*, *E. palmeri*, *E. grandis* or *E. visnaga*. The type was collected by Deppe and weighed 200 pounds!

6. *E. acutatus* & 7. *E. sellowii*. See no. 2 above.

8. *E. tuberculatus*. Britton & Rose were unable to suggest an identity for this name, which is based on another Deppe collection from Mexico. It could be a young plant of *E. platyacanthus* or *Ferocactus histrix*.

9. *E. recurvus*; *Cereus recurvus* Link in *Linnaea* 2: 493 (1827); *Cactus recurvus* Mill. (1768). Link & Otto's illustration, if correctly identified, is the earliest figure of *Ferocactus recurvus* (Mill.) Borg. However, the plant depicted has rather weak spines, and may not be this species, unless it was a long-suffering survivor of bad cultivation!



Link & Otto's illustrations of *Echinocactus tenuispinus*, probably the same as *Notocactus ottonis*

10. *E. gladius*. This has been considered to be a stenocactus, but the illustration (said to be of an immature plant) does not resemble any member of this group, having broad obtuse ribs. It was based on material obtained in Mexico by Deppe.

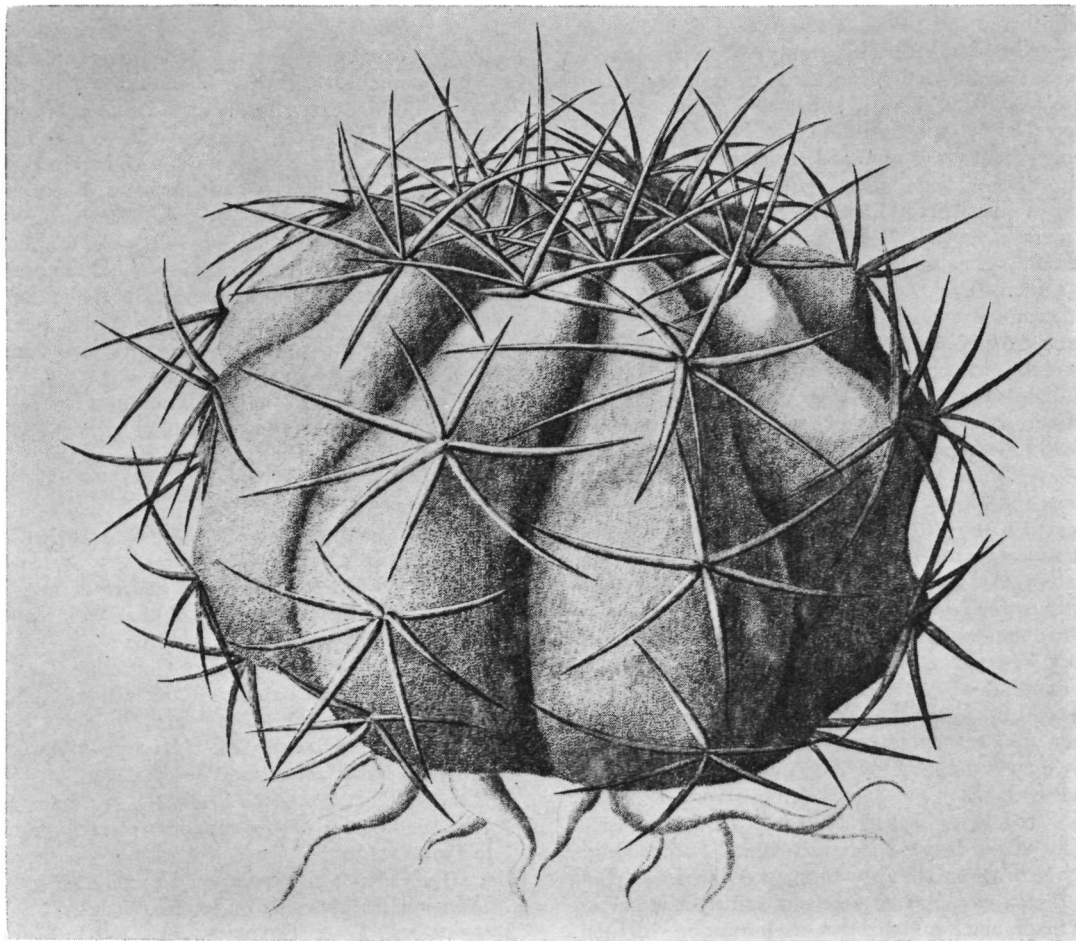
11. *E. orthacanthus*. This name was based on plants collected at Montevideo by Sellow. It may be a *Wigginsia*, but has never been positively identified.

12. *E. subuliferus*; *Cereus subuliferus* Link in *Linnaea* 2: 493 (1827). Britton & Rose (*Cact. 3*: 136) cite Link & Otto's illustration for *Ferocactus robustus*, but the ribs and close spacing of the areoles do not suggest this identity to me. In any case if this identification were correct then *E. subuliferus* would take precedence over the well-known *E. robustus* Pfeiffer (1837). The illustra-

tion is of a plant collected by Deppe in Mexico, and is best regarded as of uncertain identity if upheaval of later names is to be avoided.

13. *E. intricatus*; *Cereus intricatus* Link in *Linnaea* 2: 493 (1827). Based on another collection of Sellow from Montevideo, with 20 close ribs bearing approximate areoles with numerous spines. There can be little doubt that this is a *Notocactus*, but no one has positively identified which species to date.

14. *E. meonacanthus*; *Cereus meonacanthus* Link in *Linnaea* 2: 493 (1827). Britton & Rose refer this name to the synonymy of *Cactus melocactus* (= *Melocactus communis*), no doubt because it is based on plants from Jamaica. However, they do not credit this species with spines as short as those described for the Link & Otto plant.



Link & Otto's *Echinocactus tuberculatus*, probably a young plant of *E. platyacanthus* or *Ferocactus histrix*.

Microwaves: a modern aid in preparing herbarium specimens of succulents

by Beat Ernst Leuenberger

Botanischer Garten und Botanisches Museum,
Berlin-Dahlem

Methods of preparing herbarium specimens of succulents have been described by Benson (1950), Clover (1952), Fosberg & Sachet (1965), and by Stadelmann & Friedrich (1963) who recommended freeze-drying. Chudovska (1979) used silica-gel after freezing for leaf-succulents and slender stem succulents. For bulky stem succulents she recommends embedding in silica-gel at 50°C in a drying oven.

In the last mentioned method the advantage of preserving the whole plant including flowers true to nature both in shape and colour is emphasized. But most of these methods are rather laborious, and preservation of succulents continues to be neglected by many collectors in the field as well as in botanical institutions well-equipped with drying facilities.

Only recently a simple and rapid method has been described by Fuller & Barbe (1981), that allows easy drying of succulents and avoids both laborious handling and use of chemicals. In the California Department of Food and Agriculture, Fuller and Barbe experimented with a microwave oven to kill plant tissues, which upon and during short treatment begin to exude liquid. After treatment the plants can be handled like normal specimens in the plant press and drier.

Microwaves generated at 2450 MHz/sec. agitate water and fat molecules, and this effect is used in microwave ovens for warming up food and for cooking. Microwave ovens are increasingly used in (fast-food) restaurants and in private households. Smaller models sell for less than 800 DM (c. £200). Since no pre-treatment of the plants is necessary and treatment itself is very short (30 to 120 seconds), this method seems very promising for laboratory use in botanical institutions and field stations. Drying of specimens cannot of course replace preservation of samples in spirit or FAA (a mixture of solutions of formaldehyde, ethanol and acetic acid) which, depending on the goal of subsequent examination, may still be preferable.

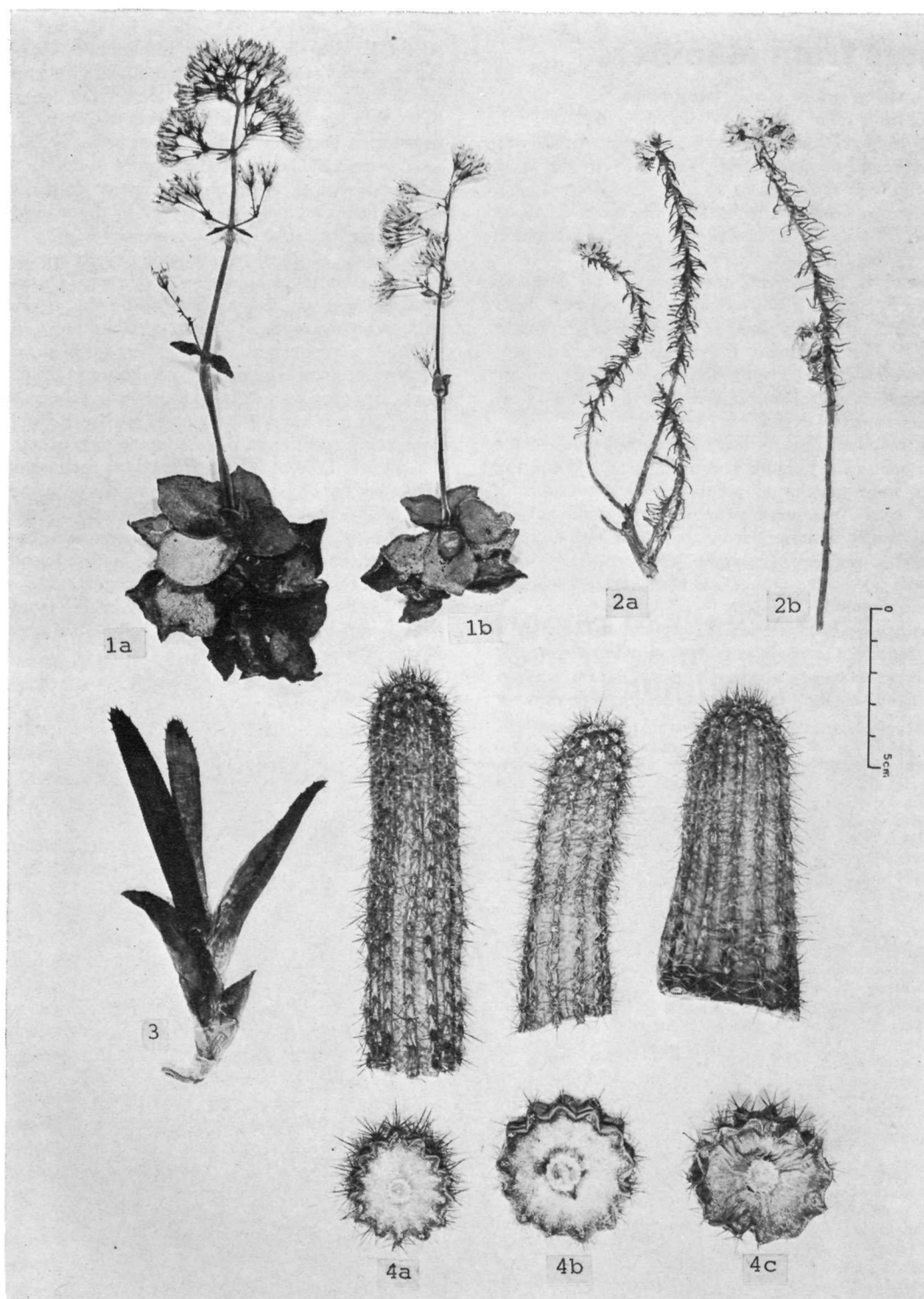
My own first experience with this new method fully agrees with the results presented by Fuller & Barbe (1981). Thanks to the generous help of the technical assistant of the Berlin-Dahlem Botanical Garden, Mrs. S. Schwerdtfeger, who possesses a household model of such a microwave oven, successful initial experiments were made, and it is hoped that our institution will soon have a microwave oven for use in support of the garden herbarium. Preparation of dried specimens of succulents

for the voucher collection of our garden herbarium was always a problem. Boiling has been used so far to kill succulents prior to drying, since drought-resistant species of *Sansevieria*, *Echeveria*, *Sedum* and cacti tend to survive or even etiolate in the plant press. While fresh specimens need weeks or even months to dry, samples treated with microwaves, like cooked specimens, dry out within a few days. Treatment can be observed through the window of the microwave oven, and the plants are 'done' when they begin to appear wet and start to exude liquid. Large objects need longer treatment, but to avoid prolonged boiling that could cause ruptures in the plant tissues or bubble-shaped detaching of the epidermis it may be preferable to treat in several short intervals. Cacti are best cut in transverse or longitudinal sections. Much of the water then exudes during treatment in the oven. Our experiments with specimens of *Crassula*, *Sedum*, *Aloe*, *Gasteria*, *Sansevieria*, and *Trichocereus* are positive and some examples are shown in the illustration. In leaves of *Aloe*, bubble formation during microwave treatment caused partial detachment of the epidermis above water storing tissues, but the same effect is observed to a lesser degree in specimens cooked in boiling water.

According to Hall (1981) another possible use of microwave ovens is in insect control in herbaria. Stacks of mounted specimens can be put in the oven.

References

- BENSON, L. (1950). Permanent plant records. In *Cact. Succ. J. Amer.* 22(4): 115-122.
CHUDOVSKA, O. (1979). Ein neues Konservierungsverfahren für Sukkulente. In *Kakteen und andere Sukkulente* 30(4): 94-96, (5): 106-107.
CLOVER, E. U. (1952). Methods of Collecting Cacti for the Herbarium and Botanical Garden. In *Cact. Succ. J. Amer.* 24(3): 72-75, (4): 110-113.
FOSBERG, F. R. & SACHET, M.-H. (1965): *Manual for Tropical Herbaria*. Regnum Vegetabile 39, Utrecht.
FULLER, T. C. & BARBE, G. D. (1981). A microwave-oven method for drying succulent plant specimens. In *Taxon* 30: 867.
HALL, D. W. (1981). Microwave: a method to control herbarium insects. In *Taxon* 30: 818-819.
STADELMANN, E. & FRIEDRICH, H. (1963). Gefrier-trocknen—eine neue Herbartechnik für Sukkulente. In *Kakteen und andere Sukkulente* 14(4): 75-77.



Herbarium specimens of 1, *Crassula lactea*, a, treated with microwaves for 60 secs., b, not treated; 2, *Sedum griseum*, a, treated for 30 secs., b, not treated; 3, *Aloe brevifolia*, offshoot, treated for 30 secs.; 4, *Trichocereus spachianus*, a, treated three times for 60 secs., b, boiled in water, c, not pretreated.

(photo: B. Schilling)

Notes from Members

Seed-raising under sterile conditions

from Marco Avolio

I am a young enthusiast succulents grower, especially of Cactaceae and Euphorbiaceae. I read just yesterday your article in Vol. 42 number 4 of 1980 about seed sowing and their not-so-good results, so allow me to acquaint you with a positive experience of a group of cactophile growers here in Catania and in Sicily too.

Everything begins with sterilization of the compost (made of $\frac{1}{2}$ peat, $\frac{1}{4}$ leaf-mould, and $\frac{1}{4}$ washed sand: everything sifted very thinly, 1 mm approx.) . . . in the oven! ! This treatment is performed by complete imbibition with water of the above mentioned compost at a temperature of between 100° and 125° C for 15–20 minutes approx.

We use plastic pots for sowing and often they are not proper pots: for instance I use little plastic boxes for colour slides measuring approx. 5×8.5 cm with a plastic cover. Watering is to be performed from below, by imbibition, with sterilized water added with Captan-containing products (in Italy 'Orthocin-Bayer' for instance). Seeds are scattered and a little pressed, but not covered, naturally.

Finally we take care to seal every pot in small ordinary cellophane bags of approx. 20×35 cm with aperture up. It is important to keep the bags a little inflated to prevent them from touching or damaging seedlings or moving

seeds. We keep the temperature at about 18°–20° C; in winter seedlings would be sheltered inside the home or in a hot greenhouse. To protect them from direct sunlight, they are covered with a sheet of paper, such as newspaper. Further waterings are to be made with the usual water and Captan products every 30 days or when it is necessary to keep the compost moist (do not worry about a little excess of water: it will run down inside the cellophane bag to be used as a reserve).

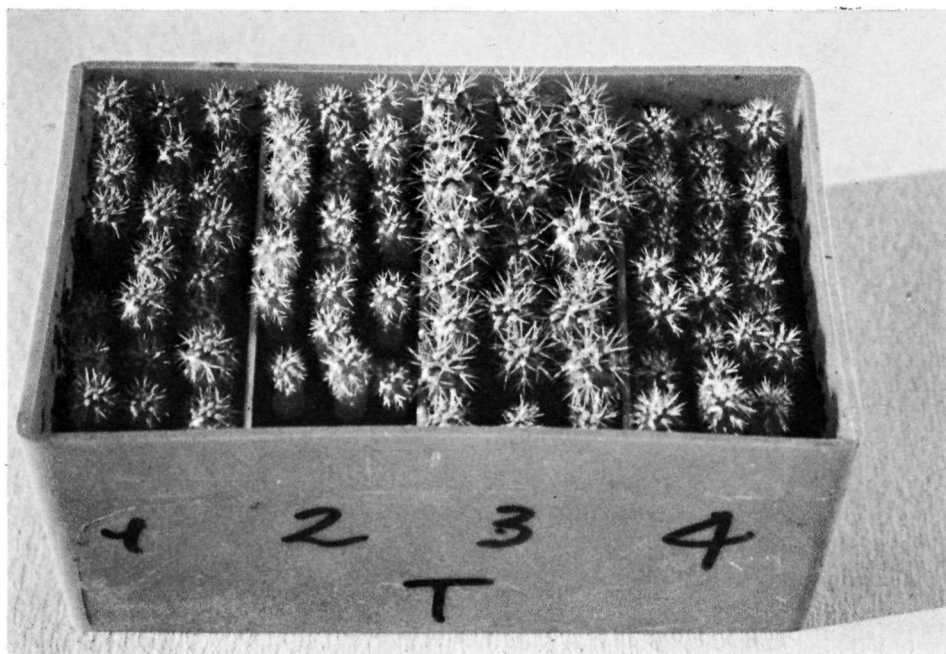
We have obtained germination percentages up to 80–90% even with seeds such as: *Melocactus*, *Discocactus*, *Frailea*, *Obregonia*, *Euphorbia*, *Epithelantha*, *Ariocarpus*, *Roseocactus* and more.

This is a very efficient method here in Sicily, where we have summer temperatures of about 25–28° C (and more! !) and winter ones of about 5–15° C in coastal zones. So it is very important to shelter seedlings in winter to prevent them from stopping their growth.

I am very keen to specify this is not a method of my invention, but I have only experimented it with remarkable results, after having tried other methods but with disappointing results. I hope this modest contribution/experience could help you, my dear English friends, to get better results in your sowings of next spring.

Pardon me for this terrible essay of English language, but it is very long time I stay away from Great Britain!

Marco Avolio
Via Collegiata 3,
95124 Catania, Italy.



Melocactus and *Notocactus* seedlings raised in a slide-box

Book Reviews

Peter J. Mitchell (Ed.). *Succulent Scene One*. Pp. 78, 30 line-drawings, 7 half-tones, 2 maps, soft covers. 6×8 inches. Southern Reprographics, Burgess Hill, West Sussex. Price £2.95.

A new medium for the publishing of succulent plant literature is offered here in the form of a (planned) series of booklets devoted to longer, popular style articles. The first combines three titles: *Euphorbias of the Transvaal* (David Brewerton), *Small growing Echinocactanae* (John Ede) and *An introduction to Stapeliads* (Colin Walker). The editor, Peter Mitchell, introduces the articles, suggesting that they might not be accommodated in our more familiar succulent periodicals, but I feel sure that most editors would be delighted to receive an article as well written, illustrated and interesting as Colin Walker's 35-page account of the fascinating Stapeliads.

We await further issues of *Succulent Scene*, assuming the initial standard can be maintained, and especially if the quality of line drawings and quantity of photographs can be increased.

N.P.T.

Brian Fearn & Leslie Pearcy. *The genus Rebutia 1895-1981*. Pp. 80, 17 half-tones, line drawings, 4 maps, soft covers with 7 colour illustrations, 5×7 inches. Abbey Brook Cactus Nursery, Matlock, Derbyshire. Price £1.75 post free.

Rebutia enthusiasts have cause to rejoice at the appearance of this long-needed booklet, the second Abbey Brook illustrated guide. While the genus (in its broad sense) has long been the subject of considerable study and interest, much of the published work has remained uncoordinated and widely dispersed in various journals. Now we have a most useful 'gathering together of loose ends', and clearly the authors have taken much trouble in achieving this. It is certainly more than just a compilation—some useful hints on relationships (and cultivation) are there too. A sensible and systematic layout includes a summary of infrageneric classification with a key, illustrations of the variety of floral structure, a geographical run down for the principal groups (plus four maps), checklists of specific and infraspecific epithets and of Ritter, Lau and Rausch field numbers, and finally, a useful bibliography. In addition 20 representative species are selected for fuller descriptive treatment and each illustrated (some in colour on the rear cover).

It is to be hoped that the authors will not stop at *Mammillaria* (booklet no. 1) and *Rebutia*—how about the popular *Sulcorebutias* and *Weingartias* next?

N.P.T.

Hermann Jacobsen. *Das Sukkulentenlexikon*, ed. 2, completed by Klaus Hesselbarth. 645pp., 100 plates.

VEB Gustav Fischer Verlag, Jena. Price DM 48.00. In German.

We welcome the second edition of Hermann Jacobsen's magnum opus, finalized, after the author's death in August 1978, by his colleague Klaus Hesselbarth. This remarkable work, treating almost all plants cultivated or classified as succulents (except Cactaceae), remains an essential component on our bookshelves. Jacobsen had more or less completed the revision and incorporation of innovations since 1970 (when ed. 1 was published) at the time of his death, and to these Hesselbarth has added a short supplement listing new names published up to the end of 1978. The extent of the revision seems rather limited in places, e.g. Bayer's work on *Haworthia* is practically ignored in the main body of the text, and the suspicion is that 'as few changes as possible' was the attitude adopted. However, it is easy to criticize, but more difficult to imagine who will ever be able to replace a work of this scale.

N.P.T.

THE CACTUS & SUCCULENT SOCIETY OF GREAT BRITAIN

Report of the Council for the year ended 31st December, 1981

This has been the year of the 50th Anniversary festivities; it is time to reflect on the successes and failures of the year as a whole and peer a little into the future. On the credit side it must be said that the 'Warrington Weekend' was a great success, as members were able to enjoy virtually two days of talks by well-known speakers, see very many splendid slides, chat amongst themselves to their hearts' content and socialize at the Annual Dinner which was itself a break with tradition being held outside London for only the second time. Daphne Pritchard and her assistants are to be congratulated on the smooth-running of the weekend as a whole.

The Pimlico Show held in the last week in September was also well-supported and well-organized with a useful number of entries and good quality plants. Credit must be given to Derek Bowdery, the Show Secretary and his Committee, for the handling of this event and thanks also to John Pilbeam for supplying the staging from the Bromley Branch of the National at very short notice. As is customary on this occasion refreshments were available and the Council wishes to thank all those concerned. Both the Weekend and the Pimlico Show are events closely connected with the work of the Publicity Officer and the untimely death of Betty Maddams on 17 July was certainly a tragedy. Jean Ellis was appointed to this office at a subsequent Council Meeting.

The present situation as regards the merger of our Society with the NCSS is that in early May both Societies opened their respective ballots and found that a majority of 10 to 1 in our Society and 8 to 1 in the NCSS were in favour of merger talks proceeding. They have in fact proceeded albeit slowly and a final agreement is not yet in sight. There does not appear to be any great fundamental difference that is holding matters up and Council is making every effort to secure an agreement acceptable to both organizations.

The Annual General Meeting this year was held at the Pickard Motor Hotel, Burgh Heath, Surrey on 28 March. This

was preceded in the morning by a slide show and talk by Bill and Yvonne Tree and the sale of young plants by 'Pete and Ken', followed by an excellent lunch prior to the AGM itself. The North Surrey Branch were the organisers.

The customary Bring & Buy Sale was held at the RHS in June, the attendance this year was less than usual and £3 was raised for the Society's funds.

David Hunt was again 'at home' on 16 and 22 August and 6 September and Council would like to record their thanks to David both for this and his continued work on the Journal together with Nigel Taylor and for his work as Treasurer.

The Society, despite a small fall in membership, continues to be in a healthy financial situation and the Journal maintained its high standard although with only two colour plates in Vol. 43.

Council wishes to conclude by offering its sincere thanks to all the senior and junior officials of the Society, to its own members and the Society's Honorary Auditors, to the various speakers and Show Organisers and all the Society's Branch officials who have assisted in any way with the organisation of the Society or the stewarding of its Shows.

R. H. I. READ
Hon. Secretary

TREASURER'S REPORT

Financially, the Society had a satisfactory year in 1981, despite a fall of about 100 in the total membership. The surplus for the year of £680 was a little higher than in 1980, but this may be

accounted for by the absence of expenditure on new stock of items such as binders which substantially reduced the 1980 surplus. The fall in membership may be put down to a variety of factors, principally the higher subscription rates and the recession which may have deterred new members, of which there were only 190 in 1981, compared with 325, 332 and 327 respectively in the three previous years. The likelihood of a merger with NCSS may also have tended to dampen our zeal for recruitment. We may take some comfort from the fact that the drop in new members was greater than the drop in total membership, implying that the number of committed members actually increased in 1981.

Careful budgeting on the journal continues to be my overriding concern, and as in 1980, the total cost of printing and publishing the journal, less receipts from advertising and the sale of reprints, was within the value of subscriptions. Sales of back numbers continued to provide a useful additional source of funds, but the volumes issued prior to 1976 were virtually out-of-print by the end of the year.

Attendance at the Warrington Weekend was lower than expected, resulting in a deficit of about £130. Like the costs of other worthwhile activities, including the seed distribution, the annual show and other displays and meetings, this actually represents but a small charge against our income for the year, and one which we have been able to absorb without difficulty.

D. R. HUNT
Hon. Treasurer

EXPENDITURE AND RECEIPTS FOR THE YEAR ENDING 31st DECEMBER 1981

EXPENDITURE			RECEIPTS		
1980		1981	1980		1981
£		£	£		£
5209.47	Journal: printing, etc.	5941.20		Subscriptions for year:	
1160.52	Journal: postage and handling	1481.47	2058.29	Paid in advance	1241.00
48.67	Officers' expenses	122.70	4004.61	Paid during year	5876.42
114.34	Printing, stationery	168.00			
39.88	R.H.S. Affiliation and hire of		6062.90		7117.42
	rooms	74.75		Journal sales:	
278.18	Seed purchasing, packeting	190.34	687.53	Back numbers	554.96
190.48	Show expenses, engraving	103.14	230.50	Offprints	181.68
674.01	Sales items, new stock	14.38	302.00	Advertising	322.16
52.35	Annual General Meeting	122.00	—	Journal donation	100.00
40.00	Display (Southport Show)	54.57	7.70	Booklet sales	5.30
190.00	Annual Dinner/Warrington		223.72	Seed sales	—
	Weekend	575.56	22.20	Raffle and plant sales	26.43
40.00	Back nos. repurchased	13.50	238.92	Sales items	212.62
23.70	Sundries and refunds	58.45	198.00	Annual Dinner/Weekend	432.50
—	Shurly Award	20.00	5.50	Donations	52.00
			—	A.G.M.	86.10
8061.60		8940.06	12.05	Sundries	124.91
	Surplus carried to balance		330.34	Building Society interest	325.99
401.96	sheet	680.21	142.20	Pimlico Show	78.20
8463.56		9620.27	8463.56		9620.27

BALANCE SHEET 31st DECEMBER 1981

1251.64	Accumulated funds:		2189.52	Cash at Barclays Bank	2911.35
401.96	Balance at 1.1.81	1653.60	10.00	National Giro	395.56
	Add surplus for year	680.21	1616.09	Britannia Building Society	3894.64
1653.60		2333.81	74.18	Halifax Building Society	121.62
	Current liabilities:				
995.19	Unpresented cheques	1919.29	3889.79		7323.17
1241.00	Subscriptions in advance	2907.57			
—	Seed orders, 1982	162.50			
3889.79		7323.17			

D. R. HUNT, Hon. Treasurer
J. S. KEESING, D. PHILCOX, Hon. Auditors

Branch & Affiliate Activities

July—October 1982

compiled by Daphne Pritchard

JULY

Date	Branch	Topic & Speaker
5 Mon	St Helens NCSS	Metztitlan <i>Dr J. Hughes</i>
6 Tues	North Surrey CSSGB Southport & Lancs CSSGB	South African Safari <i>Mrs H. Hodgson</i> Plants I like to Grow <i>Mrs J. Taylor</i>
8 Thurs	Ashford NCSS	Second Hundred Succulents for Beginners <i>Mr K. Harrow</i>
13 Tues	Bolton & District Cactus Society CSSGB	Stapeliads <i>Bill Keen</i>
14 Wed	Warrington CSSGB	South African Safari <i>Mrs H. Hodgson</i>
16 Fri	North London CSSGB	Inter-branch Quiz with Havering NCSS
20 Tues	Bromley NCSS	Echinocereus <i>Mr R. Alabaster</i>
21 Wed	Yeovil NCSS	Grafting <i>Mr D. Rushforth</i>

AUGUST

2 Mon	St Helens NCSS	Talk for Beginners <i>Mr G. Hedgecock</i>
3 Tues	North Surrey CSSGB Southport & Lancs CSSGB	My favourite plants <i>Mr N. Bentley</i> 'At Home' at Mr & Mrs J. L. Henshaw's
5 Thurs	Ashford NCSS	Lithops <i>Mr E. Harris</i>
10 Tues	Bolton & District Cactus Society	Members' Evening
11 Wed	Warrington CSSGB	Grand Canyon, Colorado <i>Mrs S. Barker-Fricker</i>
17 Tues	Bromley NCSS	Quiz Night
18 Wed	Yeovil NCSS	Coffee evening at <i>Mr J. Astley's</i>
20 Fri	North London CSSGB	Grand Canyon, Colorado <i>Mrs S. Barker-Fricker</i>

SEPTEMBER

2 Thurs	Ashford NCSS	Table Show (Plant in Flower)
4 Sat	North Surrey CSSGB	Carshalton Cactus & Honey Show at Grove Hall, Carshalton
5 Sun	Warrington CSSGB	DAY EVENT <i>Sr H. Sanchez-Mejorada</i> (Mexico)
6 Mon	St Helens NCSS	Succulents of South Africa <i>Tom Jenkins</i>
7 Tues	North Surrey CSSGB Southport & Lancs CSSGB	Epiphytes <i>Clive Innes</i> Autumn Table Show (Succulents) and Wine & Cheese evening Why these long names? <i>Mr G. Hedgecock</i>
8 Wed	Warrington CSSGB	Mexico on our own <i>Mr J. L. Henshaw</i>
14 Tues	Bolton & District Cactus Society	Cacti and Rarer Succulents <i>Mr & Mrs Smeaton</i>
15 Wed	Yeovil NCSS	Autumn Show
17 Fri	North London CSSGB	
21 Tues	Bromley NCSS	Lithops <i>Mr E. Harris</i>

OCTOBER

4 Mon	St Helens NCSS	Visit to Mexico <i>Mr J. L. Henshaw</i>
-------	----------------	--

5 Tues	North Surrey CSSGB Southport & Lancs CSSGB	Mexico: Valley of Tehuacan <i>Dr J. Hughes</i> Film of Southport Flower Show <i>Mr Boocock</i>
7 Thurs	Ashford NCSS	A.G.M. and Plant & Produce 'Bring and Buy'
12 Tues	Bolton & District Cactus Society	Slide & Tape Lecture from Gordon Rowley (<i>Mr E. Jennison</i>)
13 Wed	Warrington CSSGB	California <i>Dr & Mrs Mace</i>
15 Fri	North London CSSGB	A.G.M. and Plant Auction
19 Tues	Bromley NCSS	Blooming Marvellous <i>Pete and Ken</i>
20 Wed	Yeovil NCSS	Applied Photography <i>Mr D. Potter</i>

Queensland Succulent Society meet in Brisbane on the last Monday each month (except December) at 8.00 p.m., and visit members' collections on the first Sunday each month (except January) at 2.00 p.m.

CSSGB members will be welcome at all Branch and Affiliate Events.

Venues and contacts for more information :

Ashford NCSS

Secretary : Mrs. D. M. Nelson, Parnassus, Etchinghal, Folkestone, Kent, tel. Lyminge 862340.

Meeting Place : Furley Hall, Maidstone Road, Ashford.

Time : 1st Thursday of month, 7.30 p.m.

Bromley NCSS

Secretary : J. W. Pilbeam, 51 Chelsfield Lane, Orpington, Kent BR5 4HG, tel. Orpington 37781.

Meeting Place : Hayes Village Hall, Hayes Street, Hayes.

Time : Usually 2nd Thursday of month.

North London

Secretary : Roger Day, 50 Admiral's Walk, Hoddesdon, Herts. EN11 8AG. Tel. no. Hoddesdon (STD code from London: 61) 69521.

Meeting Place : Octagonal Room, Bishops College, Cheshunt, Herts.

Time : 3rd Friday in month, 7.30 p.m.

North Surrey

Secretary : W. F. Maddams, 26 Glenfield Road, Banstead, Surrey SM7 2DG.

Meeting Place : Adult School, Benhill Avenue, Sutton.

Time : 1st Tuesday in month, 7.45 p.m.

Southport & Lancs.

Secretary : J. L. Henshaw, 43 Southport Road, Eccleston, Chorley, tel. Eccleston 542555.

Meeting Place : St. Johns Hall, Scarisbrick Street, Southport.

Time : 1st Tuesday in month, 7.45 p.m.

St. Helens NCSS

Secretary : G. A. Hedgecock, 142 Mill Lane, Sutton Leach, St. Helens, Merseyside WA9 4HF, tel. Marshalls Cross 811988.

Meeting Place : United Reformed Church Hall, Beaufort Street, off Sutton Road, Peasley Cross, St. Helens.

Time : Usually 1st Monday of month.

Warrington & District

Secretary : Mrs. D. Pritchard, 81 Birdwell Drive, Great Sankey, Warrington, tel. no. Penketh (092572) 4699.

Meeting Place : Meeting Lane Leisure Centre, Penketh, Warrington.

Wirral

Secretary : Mrs. I. Boote, 110 Mount Pleasant Road, Wallasey, Merseyside L45 5HU, tel. no. Wallasey (051639) 4305.

Meeting Place : The Grange, Grove Road, Wallasey.

Time : 3rd Thursday in month, 7.45-10.30 p.m.

Yeovil NCSS

Secretary : Mrs. D. Raffill, New Chapter, Middle Chinnock, Crewkerne, Somerset TN18 7PN, tel. Chiselborough 294.

Meeting Place : Astley Motors, Oxford Road, Yeovil.

Time : 3rd Wednesday of month, 7.30 p.m.

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For free listing (members only), send particulars to the Editorial Office.

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Cruck Cottage Cacti (Dorothy & Ronald Wood), Cliff Road, Wretton, Pickering, North Yorkshire YO18 8PJ. Tel. no. Pickering (0751) 72042. Open daily except Sat. morning. No lists. Nursery in garden setting.

Whitstone Gardens Ltd., The Cactus Houses, Sutton-under-Whitstonecliffe, Thirsk, North Yorkshire YO7 2PZ. Tel. no. Sutton (08456) 467. Open daylight hours every day throughout the year. Send 4x8p stamps (UK) or 3 international postal reply coupons for list. Everything for the cactophile; plants, seeds, books, sundries; substantial stocks and extensive collection on view.

Oak Dene Nurseries, 10 Back Lane West, Royston, Barnsley, Yorkshire S71 4SB. Tel. no. Royston (022670) 2253. Open every day, April–Sept. 9–6, Oct.–March 10–4 (closed for lunch 12.30–1.30). S.A.E. for list. Seed, plants, books and sundries.

Merseyside & Lancashire

Jim Bolton, Southview, 39 Altcar Road, Formby, Liverpool L37 8DR. Tel. no. Formby (07048) 73187. Open all day Sundays, advisable to telephone for weekday visits. Large selection of seedlings, etc., all at reasonable prices. No list.

Croston Cactus (J. L. Henshaw), 43 Southport Road, Eccleston Chorley, Lancs. PR7 6ET. Open evenings and weekends. S.A.E. for list. Choice Mexican cacti, occ. Tillandsias and other bromeliads.

Harry Mays, Woodsleigh, Moss Lane, St. Michaels on Wyre, Preston PR3 0TY tel. no. St Michaels (09958) 295. Surplus seedlings for sale to visitors only. Prior 'phone call essential.

Derbyshire

Abbey Brook Cactus Nursery, Old Hackney Lane, Matlock, Derbyshire. Tel. no. Matlock (0629) 55360. Open every afternoon 2–6 except Tuesday (closed all day). List free on request, stamp appreciated. Mail order catalogue illustrated in colour lists over 1700 species of nursery-grown cacti and other succulent plants.

South Humberside & Lincolnshire

Junamery Cacti (June & Tom Jenkins), St. Catherine's Lodge, Cranesgate Road, Whaplode St. Catherine, Nr. Spalding, Lincs PE12 6SR. Tel. no. Holbeach St. Johns (040634) 373. Open 9–5 Sunday–Friday, closed Saturday. S.A.E. for list.

Norfolk

Richard & Wendy Edginton, The Vines, 2 Green Man Lane, Kirstead, Norwich, Norfolk NR15 1EP. Tel. no. Brooke (0508) 58113. Open most mornings and weekends. S.A.E. for list. Seedling cactus plants 35p upwards.

Barleyfield Succulent Plant Nursery (Victor & Heather Graham), Southburgh, Thetford, Norfolk. Tel. no. Dereham (0362) 820457. Nearly always open, but telephone call appreciated. S.A.E. for list. 'Other' succulents, handmade plant pots. (0362) 820457. Stamp for list. Open Sundays only. Best to 'phone for directions. Very large selection of succulents including some cacti.

Warwickshire

Rod & Ken Preston Mafham, 2 Willoughby Close, Kings Coughton, Alcester, Warwickshire, tel. no. Stratford (0789) 762938, invite members to see their collection at weekends or during school holidays—please 'phone first. Surplus seedlings.

Gloucestershire

W. G. Geissler, 1 Lyefield Road, Charlton Kings, Cheltenham GL53 8BA. Tel. no. Cheltenham (0242) 517846. Open weekends and evenings. No list, no orders by post, but visitors very welcome in Cotswold country.

P. Strong, Green Mead, Green Lane, Chedworth, Cheltenham GL54 4AR. Tel. no. Fossebridge (028572) 581. Surplus seed-raised plants.

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A. & V. Parker, 31 Southill, Nr. Biggleswade, Beds. SG18 9HU. Tel. no. Hitchin (0462) 814022. Open evenings and weekends ('phone first). No list. Seed-raised plants.

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R. F. S. & B. R. Dale, Thurnlea, 14 Buttondene Crescent, Old Nazeing Road, Broxbourne, Herts EN10 6RH. Tel. no. Hoddesdon 63234. Open almost any time but write or 'phone. No list. Full range B.E.F. pots, labels, top dressing, etc.

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The Cactus Place (David & Barbara Brewerton), 33 Bridge Avenue, Upminster, Essex RM14 2LX. Tel. no. Upminster 29911. No list. Open 9 till dusk, but 'phone first. Large and medium sized specimens.

H. Guirl, Glenholme, Nursery Road, Nazeing, Essex. Tel. no. Hoddesdon 62291. Visitors and parties welcome. A prior telephone call would be appreciated. No list.

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Ernest Hepworth, Mira Mar, 133 Ambleside Avenue, Telscombe Cliffs, Sussex BN9 7LG. Tel. no. Peacehaven (07914) 3260. Open by appointment; closed Sundays. Send 12p stamp for list. Lithops, Mesems, Sempervivums.

Holly Gate Nurseries Ltd., Billingshurst Lane, Ashington, Sussex RH20 3BA. Tel. no. (0903) 892439. Open 9–5 every day, incl. weekends and Bank Hols. Send 25p for current catalogue of plants and seeds. Reference collection, entry 25p each.

Dorset

Pine Ridge Cacti (Joan & Dick Smeaton) 197 Ringwood Road, Verwood, Wimborne, Dorset BH21 6AG. Tel. no. Verwood (020123) 2796. Open 10–6. Closed Saturday and Monday. Choice and rarer 'other succulents'.

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John E. White, 64 Bath Road, Ashcott, Bridgwater, Somerset TA7 9QJ. Tel. no. Ashcott (0458) 210256. Open daily except Mondays. Uncommon Succulents.

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Phil Goodson, 1 Marsh Lane, Chudleigh, Newton Abbot, Devon. Tel. no. Chudleigh (0626) 852309. Collection open, plants usually for sale. Between the scenic Teign Valley and Haldon Hills, five miles from M5. 'Phone for directions and convenient times.

G. N. Short, Greenshaws, 7 Reabarn Road, Brixham, Devon TQ5 9DU. Tel. no. Brixham (08045) 2878. Open by appointment. The Devonian Collection of Cacti & Succulents; over 4000 species. Surplus plants for sale or exchange.

Westfield Cacti (Ralph Northcott), 10 Shillingford Road, Alphington, Exeter, Devon EX2 8UB. Tel. no. Exeter (0392) 56925. Nursery grown cacti and other succulents, books and sundries. S.A.E. for list. Visitors, including coach parties, welcome, by appointment, please. Collections bought.

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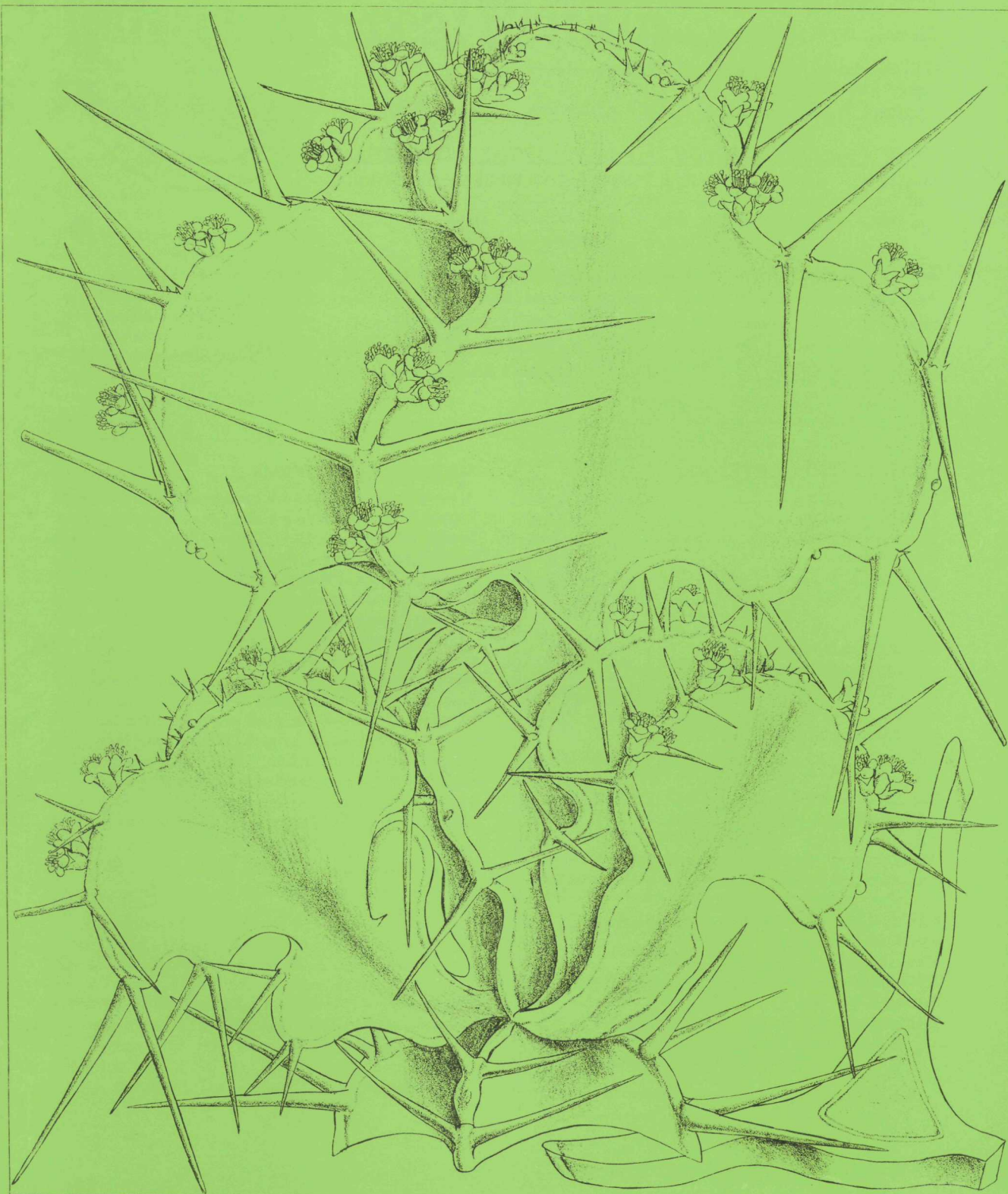
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Volume 44/Number 3
September 1982

The Cactus and Succulent Journal of Great Britain



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BACK VOLUMES

The following are out of print: Vols. 1-20, 22, 23, 34, 37. A few copies of Vols. 21, 24-33, 35, and 36 are still available price £3 per volume, post free. Recent volumes are also available as follows:

Vols. 38, 39, 41, 42, per volume		£5.00
Vol. 43		£6.50
Vols. 24-30 as a set, incl. index		£15.00
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Applications for membership, advertising, back volumes and indexes should be made to the following address:

Cactus & Succulent Society of Great Britain
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Cheques, etc., should be made payable to the Society and not to individual officers. When remitting in a currency other than sterling, please add the equivalent of £0.70p to cover currency negotiation charges.

Cover illustration: *Euphorbia grandicornis* Goebel ex N. E. Br., from the illustration by Matilda Smith for Hooker's *Icones Plantarum*, t.2531 (1897).

The Journal is published quarterly by the Society
This issue price £1.50 (ISSN 0007-9375).

The Cactus and Succulent Journal of Great Britain

Volume 44 Number 3 September 1982

edited by David Hunt and Nigel Taylor

In this issue

The genus <i>Pterocactus</i>	51
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Merger approved

An overwhelming majority of members (of both Societies) who responded to the Merger Ballot were in favour of the amalgamation, the figures for the CSSGB voting being: Votes cast, 334; in favour of merger, 318; against, 16. As to the name of the new Society, 'The British Cactus and Succulent Society' was preferred by members of both Societies by a substantial margin.

The merger proposals are now considered ratified, and representatives of the two Societies will have met by time this is published to set up a steering committee and work out practical arrangements. Your subscription to the new Society and Journal, and optional subscription to the new Yearbook, will be invited in our final issue as a separate Journal, scheduled for early December.

The Council of The Cactus and Succulent Society of Great Britain, with the authority vested in it under Rule 13, will formally transfer the assets of the Society into the British Cactus and Succulent Society from the date of inception of that Society.

Journal Index

An annual index to the Journal was last published with Volume 25 (1963). Subsequently, mimeographed indexes were produced by Mr G. G. Leighton-Boyce for Volumes 26-30 (1964-68) and 31-37 (1969-75). An Index for Volumes 38-44 is now being prepared by our Swiss member, Mr Urs Eggli, and we hope to make an announcement about this in the next issue.

As this will be the last year of publication of this Journal and of the The National Cactus and Succulent

Journal, Mr Eggli is also preparing indexes to the complete run of both publications, to be issued in due course.

IOS meets in Vienna

The International Organization for Succulent Plant Study held its XVIIth Congress at the Horticulture School of the Palace of Schönbrunn, Vienna, on 22-28 August. The Congress was opened by the Austrian Minister for Agriculture and included seminars for those actively working in various fields of succulent plant research, public lectures, excursions etc. At the members' business meeting, changes to the rules regarding membership were made. Sections reflecting the scientific and technical interests of active members were established together with a category of associate membership for persons wishing to support IOS or attend its

THE CACTUS AND SUCCULENT SOCIETY OF GREAT BRITAIN ANNUAL SHOW

SATURDAY 16 OCTOBER 1982
at St. Saviour's Hall, St. George's Square,
Pimlico, London, S.W.1.

PROGRAMME

<i>Latest Date for Entries:</i>	13 October
<i>Staging of Exhibits:</i>	9.15-10.45 a.m.
<i>Hall cleared for Judging:</i>	10.45 a.m.
<i>Show Open:</i>	11.00 a.m.
<i>Draw and Presentation of Awards:</i>	5.15 p.m.
<i>All Exhibits must be cleared by:</i>	6.30 p.m.
<i>Admission 25p (OAPs and children 10p);</i>	
<i>FREE to members entering 5 or more classes.</i>	

Refreshments, Plants and Seeds, Society Goods, on sale. Tombola and Grand Draw.

Show Schedules from the Hon. Show Secretary, D. Bowdery, 14 Callander Road, London, SE6 2QD (tel. no. 01-698 3186) or Hon. Publicity Officer, Mrs. J. Ellis, 6 Buxton Crescent, North Cheam, Sutton, Surrey, SM3 9TP.

meetings but not actively engaged in research. The coveted 'Cactus d'Or' was awarded (*in absentia*) to Gordon Rowley.

Amongst the lectures, the highspot was Dr Gerald Barad's exposition of pollination mechanisms in the *Stapelieae*, illustrated with exceptionally fine colour macro-photography. The seminars or working sessions focussed on advances in seven fields of interest: A. Taxonomy of N. American Cactaceae (led by Dr Beat Leuenberger); B. Taxonomy of S. American Cactaceae (Dr Heimo Friedrich); C. Taxonomy of 'other' succulents (Dr Heidi Hartmann); D. 'Microscopy' (SEM studies, anatomy, palynology and cytology, led by Prof. Dr Wilhelm Barthlott); E. 'Ecophysiology' (ecology, physiology and related disciplines, led by Dr Benno Eller); F. Cultivation (Dieter Supthut); and G. Conservation and Reserve Collections (David Hunt).

A day excursion was made to the Linz Botanical Garden, where there is a notable collection of *Gymnocalycium*, and the Congress also visited the extensive collections of succulents, not on view to the public, which are grown at Schönbrunn under the care of Ernst Zecher, the Chairman of the Congress Organizing

Committee. The Schönbrunn collection must now rank as one of the finest in Europe.

The new President of IOS is Professor Werner Rauh, with Hernando Sanchez-Mejorada as Vice-President. Under the new rules, the various 'sectional coordinators' are 'ex-officio' members of the committee, and will assist the officers (David Hunt, Secretary; Heidi Hartmann, Asst. Secretary; Dieter Supthut, Treasurer) to keep in personal touch with members and plan future Congresses.

The Whitesloanea that wasn't

In our February issue, we gave an illustration of one of the 'living stone' stapeliads, a specimen sent to Kew from Somalia in response to a request to look out for *Whitesloanea crassa*. Wishful thinking that it might indeed be *Whitesloanea* soon gave way to a much stronger suspicion that it was actually *Pseudolithos cubiformis*. Sure enough, the plant has now produced two inflorescences, proving that suspicion correct and leaving *Whitesloanea crassa* on the 'Missing, presumed extinct' list.

9th Convention of Australian Cactus & Succulent Societies, Sydney, New South Wales, 20-22 April 1984

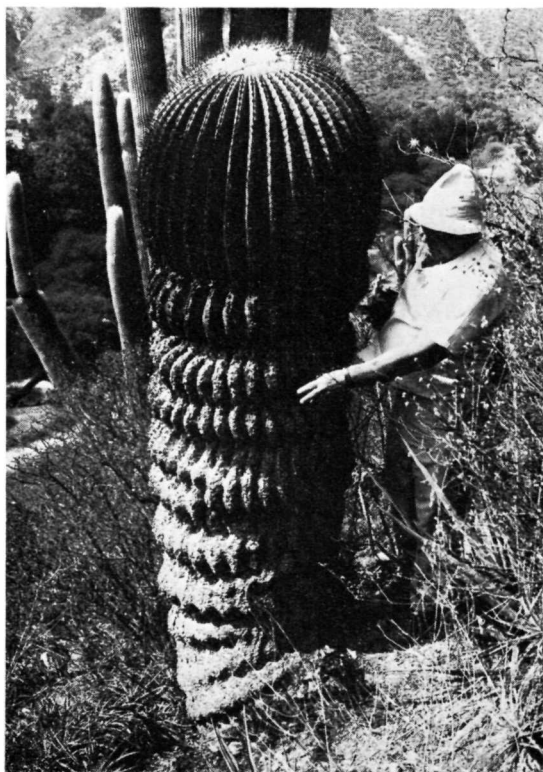
Convention Secretary Mrs. Mary Gilje has written to issue an invitation to members of CSSGB to attend the convention, which will be held at Macquarie University about 15 km from the centre of Sydney. She says: 'Although 1984 seems a long way off, most of us plan overseas trips in advance and any of your members coming our way at that time would be more than welcome'. Her address is 31 Centennial Avenue, Lane Cove, NSW 2066, Australia.

Can you help?

Ivo Baras (aged 17) asks whether anyone would kindly send him some seeds or literature, or write letters about cacti and succulents to help with the development of his collection and with the naming of his plants. His address is: Ivo Baras, Oko Kmana 39/VI, 58000 Split, Yugoslavia.

Travelling Fellowships

We have been asked to publicize the Travelling Fellowships awarded by the Winston Churchill Memorial Trust, 15 Queen's Gate Terrace, London SW7 5PR, which are 'the chance of a lifetime' for all UK citizens and enable the successful applicants to spend about eight weeks abroad carrying out a project of their choice. Grants are offered in different categories each year and for 1983 these will include gardeners and garden historians, and 'natural history and conservation of local environment'. Application forms (from the above address) must be in by 27 October 1982.



Giants of the cactus world: IOS President Werner Rauh with a venerable *Echinocactus platyacanthus* (*E. ingens*) in the great barranca of Metztitlan, Mexico, March 1980 (photo: Leuenberger)

The genus *Pterocactus*

by Roberto Kiesling*

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This is a genus endemic to the south and west of Argentina. The plants are small with cylindric or globose segments, apical flowers, conspicuous winged seeds and a very thick tuberous rootstock.

Only *P. kuntzei* (= *P. tuberosus* sensu B. & R.) is known in cultivation. Without exception the other species are small gems of nature and merit a place in collections of succulents and also among those of hardy plants and alpinists.

Herbarium material is cited according to the abbreviations in Index Herbariorum, ed. 6 (1974). Additionally, the abbreviation 'RL' refers to the IADIZA herbarium where the collections of Dr. Ruiz Leal are deposited (IADIZA: Instituto Argentino de Investigaciones de Zonas Aridas, Mendoza). For reasons of space, only types and important specimens are listed. A complete list has been prepared and is available in the libraries of the Instituto Darwinion and the Cactus & Succulent Society of Great Britain.

Pterocactus K. Schum. in Monats. f. Kakteenk. 7: 6 (1897).

Roots tuberous, usually large, up to the size of one's fist, from which arise one or more slender underground stems ('necks') ascending to ground-level where they branch into the aerial stems. *Stems* small, globose, cylindric or clavate, not more than 10 cm. long and 2 cm. diam., green, brown or purple, epidermis usually papillate. *Leaves* subulate, small, quickly caducous. *Spines* acicular, subulate or papery. *Glochids* numerous to few or absent. *Flowers* immersed in the apex of the stem-segments, rotate, yellow to reddish, with sensitive stamens. *Fruits* dry, umbilicate, opening, splitting transversely (pyxidial dehiscence), with spines similar to or more developed than those of the vegetative parts. *Seeds* arranged irregularly within the fruit or in some species arranged like the pages of a book, smooth, with three integuments, the outermost (of funicular origin) expanded to form a light brown papery wing, wind-dispersed. Type species: *Pterocactus kuntzei* K. Schum.

The species of this genus are confined to Argentina, occurring throughout Patagonia and in the west of the country from Mendoza to Salta. They grow in flat or gently sloping sandy or stony soils.

Relationships

Pterocactus belongs to the subfamily Opuntioideae, as is shown by the structure of the flowers and seeds and the

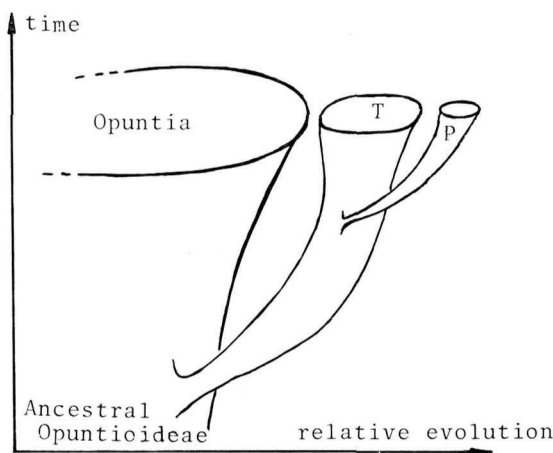
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presence of glochids. They are plants with very remarkable adaptations: the big tuberous root, underground shoots adapted to terrain with shifting sands, short-lived aerial stems, flowers immersed in the shoots, wind-dispersed winged seeds and fruits which open like a box with a hinged lid. All these specializations lead me to believe that we are dealing with a highly evolved genus*.

The most closely related genus, in my opinion, is *Tephrocactus* whose species have very similar pollen and seeds with a very well-developed aril (though not wing-like), roughly similar to those of *P. hickenii*.

Marenopuntia, from Mexico, a genus with one species only (*M. marenae* (Parsons) Backeb.), closely resembles *Pterocactus*, but the similarity is superficial due to what is called 'convergent evolution'. Without doubt, this species is derived from *Cylindropuntia*.

The following diagram will clarify my idea of the origin of *Pterocactus* (T = *Tephrocactus*; P = *Pterocactus*):



*This is exactly contrary to the view recently expressed by H. Friedrich in this journal (CSJGB 41(3): 67-69, 1979), who maintains that this is a very primitive genus derived from *Maihuenia*. This is based on the flower being inserted at the apex of the shoots. To me, this same feature proves the contrary, since cacti belong to the order *Centrospermae* whose members generally have pedunculate flowers. The *Cactaceae* would have been derived from a primitive group of *Centrospermae* involving a process of *reduction* and the loss of peduncles, branches and leaves (for which reason we consider that *Pereskia* is the most primitive genus in the family, since it has peduncles, branches and normal leaves).

Distribution

Pterocactus occurs in the phytogeographical provinces known as Patagonian and the Monte. *P. kuntzei* has the widest distribution: it corresponds to the whole of the Monte area. On the western edge of this province are the endemic species *P. megliolii*, *P. reticulatus* and *P. gonjianii*. Further south, in the northwest of the Patagonian province (District of La Payunia), *P. fischeri* occurs in some abundance and more rarely *P. araucanus* is encountered. In the south of the Patagonian Province, over a wide area, there is *P. australis*. *P. hickenii* is more scarce. *P. valentinii* has only been collected a few times, making its exact distribution and its characters, uncertain.

These plants are fairly abundant but difficult to find because of their colour and shape. Furthermore, in winter the aerial parts dry up and break off. The wind carries seeds far away, so that very often the specimens found are isolated. Other times they grow in small colonies.

Climate

The Patagonian Province has a dry cool-temperate climate. Frosts occur for the majority of the year and snow falls in winter. Depending on the latitude, the mean temperature varies from 7° to 13°C (with a mean annual minimum of 1.7° to 6°C and a mean annual maximum of 12° to 22°C, absolute minima of -5° to -24°C and absolute maxima of 29° to 39°C). Rainfall is very irregular, fluctuating between 120 mm. and 270 mm. per annum; usually it is distributed uniformly throughout the year (in some localities slightly more in winter and in others in spring).

The Monte Province, more than 2000 km. from north to south, is subject to very extreme temperatures. The mean temperatures range from 13° to 17°C (mean minimum 7° to 10°C; mean maximum 20° to 27°C, absolute minima -8° to -13°C and absolute maxima 29° to 39°C). The rainfall is predominantly in summer and very light, 80 mm. to 260 mm. per annum, and is rapidly lost thanks to the high spring temperatures and soil structure.

Cultivation

The cultivation of these plants is easy. Rooting is by placing the tuberous root on the soil or partly burying it, or doing the same with stem-segments. The plants should get bright sun and cold, dry conditions in winter. Without these conditions the form of the shoots and the number and size of the spines changes completely. In winter, the aerial shoots break off, and this also sometimes happens in cultivation.

Etymology

The generic name is derived from the curious form of the seed (Greek, *pteron*, a wing).

Key to species

1. Central spines flat (everywhere or only the upper part of the shoot):
 2. Stem-segments globose or obpyriform; central spine thick1. ***P. australis***
 2. Stem-segments cylindric; central spines papery2. ***P. fischeri***
1. Spines terete:
 3. Stem-segments globose or obpyriform, sometimes some elongate:
 4. Spines sparse, less than 5 mm. long; not covering the stem:
 5. Fruits apical3. ***P. araucanus***
 5. Fruits lateral4. ***P. reticulatus***
 4. Spines very dense, 4-15 mm. long, covering the stem:
 6. Spines 4-5 mm. long, yellow, bristly5. ***P. valentinii***
 6. Spines 10-20 mm., brown or black (rarely yellow), stiff6. ***P. hickenii***
 3. Stem-segments cylindric:
 7. Plants very spiny, with uniformly-coloured epidermis:
 8. Areoles very woolly; spines less than 2 mm. long7. ***P. megliolii***
 8. Areoles not woolly; spines more than 4 mm. long5. ***P. valentinii***
 7. Plants not very spiny (rarely very spiny); epidermis brown or violet with darker stripes below the areoles:
 9. Stem tuberculate8. ***P. gonjianii***
 9. Stem not tuberculate9. ***P. kuntzei***

Enumeration of species

1. ***P. australis*** (Weber) Backeb. in Desert Plant Life 22(10): 17 (1950).

Opuntia australis Weber in Bois, Dict. Hort., 896 (1899) (description completed in Bull. Mus. Hist. Nat. Paris 10: 398. 1904). Type not known to have been preserved.

Stems formed of obpyriform segments superposed, 1-1.5 cm. diam. and a little longer than this (up to 8 cm., according to the original description), greenish-brown to purple. Central spines 1-2, developing only at the apices, upward-pointing, 2 cm. long, thick, flattened, whitish to brown or blackish. Radial spines 10-15, 3-4 mm. long, white; glochids few and inconspicuous. Flowers yellow and somewhat pink to brown, 2-3 cm. diam. Receptacle with areoles similar to those of the stem and spines somewhat more developed. Outer perianth-segments with small, slender, cylindric, axillary spines. Fruits with the areoles caducous when ripe; seeds 4-6 mm. diam. (3 mm. without the small wing), 1 mm. thick.

Grows in the provinces of Santa Cruz and Chubut, on sandy or stony hillsides, including amongst stones near the coast. It is the most southerly-occurring species of cactus. The type locality is south of the Rio Santa Cruz. I did not find the holotype in the Museum of Natural History, Paris, where Weber's herbarium is preserved.

2. ***P. fischeri*** Britton & Rose, The Cact. 1: 31 (1919). Type: Rio Negro, 1914, W. Fischer (NY!).

Stem-segments cylindric unbranched, up to 10(-15) cm. long, 1-1.5 cm. diam., tuberculate, greenish-brown. Spines numerous. Central spines about 4, sometimes only developed in the upper

part of the stem, 1-3(-5) cm. long, subpapyraceous, brown to black with base and tip yellowish, usually basipetal. *Radial spines* 12 or more, 6 mm. long, setaceous, whitish; *glochids* numerous, 3-4 mm. long, yellowish. *Flowers* c. 2.5 cm. diam., coppery yellow to clear brown or purple. *Stamens* yellow. *Style* pinkish, fusiform; *stigma* 4-lobed. *Fruits* in the apex of the segments, 2-2.5 cm. diam., strongly tuberculate with areoles similar to those of the stems, well developed; *seeds* with well-developed but incomplete wing, 6-9 mm. diam. (4 mm. without the wing) and 2 mm. thick.

From the low and dry zones of the south of Mendoza, Neuquén and Rio Negro; there is also a specimen from Peninsula Valdez in Chubut.

P. fischeri is very close to *P. australis*, both having flattened central spines and a similar arrangement of the spines in the areole. They are differentiated by the characters given in the key, by the presence of numerous glochids in *P. fischeri* (almost non-existent in *P. australis*), by the number and direction of the central spines (c. 4, basipetal in *P. fischeri* and 1-2 in *P. australis* covering the apex). The seeds of *P. australis* have a rudimentary wing whereas that in *P. fischeri* is more developed.

3. ***P. araucanus*** Castellanos in Rev. Fac. Cienc. Agr. Mendoza 8(2): 6 (1964 ['1960-61']). Type: Chubut, small mesas near the Rio Hualojaina, 14 Feb. 1945, Castellanos 16812, said to be deposited at the Instituto Lillo (LIL) but actually in the Museo de Ciencias Naturales de Buenos Aires (BA, preserved in spirit).

Stem-segments globose to obpyriform, superposed, 3-4 cm. long, 1-1.5 cm. diam., greyish-brown. *Spines* c. 8, 3 mm. long, pectinate adpressed, somewhat arched over the stem, yellowish or thickest black with yellowish tip. *Flowers* c. 4 cm. diam., opaque, red-brown. *Stamens* and *style* yellow. *Fruits* globose, not very umbilicate, 2 cm. diam., with areoles and spines like those of the stem but the spines longer, 5-7 mm.; *seeds* discoid, irregular, 4-9 mm. diam. (3-6 mm. without the wing) and c. 2 mm. thick, with irregular very wavy wing.

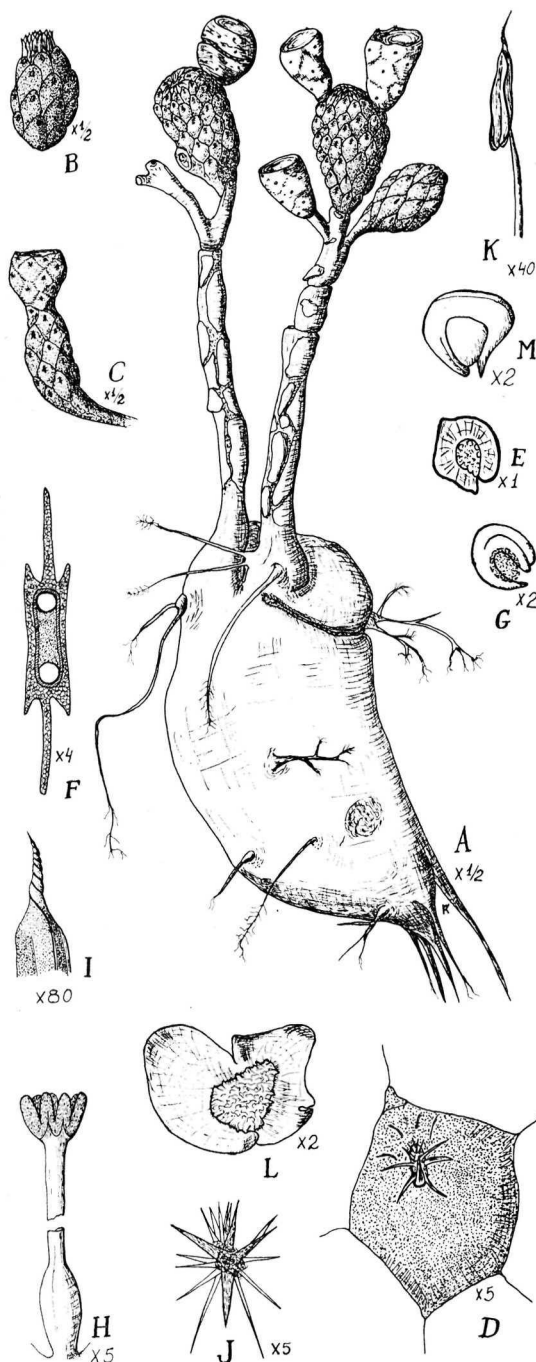
Grows on the plains of Neuquén, the west of Rio Negro and northwest of Chubut.

The structure of the areole indicates that it is related to *P. hickenii*.

4. ***P. reticulatus*** Kiesling in Bol. Soc. Argent. Bot. 14(1-2): 144 (1971). Type: San Juan, dpto. Iglesia, Llanos de la Patria, Kiesling 56 (LP, holo.; SI, iso.).

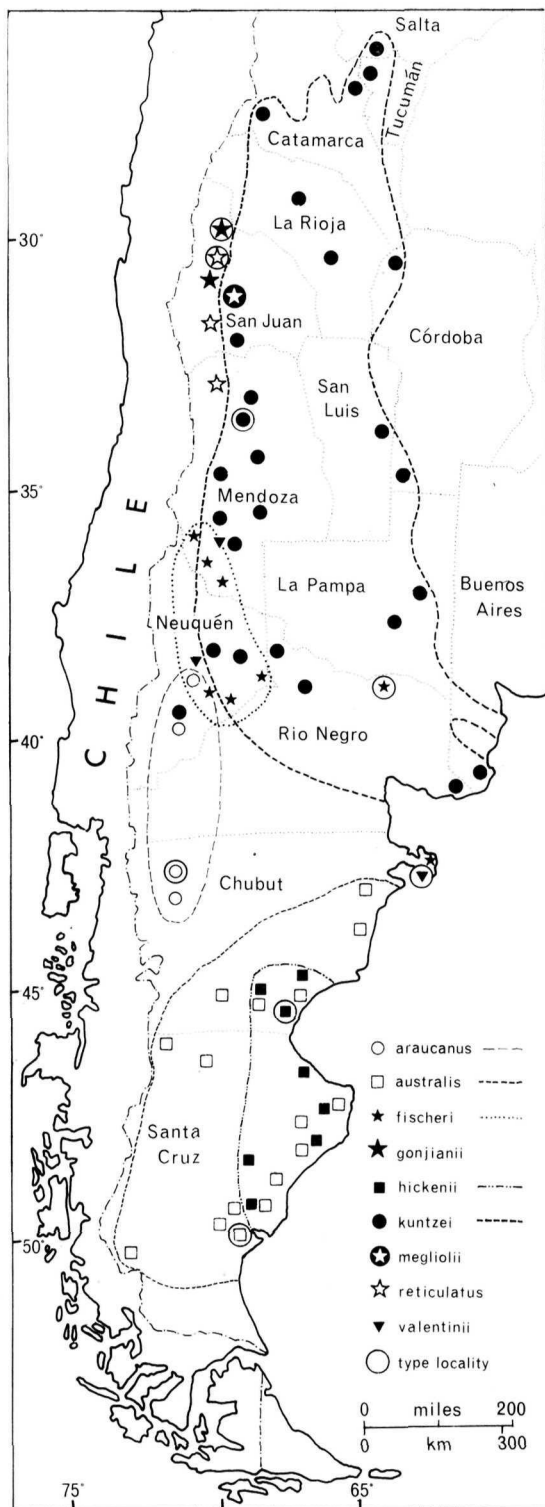
Stem-segments pyriform to globose, 2-3 cm. long, 1-2 cm. diam., greyish-purple or brown to olive-green, unbranched, with conspicuous rhomboid tubercles. *Central spine* 0-1, erect, *radials* c. 6, pectinate, all 2-5 mm. long, whitish to brown; *glochids* few, inconspicuous. *Flowers* apical, 4-5 cm. diam., pearly white, lightly tinged pink. *Style* short, thick, white; *stigma* 5-9 lobulate, dark red, very papillose. *Fruits* dry, lateral by the growth and tapering of the stem after flowering, globose to obconic, 2-2.5 cm. diam., umbilicus almost flat, dehiscence transverse; *seeds* with regular wing, c. 1 cm. diam. (4 mm. without the wing) and 1-2 mm. thick.

In the wild, flowers appear between December and February opening for a few hours after mid-day only for 2-3 days.



Figs. A-G, *Pterocactus reticulatus*: A, fruiting plant; B, stem-segment with closed flower; C, stem and fruit, with beginnings of neck formation; D, tubercle and areole; E, seed; F, diagrammatic section of seed showing (from outside to inside), the spongy outer integument, the dark inner integument (cross-hatched), the embryo (unshaded) and the endosperm (dotted); G, embryo and endosperm.

Figs. H-M, *P. meglii*: H, style and stigma; I, apex of stamen; J, areole (drawn without wool); K, stamen; L, seed; M, embryo with endosperm. Drawn by the author.



Argentina: Distribution of *Pterocactus*

It grows in the valleys of Calingasta (San Juan) and Uspallata (Mendoza) between 1500 and 3000 m.s.m. in full sun, on clayey soils covered with pebbles and swept daily by the wind. *P. gonjianii* and *Austrocylindropuntia clavarioides* grow with it.

5. ***P. valentinii*** Spegazzini in An. Soc. Cient. Argent. 48: 51 (1899).

P. pumilus Britton & Rose, The Cact. 1: 32 (1919).

Types: see below.

Tuberous roots relatively small, 2–4 cm. long, 1–2 cm. diam. *Aerial stem-segments* little branched, cylindric, 4–8 cm. long, 1–1.5 cm. diam., green. *Spines* 25–30, 4–5 mm., radiating, hyaline. *Flowers* yellow to coppery. *Fruits* c. 2 cm. diam., yellowish-pink, with spines like those of the vegetative parts or with several additional flat, papery centrals.

In the original description, Spegazzini mentions two collections, the first not encountered amongst herbarium material examined and surely not extant, the second (Valdez, Lahille, LPS 23189) I designate as *lectotype*. The type of *P. pumilus* B. & R. is from the same locality: Peninsula Valdez, Pto. Piramides, 8 Jan. 1914, *Hicken* (& *Haumann*) 3286 (SI, isotype!; NY, holotype, not seen), clearly showing that it is the same species.

This species is little known. In addition to those mentioned from Chubut (Peninsula Valdez), I have seen two other specimens from the south of Mendoza and one from Neuquén. Some of the specimens cited by Castellanos are, in my opinion, depauperate plants of *P. fischeri*.

P. valentinii is well-differentiated from all the other species by its very numerous radiating spines with no difference between radial and central.

6. ***P. hickenii*** Britton & Rose, The Cact. 1: 31 (1919).

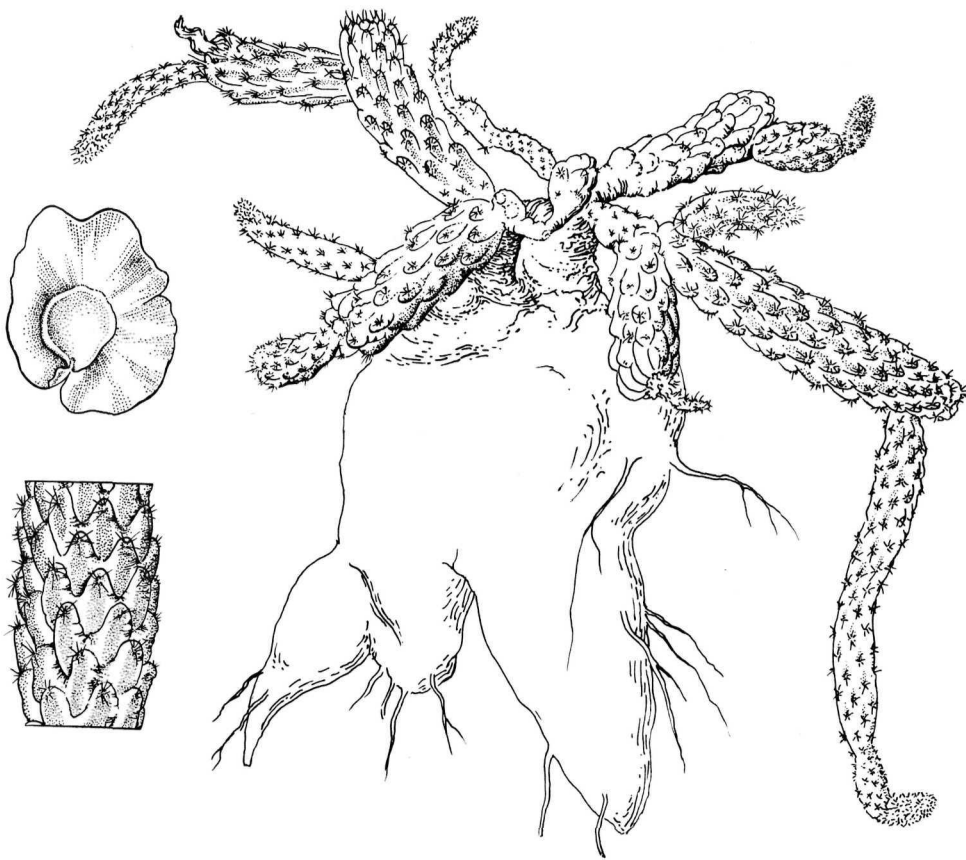
Type: near Comodoro Rivadavia, 10 Jan. 1914, *Hicken* (& *Haumann*) 3281 (NY, holo., SI, iso.).

Roots enlarged, composed of several narrow-necked segments. *Stem-segments* globose to cylindroid, short, 2–3(–5) cm. long and 1 cm. diam., completely covered with spines. *Spines* very numerous, c. 20, 1–2 cm. long, acicular, straight, ± rigid, yellowish with brown base to black throughout; *glochids* numerous. *Flower* separated from the stem by a slight narrowing at the base of the ovary, c. 3 cm. long and 3 cm. diam., with the areoles of the receptacle spiny, similar to those of the stem. *Perianth-segments* broad, c. 2 cm. long and 1 cm. broad, mucronate. *Stamens* numerous, 0.5–1 cm. long; *anthers* narrow, ending in a sharp point. *Style* cylindric, c. 2 cm. long; *stigma* with about 5–6 short, obtuse, papillate, violet-red lobes. *Fruit* not described. *Seeds* c. 7 mm. diam. (5 mm. without the wing) and 1.5 mm. thick, with narrow incomplete wing.

Found in the east of Chubut and Santa Cruz.

7. ***P. megliolii*** Kiesling in Bol. Soc. Argent. Bot. 14(1–2): 111 (1971). Type: San Juan, dpto. Zonda, on the way to Maradona, 24 Mar. 1971, *Volponi* 157 (LP).

Tuber up to 15 cm. long and 5–8 cm. diam. *Underground stems (necks)*, 1–8 cm. long, cream-coloured. *Aerial stems* c. 5(3–10) cm. long and 0.5–1 cm. diam., rarely articulate, brownish-green. *Areoles* small, crowded, woolly. *Central spines*



Pterocactus gonjianii: Plant, $\times 2/3$; seed, $\times 2$; portion of stem, $\times 1\frac{1}{2}$. Drawn by Christabel King.

usually 4(0-5), light to dark brown. Radial spines 10-20, up to 2 mm. long, adpressed, hyaline; glochids few or lacking. Flowers rotate, 3 cm. diam., yellow. Style cylindric to clavate, 2 cm. long; stigma 8-lobed, wine-red. Fruits dry, slightly thicker than the stems; seeds c. 10 mm. diam. (4 mm. without the wing) and 1 mm. thick.

From the surroundings of the town of San Juan in very dry, sun-drenched places with stony soil or fine sediments, very poor in organic material. The sparse rainfall (c. 80 mm. per annum) is mainly in spring.

8. ***P. gonjianii*** Kiesling, **species nova**; caespitosa radice tuberosa crassa c. 15 cm. longa, 6 cm. diametro, caulibus cylindraccis non vel parce articulatis 5-10 cm. longis, 1-1.5 cm. crassis violaceis, mammillis prominentibus surco 4-6-gonali conspicuo circumdati, areolis circularibus c. 2 mm. diametro copiose albilanoso, spinis 6-10 hialinis vel castaneis, glochidiis numerosis. Flores ad apices ramorum inserti solitarii sessiles rotati c. 3.5 cm. diametro, petalis luteis vel cremeis, stylo cylindrico, stigmatibus 5-lobato viridi vel rubro. Fructus apicalis, siccus, transverse circumscissus, seminibus ∞ , alatis, 5-10 mm. diametro. Holotypus: San Juan, dpto. Iglesia, way to Quebrada of the Agua Negra, c. 2000 m.s.m., Jan. 1971, Kiesling 307 (LP).

Plant caespitose, with thick tuberous root up to 15 cm. long and 6 cm. diam. Underground stems 2-7 cm. long, cream in colour, with a few inconspicuous areoles and branching at soil level. Aerial stems not articulate, cylindric, 5-10 cm. long, 1-1.5 cm. diam., purple; tubercles prominent, rhomboid, c. 4-6 mm. long and broad and 1-2 mm. high, surrounded by a groove. Areoles at the apex of the tubercles, circular, 2 mm. diam., with abundant white wool. Spines 6-10, not differentiated into central and radial, (1-)3-4 mm. long, hyaline to light brown; glochids numerous, 2 mm. long, situated in the upper part of the areole. Flowers inserted in the apex of the stem, rotate, 4-5 cm. diam., outer perianth-segments brown edged cream, inner cream or yellow overall, the larger broadly spatulate, 2.5 cm. long and 1.5 cm. broad, margin slightly serrate. Style cylindric, c. 1.5 mm. long and 2 mm. diam. cream; stigma 5-lobed, green or purple, papillose. Fruits dry, with transverse dehiscence, somewhat broader than the stems, c. 2.5 cm. long, 2 cm. diam., with areoles and spines similar to the vegetative; seeds numerous, with large, regular wing, 5-10 mm. diam. (4-5 mm. without the wing) and 2 mm. thick.

Further material studied: San Juan, dpto. Iglesia, Camino to Quebrada del Agua Negra (type locality), Dec. 1972, *Gonjian* 10 (LP); the same, Tocota, Jan. 1979, *Gonjian* 12 (SI).

This new species occurs in the high valleys of the west of San Juan in the departamento of Iglesia, at 1500-2500 m.s.m., on plains and gentle sloping ground where

the soil is sandy or stony and covered with pebbles. It grows with *P. reticulatus* which it resembles in colour and the tuberculation of the stem; but it is distinguished by the more cylindric shape of the stems, by the number, nature and disposition of the spines, by the numerous long glochids, by the colour of the flowers and especially by the apical fruits. The similarity to *P. reticulatus* has made me delay the publication of this species in order to prove by means of cultivation and repeated observation in habitat that they are different species. In the original locality both species are found but only very rarely intermediate forms, possibly hybrids or abnormal specimens.

P. gonjianii is also allied to *P. kuntzei*, a species from which it differs in the stem being divided into more or less isodiametric tubercles surrounded by a groove (tubercles very elongate with decurrent marks in *P. kuntzei*); by its spines (number, nature and disposition) and by its much larger and somewhat differently coloured flowers.

I dedicate this species with much pleasure to my friend Barkev Gonjian, outstanding collector of cacti who has known and grown this species for several years and whom I thank for the valuable information about it.

9. ***P. kuntzei*** K. Schumann in Monatsschr. Kakt. 7(1): 6 (Jan. 1897); in Engler & Prantl, Nat. Pflanzenfam. Nachtr., 259 (Oct. 1897), and in Gesamt. Kakt., 753, fig. 107 (1898). Type: Paso Cruz, 1150 m.s.m. O. Kuntze (B†).

P. decipiens Guerke in Monatsschr. Kakt. 17(10): 147 (1907). Syntypes: La Rioja, Paganzo; Mendoza, Puesto Lima, Bodenbender (comm. Kurtz).

[*P. tuberosus* Britton & Rose, The Cact. 1: 32 (1919), non *Opuntia tuberosa* Pfeiff. (species dubia, vide infra)].

KEY TO FORMS OF *P. KUNTZEI*

- 1. Stem-segments 8–15 mm. diam. f. **kuntzei**
- 1. Stem-segments 5–8 mm. diam. f. **lelongii**

f. **kuntzei**

Aerial stems cylindric, 7–13(–20) cm. long and 8–15 mm. diam., brown or greenish-brown, with a vertical violet line below the areoles. *Spines* 8–12, small 0.5–1 cm. long, whitish. *Flowers* 3(–5) cm. diam., dirty yellow (somewhat brown) to coppery. *Style* cylindric, c. 2 cm. long; *stigma* 6–8-lobed, pink to dark red, occasionally green, cavity of ovary cylindric or fusiform, c. 1–1.5 cm. long and 4–5 mm. diam. *Seeds* with broad, complete and regular wing 1–1.2 cm. diam. (0.5 cm. without the wing) 2–4 mm. thick, light brown.

P. kuntzei K. Schum. (generic-specific description) was based on collections made by Otto Kuntze in Mendoza at Paso Cruz, alt. 1500 m.s.m., on the road to Chile. Schumann gave a good description and illustration. The holotype is not mentioned in the original description but it was preserved in the Berlin-Dahlem herbarium. Regrettably it was destroyed in the Second World War, together with the greater part of the herbarium. The species grows in the west of Argentina

from S. Salta (Cafayate), W. Tucuman (Amaicha del Valle), Catamarca, La Rioja, W. Cordoba, San Juan, Mendoza, La Pampa, N. Neuquén, N. Rio Negro and extreme S. Buenos Aires, between 500–1500 m.s.m. It flowers between December and March. It inhabits sandy, sometimes a little saline, soils. There are chromosome counts for this species (2n=22, 44 and 66) indicating the existence of diploid, tetraploid and hexaploid forms.

f. **lelongii** Ruiz Leal ex Kiesling, **forma nova**; a f. *kuntzei* habitu magis ramoso, ramis gracilioribus, floribus citrinis stigmatibus viridibus differt. Holotypus: Mendoza, dpto. La Paz, environs of Villa La Paz, 5 Dec. 1948, Ruiz Leal 12017 (RL).

Differs from f. *kuntzei* by being more branched with more slender branches only 5–7 mm. diam., and by the lemon-yellow flowers with green stigma.

Further material studied: Mendoza, dpto. Junin, Alto Verde, 820 m.s.m., very common on sandy soils, 13 Jan. 1948, Ruiz Leal 3828 (RL), San Juan, dpto. Sarmiento, Media Agua, Meglioli s.n. (cultivated).

This form occurs in the NE. of Mendoza (deptos. of Junin and La Paz) and the S. of San Juan (depto. Sarmiento), between 400 and 900 m.s.m. It grows with f. *kuntzei*, so the rank of form rather than variety or subspecies seems appropriate.

At a time when we mourn the recent death of Dr. Adrian Ruiz Leal, botanist of Mendoza and indefatigable collector of the flora of that province, I have the pleasure of dedicating this form, in accordance with his wish, to Sra Herminia Lelong de Castellanos, wife and collaborator of Dr. Alberto Castellanos.

INSUFFICIENTLY KNOWN SPECIES

Opuntia tuberosa Pfeiffer

O. tuberosa was described, (no doubt from plants sent by J. Gillies) from a species from Mendoza. The description is short and one cannot say whether it applies to *P. kuntzei* or *P. reticulatus* both of which grow in the same province. It is very unlikely that a type exists which would permit its identification and it must therefore be considered a name of doubtful application (nomen dubium).

Pterocactus kurtzii K. Schum. in Engl. & Prantl, Nat. Pflanzenfam. Nachtr. 259 (Oct. 1897) (as *kurtzei*) was a nomen subnudum, since the author only mentioned it as a second species of the genus more than twice as large as *P. kuntzei* and in flower. It was sent from Tucuman by F. Kurtz. Britton & Rose placed it in the synonymy of '*P. tuberosus*' and may have assumed it to be merely a variant spelling of *P. kuntzei*, saying 'we have not seen the type of *P. kuntzei*, which is doubtless at Berlin, but have examined co-types in the Kurtz Herbarium at Cordoba, Argentina and at New York'. The latter may, however, represent the Kurtz collection rather than that of Kuntze.

What is a Stapeliad Genus?

by Colin C. Walker

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The Question

This question was prompted during the recent preparation of a review of a monograph of *Cynanchum* subgenus *Mellichampia* (Sundell, 1981). Although Sundell was primarily concerned with American members of *Cynanchum* which are tropical and subtropical perennial, herbaceous, twining vines, some of his discussion on 'history and generic relationships' is pertinent to the genus-concept within the succulent Stapeliads. The question came to mind particularly in regard to the current trend for splitting Stapeliads into ultra-fine genera, as initiated by Leach (1975).

Although no one has yet satisfactorily defined what precisely a genus is (witness the IOS meeting on the subject held at Kew in March 1976; see Rowley, 1976), we can at least compare generic revisions in the *Stapeliaceae* with those in other areas of the *Asclepiadaceae* to see whether they are out-of-step or in line with the general trend. Surely within a given family there ought to be some consistency with which the concept of a genus is applied?

Historical Review

Our story starts with Linnaeus (1737, 1753) who described the genus *Stapelia* with only two species: *S. hirsuta* L. and *S. variegata* L. The next major work was Masson's 'Stapeliae Novae' of 1776 in which 41 species were described and illustrated, 37 of which were previously undescribed. All of these, however, were still contained within the single genus *Stapelia*. Other species were steadily added to the list, notably by Jacquin in the period 1806-1819.

The first major split of the genus was produced by R. Brown (1810) who separated the family *Asclepiadaceae* from the *Apocynaceae*. He divided the Stapeliads into four genera: *Stapelia*, *Huernia*, *Piранthus* and *Caralluma*, primarily on differences in the corona. His work was to set the pattern and concept of the genus until 1975. Haworth followed quickly in Brown's footsteps and in 1812 published the 'Synopsis Plantarum Succulentarum' with a 'Supplementum' in 1819, adding several new genera: *Gonostemon*, *Podanthes*, *Tridentea*, *Tromotriche*, *Orbea*, *Obesia*, *Duvalia*, *Pectinaria*, and *Caruncularia*. Some of these were later reduced to sections of *Stapelia*, primarily by Bentham & Hooker (1873).

So genera were based on differences in the corona, until N. E. Brown (1890) who was '... in favour of uniting most of the forms under the two genera *Stapelia* and *Caralluma* which, although containing (in the sense

that I understand these genera) a heterogeneous assemblage of species in each case, yet in most cases are seen to be bound together by evident relationship with one another, when all the species, described and undescribed (of which there are many), are passed in review'. He was of the opinion that the corona was infinitely variable and argued against splitting *Stapelia* and *Caralluma*: 'If the various forms be not so grouped under these two genera, then a large number of small and often monotypic genera would have to be made, especially if the coronal structure is made the basis of classification as hitherto, and taking each variation as of equal generic value. Such genera would be very unnatural, and would be rather a hindrance than an aid to the student who wished to determine his plants.'

Brown, however, maintained a few segregates, but was '... of the opinion that some of the genera still retained are more artificial than natural; for instance, *Frerea* and *Trichocaulon* only differ from *Caralluma* in habit, and *Trichocaulon* only differs from *Hoodia* in its corolla, for although some of the species have a different corona, one has a corona indistinguishable from that of *Hoodia*'.

The only complete monograph of the group is the three volume work of White & Sloane (1937). They did nothing to alter the generic concepts established by Brown. They made only two contributions to the list of genera: *Drakebrockmania* was still-born, being a synonym of *Whitesloanea*, and *Luckhoffia*, which is almost certainly an intergeneric hybrid.

The recent generic revisions of Leach (1975, 1978a, 1978b), however, have returned to the system of Haworth. He has been followed by Gilbert (1980) and by Bruyns (1981) in establishing or re-establishing small genera as listed in Table 1. Leach (1978b) has the following to say in support of his generic concept: 'Until the reinstatement of Haworth's *Orbea* (Leach, 1975, 1978) the classification of *Stapeliaceae* has been based almost entirely on floral characters and particularly on those of the corona, while the all important generic facies has been largely ignored.'

'This undue preoccupation with coronal characters has resulted in a most unsatisfactory position, particularly at sectional and genus level, as is evident in numerous examples, a few of which are discussed below. There is no doubt that the confusion is due in no small measure to the extent of variation and convergence to be found in the floral characters throughout the tribe. The outer corona-lobes, which have been most fre-

Table 1. Small genera established in recent revisions of *Stapeliaceae*

Genus	No. of Species	Reference
<i>Orbea</i>	20	Leach, 1975
<i>Orbeopsis</i>	10	Leach, 1978a
<i>Pachycymbium</i>	2	Leach, 1978a
<i>Orbeanthus</i>	2	Leach, 1978a
<i>Tridentea</i>	17	Leach, 1978b
<i>Pectinaria</i>	3	Bruyns, 1981
<i>Ophionella</i>	1	Bruyns, 1981
<i>Stapeliopsis</i>	6	Bruyns, 1981
<i>Duvaliandra</i>	1	Gilbert, 1980
<i>Desmidorchis</i>	2*	Gilbert & Raynal, 1980
<i>Tromotriche</i>	3	Leach, 1982

*This genus will contain perhaps 15-20 species once a full revision has been completed.

quently used in this connection, are particularly subject to wide variations, sometimes to such an extent as to indicate different sections within a single flower.

'Now while vegetative characters have been generally overlooked, particularly in relation to *Stapelia sens. lat.* (some important collections consist almost entirely of loose flowers only), they do, in fact, appear to indicate groupings on a far more natural basis than those based on floral characters.'

Analysis of the Genus Concept

This brief history of the genus concept as applied to the Stapeliads is summarized in Table 2. Note that until recently, description of new genera has lagged behind the introduction of new species, so that the mean number of species per genus has risen more or less steadily. The recent revisions, however, have reversed this trend, so that with current generic concepts there are approximately 30 genera compared with the 20 of White & Sloane's 1937 monograph for about the same number of species.

When 1974 is compared to 1982, the reduction in the number of species is accounted for by the present broader view of the species. This is an interesting point, in that the recent revisions with narrow generic concepts encompass broad concepts of the species. For example, Leach (1978a) includes 22 synonyms under *Orbea variegata* (L.) Haw., and Gilbert & Raynal include 15 under *Desmidorchis acutangula* Decne. This treatment of the species is to be encouraged, but has produced an imbalance when compared to the genus concept. At least Haworth and other earlier workers had uniformly narrow concepts at all levels.

The information for the three years (1937, 1974 and 1982) from Table 2. is shown in Fig. 1., where the numbers of species per genus are plotted against the numbers of genera. There is general agreement for all three graphs with the logarithmic series for the size of genera in plant families, as described by Clayton (1972), showing that generally small genera are preferred by taxonomists, and that large genera are disliked.

The patterns for the years 1937 (White & Sloane) and 1974 (Jacobsen) are very similar, showing that the significant increase in the number of species (22%) over this period has been readily accommodated, with little change, into the existing generic system. The pattern for 1982, however, shows a prominent move to the left of the graph with the trend for small genera (some of which are listed in Table 1.). This latest pattern must, however, be seen as only a provisional one, since revisions for several genera are not yet complete (see legend to Table 2.). This trend towards small genera leaves only *Huernia* at present with more than 30 species. The recent change in direction for the genus concept in the *Stapeliaceae* has pushed the genus considerably closer to that of the species. This trend will undoubtedly continue as there are several anomalous species still to be split away from *Caralluma sens. str.*, so that the estimate of 29 genera for the group based on current generic concepts is perhaps slightly conservative. This is the major fault of narrow concepts—each new combination of characters will not fit into the system, so that a new genus is required and the inflation continues. So what N. E. Brown (1890) warned against is taking place—the classification is becoming unstable.

Table 2. History of the Stapeliad Genus Concept

Date	Authority	No. of Species	No. of genera	Mean no. of species per genus
1753	Linnaeus	2	1	2.0
1796	Masson	41	1	41.0
1810	Brown	22	4	5.5
1812 and 1819	Haworth	103	12	8.6
1873	Bentham & Hooker	120	11	10.9
1897	Schumann	170	13	13.1
1904 and 1909*	Brown	260	13	20.0
1910	Berger	225	14	16.0
1937	White & Sloane	367	20	18.4
1974	Jacobsen	447	22	20.3
1982†	Leach <i>et al.</i>	350	29	12.1

*Slightly incomplete, since these two works are regional floras covering South and Tropical Africa, so the Arabian and Indian species are excluded.

†The current position is an extrapolation from the work of Leach (1975, 1978a, 1978b), Gilbert (1980), Gilbert & Raynal (1980) and Bruyns (1981). This assumes that names such as *Stapelia* and *Caralluma* will be applied in their strictest sense and that other segregates such as *Desmidorchis* and *Quaqua* will contain species previously classified in these larger genera. Since revisions of *Stapelia*, *Caralluma* and *Huernia* are as yet incomplete, the numbers of genera and species are only approximate. Further monotypic or small genera may be required if the present narrow concept of the genus is continued to be applied, to accommodate 'anomalous' species such as *Caralluma bredae* R. A. Dyer and *C. rogersii* Bruce & Dyer.

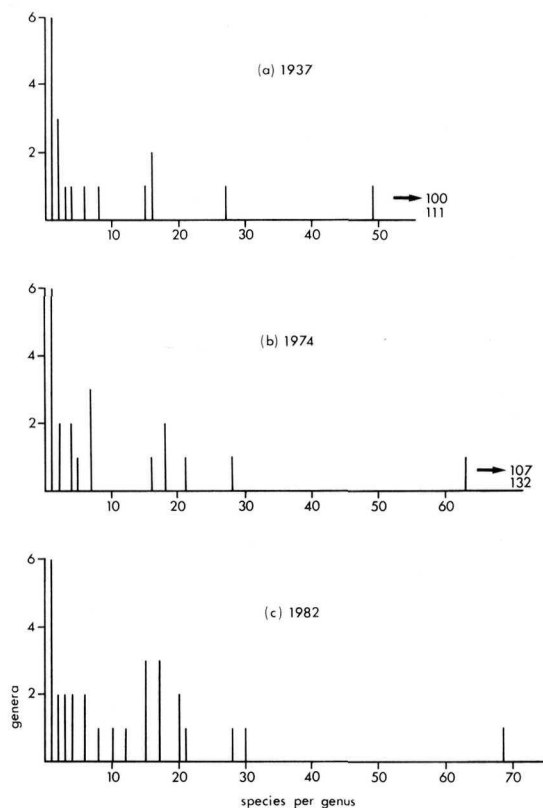


Fig. 1. Size distribution for Stapeliad genera. **1a**, 1937, data from White & Sloane (1937); **1b**, 1974, data from Jacobsen (1974); **1c**, 1982, data determined as described in the legend to Table 2.

Table 3. Generic Revisions of Asclepiads (excluding Stapeliads)

Genus	No. of generic synonyms	Reference
<i>Asclepias</i>	20	Woodson, 1941
<i>Brachystelma</i> *	10	Dyer, 1980
<i>Ceropegia</i>	4	Huber, 1957
<i>Cynanchum</i> *	23	Woodson, 1941
	4	Descoings, 1961
<i>Dischidia</i> *	3	Rintz, 1980
<i>Gonolobus</i>	5	Woodson, 1941
<i>Hoya</i> *	2	Rintz, 1978
<i>Marsdenia</i>	8	Rothe, 1915
<i>Matelea</i>	29	Woodson, 1941
<i>Sarcostemma</i> *	7	Woodson, 1941
	11	Holm, 1950
	3	Descoings, 1961

*These revisions are essentially parts of regional floras, but most cover significant percentages of the genera concerned.

The Asclepiad Genus

How does this ultra-fine splitting of the Stapeliads compare with the situation in the rest of the family? Recent revisions for the *Asclepiadaceae* are shown in Table 3. Unfortunately many genera have only been studied on a regional basis and some, such as *Cynanchum*, require revision on a global scale. However, the overall trend in the family is for larger genera which is clearly at odds with the present position in the *Stapeliaceae*. Woodson (1941) initiated the American strategy of large genera and reduced 97 genera to 9. He had this to say: 'A lifetime would be too short to perfect a complete system of the North American Asclepiads. But after an intensive study of several years, I have arrived at a definition of the genera which I believe may well lead to a more adequate understanding of the complex as a whole.'

'In this group of plants apparent entomophily has produced a floral structure even more complicated and variable than in the Orchids. Morphological details separate species and even varieties here, which would serve to distinguish genera in other groups of Flowering Plants. The student of the Asclepiads is impelled to the defeatist attitude that only two choices are available in classification: to "lump" genera or to "split" them. If he continues the study of Milkweeds sufficiently long, he probably will find himself tossed from horn to horn of the dilemma.'

'After several such harrowing experiences, I have recognized that a narrow concept of coronal structure as a criterion of genera, if pursued consistently, will lead to a multitude of monotypic entities—as a matter of fact, that few genera will consist of more than two or three species—and that each new species will introduce anew the question of generic differentiation.'

It is unfortunate that some areas of the *Asclepiadaceae* have large genera whereas others have predominantly ultra-small ones. A good balance would be achieved if one worker could examine and revise the whole family at once, but this is clearly a mammoth task.

The Answer

I'll conclude the answer to my initial question 'What is a Stapeliad Genus?' with another: Would the single genus *Stapelia* better represent the classification of Stapeliads than the present and growing collection of tiny genera, in view of the broader generic concepts applied to other areas of the family? My answer would be *yes*, it would, because the current trend for minute genera in the *Stapeliaceae* is inherently unstable. Thirty or so genera for a mere 350 or so species seems very excessive, and each new novelty will probably require a new genus, so the inflation continues. Woodson's (1941) plea is a sound one, 'The desideratum of stability and convenience will be served much better in having a few, almost infallibly recognizable genera even though they may be large'. The single genus *Stapelia* for all the Stapeliads, although relatively diverse, would be well

defined and clearly separable from all other Asclepiads. This would compare favourably with other varied genera of the family such as *Ceropegia*, *Cynanchum* and *Asclepias* with approximately 200, 150 and 120 species respectively. In partial support of this notion is the ever-growing list of 'intergeneric' hybrids (see Walker, 1978 & Rowley, 1980 for lists). Clearly the Brownian system for the tribe of two large, poorly-defined genera (*Stapelia* and *Caralluma*) with a number of small but precisely-defined ones is unbalanced and unacceptable. There are then two alternatives—a single all-embracing genus or a large number of tiny genera whose concepts are nearly synonymous with that of the species. I personally prefer the former.

The recent revisions of Leach and others are clarifying the relationships at the species level. These natural affinities could be indicated sufficiently well by the erection of subgenera and sections within the one clearly defined genus *Stapelia*.

References

- BENTHAM, G. & HOOKER, J. D. (1873). *Genera Plantarum*, vol. 2.
- BROWN, N. E. (1890). *Stapeliae Barklyanae*. In Hook. Icon. Pl. 10: 1-13.
- BROWN, R. (1810). On the *Asclepiadeae*, a natural order of plants separated from the *Apocineae* of Jussieu. In Mem. Wern. Nat. Hist. Soc. 1: 12-78.
- BRUYNS, P. V. (1981). A review of *Pectinaria* Haw., *Stapeliopsis* Pillans and a new genus, *Ophionella* (*Asclepiadaceae*). In Cact. Succ. J. Gt. Brit. 43: 61-83.
- CLAYTON, W. D. (1972). Some aspects of the genus concept. In Kew Bull. 27: 281-287.
- DESCOINGS, B. (1961). Notes taxinomiques et descriptives sur quelques Asclepiadees Cynanchees (*Asclepiadaceae*) aphylls de Madagascar. In Adansonia 1: 299-342.
- DYER, R. A. (1980). *Ceropegia*, *Brachystelma* and *Riocreuxia*. In Leistner (ed.), *Flora of Southern Africa* 27(4).
- GILBERT, M. G. (1980). *Duvaliandra*: a new genus of Stapeliad. In Cact. Succ. J. Gt. Brit. 42: 99-101.
- GILBERT, M. G. & RAYNAL, J. (1980). The status and typification of *Desmidorchis* Ehrenb. and *D. retrospiciens* (*Asclepiadaceae*). In Adansonia 19: 319-323.
- HOLM, R. W. (1950). The American species of *Sarcostemma* R.Br. (*Asclepiadaceae*). In Ann. Miss. Bot. Gard. 37: 477-560.
- HUBER, H. (1957). Revision der gattung *Ceropegia*. In Mem. Soc. Brot. 12: 1-203.
- JACOBSEN, H. (1974). *The Succulent Lexicon*.
- LEACH, L. C. (1975). The lectotype species of *Stapelia* L. and the reinstatement of *Orbea* Haw. (*Asclepiadaceae*). In Kirkia 10: 287-291.
- . (1978a). A contribution towards a new classification of *Stapeliae* (*Asclepiadaceae*) with a preliminary review of *Orbea* Haw. and descriptions of three new genera. In Excelsa Tax. Ser. 1: 1-75.
- . (1978b). On the classification of *Stapeliae* and the reinstatement of *Tridentea* Haw. (*Asclepiadaceae*). In Trans. Rhod. Scient. Ass. 59: 1-5.
- . (1982). The reinstatement of *Tromotriche* Haw. (*Stapeliae*). In J. S. Afr. Bot. 48: 425-426.
- LINNAEUS, C. (1737). *Genera Plantarum*, ed. 1.
- . (1753). *Species Plantarum*, ed. 1.
- PLOWES, D. C. H. (1977). *Stapeliad checklist*. In Excelsa 7: 67-86.
- RINTZ, R. E. (1978). The peninsular Malaysian species of *Hoya* (*Asclepiadaceae*). In Malay. Nat. J. 30: 467-522.
- . (1980). The peninsular Malayan species of *Dischidia* (*Asclepiadaceae*). In Blumea 26: 81-126.
- ROTHER, W. (1915). Über die gattung *Marsdenia* R.Br. und die stammpflanze der condurangorinde. In Engl. Bot. Jahrb. 52: 354-434.
- ROWLEY, G. D. (1976). In quest of the genus. In Cact. Succ. J. Gt. Brit. 38: 53-56.
- . (1980). Name that Succulent.
- SUNDELL, E. (1981). The new world species of *Cynanchum* subgenus *Mellichampia* (*Asclepiadaceae*). In Evolutionary Monographs 5: 1-63.
- WALKER, C. C. (1978). Putative natural hybrids amongst the Stapeliads. In *Asclepiadaceae* 13: 11-12.
- WHITE, A. & SLOANE, B. L. (1937). *The Stapeliae*.
- WOODSON, R. E. (1941). The North American *Asclepiadaceae*. In Ann. Missouri Bot. Gard. 28: 193-244.

Decorative or deceitful?

Many members of the UK cactus societies have seen the small cacti on sale in supermarkets, etc. with flowers stuck on. Those we've seen have been 'decorated' with dyed *Helichrysum* ('Everlasting') flowers glued on or pushed in by their stalks, and included (accidentally or on purpose) quite a good fake *Mammillaria guelzowiana* (*M. bocasana*, of course). The plants themselves were not named. The suppliers and sellers mostly take good care, in print of various sizes, to avoid misleading the innocent, but we are expecting to hear of prosecutions brought under the Trade Descriptions Act.

We felt a bit sorry for the *Mammillaria* with its tubercles unable to spread because of the glue, but couldn't work up as much heat under the collar as some people about the 'fraud'. It could be argued that the added flowers are just make-up, a sales gimmick and a nine-day wonder. Most cacti and succulents offered in shops these days are dreary, not to say overpriced, and I have a feeling the fakes will attract more to the hobby than they will discourage. Has anyone got a better marketing idea?

Exine sculpture in pollen of the genus *Leipoldtia* L. Bol.

A contribution towards taxonomic revision of the genus

by Suzanne Dupont and Heidrun E. K. Hartmann

The genus *Leipoldtia*

In the genus *Leipoldtia* L. Bol., 23 species and one variety have been named. Typically, the plants have a shrubby habit, growing either long woody axes or with ascending stems which can recurve to the soil, where they can root. One or two species are procumbent. The genus is characterized by multilocular fruits with cell-wings, large tubercles and additional closing rodlets from the cell roofs. The leaves are elongate, 3–4 times as long as broad, the leaf-pairs scarcely connected at the base, and the lilac or rarely white flowers are aggregated in copious dichasial inflorescences producing a fresh, fruity scent.

Three groups of species can be tentatively recognized:

1. *L. PLANA* complex: Plants procumbent; fruits with prominently elevated centre; leaves slightly compressed and dark green; flowers large with long filamentaceous stamens elongating during anthesis. Two species and one variety described.
2. *L. KLAVERENSIS* complex: Fragile, lax shrubs with thin chestnut-brown axes and fruits of the same colour; leaves yellowish green, shorter and more rounded than those of the other species. One species described.
3. *L. CONSTRICTA* complex: Stems upright or ascending, sometimes rooting adventitiously; fruits grey; leaves greyish green. Twenty species described.

Material and methods

Pollen of 14 populations of known origin (collected in habitat by H.E.K.H.) has been studied; the same plant material has been used for investigations in morphology, etc. Buds were collected from greenhouse cultures at Hamburg and sent to Nantes. The dried pollen was acetolized, coated with gold by cathode sputtering, and examined under a scanning electron microscope 'JSM 2' (at about 25kv, the voltage being adjusted to each preparation). To avoid misinterpretation of artefacts, pollen grains were also examined by light microscope. Measurements of P (distance between poles) and E (equatorial diameter) were taken of freshly acetolized grains. Mean values are based on measurements of 100 grains. Voucher specimens are deposited at HBG.

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Description of exine characters

Pollen grains of *Leipoldtia* are tricolpate and slightly triangular in polar view. The apertures are positioned at the edges and the sides are arched (figs. 1, 5, 9, 10). The exine is usually tectate and perforate, but semitectate or reticulate conditions can also occur; verrucae are present.

Perforations

The size of perforations varies from microperforations of about 0.1 μm (fig. 3) to large pores (up to 0.85 μm , fig. 12). The number of perforations ranges from 20–72 in an area of 5 μm^2 (fig. 11, 12), measured on the mesocolpium. From these two characters, three types of exine can be distinguished:

- P1. Few perforations ($n < 40$); largest diameters (in single grains) 1.2–2.1 μm ; microperforations absent or very scarce (figs. 5, 8, 13). The area of the grain covered by the exine is less than 80%, i.e. it is semitectate (Hartmann 7285, 7304, 7366, and 7310).
- P2. Few perforations ($n < 40$); largest dimensions 0.45–0.85 μm (fig. 6); microperforations numerous (with the exception of *L. plana*, where they are absent). The exine is tectate (perforations less than 20%) and this type possesses the highest values of the genus (Hartmann 7165, 7391, 7864, and 7777).
- P3. Number of perforations higher than in other groups ($n > 55$); longest extension of a single perforation 0.7–0.8 μm (fig. 12); microperforations numerous. The tectate area is 80–90% of the surface of the grain, with a tendency towards lower values. The surface view is intermediate between those of type 1 and type 2 (Hartmann 7415, 7577, 8562).

Except for one population of *L. klaverensis* (7569), all populations can be assigned to one of the groups, but there is no direct correlation between exine types and morphological grouping.

Verrucae

In all populations examined, the exine is ornamented with verrucae, a condition typical for the family Mesembryanthemaceae (Dupont, 1977). In most pollen grains of *Leipoldtia*, the verrucae are 0.3–0.4 μm long, rising from a base of about 3 μm width and tapering into a rounded tip of 0.1 μm diameter (figs. 5–14), which appears rather prominent when viewed from above. Larger verrucae occur in *L. plana*, the basal diameter being 0.9–1 μm , the height reaching 0.4–0.5 μm (figs. 1–4).

The number of verrucae (calculated as mean value on the mesocolpium of $5\mu\text{m}^2$) varies from 20–94 in the material studied. No general correlation between number of verrucae and extent of tectum can be seen, but grains with few and small perforations (type 2) possess the lowest amounts of verrucae ($20 \leq n \leq 40$; fig. 10).

Pollen grains with few but large perforations (lumina), type 1, show a higher density in verrucae ($40 \leq n < 100$; fig. 6). In contrast to these two examples, where the number of verrucae is correlated with the size of perforations, a wide variation in verrucae is found in grains of type 3, with many small perforations ($31 < n < 94$; figs. 11, 12). In addition to the formation of verrucae on the exine, free bacula have been found (fig. 12) in several cases. So far, bacula have been detected in semitectate pollen (P1) mainly, probably, because the high reduction of exine favours the visibility of these bacula; the presence of free bacula seems to be a general feature in the family (Nowicke & Skvarla, 1977; Skvarla & Nowicke, 1976).

The poles

Deviations in exine pattern in the region of the poles are not uncommon and in the material studied two divergent tendencies have been observed: in pollen grains with few, large lumina (P1) larger perforations are often seen in the polar area (fig. 9). In contrast, pollen with many small perforations (type P3) often has a nearly complete tectum in the polar regions (fig. 14). A similar situation can be found in pollen of type 2, where few small pores are formed, thus indicating that the polar features are correlated with the size rather than the frequency of the perforations.

Apertures

Open colpi are only found in pollen of *L. plana* (figs. 1, 3), where the edges are shaped as prominent ridges covered with verrucae. All other populations studied possess closed colpi, at least in their equatorial region (figs. 7, 9, 10, 11, 13), while the polar section of the furrow can be wider, exhibiting a plain nexine (fig. 7). Colpus margins show a reduction in size and number of perforations, and to a lesser degree in the number of verrucae. In both lines of development, the effect depends on the type of tectum found on the mesocolpium. Consequently pollen grains of type 1 possess larger perforations along the edges of their colpi (fig. 11) than pollen grains of type 2 or 3 (figs. 7, 13). It is therefore not surprising to find that the smoothest and most completely tectate form of margin is found in a representative of pollen type 2. The tendency described is less pronounced in members of *L. klaverensis*, this being the only qualitative difference compared with species of the *L. constricta* complex.

Pollen size

Pollen grains of *Leipoldtia* are brevixial, i.e. the distance

between the poles (P) is shorter than the equatorial diameter (E). The ratio P:E varies between 0.94 and 0.96, with the exception of *L. plana* where it is 0.88 (fig. 15). The same species also has the smallest grains amongst the material studied. Further inspection of absolute P and E values shows that the samples of *L. klaverensis* are largest in both dimensions, with members of the *L. constricta* complex intermediate. The variation is, however, continuous, thus offering no support for the morphological groupings.

Taxonomic evaluation

Unlike other succulent families such as the Cactaceae, where palynology has been used for taxonomic purposes (e.g. Leuenberger, 1976), its application in the Mesembryanthemaceae has been limited. Individual taxa have been studied by Mitroiu-Radulescu (1973), Nowicke (1975), Skvarla & Nowicke (1976) and Nowicke & Skvarla (1977). More extensive surveys have been made by Dupont (1970, 1973, 1975, 1977), the total of species investigated being 50–70. The family as a whole has between 1,600 and 2,400 species, however, depending on viewpoint, and so any taxonomic comments based on the present study can clearly only be tentative.

Three groups corresponding to the morphological groups mentioned at the start can nevertheless be distinguished on the basis of exine characters and pollen size:

1. Pollen of *L. plana* differs markedly from all the rest in its morphology and size. The most similar pollen illustrated hitherto is that of *Fenestraria rhopalophylla* (Dupont, 1977; Hartmann, in press). Both taxa are traditionally placed in the subtribe Leopoldtiinae Schwantes, and recent morphological studies suggest that both are closer to one of the sections of *Cephalophyllum* (Hartmann, 1978) than any other genus. But no particular morphological similarity has been noticed so far between *L. plana* and *Fenestraria*. In any event, the pollen supports the suggestion of Bolus (1967), based on fruit characters, that *L. plana* should be removed from *Leipoldtia*.
2. Pollen of *L. klaverensis* agrees well in its exine characters with the remaining species of *Leipoldtia* and only differs in its larger size. Its different fruit, habit and leaf characters do, however, make it very distinct, and even suggest that it too might be removed from *Leipoldtia*, to a genus of the subtribe Ruschiinae Schwantes. If this is correct, the observed variability might be explained in terms of parallelism with the *L. constricta* complex. In this connection, it is important to note that the most similar pollen to that of both *Leipoldtia* groups observed so far is that of *Ruschia perfoliata* (Dupont, 1977).
3. The pollen of members of the *L. constricta* complex can be divided into three groups (P1, P2 and P3), but unfortunately no correlation has been found with other

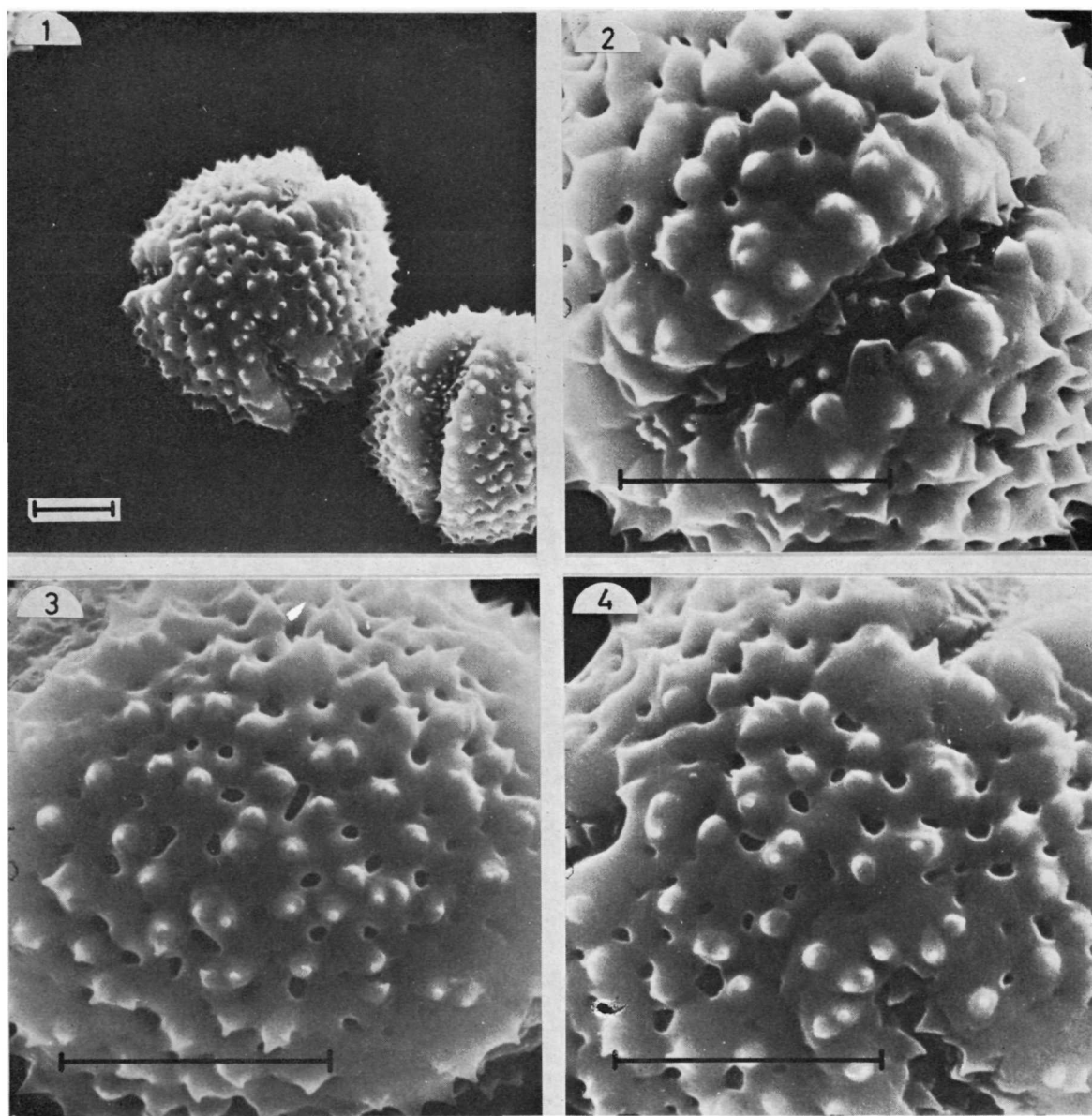


PLATE I. *Leipoldtia plana* L. Bolus (Hartmann 7038). **fig. 1**, pollen grains; **fig. 2**, colpus without perforations, but with verrucae; **fig. 3**, mesocolpium of pollen grain, note the absence of microperforations; **fig. 4**, polar region of pollen grain. All scale lines are 5 μ m long.

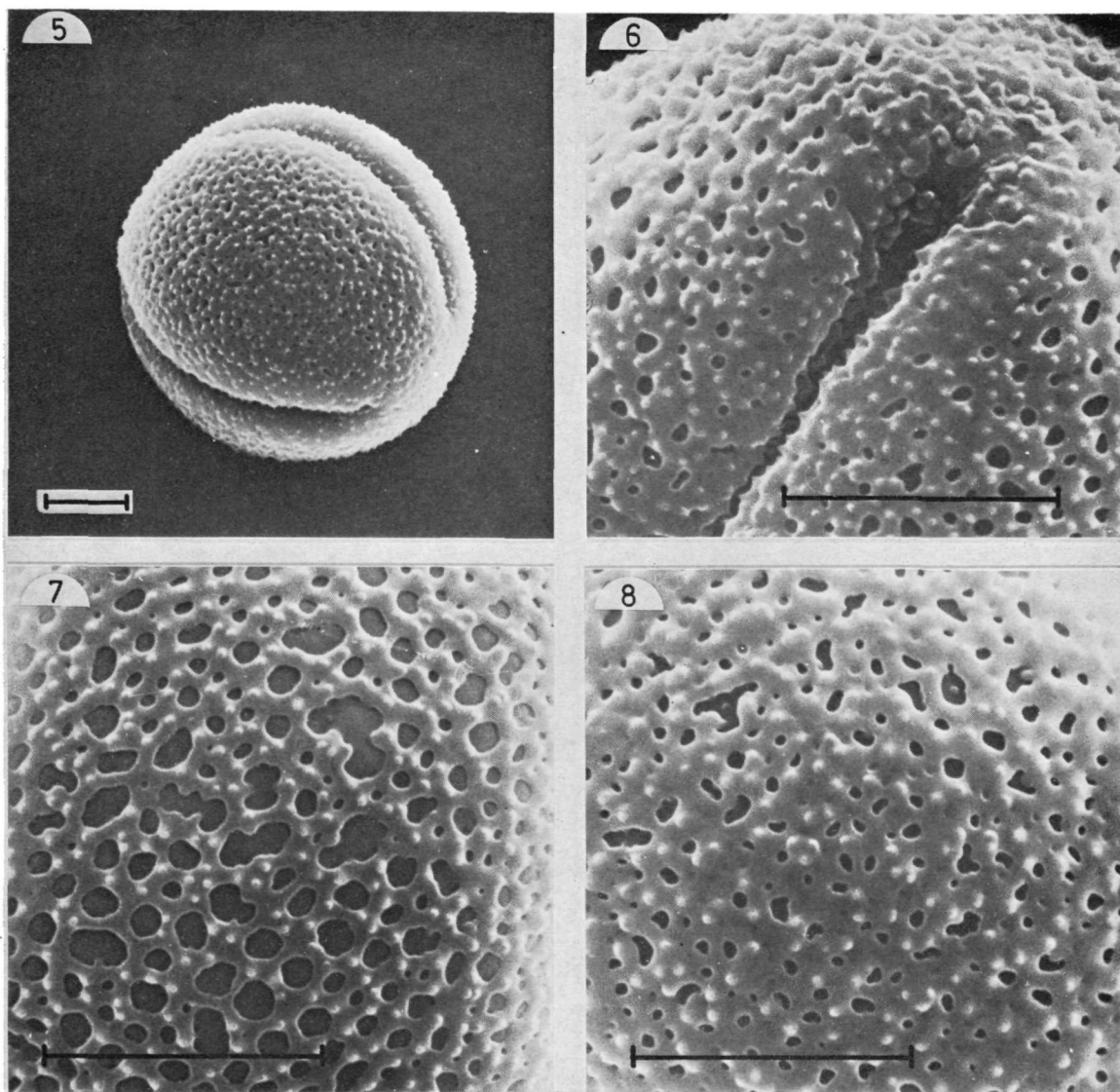
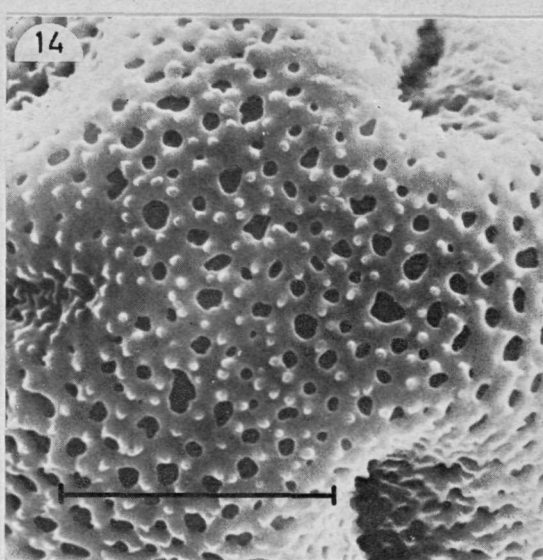
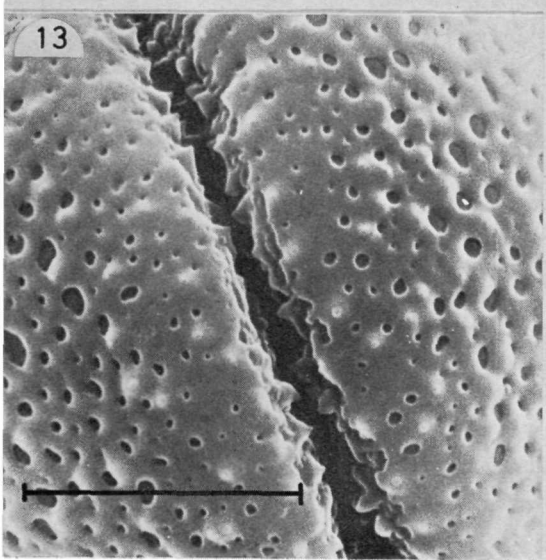
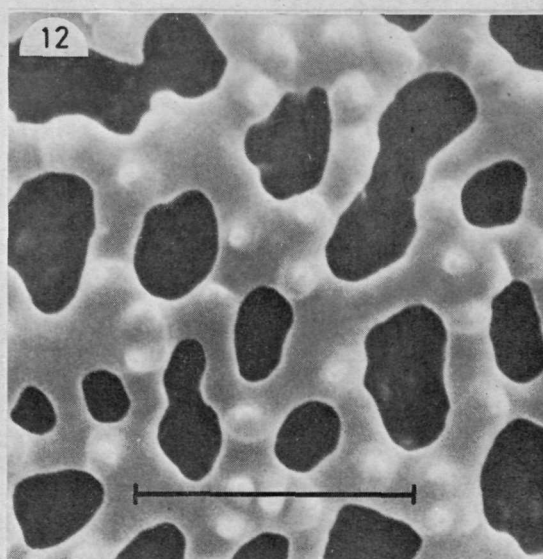
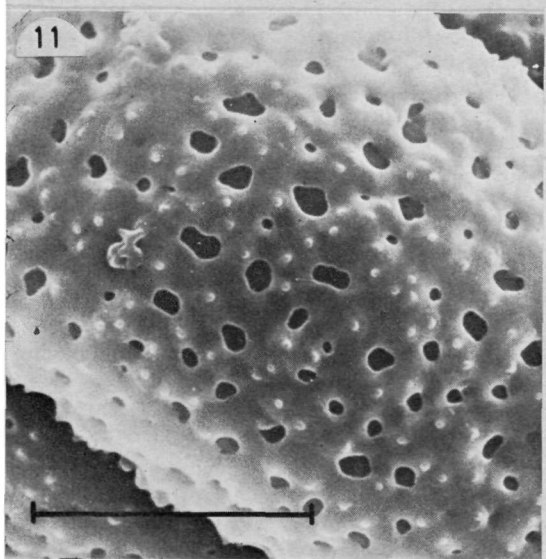
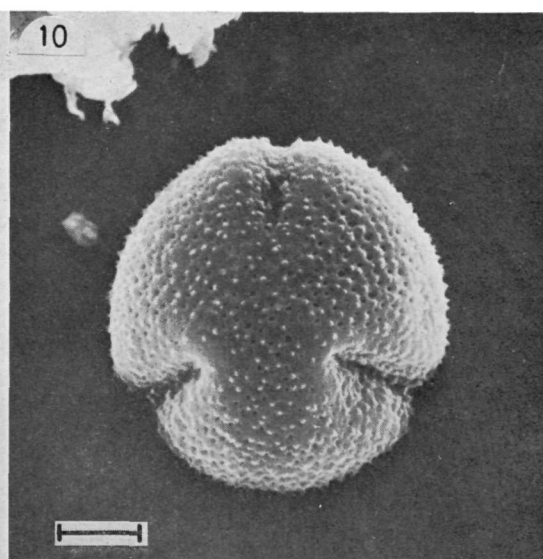
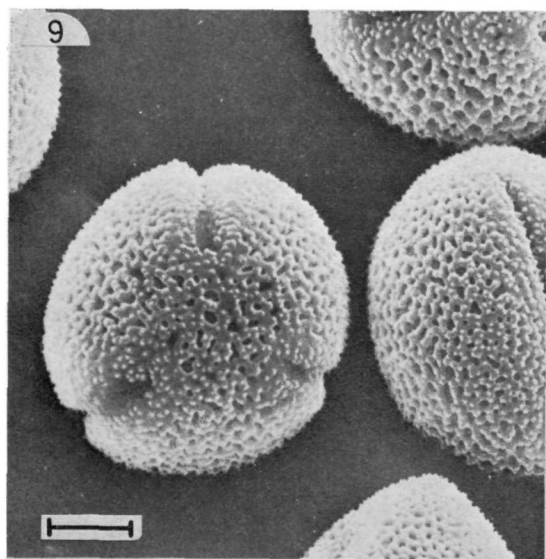


PLATE II. *Leipoldtia klaverensis* complex. **fig. 5**, pollen grain in oblique view (Hartmann 7569); **fig. 6**, polar end of colpus: note the reduction in size of perforations along the colpus margins, (Hartmann 7777); **fig. 7**, view of the nearly reticulate mesocolpium (Hartmann 7310); **fig. 8**, punctate tectum of mesocolpium (Hartmann 7569). All scale lines are 5 μm long.

PLATE III. *Leipoldtia constricta* complex. **Fig. 9**, pollen grains in polar (left) and side view (right) (Hartmann 7304); **fig. 10**, pollen grain in polar view (Hartmann 7864); **fig. 11**, punctate tectum of the mesocolpium, (Hartmann 7391); **fig. 12**, reticulate tectum, bacula visible in perforations, (Hartmann 7483), scale line: 2.5 μm ; **fig. 13**, colpus margin with reduced perforations (Hartmann 7415); **fig. 14**, polar view (Hartmann 8562). All scale lines except fig. 12 are 5 μm long.



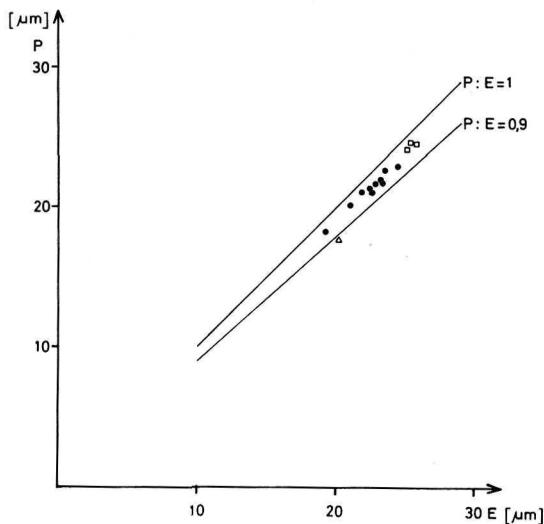


Fig. 15, Polar diameter (P) plotted against equatorial diameter (E). Triangle: *L. plana*; dots: *L. constricta* complex; squares: *L. klaverensis* complex.

characters. The pollen therefore, does not provide a key character by which to subdivide this complex of closely interconnected taxa.

Acknowledgements

Field work by H.E.K.H. was supported by the Deutsche Forschungsgemeinschaft, the CSIR (RSA) and by the award of the Kirstenbosch Jubilee Fellowship 1977. To all donors we extend our gratitude. For help with SEM-work and photographs we thank A. Barreau and G. Hauray.

Literature

- BOLUS, L. (1967). *Leipoldtia compressa* L. Bol. var. *lekkersingensis*. In J. S. Afr. Bot. 33: 67.
- DUPONT, S. (1970). Pollen de Mesembryanthemaceae en microscopie électronique à balayage. In Comptes R. Acad. Sci. Paris, Série D 271: 832-834.
- (1973). Etude du pollen des Mésembryanthemacées très succulentes. In C. R. Acad. Paris, Série D 277: 2373-2376.
- (1975). Etude du pollen des Mésembryanthemacées peu succulentes. In C. R. Acad. Paris, Série D 281: 791-794.
- (1977). Notes on the pollen of the Mesembryanthemaceae. In Cact. Succ. J. Gt. Brit. 39: 57-63.
- HARTMANN, H. (1978). Zur Kenntnis der Gattung *Cephalophyllum*. In Bot. Jahrb. Syst. 99: 264-302.
- (in press). Monographie der Gattung *Fenestraria* (Mesembryanthemaceae). Monographien der Subtribus Leipoldtiinae. III. In Bot. Jahrb. Syst. 103.
- LEUENBERGER, B. (1976). Die Pollenmorphologie der Cactaceae. Diss. Bot. 31: 1-321.
- MITROIU-RADULESCU, N. (1973). Cercetari morfopolinice asupra familiei Aizoaceae I. In Analele Univ. Bucuresti 22: 29-39.
- NOWICKE, J. (1975). Pollen Morphology in the Order Centrospermae. In Grana Palyn. 15: 51-77.
- NOWICKE & SKVARLA, J. (1977). Pollen Morphology and the Relationship of the Plumbaginaceae, Polygonaceae, and Primulaceae to the Order Centrospermae. In Smithsonian Contributions to Botany 37: 1-64.
- SKVARLA, J. & NOWICKE, J. (1976). Ultrastructure of Pollen Exine in Centrospermae Families. In Plant Syst. Evol. 126: 55-78.

Parry's *Nolina* (*Nolina parryi*)

by Larry W. Mitich

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Beargrass is the common name for the genus *Nolina* in the southwestern region of the United States. The name suggests a large, coarse grass—precisely what the nolinas resemble when not in flower.

The genus *Nolina* honours P. C. Nolin, a French agriculturist of Paris who published numerous articles in the mid 1750s. *Nolina* was erected as a genus in 1803 by André Michaux, a French botanist, who lived in the United States for a number of years. The first species described was *Nolina georgiana* Michx. which grows in the pine and oak woodlands and sandhills along the Coastal Plain in the eastern United States from Florida to South Carolina. Michaux collected the first specimens in Georgia and named the species for the state. There are about 30 species in North America, the majority of

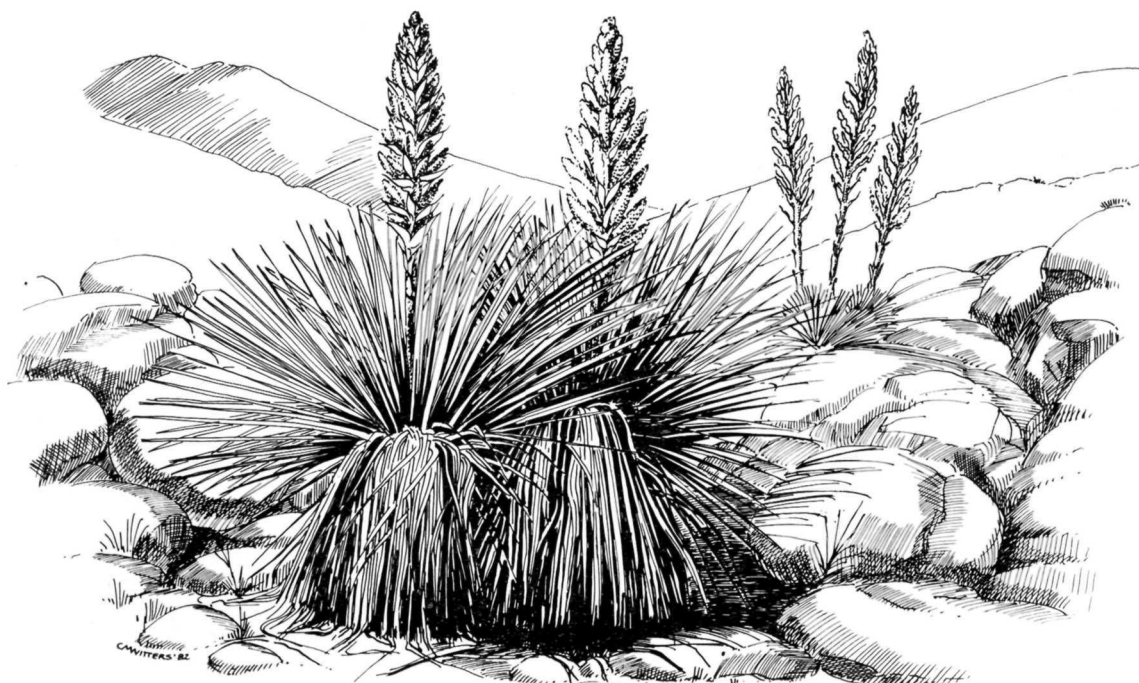
which are found in Mexico. *Nolina* is closely related to *Dasyllirion* and in a superficial way resembles *Dracaena*.

Two species of *Nolina* are native to California—*N. bigelovii* Wats. and *N. parryi* Wats. The latter is the more common and important species.

Nolina parryi is a large perennial arising from a large cluster of small rope-like roots. The stems of old plants often are several feet high, unbranched, and usually occur in clumps of several due to basal offshoots.

The leaves are dull green from 2 to 5 feet long, and form a dense crown. They are slightly concave, stiff or flexuous with serrated margins and about 1 inch wide. The leaves arise from a broad clasping base and taper to a sharp point.

The plants are dioecious—the staminate (male) and



pistillate (female) flowers are borne on separate plants. The inflorescence is an impressive compound panicle of thousands of flowers borne on a huge stalk often 4 to 6 inches in diameter and many feet high. In the early stages of development, the flower stalk appears as a huge stem of asparagus, each lateral branch of which is covered with a pale greenish (later straw-coloured) bract 3 to 4 inches wide and 8 to 15 inches long. The flowering stalk develops at the rate of several inches per day. Staminate flowers are borne on whitish slender pedicels about 0.25 inch long which are jointed at the middle; the perianth is creamy white and its 6 segments are all reflexed forming a low bowl-shaped flower about 0.25 inch across. The 3 outer segments (petals) are essentially alike, that is elliptic and 1-nerved; the 6 stamens are exserted and the anthers are greenish, 2-celled and versatile; the ovary is abortive but develops occasionally.

The pistillate flower with perianth is similar to a staminate one, but the segments are smaller, greenish and not reflexed; there are 6 stamens (abortive or occasionally fertile); the ovary is 3-celled and greenish and the stigmas are borne on a very short style; the seed pod (capsule) is about 0.5 inch broad and each of its 3 cells develops into a flattened, straw-coloured, papery wing oval containing 1 to 2 rounded tan seeds 0.125 inch in diameter. The capsules rupture irregularly over a period of many weeks.

Nolina parryi was described in 1879 by Sereno Watson, an American botanist, from specimens collected by Dr. Charles C. Parry in 1876 from the western border of the San Bernardino Desert. It is probable that his specimens were collected on the desert slopes of the San Bernardino Mountains. Parry's *Nolina* ranges from there to San Felipe, San Diego County, extending coastward on the west slopes of the Santa Ana Mountains. In the Colorado Desert, it occurs in the Little San Bernardinos, the Chuchwallas and the Eagle Mountains. Distribution is restricted to the Kingston Mountains in the Mojave Desert. *Nolina parryi* also occurs in Arizona and Baja California.

In habitat, Parry's *Nolina* grows in association with Parry Piñon (*Pinus cembroides* var. *parryana*) and junipers (*Juniperus* spp.) in its desert environment, while toward the coast it is found with chaparral plants.

The plant is often mistaken by amateurs for a species of *Yucca*, especially when not in flower or fruit. Old plants of this *nolina* are spectacular when in flower or fruit, since they often grow on prominent rocky ledges where they are visible for many miles, silhouetted against the skyline like huge sentinels.

When rainfall has been adequate, the plants bloom in April and May, the seeds ripening in September and October. The flower stalk arises from the centre of the huge cluster of rather stiff leaves and grows at the amazing rate of several inches per day. Some outstanding specimens have been observed in the Kingston

Mountains where conditions seem to be ideal for the plant's development. It is not uncommon for some gigantic individuals to reach a height of 16 feet with trunks 3 feet in diameter and leaves 5 feet long, making a plant over 12 feet in diameter. The flower stalks are enormous, too, being 12 feet long and 6 inches in diameter, with the flower portion about 6 feet long and 42 inches in width. Spectacular indeed!

Nolina parryi grows readily from seed. In mild climates, plants are easily started in outside seed beds and grow to transplanting size in less than a year. The plant prefers a rocky, well-drained soil but is able to succeed in heavy soil if given little or no water the first season. The plant begins blooming when 7 to 8 years old and usually continues each year thereafter. Pistillate plants are the most attractive since the straw-coloured fruits remain on the flowering stalks for several months.

Notes from Members

Germination of excised embryos

from Drs. Mauro Novelli and Massimo Meregalli

It seems the Post Office had a good time crushing the GB Society seeds this year! Some of the packets we received contained mostly powder with very few undamaged seeds. Anyway, the remaining seeds were sown in a normal mix of sand and leafmould (we have no proprietary soilless mix here in Italy), watered with distilled water (pH adjusted to 6, and with the addition of Chinosol and a low dose of alpha-naphthyl acetate—commercially sold as 66-F), and the temperature kept at 25°C. Normal (spontaneous) germination was rather low (11 seeds out of 90, i.e. 12%), especially when compared with results from seeds from Uhlig and Southwest Seeds which were sown in the same box and yielded more than 50%. So, after four weeks, we tried a system we call 'disembryonment'—dissecting the embryos from the seeds—which is often remarkably successful. We have never read a description of this method, so give the following explanation:

We use a stereomicroscope giving a magnification of 10x to 16x, but a strong table lens would probably serve as well. The seeds which have not germinated are salvaged from the box and put in a wet container. It is important to deal with a few seeds only at a time and to proceed with the operation immediately as the embryos begin to dry out and become flaccid in 10-15 minutes if kept dry. Each seed is put on a little dish or watch-glass covered with blotting paper, hilum uppermost. Placed under the microscope, the seed is held still while the seedcoat (testa) is broken at the edge of the hilum with a mounted needle or pin (not too sharp!). The testa should break away fairly easily and the pieces can be removed from around the embryo. With seeds which have a very narrow hilum, like those of *Ferocactus* and *Echinocactus*, an alternative is simply to break the testa near the hilum, and for seeds with a thick testa it is perhaps better to wait a little while until the

Species	CSSGB Seed no.	No. of seeds	Normal germination		Embryos		Embryo germination		Total germinated	
			no.	%	alive	dead	no.	%	no.	%
<i>Echinocactus polycephalus</i>	380	2	0	0	1	1	0	0	0	0
<i>Ferocactus covillei</i>	394	19	1	5	13	5	7	54	8	42
<i>F. haematacanthus</i>	458	13	2	15	5	6	2	40	4	31
<i>F. robustus</i>	395	9	1	11	0	8	0	0	1	11
<i>F. wislizeni</i>	396	21	3	14	12	6	12	100	15	71
<i>Gymnocalycium</i> <i>altagraciense</i>	397	7	2	28	3	2	1	33	3	43
<i>G. hyptiacanthum</i>	398	10	1	10	6	3	5	83	6	60
<i>G. onychacanthum</i>	399	9	1	11	7	1	7	100	8	88
Totals/Mean % germination		90	11	12%	47	32	34	72.3%	45	50%

embryo has dried and shrunk a little. It is always better to completely free the embryo.

After this, the embryo, which is now only surrounded by a thin membrane, is placed in the propagator again, or better still, in a new box with new sterile compost. It is very delicate and any vegetable or animal pest will easily kill it. Usually, after only 24-48 hours, germination starts. Often, they must be helped in getting free from the membrane, but in a few days they usually look like normal seedlings.

At first, many of the embryos may get damaged during 'disembryonment', but as more skill is acquired, the results will get much better, sometimes up to 100% success. Sometimes it is not so good, but we think it's always worth trying, particularly when spontaneous germination has been low. It seems difficult but isn't really and we suggest starting with common species with largish seeds, like *Gymnocalycium bruchii* or *G. baldianum*.

This procedure for achieving better germination suggests that a low germination rate does not always mean the seeds are dead; they are just unable, for some reason, to break the seedcoat. We talked about this to a botanist friend of ours. He noticed that in the wild these seeds are subjected to hot days followed by cold nights and wet mornings. So each day the embryo becomes turgid, then dries (very quickly, as we have seen), and so on, day after day, until the testa breaks. But in our artificial conditions the embryo swells up at the beginning and stays turgid permanently. Sometimes this may be insufficient to break the testa. The same botanist also suggested that what he thinks happens in the wild could be a protective mechanism to prevent all the seeds germinating together with the first rains, thus extending the period over which germination can occur.

Anyway, whatever the explanation, we have found the method described very useful for many species. We start after four weeks because by this time spontaneous germination has usually begun to decrease and the ungerminated embryos may begin to die inside the seeds.

The Table lists our results with CSSGB seeds this

year. Try it yourself and let us know the results! We should really like to know what you think of the method. Just remember to recover the ungerminated seeds from the propagator a few at a time and operate without delay!

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C. Agnelli 72
10137 Torino
Italy

Dr. Massimo Meregalli
C. Picco 27
10131 Torino
Italy

Conservation news

from Sara Oldfield

In Britain, Part 1 of the Wildlife and Countryside Act 1981 comes into operation on 28 September 1982. Under the new legislation, amendments to the Endangered Species (Import and Export) Act, 1976, will make it an offence to sell, offer or expose for sale, possess or transport for the purpose of sale, any live, dead plant, part or derivative of the species listed in a new Schedule 5 which is the same as the CITES Appendix I list. Exceptions will be made for licensed plants, and the Department of the Environment is also intending that *artificially propagated* specimens should be freely licensed. The cacti on CITES Appendix I are: *Ariocarpus agavoides* and *A. scapharostris*, *Aztekium ritteri*, *Echinocereus lindsayi*, *Obregonia denegrii*, *Pelecypora aselliformis* and *P. (Encephalocarpus) strobiliformis*.

Following allegations that United States Department of Agriculture officials had been accepting 'permits' from importers of Mexican cacti without checking that the permits were legal (see the article by H. Sanchez-Mejorada in our last issue) the U.S. authorities are expected to tighten border controls. And in Mexico itself, a group of Japanese traders are believed to have been gaoled after being caught collecting far in excess of the 650 plants allowed on their permit. The permit was illegal too, so other heads may roll. The case got publicity in the Mexican press and on television there, and has raised hopes that the Mexican government will at last sign the CITES convention.

Sara Oldfield
Conservation Unit
Royal Botanic Gardens, Kew.

***Aloe juvenna* rediscovered**

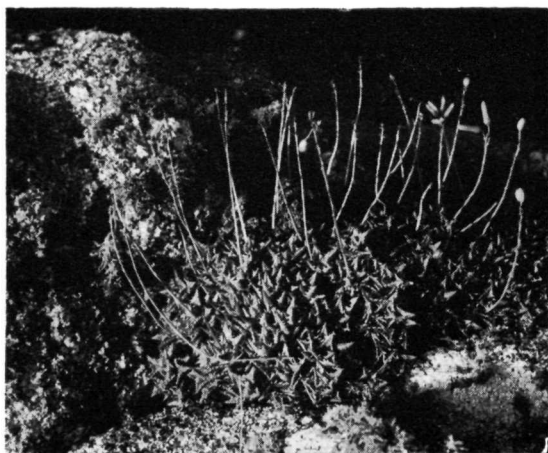
from Dr Peter Brandham and Susan Carter

Aloe juvenna is known to collectors of succulents all over the world as one of the smaller members of the genus which can be accommodated easily in an average collection, and its habit of branching freely from the base and the ease with which cuttings can be rooted have led to its being widespread in cultivation.

The name '*juvenna*' and variants of it had been known for the plant for many years as a *nomen nudum* until it was made legitimate in 1979 when we published a description and cited a type specimen which is lodged in the Kew Herbarium (CSJGB 41: 27–29). At the time, no confirmed wild locality for the plant was known and many people were of the opinion that it was a hybrid, perhaps even between an *Aloe* and an *Astroloba*. Nevertheless we described the species despite the criticism and disbelief of some of our friends and colleagues.

Chromosomal evidence was presented at the time for its being a true species, and it was even suggested that it might be of East African origin. This was because it is a tetraploid with 28 chromosomes instead of the more usual 14, and our researches have shown that all of the other aloes known to be tetraploid come from East Africa.

Especially because of this last piece of speculation we are extremely pleased to be able to say that the species has recently been rediscovered in the wild in South-West Kenya! It was found in the Loita Hills to the west of the Rift Valley by Lionel Hartley of the International Laboratory for Research on Animal Disease in Nairobi. He showed the site to his colleague Tony Irvin who has an interest in Kenyan succulents and immediately recognised the plants to be something special. A living specimen has reached Kew from Mr Irvin via Mike Gilbert of the Kenya Herbarium and Mr Irvin himself has visited us bringing photographs that he had taken.



Aloe juvenna flowering in the Loita Hills, Kenya
(photo: Irvin)

There is thus no doubt about the identity of the plants, and since they were found many miles from any settlement they are certainly native to the region where they occur. A specimen has been lodged in the Kenya Herbarium in Nairobi.

The species appears to be extremely local; a few plants only were seen in an area about 5 metres square, each plant forming a clump up to 75 cm across. The precise site must remain a secret in the case of so rare a species, but it inhabits a rocky ridge above lush montane forest in a high rainfall area at an elevation of 2,300 metres, the site being about 10 km off the track south of Narok, leading from Morijo, Kenya to Loliondo, Tanzania. When photographed at the end of December 1981 the plants bore large numbers of unbranched inflorescences which had almost finished flowering, the peak flowering time being probably November or early December.

Aloe juvenna is therefore vindicated as a true species and it remains one of the most unusual members of the genus morphologically, apparently having no close relatives. Its low branching habit with each branch clothed with triangular leaves which are spiny on the surfaces as well as the edges makes the species well worth growing. Its only drawback is that it does not flower freely in cultivation in Britain. Perhaps the introduction of other clones from the wild will rectify this problem. Mr Irvin has sent five more clones to Kew; these are now in cultivation and we eagerly await developments. Peter Brandham & Susan Carter
Royal Botanic Gardens, Kew
Richmond
Surrey TW9 3AB.

Book Reviews

Peter Chapman & Margaret Martin. *An Illustrated Guide to Cacti and Succulents*. Pp. 160, 120 colour and 150 line illustrations, 5×9 inches, hard covers. Salamander £3.95.

This is a cleverly designed little book featuring 150 species in alphabetical order. For once the (other) succulents are not forgotten and the beginner, at whom this slim volume is aimed, is presented with a balanced view of the succulent plant world and many useful hints from two experienced hands at the hobby. The colour photographs (some a trifle dark) are arranged in blocks interspersed with text accompanied by simple line sketches to show habit—a valuable addition since some close-up pictures leave the uninitiated wondering what kind of plant produced 'those extraordinary flowers'. Like Gordon Rowley's famous Encyclopedia, Salamander have marketed this one at a keen price, considering the hard covers and general quality. One criticism: the plant figured as *Lobivia famatimensis* is a hybrid, or something else masquerading as this species.

J. Riha & R. Subik. *The Illustrated Encyclopedia of Cacti & Other Succulents*. Translated from Czech by D. Habova and edited by Gillian and Kenneth A. Beckett. Pp. 352, 450+ illustrations, c. one third in colour, hard covers. Octopus Books Ltd. £4.95.

If only one comment is permitted then it has to be said that this book is a real bargain. Two well-known Continental authors/photographers, high-quality colour reproduction, and easily absorbed text combine to give an ideal present for the budding cactophile. What a pleasure to see the familiar but stunning Golden Barrel depicted in one of its last Mexican habitats (plate 26). Stapeliad fans are similarly well catered for, as are most other sections of the hobby. A feature of particular merit, especially for those of botanical inclination, is the provision of small distribution maps for some genera. The translation and editing has been done competently so as to hide the fact that it is actually a translation. Our thanks to the publisher for making this excellent introduction to succulents available in Britain.

N.P.T.

Branch & Affiliate Activities

October—December 1982

compiled by Daphne Pritchard

OCTOBER

4 Mon	St Helens NCSS	Visit to Mexico <i>Mr J. L. Henshaw</i>
5 Tues	North Surrey CSSGB Southport & Lancs CSSGB	Mexico: Valley of Tehuacan <i>Dr J. Hughes</i> Film of Southport Flower Show <i>Mr Boocock</i>
7 Thurs	Ashford NCSS	A.G.M. and Plant & Produce 'Bring and Buy'
12 Tues	Bolton & District Cactus Society	Slide & Tape Lecture from Gordon Rowley (<i>Mr E. Jennison</i>)
13 Wed	Warrington CSSGB	California <i>Dr & Mrs Mace</i>
15 Fri	North London CSSGB	A.G.M. and Plant Auction
19 Tues	Bromley NCSS	Blooming Marvellous <i>Pete and Ken</i>
20 Wed	Yeovil NCSS	Applied Photography <i>Mr D. Potter</i>

NOVEMBER

1 Mon	St Helens NCSS	Slide/Tape Show <i>Mr L. Jennison</i>
2 Tues	North Surrey CSSGB Southport & Lancs CSSGB	Hotfoot to the Horn <i>Dr P. Brandham</i> Mesembryanthemums <i>Mr R. Hewitt</i>
3 Wed	Warrington CSSGB	Topic to be announced <i>Dr A. Lau</i>
4 Thurs	Ashford NCSS	Holiday in Madeira and the Marnier collection

9 Tues	Bolton & District Cactus Society	South Africa <i>Mr. P. Bint</i>
16 Tues	Bromley NCSS	Stapeliaceae <i>Mr J. Pilbeam</i>
17 Wed	Yeovil NCSS	Topic to be announced <i>Mr P. Goodson</i>
19 Fri	North London CSSGB	So this is Tarija <i>Mr P. Sherville</i>
27 Sat	Bromley NCSS	Two lectures by <i>Dr A. Lau</i>

DECEMBER

2 Thurs	Ashford NCSS	Christmas Meeting
6 Mon	St Helens NCSS	Christmas Meeting
7 Tues	North Surrey CSSGB Southport & Lancs CSSGB Bolton & District Cactus Society	Members' slides A.G.M. and Plant Auction A trip to Kew Gardens <i>Mr. P. Barker</i>
8 Wed	Warrington CSSGB	A.G.M. and Social Evening
15 Wed	Yeovil NCSS	Christmas Party
17 Fri	North London CSSGB	Christmas Meeting
21 Tues	Bromley NCSS	Christmas Party

CSSGB members will be welcome at all Branch and Affiliate Events.

Venues and contacts for more information :

Ashford NCSS

Secretary : Mrs. D. M. Nelson, Parnassus, Etchinghal, Folkestone, Kent, tel. Lyminge 862340.

Meeting Place : Furley Hall, Maidstone Road, Ashford.

Time : 1st Thursday of month, 7.30 p.m.

Bromley NCSS

Secretary : J. W. Pilbeam, 51 Chelsfield Lane, Orpington, Kent BR5 4HG, tel. Orpington 37781.

Meeting Place : Hayes Village Hall, Hayes Street, Hayes.

Time : Usually 2nd Thursday of month.

North London

Secretary : Roger Day, 50 Admiral's Walk, Hoddesdon, Herts. EN11 8AG. Tel. no. Hoddesdon (STD code from London: 61) 69521.

Meeting Place : Octagonal Room, Bishops College, Cheshunt, Herts.

Time : 3rd Friday in month, 7.30 p.m.

North Surrey

Secretary : W. F. Maddams, 26 Glenfield Road, Banstead, Surrey SM7 2DG.

Meeting Place : Adult School, Benhill Avenue, Sutton.

Time : 1st Tuesday in month, 7.45 p.m.

Southport & Lancs.

Secretary : J. L. Henshaw, 43 Southport Road, Eccleston, Chorley, tel. Eccleston 542555.

Meeting Place : St. Johns Hall, Scarisbrick Street, Southport.

Time : 1st Tuesday in month, 7.45 p.m.

St. Helens NCSS

Secretary : G. A. Hedgecock, 142 Mill Lane, Sutton Leach, St. Helens, Merseyside WA9 4HF, tel. Marshalls Cross 811988.

Meeting Place : United Reformed Church Hall, Beaufort Street, off Sutton Road, Peasley Cross, St. Helens.

Time : Usually 1st Monday of month.

Warrington & District

Secretary : Mrs. D. Pritchard, 81 Birdwell Drive, Great Sankey, Warrington, tel. no. Penketh (092572) 4699.

Meeting Place : Meeting Lane Leisure Centre, Penketh, Warrington.

Wirral

Secretary: Mrs. I. Boote, 110 Mount Pleasant Road, Wallasey, Merseyside L45 5HU, tel. no. Wallasey (051639) 4305.

Meeting Place: The Grange, Grove Road, Wallasey.

Time: 3rd Thursday in month, 7.45–10.30 p.m.

Yeovil NCSS

Secretary: Mrs. D. Raffill, New Chapter, Middle Chinnock, Crewkerne, Somerset TN18 7PN, tel. Chiselborough 294.

Meeting Place: Astley Motors, Oxford Road, Yeovil.

Time: 3rd Wednesday of month, 7.30 p.m.

Nursery List

For free listing (members only), send particulars to the Editorial Office.

North & South Yorkshire

Cruck Cottage Cacti (Dorothy & Ronald Wood), Cliff Road, Wreton, Pickering, North Yorkshire YO18 8PJ. Tel. no. Pickering (0751) 72042. Open daily except Sat. morning. No lists. Nursery in garden setting.

Whitstone Gardens Ltd., The Cactus Houses, Sutton-under-Whitstonecliffe, Thirsk, North Yorkshire YO7 2PZ. Tel. no. Sutton (08456) 467. Open daylight hours every day throughout the year. Send 4×8p stamps (UK) or 3 international postal reply coupons for list. Everything for the cactophile; plants, seeds, books, sundries; substantial stocks and extensive collection on view.

Oak Dene Nurseries, 10 Back Lane West, Royston, Barnsley, Yorkshire S71 4SB. Tel. no. Royston (022670) 2253. Open every day, April–Sept. 9–6, Oct.–March 10–4 (closed for lunch 12.30–1.30). S.A.E. for list. Seed, plants, books and sundries.

Merseyside & Lancashire

Jim Bolton, Southview, 39 Altcar Road, Formby, Liverpool L37 8DR. Tel. no. Formby (07048) 73187. Open all day Sundays, advisable to telephone for weekday visits. Large selection of seedlings, etc., all at reasonable prices. No list.

Croston Cactus (J. L. Henshaw), 43 Southport Road, Eccleston Chorley, Lancs. PR7 6ET. Open evenings and weekends. S.A.E. for list. Choice Mexican cacti, occ. Tillandsias and other bromeliads.

Harry Mays, Woodsleigh, Moss Lane, St. Michaels on Wyre, Preston PR3 0TY tel. no. St Michaels (09958) 295. Surplus seedlings for sale to visitors only. Prior 'phone call essential.

Clwyd

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Volume 44/Number 4
December 1982

The Cactus and Succulent Journal of Great Britain



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Cover: The lure of Peru—*Browningia candelaris* near Arequipa, with the volcano Misti beyond. Scraper-board drawing by Christabel King.

The Journal is published quarterly by the Society. This issue price £1.50 (ISSN 0007-9375).

The Cactus and Succulent Journal of Great Britain

Volume 44 Number 4 December 1982

edited by David Hunt and Nigel Taylor

In this issue

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Great expectations

It would be hard to deny that the forthcoming merger of the two Cactus & Succulent Societies in this country will be the most important milestone in the progress of the hobby here since its post-war rebirth, and though some members, particularly those of long-standing, may regret the end of our 'green journal', or even feel apprehensive for future developments, the overriding feeling for most of us is surely one of expectation rather than nostalgia.

The quarterly journal of the new Society, to be called the British Cactus & Succulent Journal, will be printed by the present printers of the National C & S Journal, Smarts of Brackley, and although we hope that the projected yearbook of the new Society will be entrusted to our printers, W. H. Houldershaw Ltd of Southend, we cannot let the milestone pass without a word of tribute to Houldershaws, and their Managing Director, Arthur Pears, who have printed our journal to such a very high standard for the past seventeen years. Mr Pears and his colleagues have greatly lightened the burden of successive editors by their reliability in every aspect of production, by their skilful and painstaking attention to detail and by their unfailing friendliness and patience towards customers not always well-versed in technical matters or reasonable in their demands! Our cordial thanks for all their efforts on our behalf.

Although 'Bembo' (this, our pet type-face) will be going into retirement, the Editors, for their sins, will not. The steering committee of the new Society have asked Bill Keen (NCSJ Editor) and ourselves to assume

responsibility for all its publications. Although each of us will be in charge of one department, journal, yearbook and booklets will all be a collaborative effort. With the new journal uppermost in our minds, we have been discussing such matters as the cover, general layout, content and typography, to try to produce a distinctive hybrid combining the best genes from its parents and introducing some 'hybrid vigour'! Germination is eagerly awaited. . .

The first issue of the yearbook, to be called *Bradleya* in commemoration of the pioneer succulent plantsman Richard Bradley, is provisionally scheduled for May 1983. A subsidy towards printing and publication costs is promised from the general funds of the new Society, but the principal factor determining how many pages it will have, and how many colour plates, will be the extent to which members back it with advance subscriptions. The subscription price in effect offers a pre-

IMPORTANT NOTICE TO SUBSCRIBERS

This is the final issue of the Cactus and Succulent Journal of Great Britain. In 1983, the British Cactus & Succulent Society, formed by the merger of the Cactus and Succulent Society of Great Britain and the National Cactus and Succulent Society, will commence publication of two new periodicals, the *BRITISH CACTUS & SUCCULENT JOURNAL* (quarterly), and *BRADLEYA* (annual).

For subscription arrangements to the new publications, please see the enclosed invitation.

Enquiries concerning back issues and indexes should be sent to: N. P. Taylor, 47 Heron Dale, Addlestone, Weybridge, Surrey KT15 2JS, England.

publication discount of one-third of the full price to be charged after publication, so we hope as many members as possible will help the launching *and themselves* by ordering NOW. What, you may ask, will it contain? The answer is: mainly substantial illustrated articles, covering as wide a variety of succulent plant groups as possible. Already to hand are contributions on several cactus genera including *Echinopsis*, *Ferocactus* and *Mammillaria*, one on a newly re-established genus of the Stapeliaceae (to be illustrated in colour), one on the succulent species of *Senecio*, and a review of the techniques and literature of tissue culture. Several other features have been promised, and it should add up to an interesting and valuable work of reference.

Special CSSGB Seed Distribution

As last year, copies of the seedlist are being sent out with the final journal of the year, but in view of the merger it is not a condition of ordering that you also pay your subscription for 1983! As usual, our Hon. Seed-Purchaser, Dr Terry Smale, has obtained an appetizing selection for us, and these will be available on a 'first come, first served' basis against a contribution of 50p, or \$1 US currency, or 2DM, towards the cost of the seeds, packeting, packing and postage. In view of damage to seeds in the post in recent years, we are purchasing Post-Office-proof boxes for this distribution, and hope you will receive all the seeds you order in good condition.

Was your last Journal damaged?

Back to present problems: We have received a couple of complaints from UK members that their copy of the last issue arrived in poor condition after rough handling in the post. We hope such cases were rare and will replace any other copies similarly damaged, free of charge, if returned to us.

Journal Index, Volumes 38 thru' 44

The promised index to our last seven volumes will be made available as soon as possible, but details of price, etc., have yet to be determined.

Pimlico Show

Our final competitive Show as a separate Society was well-supported and has raised hopes that it will be possible to continue the event in future years. The judges were Bill and Yvonne Tree who had some excellent classes of mesems to assess and a generally high standard of 'other succulents'. The quality of the cacti on display was more mixed, with some very good entries and some which attracted unfavourable comment. It hardly needs saying, of course, that cacti are generally at their best for show purposes in spring and early summer.

If the Pimlico Show is to continue as a London-area

event under the auspices of the new British Cactus & Succulent Society, another and larger venue may have to be found, since many more exhibitors would be expected to participate. Alternatively, if it were to continue as an autumn event, the show might be restricted to classes for 'other succulents' only, thus reducing the amount of space needed. What are your views? Our Chairman, Bill Maddams, who is one of those in favour of continuing the show, would like to hear your comments and ideas. You can write to him at 26 Glenfield Road, Banstead, Surrey SM7 2DG, or 'phone Burgh Heath 54036.

SEPASAT

This slightly unhealthy-sounding acronym stands for 'Survey of Economic Plants for Arid and Semi-Arid Tropics', and is the title of a project based at Kew Gardens and largely funded by OXFAM. The purposes of the survey are healthy enough: to compile a database for advice on plants of actual or potential value in such regions and promote research on the most promising. In many arid areas the present flora is both relatively impoverished and specialized. There are many ecological niches unfilled. Species in one part of the world may help or transform the economy of another. It also must not be forgotten that the needs of the human population in arid and semi-arid zones may be basic: better forage for cattle, more firewood for cooking, as well as the more obvious needs for additional food-plants. Then there may be a need for better plant cover to stabilize and prevent soil erosion, for 'live fences' to protect growing crops or contain animals, for honey plants, sources of insecticides and so on and so forth.

As a first step, the SEPASAT team is hard at work compiling information from the library, herbarium and museums at Kew to feed the memory store of a hungry computer.

The Garden the Whole World Knows

This is the claim of the famous Palmengarten at Frankfurt-am-Main which D.H. visited recently, and even if the claim might come unstuck in some far-fetched corner of the globe, the forward-looking Director, Dr Gustav Schoser, certainly hopes that cactophiles everywhere will know about the garden before long. Plans are afoot to develop a comprehensive reference collection of cacti and succulents at the garden, which (like the Zurich collection) is run by the city. Splendid automated greenhouses have recently been built for propagation and reserve material and revolutionary display complexes are under construction. The existing show-houses already house a wide selection of plants from several ecological zones, and amongst the plants that attract attention are the elusive *Strophocactus wittii* (which usually flowers each year) and a space-consuming *Epiphyllum chrysocardium* with stems 20 ft. (7 m.) and more long and a 'trunk' 3-4 cm. in diameter towards the base.

A Checklist of *Lobivia* names

by Gordon Rowley

The three-part 'Lobivia' by Walter Rausch (1976, 1977) is outstanding among recent surveys of single genera of succulents in two ways. First and most obviously it is superbly illustrated with 148 large coloured photographs of the species, mostly taken in habitat and presenting a perfect visual display of the often wide variability of species. They greatly assist all *Lobivia* enthusiasts seeking to name their plants, and would alone justify the rather high cost of the book.

Second, and less obvious, is the author's admirably conservative attitude in reducing the large surfeit of ill-founded species names from 149 (in Backeberg's *Lexicon*) to 22: a drastic massacre in which he does not hesitate to sink even a number of his own earlier species—an example all too rare among living taxonomists! The treatment is thus in line with present-day taxonomy based on a multi-disciplinary approach and is the outcome of his extensive studies of the genus in the field. Of course, many will find fault with some of Rausch's 'lumpings', and later adjustments can be expected. Already there are recently described Ritter names to fit into the system. But at least we have a foundation on which to build, and a refreshing change from the plethora of 'new species' being churned out in some other cactus genera.

Having sung the praises, I now come to criticisms. Rausch's book is not easy to consult. The index drives one crazy, and there is further confusion as a result of the author's understandable indecision about some taxa. For example, *Lobivia caespitosa* is spoken of as a species on p. 28, demoted to a variety on p. 36, elevated to a subspecies on p. 178 and finally becomes a species again two years later when he published a new variety of it! I have endeavoured to rationalise these vagaries here. There were also nomenclatural errors. I will not elaborate them here: it would take many pages and much technical jargon. Suffice to say that under the 1978 International Code of Botanical Nomenclature (ICBN) several of the combinations transgressed and were reported as such in *Repertorium Plantarum Succulentarum*. The Code was revised in 1981 and some of these names are now acceptable, others are not. The list of new combinations set out here attempts to put matters straight. Incidentally, the listing of Rausch's names in the *Repertorium* also, I regret to say, contains some errors.

The check-list that follows is not intended to be a complete or final revision: that would be a much greater task and involve hunting up type material and defining the limits of the genus, at present much in doubt. Its far humbler aim is to enable the *lobivia* collector to check his labels and adopt a rational scheme of classification based on field studies of variability. It spells death to the concept that because two plants look different they must necessarily bear different specific names. It does not absolve the collector from checking the results against descriptions, nor does it claim to be final and perfect. Such merits forever elude us, try as we may!

Taxa are listed in alphabetical order under each rank from species downwards, except that type subspecies (which repeat the epithet of the species) are always placed first. Rausch at first broke with convention in adopting only two categories, variety and subvariety. In the appendix to his book (pp. 178-179) he changed his mind and adopted the more usual ranks of subspecies and variety.

'Nom. nud.' (nomen nudum) means a name that has never been formally published with a description. There are many such names around, unfortunately, and they have no standing in botany. The same applies to 'nom. prov.' (a provisional name). 'Indeterminate cultigen' is my rather pompous-sounding way of indicating plants not found in the wild and insufficiently known to assign to any one species. They are presumed to have originated in gardens and may well be hybrid.

I would like to thank John D. Donald for most kindly reading this list and making corrections and helpful comments.

Bibliography

- BACKEBERG, C. (1978). *Cactus Lexicon*. Translated by L. Glass. Poole.
- BUNING, A. & DONALD, J. (1963). In *Sukkulantenkunde* 7-8: 96-107.
- HAAGE, W. (1981). *Kakteen von A bis Z*. Leipzig.
- HEWITT, T. (1974-76). *Species Catalogue for the Cactaceae*. Issued with *Ashingtonia* 1(4)-2(4).
- RAUSCH, W. (1976, 1977). *Lobivia—the day flowering Echinopsidinae from a geographical distribution point of view*. Translated by J. Donald. Parts 1 & 2 (1976); part 3 (1977). Vienna.
- ROWLEY, G. D. et al. (1975-). *Repertorium Plantarum Succulentarum*, vol. 26 et seq. Richmond.

Checklist of *Lobivia* names*

Names in **bold type** are accepted. The generic name is omitted from *Lobivia* binomials.

- abrantha* Y. Ito=*caineana*.
acanthoplegma Backeb., nom. inval.=*cinnabarina* ssp. *taratensis*.
 var. *patula* Rausch, nom. inval.=*cinnabarina* var. *taratensis*.
 var. *roseiflora* Rausch, nom. inval.=*cinnabarina* var.
achacana Wessner, nom. nud.=?
aculeata Buin.=*pentlandii* var. *hardeniana*.
adpressispina F. Ritter=*pugionacantha* var. *cornuta*.
aguilarii Vasq.=*Echinopsis obrepanda*.
akersii Rausch=*tegeleriana* var. *akersii*.
albicentra Fric, nom. nud.=*haematantha* ssp. *densispina*.
albispina Backeb. ex Borg, nom. nud.=*haematantha*?
albolanata Buin.=*haematantha* var. *pectinifera*.
allegraiana Backeb.=*backebergii* var. *hertrichiana*.
amblayensis Rausch & vars.=*haematantha* var. *amblayensis*.
andalgalensis sensu B. & R.=*huascha* var. *crassicaulis*.
andina F. Ritter, nom. nud.=*pugionacantha* var. *rossii*.
apurimacana F. Ritter=*maximiliana* var. *intermedia*.
arachnacantha Buin. & F. Ritter & vars.=*Echinopsis ancistrophora*.
'areopegon' Speg. ex Hosseus. Misprint for *oreopepon*.
argentea Backeb.=*pentlandii* var. *pentlandii*.
astranthema hort.=*haematantha* var. *pectinifera*.
atrovirens Backeb.=*Rebutia pygmaea* var. *atrovirens*.
aurantida Wessner=*Rebutia steinmannii*.
aurantiaca Backeb., nom. inval. (Art. 36)=*pentlandii* var. *hardeniana*.
aurea (B. & R.) Backeb. in *Der Kakteenfreund* 1934: 85 (1934); Rausch (1977): 144.
 var. ***aurea***
 var. ***albiflora*** Rausch in *Succulenta* 58(7): 161-162 (1979).
 var. ***dobeana*** (Doelz) Rausch (1977): 148. The synonym included here by Rausch should have been cited as '*Cereus huascha* var. *rubriflorus* sensu Speg. (1905), non F. A. C. Weber (1893)', to avoid giving the impression that the epithet *rubriflorus* was available for this variety.
 var. ***fallax*** (Oehme) Backeb. ex Rausch (1977): 148. (Wrongly credited to Backeb., *Die Cact.* 2: 1357.)
 var. ***leucomalla*** (Wessner) Rausch (1977): 148. (Wrongly cited ex *KuS* 16: 214. 1965.)
 var. ***quinesensis*** (Rausch) Rausch ex G. Rowley; Rausch (1977): 148, nom. inval. (Art. 33.2.)
 var. ***robustior*** Backeb. (1935), nom. inval. (Art. 36)=var. *fallax*.
 var. ***shaferi*** (B. & R.) Rausch (1977): 148. Syn. *Cereus huascha* var. *flaviflorus* sensu Speg. (1905), non F. A. C. Weber (1893)—see note after var. *dobeana* above.
 var. *spinossissima* Y. Ito, nom. nud.=*aurea*.
aureolilacina Cardenas=*ferox* var. *longispina*.
aureosensis Knize=*maximiliana* var. *westii*.
backebergiana Y. Ito=*ferox* var. *longispina*.
backebergii (Werderm.) Backeb. in *Blatt. f. Kakteenf.* 1935: 12 (1935); Rausch (1976): 16, (1977): 178.
 ssp. ***backebergii***
 var. ***backebergii***
 var. ***oxyalabastra*** (Cardenas & Rausch) Rausch (1976): 20.
 ssp. ***hertrichiana*** (Backeb.) Rausch ex G. Rowley; Rausch (1977): 178, nom. inval. (Art. 33.2).
 var. ***hertrichiana*** (Backeb.) Rausch (1976): 20.
 var. ***loui*** (Donald) Rausch (1976): 20.
 var. ***simplex*** (Rausch) Rausch (1976): 20.
 ssp. ***schieliana*** (Backeb.) Rausch ex G. Rowley; Rausch (1977): 178, nom. inval. (Art. 33.2); (as var.) Rausch (1976): 20.
 ssp. ***wrightiana*** (Backeb.) Rausch ex G. Rowley; Rausch (1977): 178, nom. inval. (Art. 33.2).
 var. *chilensis* Rausch (1976): 20, (1977): 178, nom. nud. (*chilensis* Knize, nom. nud.).
 var. ***winteriana*** (F. Ritter) Rausch (1976): 20.
 var. ***wrightiana*** (Backeb.) Rausch (1976): 20.
 ssp. ***zecheri*** (Rausch) Rausch ex G. Rowley; Rausch (1977): 178, nom. inval. (Art. 33.2); (as var.) Rausch (1976): 20.
binghamiana Backeb. & vars.=*backebergii* var. *hertrichiana*.
boedekeriana Harden=*pugionacantha* var. *rossii*.
boliviensis B. & R. & vars.=*pentlandii* var. *pentlandii*.
boliviensis sensu Werderm. (1938)=*pentlandii* var. *hardeniana*.
brachyantha Wessner=*Rebutia brachyantha*.
breviflora Backeb.=*sanguiflora* var. *breviflora*.
bruchii B. & R.=*formosa* ssp. *bruchii*.
 var. *nivalis* Fric=*formosa* var. *nivalis*.
brunneo-rosea Backeb.=*pentlandii* var. *pentlandii*.
buiningiana F. Ritter=*chrysanthia* ssp. *jajoiana*.
cabradae Fric, nom. nud. & vars.=*haematantha* ssp. *densispina*.
cachensis (Speg.) B. & R.=*saltensis* var. *saltensis*.
caespitosa (J. Purpus) B. & R.=*maximiliana* ssp. *caespitosa*.
 var. *altiplani* F. Ritter=*maximiliana* var. *caespitosa*.
 var. *columnaris* Y. Ito=*maximiliana* ssp. *caespitosa*.
 var. *rinconadensis* F. Ritter=*maximiliana* var. *hermanniana*.
 var. *violacea* Rausch=*maximiliana* var. *violacea*.
caineana Cardenas in *Cact. Succ. J. Amer.* 24(6): 184-185 (1952); Rausch (1976): 72.
callianthus F. Ritter=*huascha*.
calochrysea F. Ritter=*aurea* var. *fallax*.
camataquiensis Cardenas=*lateritia*.
campicola F. Ritter=*pugionacantha*.
capinotensis Rausch=*pentlandii* var. *larae*.
cardenasiana Rausch=*Echinopsis ancistrophora*.
cariquinensis Cardenas=*maximiliana* var. *maximiliana*.
carminantha Backeb.=*pentlandii* var. *pentlandii*.
caspalensis Rausch, nom. nud.=*huascha* var. *caspalensis*, nom. nud., non *chrysanthia* var. *caspalensis*.
cerasiflora Fric, nom. nud.=*haematantha* ssp. *densispina*.
charazanensis Cardenas=*maximiliana* var. *charazanensis*.
charcasina Cardenas=*cinnabarina* var. *cinnabarina*.
chereaumiana (Schlumb.) Backeb.=*cinnabarina* var. *cinnabarina*.
chilensis Knize, nom. nud.=*backebergii* var.
chionantha (Speg.) B. & R.=*Acanthocalycium chionanthum*.
chiquitana hort. Indeterminate cultigen.
chlorogona Wessner & vars.=*haematantha* var. *rebutioides*.
chorrillosensis Rausch=*haematantha* ssp. *chorrillosensis*.
chrysanthia (Werderm.) Backeb. in Backeb. & F. Knuth, *Kaktus-ABC*, 236 (1935); Rausch (1976): 108, (1977): 179. Based on *Echinopsis chrysanthia* Werderm. in *Notizbl. Bot. Gart. Berlin* 11: 264 (1931); it is possible that *Lobivia klusacekii* Fric in *Kaktusar* 2: 82 (1931) may have priority if exact dates of the two publications can be ascertained.
 ssp. ***chrysanthia***
 var. ***chrysanthia***
 var. *hossei* (Werderm.) Backeb.=var. *chrysanthia*.
 var. ***hypocyrtia*** Rausch in *Kakt. u. a. Sukk.* 23: 292 (1972); Rausch (1977): 179; (as subvar.) Rausch (1976): 112.
 var. *janseniana* (Backeb.) Backeb.=var. *chrysanthia*.
 var. ***klusacekii*** (Fric) Rausch ex G. Rowley; Rausch (1977): 179, nom. inval. (Art. 33.2); (as subvar.) Rausch (1976): 112.
 var. *leucacantha* (Backeb.) Backeb.=var. *chrysanthia*.
 ssp. ***jajoiana*** (Backeb.) Rausch ex G. Rowley; Rausch (1977): 179, nom. inval. (Art. 33.2);
 var. ***caspalensis*** (Rausch) G. Rowley; Rausch (1977): 179, nom. inval.
 var. ***glauca*** (Rausch) G. Rowley.
 var. ***jajoiana*** (Backeb.) Rausch (1976): 112. Incl. subvar. *fleischeriana* (Backeb.) Rausch (1976): 112.
 var. *paucicostata* (Rausch) Rausch (1977): 179, nom. inval. (Art. 33.2); (as subvar.) Rausch (1976): 112=var. *glauca*.
 var. ***vatteri*** (Kraenz) Rausch ex G. Rowley; Rausch (1977): 179, nom. inval. (Art. 33.2); (as subvar.) Rausch (1976): 112.

*Prepared with the assistance of N. P. Taylor.

chrysantha (contd.)

- ssp. **marsoneri** (Werderm.) Rausch ex G. Rowley; Rausch (1977): 179, nom. inval. (Art. 33.2).
var. **marsoneri** (Werderm.) Rausch (1976): 112 = var. **muhriae**.
var. **muhriae** (Backeb.) G. Rowley.
var. **rubescens** (Backeb.) Rausch ex G. Rowley; Rausch (1977): 179, nom. inval. (Art. 33.2); (as subvar.) Rausch (1976): 112.
- chrysochete** (Werderm.) Wessner in Beitr. Sukkulantenk. u.-Pflge 1938: 71 (1938); Rausch (1976): 96, (1977): 179.
var. **chrysochete**
var. **chunchullensis** Rausch, nom. nud. = var. **chrysochete**, fide Rausch (1977): 179.
var. **markusii** (Rausch) Rausch (1976): 96.
var. **minutiflora** Rausch in Kakt. u. a. Sukk. 28(4): 74 (1977).
var. **tenuispina** (F. Ritter) Rausch (1976): 96.
'**chrysostele**' hort. Misprint for **chrysochete**.
churinensis Johns., nom. nud. = **tegeleriana** var. **akersii**.
cincero Fric, nom. nud. = **haematantha** ssp. **kuehnrchii**.
- cinnabarina** (Hook.) B. & R., Cact. 3: 54 (1922); Rausch (1976): 56, (1977): 178.
ssp. **cinnabarina**
var. **cinnabarina**
var. **gigantea** Rausch, nom. nud.
var. **gracilis** Rausch, nom. nud.
var. **spinosior** (Salm-Dyck) Y. Ito = var. **cinnabarina**.
var. **walterspielii** (Boedeker) Rausch ex G. Rowley; Rausch (1977): 178, nom. inval. (Art. 33.2); (as subvar.) Rausch (1976): 64.
var. **zudanensis** (Cardenas) Rausch ex G. Rowley; Rausch (1977): 178, nom. inval. (Art. 33.2); (as subvar.) Rausch (1976): 64.
- ssp. **acanthoplegma** (Backeb.) Rausch (1977): 178; var. **acanthoplegma** (Backeb.) Rausch (1976): 64, based on **Pseudolobivia acanthoplegma** Backeb., Die Cact. 6: 3726 (1962), nom. inval. (Art. 37) = ssp. **taratensis**.
- ssp. **prestoana** (Cardenas) Rausch ex G. Rowley; Rausch (1977): 178, nom. inval. (Art. 33.2).
var. **draxleriana** (Rausch) Rausch ex G. Rowley; Rausch (1977): 178, nom. inval. (Art. 33.2); (as subvar.) Rausch (1976): 64.
var. **grandiflora** Rausch in KuaS 23: 291 (1972).
var. **prestoana** (Cardenas) Rausch (1976): 64 = var. **grandiflora**.
- ssp. **taratensis** (Cardenas) G. Rowley.
var. **oligotricha** (Cardenas) Rausch ex G. Rowley; Rausch (1977): 178, nom. inval. (Art. 33.2); (as subvar.) Rausch (1976): 64. Incl. subvar. **neocinnabarina** (Backeb.) Rausch.
var. **roseiflora** Rausch (1977): 178, nom. inval. (epithet publ. under an invalid binomial).
var. **taratensis** (Cardenas) G. Rowley. Incl. subvar. **patula** Rausch (1976): 64, nom. inval.
- cintiensis** Cardenas & vars. = **lateritia** var. **lateritia**.
citriflora Krainz = **haematantha** ssp. **densispina**.
claeysiana Backeb. = **ferox** var. **longispina**.
columnaris Wessner = **Rebutia einsteinii** var. **columnaris**.
conoidea Wessner = **Rebutia einsteinii** var. **conoidea**.
corbula (Herrera) B. & R. = **maximiliana** var. **corbula**.
corbula sensu B. & R. = **maximiliana** var. **maximiliana**.
cordipetala Fric, nom. nud. = ?
'**coriquinensis**' Wilh. ex Backeb. Misprint for **cariquinensis**.
cornuta Rausch = **pugionacantha** var. **cornuta**.
costata (Werderm.) Wessner = **Rebutia costata**.
cruciaureispina Knize = **maximiliana** var. **westii**.
culpinensis F. Ritter = **pugionacantha** var. **culpinensis**.
cumingii (Hopffer) B. & R. = **Weingartia neocumingii**.

cylindracea Backeb. = **aurea** var. **shaferi**.
cylindrica Backeb. = **aurea** var. **aurea**.

deesziana Haage, nom. nud. = **haematantha** var. **pectinifera**.
densispina (Werderm.) Werderm. ex Backeb. & F. Knuth & vars. = **haematantha** var. **densispina**.
digitiformis Backeb. = **Rebutia pygmaea**.
divaricata F. Ritter = **backebergii** var. **hertrichiana**.
dobeana Doelz = **aurea** var. **dobeana**.
dragai Fric = **chrysantha** var. **klusacekii**.
draxleriana Rausch & vars. = **cinnabarina** var. **draxleriana**.
drijveriana Backeb. & vars. = **haematantha** var. **drijveriana**.
ducis-paulii Fric. & vars. = **ferox** var. **longispina**.
duursmaiana Backeb. = **sanguiniflora** var. **duursmaiana**.

echinata Rausch = **backebergii** var. **hertrichiana**.
einsteinii hort. = **Rebutia einsteinii**.
elongata Backeb. = **haematantha** var. **elongata**.
emmae Backeb. & vars. = **saltensis** var. **emmae**.
euanthema Backeb. = **Rebutia euanthema**.
eucaliptana Backeb. = **Rebutia costata** fa. **eucaliptana**.

fallax Oehme = **aurea** var. **fallax**.

famatimensis (Speg.) B. & R., Cact. 3: 286 (1922); Rausch (1976): 148, non Backeb. (1951) et seq.
var. **famatimensis**
var. **jachalensis** Rausch in Kakt. u. a. Sukk. 28(12): 289 (1977).
var. **sanjuanensis** Rausch in ibid. 28(4): 75 (1977).

famatimensis sensu Backeb. & vars. = **haematantha** ssp. **densispina**.

ferox B. & R., Cact. 3: 50 (1922); Rausch (1976): 68.

var. **ferox**
var. **camargensis** F. Ritter = var. **ferox**.
var. **longispina** (B. & R.) Rausch (1976): 72.
var. **nigra** (Backeb.) H. Friedrich in Kakt. u. a. Sukk. 25: 83 (1974).
var. **potosina** (Werderm.) Rausch (1976): 72.

formosa (Pfeiffer) Dodds in Cact. Succ. J. Amer. 8: 146 (1937); Rausch (1977): 156.

ssp. **formosa**. Incl. var. **rubriflora** F. Ritter.
ssp. **bruchii** (B. & R.) Rausch (1977): 164.
var. **bruchii**
var. **kieslingii** Rausch, nom. nud.
var. **ivalis** (Fric) Rausch (1977): 164 (Combination wrongly credited to Fric.)
ssp. **grandis** (B. & R.) Rausch (1977): 164. Incl. var. **pinchasensis** Rausch, nom. nud.
ssp. **tarijensis** (Vaupe) Rausch (1977): 164.
var. **bertramiana** (Backeb.) Rausch (1977): 164 = var. **orurensis**.
var. **orurensis** (Cardenas) G. Rowley.
var. **poco** (Backeb.) G. Rowley. Syn. **Cereus tarijensis** Vaupe.
var. **tororensis** (Cardenas) Rausch (1977): 164.

frankii Bosc. = **Echinopsis obrepanda**.
fricii Rausch = **tiegeliana** var. **cinnabarina**.
fungiflora Braun, nom. nud. = **backebergii** ssp. **zecheri**.

glauca Rausch & vars. = **chrysantha** var. **glauca**.
glaucescens F. Ritter = ?
graciliflora Cardenas = **cinnabarina**?
grandiflora B. & R. = **huascha** var. **grandiflora**.
grandis B. & R. = **formosa** ssp. **grandis**. (Referred to **Echinopsis** by Friedrich & Rowley.)
graulichii Fric. = **Echinopsis ancistrophora**.
var. **cinnabarina** Fric = **tiegeliana** var. **cinnabarina**.
gregeri Kreuzinger = **chrysantha** var. **vatterii**.

haageana Backeb. & vars. = *chrysantha* var. *rubescens*.

haematantha (Speg.) B. & R., Cact. 3: 57 (1922); Rausch (1976): 116, (1977): 179.

ssp. **haematantha**

var. **haematantha**

var. **elongata** (Backeb.) Rausch ex G. Rowley; Rausch (1977): 179, nom. inval. (Art. 33.2); (as subvar.) Rausch (1976): 124.

var. **fechseri** (Rausch) Rausch ex G. Rowley; Rausch (1977): 179, nom. inval. (Art. 33.2); (as subvar.) Rausch (1976): 124.

var. **hualfinensis** (Rausch) Rausch ex G. Rowley; Rausch (1977): 179, nom. inval. (Art. 33.2); (as subvar.) Rausch (1976): 124.

ssp. **chorrillosensis** (Rausch) Rausch ex G. Rowley; Rausch (1977): 179, nom. inval. (Art. 33.2); (as subvar.) Rausch (1976): 124.

ssp. **densispina** (Werderm.) Rausch ex G. Rowley; Rausch (1977): 179, nom. inval. (Art. 33.2).

var. **densispina** (Werderm.) Rausch (1976): 125.

var. **pectinifera** (Wessner) Rausch ex G. Rowley; Rausch (1977): 179, nom. inval. (Art. 33.2); (as subvar.) Rausch (1976): 125.

var. **rebutioides** (Backeb.) Rausch ex G. Rowley; Rausch (1977): 179, nom. inval. (Art. 33.2); (as subvar.) Rausch (1976): 125.

var. **sublimiflora** (Backeb.) Rausch ex G. Rowley; Rausch (1977): 179, nom. inval. (Art. 33.2); (as subvar.) Rausch (1976): 125.

ssp. **kuehnrichii** (Fric) Rausch ex G. Rowley; Rausch (1977): 179, nom. inval. (Art. 33.2).

var. **amblayensis** (Rausch) Rausch ex G. Rowley; Rausch (1977): 179, nom. inval. (Art. 33.2); (as subvar.) Rausch (1976): 124.

var. **drijveriana** (Backeb.) G. Rowley.

var. **kuehnrichii** (Fric) Rausch (1976): 124 = var. *drijveriana*.

hardeniana Boedeker = *pentlandii* var. *hardeniana*.

hastifera Werderm. = *ferox* var. *longispina*.

hermanniana Backeb. & vars. = *maximiliana* var. *hermanniana*.

hertrichiana Backeb. = *backebergii* var. *hertrichiana*.

higginsiana Backeb. & vars. = *pentlandii* var. *pentlandii*.

hoffmanniana Backeb., nom. inval. (Art. 9) = *Sulcorebutia hoffmanniana*, nom. inval.

horrida F. Ritter = *lateritia* var. *kupperiana*.

var. *sanguiniflora* F. Ritter = *lateritia* var.

hossei Backeb. = *chrysantha* var. *chrysantha*.

hualfinensis Rausch = *haematantha* var. *hualfinensis*.

var. *fechseri* Rausch, nom. inval. (Art. 37) = *haematantha* var.

huariensis hort. = *pugionacantha* var. *rossii*.

huascha (F. A. C. Weber) W. Marshall in Cact. Succ. J. Amer. 9: 114-115 (1938); Rausch (1977): 172. (Referred to *Echinopsis* by Friedrich & Rowley.) Based on *Cereus huascha* var. *flaviflorus* F. A. C. Weber, not var. *rubriflorus* F. A. C. Weber—see Schumann, Gesamtb. Kakt. 168 (1897).

var. **huascha**. Syn. *Cereus huascha* var. *flaviflorus* F. A. C. Weber (1893), non Speg. (1905).

var. *andalgalensis* (F. A. C. Weber ex Schumann) Rausch (1977): 172 = var. *rubriflora*.

var. *caspalasensis* Rausch, nom. nud.

var. **crassicaulis** (Backeb.) Rausch (1977): 172.

var. **grandiflora** (B. & R.) Rausch (1977): 172.

'ssp. ? *narvaecensis*' (Cardenas) Rausch (1977): 172, nom. inval. The query denoting doubt as to the taxonomic rank nullifies validation of this combination.

var. *purpureominiata* Rausch, nom. nud.

var. **rubriflora** (F. A. C. Weber) G. Rowley.

huilcanota Rauh & Backeb. ex Backeb. = *backebergii* var. *hertrichiana*.

hyalacantha Speg. = *huascha* var. *huascha*.

hystrichacantha Y. Ito = *maximiliana* var. *charazanensis*.

hystrix F. Ritter = *chrysochete* var. *chrysochete*.

ikedae Y. Ito & vars. Indeterminate cultigens.

imporana F. Ritter & vars. = *lateritia* var. *lateritia*.

incaica Backeb. = *backebergii* var. *hertrichiana*.

incuiensis Rauh & Backeb. ex Backeb. = *tegeleriana* var. *incuiensis*.

interjuncta F. Ritter, nom. nud. = *ferox*.

intermedia Rausch = *maximiliana* var. *intermedia*.

iridescens Backeb. = *chrysantha* var. *muhriae*.

jajoiana Backeb. = *chrysantha* ssp. *jajoiana*.

var. *carminata* Wessner = *chrysantha* var. *jajoiana*.

var. *caspalasensis* Rausch = *chrysantha* var. *caspalasensis*.

var. *elegans* Rausch, nom. nud. = *chrysantha* var. *jajoiana*.

var. *fleischeriana* Backeb. = *chrysantha* var. *jajoiana*.

var. *nigristoma* (Buin.) Backeb. = *chrysantha* var. *vatteri*.

var. *splendens* Wessner = *chrysantha* var. *jajoiana*.

janseniana Backeb. & vars. = *chrysantha* var. *chrysantha*.

johnsoniana Backeb. = *pentlandii* var. *pentlandii*.

jujuiensis F. Ritter, nom. nud. = *chrysantha* var. *vatteri*.

jujuyana F. Ritter = *chrysantha* var. *vatteri*.

katagirii Y. Ito & vars. Indeterminate cultigens.

kieslingii Rausch = *formosa* ssp. *bruchii* var.

klimpeliana A. Berger = *Acanthocalycium klimpelianum*.

klusacekii Fric. & vars. = *chrysantha* var. *klusacekii*.

korethroides (Werderm.) Werderm. = *formosa* var. *nivalis*.

kreuzingeri Y. Ito = *haematantha* var. *densispina*.

kuehnrichii Fric & vars. = *haematantha* var. *drijveriana*.

kupperiana Backeb. & vars. = *lateritia* var. *kupperiana*.

larabei Johns., nom. nud. = *backebergii* var. *hertrichiana*.

larae Cardenas = *pentlandii* var. *larae*.

lateritia (Guerke) B. & R., Cact. 3: 56 (1922); Rausch (1976): 76, (1977): 179.

var. **lateritia**

var. *borealis* Rausch, nom. nud. = var. *lateritia*.

var. **cotagaitensis** Rausch in Kakt. u. a. Sukk. 28(10): 235 (1977).

var. **kupperiana** (Backeb.) Rausch (1976): 76.

var. *sanguiniflora* Rausch, nom. nud.

laui Donald = *backebergii* var. *laui*.

lauramarca Rauh & Backeb. ex Backeb. = *maximiliana* var. *corbula*.

leptacantha Rausch = *maximiliana* var. *leptacantha*.

leucomalla Wessner & vars. = *aurea* var. *leucomalla*.

leucorhodon Backeb. = *pentlandii* var. *pentlandii*.

leucosiphus Cardenas, nom. nud. = *cinnabarina* var. *taratensis*.

leucotricha F. Ritter, nom. nud. = ?

leucoviola Backeb. = *pentlandii* var. *pentlandii*.

longiflora Johns., nom. nud. = *maximiliana* var. *caespitosa*.

longispina B. & R. & vars. = *ferox* var. *longispina*.

longistigmatica Rausch, nom. nud. = *pentlandii* var. *hardeniana*.

luteiflora Backeb. = *aurea* var. *aurea*.

maresii Fric, nom. nud. = *Rebutia pygmaea*.

markusii Rausch = *chrysochete* var. *markusii*.

marsoneri Backeb. = *chrysantha* var. *muhriae*.

matuzawae Y. Ito. Indeterminate cultigen.

maximiliana (Heyder) Backeb., '10 Jahre Kakteenforschung 1927-1937', 28, sine basionym ref.; Rausch (1976): 24, (1977): 178.

ssp. **maximiliana**

var. **maximiliana**

var. *corbula* (Herrera) Rausch (1976): 36.

ssp. **caespitosa** (J. Purpus) Rausch ex G. Rowley; Rausch (1977): 178, nom. inval. (Art. 33.2).

var. **caespitosa** (J. Purpus) Rausch (1976): 36.

var. **charazanensis** (Cardenas) Rausch (1976): 36.

var. **hermanniana** (Backeb.) Rausch (1976): 36.

var. **miniaticlora** (F. Ritter) Rausch (1976): 36.

var. **violacea** (Rausch) G. Rowley.

maximiliana (contd.)

- ssp. **quiabayensis** (Rausch) Rausch ex G. Rowley; Rausch (1977): 178, nom. inval. (Art. 33.2).
 var. **leptacantha** (Rausch) Rausch (1976): 36.
 var. **quiabayensis** (Rausch) Rausch (1976): 36.
 ssp. **westii** (Hutchison) Rausch ex G. Rowley; Rausch (1977): 178, nom. inval. (Art. 33.2).
 var. **intermedia** (Rausch) Rausch (1976): 36.
 var. **westii** (Hutchison) Rausch (1976): 36.
megacarpa F. Ritter = *Echinopsis ayopayana*.
megatae Y. Ito. Indeterminate cultigen.
microthelis F. Ritter, nom. nud. = *cinnabarina* var. *oligotricha*.
miniatiiflora F. Ritter = *maximiliana* var. *miniatiiflora*.
miniatiiflora F. Ritter = ?
minuta F. Ritter = *backebergii* var. *hertrichiana*.
mirabunda Backeb. = ?
mistiensis (Werderm. & Backeb.) Backeb. & vars. = *pampana*.
mizquensis Rausch = *Echinopsis obrepanda*.
moqueguana Knize = *pampana*.
muhriae Backeb. & vars. = *chrysantha* var. *muhriae*.
multicostata Backeb. = ?
napina Pazout = *haematantha* var.
nealeana Backeb. & vars. = *saltensis* var. *emmae*.
neocinnabarina Backeb. = *cinnabarina* var. *oligotricha*.
neohaageana Backeb. & vars. = *Rebutia pygmaea*.
nicolai hort. = *Rebutia einsteinii* var. *conidea*.
nigra Y. Ito = *haematantha* ssp. *densispina*.
nigricans Wessner = *Rebutia ritteri* var. *nigricans*.
nigrispina Backeb. & vars. = *haematantha* var. *drijveriana*.
nigristoma Buin. = *chrysantha* var. *vatterii*.
nivosa hort. = ?
oculata Wessner = *Rebutia euanthema*.
oligotricha Cardenas & vars. = *cinnabarina* var. *oligotricha*.
omasuyana Cardenas = *pentlandii* var. *pentlandii*.
oreopepon Speg. = *formosa* var. *formosa*.
'oreopogon' Werderm. Misprint for *oreopepon*.
orurensis Backeb. = *Rebutia pygmaea*.
otukae Y. Ito & vars. = *famatimensis*.
oxyalabastra Cardenas & Rausch = *backebergii* var. *oxyalabastra*.
oyonica Akers, nom. nud. = *tegeliana* var. *akersii*.
pachyacantha Y. Ito = *ferox* var. *longispina*.
pampana B. & R., Cact. 3: 56 (1922); Rausch (1976): 12.
paucartambensis Johns., nom. nud. = *backebergii* ssp. *hertrichiana*.
peclardiana Krainz & vars. = *tiegeliana* var. *tiegeliana*.
pectinata Fric & vars. = *haematantha* ssp. *densispina*.
pectinata Backeb. = *Rebutia pygmaea*.
pectinifera Wessner & vars. = *haematantha* var. *pectinifera*.
penca-poma Blossf. = *haematantha* var. *drijveriana*.
pentlandii (Hook.) B. & R., Cact. 3: 54 (1922); Rausch (1976): 40, (1977): 178.
 var. **pentlandii**. Including vars. of Y. Ito & Fric.
 var. *corbula* Krainz = *maximiliana* var. *corbula*.
 var. **hardeniana** (Boedeker) Rausch (1976): 44.
 var. **larae** (Cardenas) Rausch (1976): 44.
 var. *maximiliana* (Heyder) Backeb. = *maximiliana* var. *maximiliana*.
peterseimii Fric = *Rebutia ritteri* var. *nigricans*.
pictiflora F. Ritter = *ferox* var. *longispina*.
pilifera Fric = *Rebutia ritteri*.
planiceps Backeb. = *backebergii* var. *hertrichiana*.
poco Dodds, nom. nud. = *formosa* var. *poco*.
pojoensis Rausch & vars. = *Echinopsis ancistrophora*.
polaskiana Backeb. & vars. = *chrysantha* var. *klusacekii*.
polyantha Y. Ito. = Indeterminate cultigen.
polycephala Backeb. = *sanguiniflora* var. *duursmaiana*.
potosina (Werderm.) H. Friedrich = *ferox* var. *potosina*.
prestoana Cardenas = *cinnabarina* var. *grandiflora*.
prolifera F. Ritter, nom. nud. (*Neolobivia prolifera* F. Ritter) = ?
pseudocachensis Backeb. & vars. = *saltensis* var. *emmae*.

- pseudocariquinensis* Cardenas = *maximiliana* var. *maximiliana*.
pseudocinnabarina Backeb. = *cinnabarina* var. *oligotricha*.
pseudofamatimensis Backeb. = *famatimensis*.
pseudolateritia Backeb. = *sanguiniflora* var. *sanguiniflora*.
pseudoreicheanus Backeb. = *famatimensis*.
pugionacantha (Rose & Boedeker) Backeb. in Backeb. & F. Knuth, Kaktus-ABC, 235 (1935); Rausch (1976): 84.
 var. **pugionacantha**
 var. **cornuta** (Rausch) Rausch (1976): 84.
 var. **culpinensis** (F. Ritter) Rausch (1976): 84.
 var. *flaviflora* Backeb. = var. *pugionacantha*.
 var. *haematantha* Rausch, nom. nud.
 var. **rossii** (Boedeker) Rausch (1976): 84.
 var. **salitrensis** (Rausch) Rausch (1976): 84.
 var. **versicolor** (Rausch) Rausch (1976): 84.
purpurea Y. Ito = *haematantha* ssp. *densispina*.
purpurea *spatulata* Fric = *Rebutia pygmaea*.
purpureominiata F. Ritter = *huascha*.
pusilla F. Ritter = *tiegeliana* var. *pusilla*.
 fa. *flaviflora* F. Ritter = *tiegeliana* var. *flaviflora*.
pygmaea Backeb. = *Rebutia pygmaea*.
quiabayensis Rausch = *maximiliana* var. *quiabayensis*.
raphidacantha Backeb. = *pentlandii* var. *pentlandii*.
rauschii Zecher in Succulenta 53: 41-43 (1974); Rausch (1976): 100.
rebutioides Backeb. & vars. = *haematantha* var. *rebutioides*.
rigidispina Backeb. Indeterminate cultigen.
ritteri Wessner = *Rebutia ritteri*.
robusta hort. = *chrysantha* var. *vatterii*.
rosarioana Rausch in Kakt. u.a. Sukk. 30(12): 284-286 (1979).
 var. *rubriflora* Rausch in ibid. 30(12): 284-286 (1979).
rossii Boedeker & vars. = *pugionacantha* var. *rossii*.
rowleyi Y. Ito & vars. Indeterminate cultigens.
ruberrima Y. Ito. = *haematantha* ssp. *densispina*.
rubescens Backeb. & vars. = *chrysantha* var. *rubescens*.
salitrensis Rausch & vars. = *pugionacantha* var. *salitrensis*.
saltensis (Speg.) B. & R., Cact. 3: 53 (1922); Rausch (1976): 128, (1977): 132.
 var. **saltensis**
 var. **emmae** (Backeb.) G. Rowley.
 var. **multicostata** Rausch in Kakt. u.a. Sukk. 28(4): 75 (1977).
 var. *nealeana* (Backeb.) Rausch (1977): 132 = var. *emmae*.
 var. **schreiteri** (Castellanos) Rausch (1977): 132.
 var. **stilowiana** (Backeb.) Rausch (1977): 132.
sanguinea Rausch, nom. nud. = *pugionacantha* var.
sanguiniflora Backeb. in Backeb. & F. Knuth, Kaktus-ABC, 414 (1935); Rausch (1976): 104, (1977): 179.
 var. **sanguiniflora**
 var. **breviflora** Rausch (1976): 104. "Can only be recognised as a form" — Rausch (1977): 179.
 var. **duursmaiana** (Backeb.) Rausch (1976): 104.
 var. *pseudolateritia* Backeb. = var. *sanguiniflora*.
scheeri Backeb. = *pampana*? Perhaps an earlier name for *pampana*.
schieliana Backeb. & vars. = *backebergii* ssp. *schieliana*.
schmiedcheniana Köhl = *Rebutia einsteinii* fa. *schmiedcheniana*.
schneideriana Backeb. & vars. = *pentlandii* var. *pentlandii*.
schreiteri Castellanos = *saltensis* var. *schreiteri*.
schuldtii Fric = *chrysantha* var. *klusacekii*.
scoparia (Werderm.) Werderm. ex Backeb. & F. Knuth = *haematantha* var. *densispina*.
scopulina Backeb., nom. inval. (Art. 37) = *lateritia* var. *lateritia*.
shaferi B. & R. = *aurea* var. *shaferi*.
sicuantensis Rausch = *maximiliana* var. *corbula*.
silvestrii (Speg.) G. Rowley in Nat. Cact. Succ. J. 22: 68 (1967); Rausch (1977): 132.
simplex Rausch = *backebergii* var. *simplex*.
spiniflora B. & R. ex Hosseus = *Acanthocalycium spiniflorum*.
spinossissima Backeb. = *ferox* var. *longispina*.

spiralispala Jajo = *Rebutia aureiflora* var. *aureiflora*.
staffenii Fric & vars. = *chrysantha* var. *chrysantha*.
steinmannii Backeb. = *Rebutia pygmaea*.
stollenwerkiana Boedeker = *pugionacantha* var. *rossii*.
stilowiana Backeb. = *salsensis* var. *stilowiana*.
sublimiflora Backeb. = *haematantha* var. *sublimiflora*.

taratensis Cardenas & vars. = *cinnabarina* var. *taratensis*.
tegeleriana Backeb. in Jahrb. DKG 1: 82-83 (1936); Rausch (1976): 8.
 var. **tegeleriana**. Including vars. of Backeberg.
 var. **akersii** (Rausch) Rausch (1976): 8.
 var. **incuensis** (Rauh & Backeb. ex Backeb.) Rausch (1976): 8.
 var. *puquiensis* F. Ritter = var. *tegeleriana*.
tenuispina F. Ritter = *chrysochete* var. *tenuispina*.
thionantha (Speg.) B. & R. = *Acanthocalycium thionanthum*.
tiegeliana Wessner in Beitr. z. Sukkulantenk. 1939: 49 (1939); Rausch (1976): 92.
 var. **tiegeliana**
 var. **cinnabarina** (Fric) G. Rowley.
 var. *distefanoiana* Cullmann & F. Ritter = var. *tiegeliana*.
 var. **flaviflora** (F. Ritter) Rausch (1976): 92.
 var. *fricii* (Rausch) Rausch (1976): 92 = var. *cinnabarina*.
 var. *peclardiana* Krainz & forms = var. *tiegeliana*.
 var. **pusilla** (F. Ritter) Rausch (1976): 92.
 var. **ruberrima** Rausch in Succulenta 51: 101-102 (1972).
 var. **uriondoensis** Rausch in ibid. 58(10): 233-234 (1979).
titicacensis Cardenas = *pentlandii* var. *pentlandii*.
torrecillasensis hort. = *Echinopsis ancistrophora*.
tuberculosa F. Ritter = ?

uitewaaliana Buin. = *chrysantha* var. *muhriae*.
urubambae F. Ritter, nom. nud. = *backebergii* ssp. *hertrichiana*.

vanurkiana Backeb. Indeterminate cultigen.
varians Backeb. & vars. = *pentlandii* var. *pentlandii*.
variispina F. Ritter = ?
vatterii Krainz & vars. = *chrysantha* var. *vatterii*.
versicolor Rausch = *pugionacantha* var. *versicolor*.
vilcambae F. Ritter = *backebergii* var. *simplex*.

walteri Kiesling in Hickenia 1: 35-38 (1976).
walterspielii Boedeker & vars. = *cinnabarina* var. *walterspielii*.
watadae Y. Ito & vars. Indeterminate cultigens.
wegheiana Backeb. & vars. = *pentlandii* var. *pentlandii*.
wegneriana Grun. & Kl. Indeterminate cultigen.
wessneriana Fritz = *haematantha* var. *sublimiflora*.
westii Hutchison & vars. = *maximiliana* var. *westii*.
wilkeae (Backeb.) H. Friedrich, nom. inval. (Art. 37) & vars. = *ferox* var. *longispina*.
winteriana F. Ritter = *backebergii* var. *winteriana*.
wrightiana Backeb. & vars. = *backebergii* var. *wrightiana*.

zecheri Rausch & vars. = *backebergii* var. *zecheri*.
zudanensis Cardenas = *cinnabarina* var. *zudanensis*.

Validation of new names

The majority of names validated below are necessary because Rausch failed to satisfy ICBN Art. 33.2, which requires that new names be accompanied by a direct bibliographic reference to the basionym (cf. Rausch 1977, pp. 178-179).

Lobivia aurea var. **quinesensis** (Rausch) Rausch ex G. Rowley, **comb. nov.** Basionym: *Echinopsis aurea* var. *quinesensis* Rausch in Kakt. u. a. Sukk. 17: 107 (1966), nom. inval. (Art. 37); ibid. 21: 45 (1970), cum typ.
Lobivia backebergii ssp. **hertrichiana** (Backeb.) Rausch ex G. Rowley, **stat. nov.** Basionym: *Lobivia hertrichiana* Backeb. in Der Kakteenfreund 2: 103 (1933).

Lobivia backebergii ssp. **schieliana** (Backeb.) Rausch ex G. Rowley, **stat. nov.** Basionym: *Lobivia schieliana* Backeb., Descr. Cact. Nov. [1]: 30 (1956).
Lobivia backebergii ssp. **wrightiana** (Backeb.) Rausch ex G. Rowley, **stat. nov.** Basionym: *Lobivia wrightiana* Backeb., Blatter f. Kakteenf. 1937: 12 (1937).
Lobivia backebergii ssp. **zecheri** (Rausch) Rausch ex G. Rowley, **stat. nov.** Basionym: *Lobivia zecheri* Rausch in Succulenta 50: 146 (1971).
Lobivia chrysantha var. **klusacekii** (Fric) Rausch ex G. Rowley, **stat. nov.** Basionym: *Lobivia klusacekii* Fric in Kak-tusar 2: 82 (1931).
Lobivia chrysantha ssp. **jajoiana** (Backeb.) Rausch ex G. Rowley, **stat. nov.** Basionym: *Lobivia jajoiana* Backeb. in Kaktusar 4: 70 (1933).
Lobivia chrysantha var. **caspalasensis** (Rausch) G. Rowley, **stat. nov.** Basionym: *L. jajoiana* var. *caspalasensis* Rausch in Kakt. u. a. Sukk. 28 (4): 75 (1977).
Lobivia chrysantha var. **glauca** (Rausch) G. Rowley, **stat. nov.** Basionym: *Lobivia glauca* Rausch in Succulenta 50: 168 (1971).
Lobivia chrysantha var. **vatterii** (Krainz) Rausch ex G. Rowley, **stat. nov.** Basionym: *Lobivia vatterii* Krainz in Sukkulantenkunde 1: 7 (1947).
Lobivia chrysantha ssp. **marsoneri** (Werderm.) Rausch ex G. Rowley, **comb. et stat. nov.** Basionym: *Echinopsis marsoneri* Werderm. in Fedde Rep. 30: 55 (1932).
Lobivia chrysantha var. **muhriae** (Backeb.) G. Rowley, **stat. nov.** Basionym: *Lobivia muhriae* Backeb., Descr. Cact. Nov. 3: 7 (1963). Syn. *L. muhriae* var. *flaviflora* Backeb., op. cit.; *L. chrysantha* var. *marsoneri* (Werderm.) Rausch, *Lobivia* 2: 112 (1976).
Lobivia chrysantha var. **rubescens** (Backeb.) Rausch ex G. Rowley, **stat. nov.** Basionym: *Lobivia rubescens* Backeb. in Der Kakteenfreund 1: 122 (1932).
Lobivia cinnabarina var. **walterspielii** (Boedeker) Rausch ex G. Rowley, **stat. nov.** *Lobivia walterspielii* Boedeker in Jahrb. Deutsch. Kakt.-Ges. 1: 126 (1936).
Lobivia cinnabarina var. **zudanensis** (Cardenas) Rausch ex G. Rowley, **stat. nov.** Basionym: *Lobivia zudanensis* Cardenas in Cact. Succ. J. Amer. 42: 34 (1970).
Lobivia cinnabarina ssp. **prestoana** (Cardenas) Rausch ex G. Rowley, **stat. nov.** Basionym: *Lobivia prestoana* Cardenas in Cact. Succ. J. Amer. 42: 185 (1970).
Lobivia cinnabarina var. **draxleriana** (Rausch) Rausch ex G. Rowley, **stat. nov.** Basionym: *Lobivia draxleriana* Rausch in Succulenta 50: 193 (1971).
Lobivia cinnabarina ssp. **taratensis** (Cardenas) G. Rowley, **stat. nov.** Basionym: *Lobivia taratensis* Cardenas in Cact. Succ. J. Amer. 38: 141 (1966).
Lobivia cinnabarina var. **oligotricha** (Cardenas) Rausch ex G. Rowley, **stat. nov.** Basionym: *Lobivia oligotricha* Cardenas in Cactus (Paris) 18 (78): 92 (1963).
Lobivia cinnabarina var. **taratensis** (Cardenas) G. Rowley, **stat. nov.** Basionym: *Lobivia taratensis* Cardenas in Cact. Succ. J. Amer. 38: 141 (1966).
Lobivia formosa var. **orurensis** (Cardenas) G. Rowley, **comb. et stat. nov.** Basionym: *Trichocereus orurensis* Cardenas in Fuau. Herb. Bull. 1, 5: 13 (1953). Syn. *T. orurensis* var. *albiflorus* Cardenas, ibid., 16; *T. bertramianus* Backeb., Blatter f. Kakteenf. 1935: 6 (1935); *L. formosa* var. *bertramiana* (Backeb.) Rausch, *Lobivia* 3: 164 (1977).
Lobivia formosa var. **poco** (Backeb.) G. Rowley, **comb. et stat. nov.** Basionym: *Trichocereus poco* Backeb. in Backeb. & F. Knuth, Kaktus-ABC, 412 (1935). Syn. *T. poco* var. *fricianus* Cardenas in Fuau. Herb. Bull. 1, 5: 11 (1953); *Cereus tarijensis* Vaupel in Monatsschr. Kakteenk. 26: 123 (1916).
Lobivia haematantha var. **elongata** (Backeb.) Rausch ex G. Rowley, **stat. nov.** Basionym: *Lobivia elongata* Backeb., Descr. Cact. Nov. [1]: 29 (1956).
Lobivia haematantha var. **fehseri** (Rausch) Rausch ex G. Rowley, **stat. nov.** Basionym: *L. hualfinensis* var. *fehseri*

Rausch in Succulenta 51: 123 (1972).

Lobivia haematantha var. **hualfinensis** (Rausch) Rausch ex G. Rowley, **stat. nov.** Basionym: *Lobivia hualfinensis* Rausch in Kakt. u. a. Sukk. 19: 67 (1968), nom. inval. (Art. 37); *ibid.* 21: 45 (1970), cum typ.

Lobivia haematantha ssp. **chorrillosensis** (Rausch) Rausch ex G. Rowley, **stat. nov.** Basionym: *Lobivia chorrillosensis* Rausch in Kakt. u. a. Sukk. 25: 145 (1974).

Lobivia haematantha ssp. **densispina** (Werderm.) Rausch ex G. Rowley, **stat. nov.** Basionym: *Lobivia densispina* Werderm. in Kakteenk. 1934: 142 (1934).

Lobivia haematantha var. **pectinifera** (Wessner) Rausch ex G. Rowley, **stat. nov.** Basionym: *Lobivia pectinifera* Wessner in Jahrb. Deuts. Kakt.-Ges. 1940: 13 (1940).

Lobivia haematantha var. **rebutioides** (Backeb.) Rausch ex G. Rowley, **stat. nov.** Basionym: *Lobivia rebutioides* Backeb., Blatter f. Kakteenf. 1934: 12 (1934).

Lobivia haematantha var. **sublimiflora** (Backeb.) Rausch ex G. Rowley, **stat. nov.** Basionym: *Lobivia sublimiflora* Backeb., Blatter f. Kakteenf. 1935: 9 (1935).

Lobivia haematantha ssp. **kuehnrichii** (Fric) Rausch ex G. Rowley, **stat. nov.** Basionym: *Lobivia kuehnrichii* Fric in Kaktusar 2: 83 (1931).

Lobivia haematantha var. **amblayensis** (Rausch) Rausch ex G. Rowley, **stat. nov.** Basionym: *Lobivia amblayensis* Rausch in Kakt. u. a. Sukk. 23: 67 (1972).

Lobivia haematantha var. **drijveriana** (Backeb.) G. Rowley, **stat. nov.** Basionym: *Lobivia drijveriana* Backeb. in Der Kakteenfreund 2: 91 (1933). Syn. *L. drijveriana* var. *aurantiaca* Backeb., Blatter f. Kakteenf. 1934: 5 (1934); *L. kuehnrichii* Fric

in Kaktusar 2: 83 (1931).

Lobivia huascha var. **rubriflora** (F. A. C. Weber) G. Rowley, **comb. nov.** Basionym: *Cereus huascha* var. *rubriflorus* F. A. C. Weber in Monatsschr. Kakteenk. 3: 151 (1893). Syn. *C. andalgalensis* F. A. C. Weber ex Schumann, Gesamt. Kakt. 168 (1897).

Lobivia maximiliana ssp. **caespitosa** (J. Purpus) Rausch ex G. Rowley, **comb. et stat. nov.** Basionym: *Echinopsis caespitosa* J. Purpus in Monatsschr. Kakteenk. 27: 120 (1917).

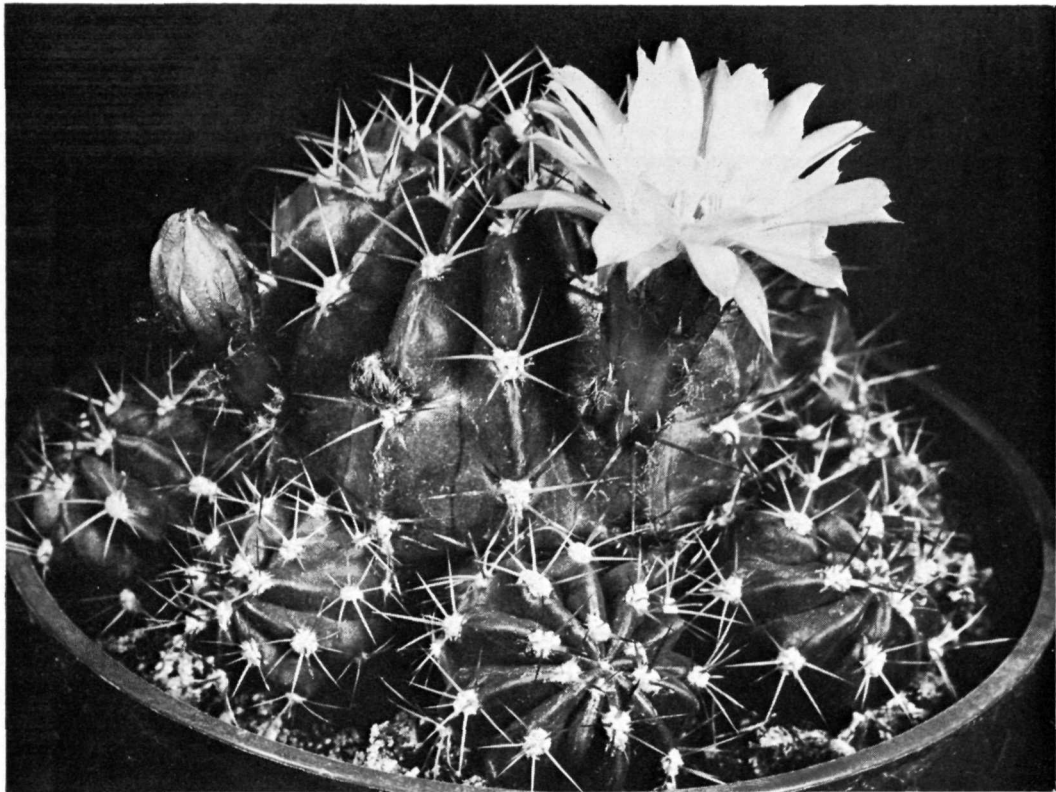
Lobivia maximiliana var. **violacea** (Rausch) G. Rowley, **stat. nov.** Basionym: *L. caespitosa* var. *violacea* Rausch in Kakt. u. a. Sukk. 30 (7): 161-162 (1979).

Lobivia maximiliana ssp. **quiabayensis** (Rausch) Rausch ex G. Rowley, **stat. nov.** Basionym: *Lobivia quiabayensis* Rausch in Kakt. u. a. Sukk. 19: 22 (1968), nom. inval. (Art. 37); *ibid.* 21: 45 (1970), cum typ.

Lobivia maximiliana ssp. **westii** (Hutchison) Rausch ex G. Rowley, **stat. nov.** Basionym: *Lobivia westii* Hutchison in Cact. Succ. J. Amer. 26: 81 (1954).

Lobivia saltensis var. **emmae** (Backeb.) G. Rowley, **stat. nov.** Basionym: *Lobivia emmae* Backeb. in The Spine 1 (4): 109 (1948). Syn. *L. emmae* var. *brevispina* Backeb., op. cit.; *L. nealeana* Backeb. (1934); *L. saltensis* var. *nealeana* (Backeb.) Rausch, Lobivia 3: 132 (1977); *L. pseudocachensis* var. *cinnabarina* Backeb. in Backeb. & F. Knuth, Kaktus-ABC, 241 (1935), nom. inval. (Art. 36).

Lobivia tiegeliana var. **cinnabarina** (Fric) G. Rowley, **stat. nov.** Basionym: *L. graulichii* var. *cinnabarina* Fric in Kaktusar 2: 81 (1931). Syn. *L. fricii* Rausch (1973); *L. tiegeliana* var. *fricii* (Rausch) Rausch (1976).



Lobivia pentlandii

(photo: Margaret Martin)

Connoisseurs' Cacti

chosen by Nigel Taylor

19. *Rebutia heliosa* var. *cajasensis* (Lau 405)

The taxa belonging to the *Rebutia heliosa* Group (Section *Aylostera*) have recently been the subject of an investigation by Donald & Brederoo (*Ashingtonia* 3: 140–153, tt. 18–30. 1980), in which the variant illustrated here was named. Previously it had been identified as *R. albopectinata*, another member of this group, while material distributed in the USA was labelled *R. narvaecensis*. To make matters worse we are told that some cultivated stock has become confused with the related Lau 401 or *R. heliosa* var. *condorensis* Donald, loc. cit., tt. 19 & 21. Both of these are very attractive plants like typical *R. heliosa* itself. This group, which includes *R. suphuthiana*, *R. schatzliana*, *R. albiflora*, *R. pulvinosa* and *R. perplexa* in addition to those named above, is centred on the adjacent borders of the Bolivian Departments of Tarija and Chuquisaca. In their useful booklet on the genus*, Brian Fearn & Leslie Pearcy regard *R. heliosa* as one of the slower growing species, but consider that grafting is unnecessary and tends to elongate the otherwise compact stems. However, it may

enable more rapid propagation if seeds are not available (a likelihood since self-sterility is prevalent in this group). A cold winter rest enhances flowering and avoids massive heating bills—one of the many advantages of this genus to set beside their small size and fascinating diversity (although the latter is perhaps a high level of geographical variation rather than large numbers of species). Can we look forward to the appearance of a formal monograph of *Rebutia* one day, in which the many variants now named will find a stable identity and rank?

This is badly needed, since the proliferation of dubious 'new species' in *Rebutia* has outstripped even the splitting of *Melocactus* and *Discocactus*, with upwards of 100 new names published at specific rank since Marsden & Jackson's inglorious book appeared in 1968. Despite the many pages of quasi-taxonomic notes penned by one or two devotees of the genus, it remains to be seen what 'lumping' a realistic species-concept will bring; to extrapolate from Gordon Rowley's recent survey (see NCSJ 37(2): 43.1982), we might expect the number of *Rebutia* species to fall by 50–90%, leaving between 80 and 18 (and I would guess the lower figure is nearer the mark).

*See review in June 1982 issue, p. 45.



Rebutia heliosa var. *cajasensis* (Lau 405), three years from seed

(photo: Preston-Mafham)

Notes on *Huernia namaquensis*

by P. V. Bruyns*



Huernia namaquensis (Bruyns 1452) flowering in cultivation

(photo: Bruyns)

It has long been apparent that something ought to be done to clear up a measure of taxonomic confusion that surrounds the species *Huernia namaquensis*. In Namaqualand the names *H. namaquensis* and *H. herrei* are applied with more or less equal frequency to what is apparently the same taxon; in southern Namibia the name *H. hallii* is applied, again to more or less the same taxon and very recently (1980) a new name, *H. ovamboensis*, has been produced for what yet again seems to be this taxon from northern Namibia. An attempt is made in this article to render this situation more realistic and practical.

History of the Species Complex

Pillans, in 1930, first described *H. namaquensis* from specimens that he had collected in 1926 in the Holgat River Gorge near Alexander Bay (it is interesting to note that in 1976 this species was still growing there). During the mid-1930's it was collected a few times by H. Herre in a number of wide-ranging localities in the Richtersveld and as far east as Steinkopf. Herre collected specimens near Lekkering in 1933 and it was from this area that plants sent by him to White and Sloane were described by them as *H. herrei* and *H. herrei* var. *immaculata*.

Little was seen of either of these species until collections by various people were made starting from 1952

up to the present date. Considerable confusion exists as to which is which and for example plants from Holgat R. appear under *H. herrei* and some from Karrachab Poort at Lekkering under *H. namaquensis*. It is interesting to note, however, that no significant extension of the distribution range within the western Cape is made by any of these more recent collections.

The situation was further compounded by the description in 1958 of *H. hallii* by E. and B. M. Lamb. This was described from plants collected in 1955 by H. Hall near Grunau in Namibia. Little has ever been seen of this species and it is even inexplicably omitted from Huber's treatment of *Huernia* for the Prodrum Flora SWA (1967).

The final taxon involved here was described in 1980 by Dyer from a single specimen reputedly collected by J. Vahrmeyer near Ondangua in Ovamboland in northern Namibia. No records prior to this one exist of a related species from this area.

Huernia namaquensis Pillans in J. Bot. 68: 102 (1930). Type: Cape, Richtersveld, Holgat R. Gorge, Pillans 5155, collected 1926 (BOL!).

DESCRIPTION. Stems 1.5-6 cm. tall, 1-1.5 cm. thick, 4-5 angled with deltoid, compressed teeth 3-4 mm. long, pale green sometimes flecked with purple. Flowers in cymes of 1-4 from at or near the base of stems, usually appearing on younger growth. Pedicel 0.7-1.3 cm. long, glabrous. Sepals 3-7 mm. long, 2 mm.

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wide at base, lanceolate-acuminate, glabrous. Corolla 2-2.6 cm. in diameter; tube 6-10 mm. deep, 8-10 mm. in diameter at mouth, outside pale yellow, inside whitish-yellow to pale pinkish, spotted with purple or unspotted, papillate around mouth with obtuse papillae (c. $\frac{1}{2}$ mm. long) dotted with purple and usually terminating in a minute bristle; lobes about 5 mm. long, deltoid, convex above, often slightly reflexed towards apex, sinuses produced into 'intermediate lobes' 1-2 mm. long, deltoid. Outer corona 3-7 mm. in diameter, adpressed to base of tube with 5 variously shaped lobes—varying from deeply bifid to more or less entire—purple to bright yellow, extremities of lobes spiculate, teeth 1-1.5 mm. long. Inner corona 0.6-1.5 mm. long, each lobe with a rounded, often spiculate tip, somewhat thickened around base, incumbent on anthers and, if exceeding them, then produced into connivent-erect tips.

The available information indicates *H. namaquensis* to be a fairly widespread species. It occurs approximately from an east-west line through Steinkopf and Port Nolloth up to the Cunene River in the north and west of a line through Warmbad (Namibia) and Steinkopf. In the South African part of the distribution range it is relatively frequent but it can be regarded as rare in Namibia and only a single record exists of its occurrence north of Keetmanshoop (see distribution map).

Some problems are encountered in seeking relatives of *H. namaquensis* among the other members of the genus. Pillans and White & Sloane ally it to *H. brevirostris* var. *scabra*. However, the much broader disc of the corolla and hence different appearance of the flower in all forms of *H. brevirostris* make this unlikely. Of all the species of *Huernia* known to me *H. loeseneriana* Schltr. seems the closest. The corollas of these two are very similar in shape and size. The papillae inside the corolla have the same dense covering of spicules as is found in *H. namaquensis* (they are not glabrous in *H. loeseneriana* as the illustrations of Leach (1976) may lead one to believe) and they are also similar in shape (just somewhat thicker in *H. namaquensis*). The small bristle topping each papilla is also similar in both. It is also noteworthy that although the inner corona lobes are larger in *H. loeseneriana* than in the other, those of *H. namaquensis* are also often tipped with a small 'brush' of spicules. In suggesting this relationship I am going somewhat contrary to Leach's concept of this part of *Huernia* as expressed in the paper of 1976. *H. namaquensis* was not included there although it probably belongs with these species. At the same time the fact that subsp. *hallii* does not possess similar papillae to subsp. *namaquensis* does not lessen the close relationship between these two—in fact *H. brevirostris* N.E.Br. and *H. primulina* N.E.Br. are another pair of closely related species in which the papillae in the corolla differ considerably. This may indicate that, although many of the species discussed by Leach in this paper are closely related, this is not a suitable way to subdivide the genus.

Two subspecies are recognized:

Papillae on interior of corolla about $\frac{1}{2}$ mm. long, densely covering surface . . . subsp. **namaquensis**

Papillae on corolla less than $\frac{1}{4}$ mm. long, very scattered . . . subsp. **hallii**

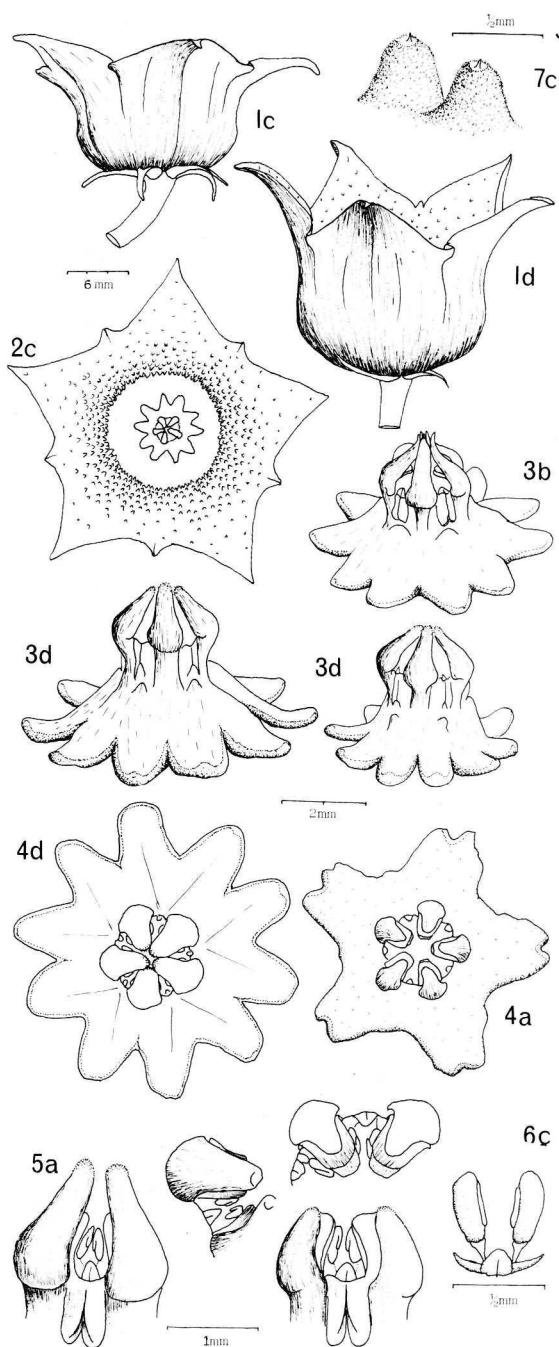


Fig. 1. *H. namaquensis* subsp. *namaquensis*. 1, side views of corolla; 2, face view of corolla; 3, side view of staminal column; 4, face view of staminal column; 5, arrangement of inner corona, anthers and pollinia from above and side; 6, pollinia; 7, papillae around mouth of corolla-tube. Drawn from a, Bruyns 1311 (Anenous Pass); b, Bruyns 1636 (Karrachab Poort); c, Bruyns 1452 (10 miles towards Eksteenfontein from Grasvlakte); d, Bruyns 2126 (1 mile S of Eksteenfontein).

subsp. **namaquensis**

H. herrei White & Sloane, The Stapeliaceae 3: 1179–1180 (1937).

Type: Part of White & Sloane's type material is preserved as an alcohol specimen at Kew: Lekkersing, Richtersveld, *H. Herre*, cult. B. L. Sloane, comm. 26 Aug. 1938 (K).

H. herrei var. *immaculata* White & Sloane, l.c. 1180.

Type: not known to exist.

H. ovamboensis Dyer in Bothalia 13(1): 136–137 (1980).

Type: Namibia, Ovamboland, *Vahrmeyer* in PRE 57730 (PRE!). (According to Mr. Vahrmeyer the locality is about 10 miles west of Ondangua).

DISTRIBUTION. NAMIBIA. 1715 (Ondangua): 10 miles W. of Ondangua (–DD), *Vahrmeyer* in PRE 57730 (PRE). This record must be considered subject to some doubt, for reasons given below.

SOUTH AFRICA. CAPE, 2816 (Oranjemund): Holgat R. Gorge (–BC), *Stayner* in KG 309/69; *Hughes* in NBG 633/51; *Hall* 580, 620, 559; *Wisura* 595, 1607 (NBG); 1928, *Pillans* 5155 (BOL); Remhoogte (–BD), *Herre* in Stellenbosch Univ. Garden (SUG) 6400 (BOL); Hellsloof (–BD), *Bayer* 392 (NBG), with pale yellow corona. 2917 (Springbok): Lekkersing (–AA), *Herre* in SUG 6962 (BOL), dark flowered form; Karrachab Poort (–AA), *Wisura* 1628 (NBG); 8 miles NW of Steinkopf (–BA), *Bayliss* in NBG 807/61 (NBG); Anenous Pass (–BA), *Hall* 908, *Bruyns* 1311 (NBG); Steinkopf (–BD), *Herre* in SUG 6402 & 6958 (BOL), form without spots.

In the southern portion of its range, i.e. the Richtersveld, it occurs in granitic or quartzitic soils (a few localities, for example, the Holgat R. are dolomite) on rocky slopes or on top of mountains. It generally occurs in full sun sometimes making some attempt, though, to avoid the merciless elements of this region by creeping into crevasses and cracks between rocks. In this area it is a fairly common plant, forming dense clusters of reddish stems which are quite easy to see.

From here there is a complete break in the recorded distribution until the type locality of *H. ovamboensis* is reached in Ovamboland. This extra-ordinary break in the distribution is made the more amazing by

1. there being no morphological or floral differences between this and subsp. *namaquensis* and
2. the fact that it was found growing in 'sandveld'. If anywhere in this region is suitable for *H. namaquensis* it must be the arid mountains of the Kaokoveld rather than the 'pancake-flat', seasonally flooded savannah of Ovamboland.

There is therefore good reason to consider this locality subject to some doubt and it may possibly be the result of a confusion of labels.

Subsp. *namaquensis* is a variable species in many respects. Stems vary from 2–6 cm. long depending mostly on the amount of shelter received. However, even when very compact, the angles on the stem are often twisted and this, the rather prominent axillary buds above each tubercle and the rather broad upper surface of the tubercles (just below the bud) make the stems fairly distinctive.

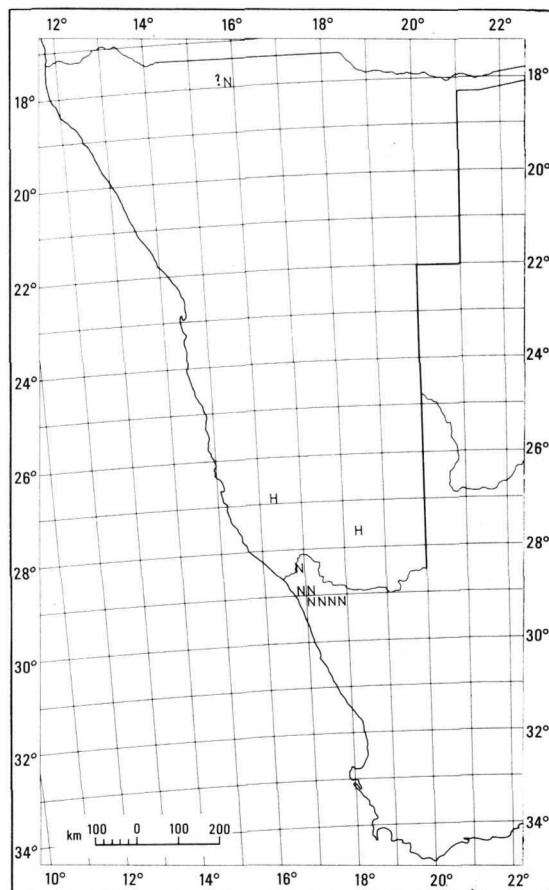


Fig. 2. Distribution map. N= subsp. **namaquensis**; H= subsp. **hallii**.

The flower varies very little in size although a few specimens were examined in which the tube was deeper than usual. Apparently the least variable character is the shape and size of the papillae found over most of the corolla surface.

Considerable emphasis has, in the past, been placed on flower colour and features of the coronas. Both these characters have proved very unreliable on an examination of specimens for this study. The colour varies from very pale yellow or pale pink throughout, to a background of these colours with purple spots or lines of variable size and intensity. Likewise the corona lobes turned out to be far more variable than originally suspected. The outer corona ranges from 10 evenly divided lobes to a five-lobed structure where each lobe has a small notch in the apex. This range was found in specimens collected at a single locality. More significant, however, is possibly the considerable range found in the actual spread of the outer corona lobes which seems to be dependent on the depth of the corolla tube. The inner corona lobes range from entirely hiding the anthers and

meeting in the centre to having a considerable part of the anthers exposed and not meeting at all.

The description and photographs accompanying the description of *H. herrei* by White & Sloane (1937), clearly show that it fits within the above concept of subsp. *namaquensis*. Collections made around the type locality given by the authors have proved to be none other than subsp. *namaquensis*. The var. *immaculata* was distinguished by its colour the corolla lacking the purple markings of the typical variety. This is felt to be a pointless distinction in view of the considerable variation seen and the necessity then to describe further colour variants.

In describing *H. herrei*, White & Sloane ignored its relationship to *H. namaquensis* and one can only assume that the latter was entirely unknown to them. It is quite possible that the photograph of Luckhoff's used to illustrate *H. namaquensis*, which shows an only partially open flower, also confused the issue.

H. owamboensis, described from a single specimen, is not related by its author to any other known species. Distinctive features given are:

1. 'small size of stem and flowers'
2. the 'delicate pink colour of the flowers'
3. the 'evenly 10-toothed outer corona'

A closer examination of the facts indicates that it is anything but distinctive and none other than subsp. *namaquensis*. Scrutiny of the type specimen and the type plant in cultivation showed that the stems and flowers were typical of those encountered in subsp. *namaquensis* both in shape and size; the colour of the flower is easily accommodated within the known range of subsp. *namaquensis* and the outer corona was of a shape fairly usual for subsp. *namaquensis*.

I do not believe in basing a taxon of any rank purely on a difference in distribution (if this even exists in this case) or habitat (or both) from its congeners. Thus this species is placed under subsp. *namaquensis*.

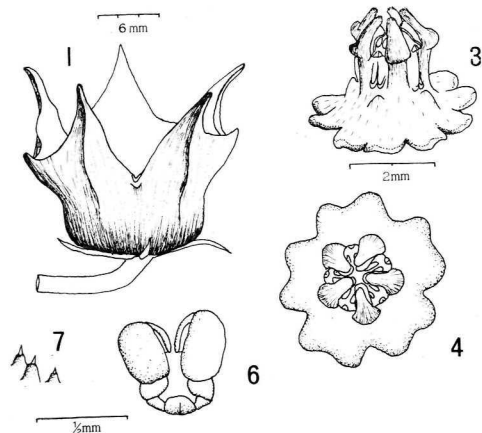


Fig. 3. *H. namaquensis* subsp. *hallii*, drawn from Bruyns 1474 (8 miles S of Aus). For key to figures, see fig. 1.

subsp. **hallii** (E. & B. M. Lamb) Bruyns, **stat. nov.**
 Basionym: *Huernia hallii* E. & B. M. Lamb in Nat. Cact. Succ. J. 13(3): 57 (1958). Type: Namibia, Grunau, Hall s.n. in Lamb 948/9. This was originally divided into two portions (Hall, pers. comm.), one used for the Lambs' description and intended in part to be sent to Kew as holotype, and the other grown at Kirstenbosch. Enquiries at Kew have shown that no material was lodged there and material at NBG from the original collection is therefore designated as neotype: NBG 511/55.

DISTRIBUTION. NAMIBIA. 2616 (Aus): 8 miles S of Aus (-CD), Bruyns 1474 (NBG). 2718 (Grunau): Grunau (-CB), Hall in NBG 511/55 (NBG).

A few records have been made from the vicinity of Grunau and a photograph in Rawe (1968), taken near Aus, probably also represents this subspecies. The collection used here to illustrate it was made on the summit of the high mountains south-east of Aus and although only one plant was found, it ought to be fairly widespread in this area. Since nothing more is known about it, it is not known whether or not it intergrades with subsp. *namaquensis* nearer the Orange River.

The Lambs distinguished their species from *H. namaquensis* by:

1. the smaller flowers
2. the less deeply bifid outer corona and
3. the inner corona lobes not having erect tips nor meeting in the centre.

The first point is not of any value since flowers of the size given by them are encountered often in *H. namaquensis*. Variation found in the specimens examined of subsp. *namaquensis* has also shown the third point to be invalid (see illustrations). In the case of the second, Lamb's drawing certainly indicates an outer corona far shorter than anything I have seen in subsp. *namaquensis* but my own collection (1474) has a far more considerable outer corona than does theirs. The examination of further material will almost certainly show also this distinction to be unreliable.

However, the Lambs appear to have missed what I feel is a reliable feature. They state in the description that the papillae on the corolla of *H. hallii* are 'minute'. This can scarcely be said for those of subsp. *namaquensis* where they are clearly visible to the naked eye. The specimen from Aus showed this clearly—the papillae were very scattered, tiny and tipped with a cone-shaped structure rather than a fine bristle. This feature is used to distinguish this subspecies from the typical one.

References

- HUBER, H. 1967. *Asclepiadaceae* in Merxmüller, Prodr. dromus Flora SWA.
 LEACH, L. C. 1976. Review of the prominently papillose *Huernia* species. In J. S. Afr. Bot. 42(4): 439-487.
 RAWE, R. 1968. Succulents in the Veld. Cape Town.
 WHITE, A. & SLOANE, B. L. 1937. The *Stapelieae* ed. 2, vol. 3. California.

The Conservation Status of Mexican Mammillarias: a preliminary assessment

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Introduction

During 1981, I was asked to assist with a project to assign IUCN Red Data Book categories (see Hunt, 1982) to individual species of Mexican Cactaceae, commencing with the genus *Mammillaria*.

To make an objective assessment of the degree to which any taxon may be threatened it is clearly necessary to have detailed information on its distribution, population-size, breeding system and age-structure, coupled with comprehensive knowledge of the habitat and any factors causing instability or threat. For *Mammillaria* species, such data is extremely sparse. All that is at present possible, therefore, is 'intelligent guesswork' on the basis of whether a species is known to occur over a relatively wide range, or from one area or population only; whether or not it is collected for trading or generally grown from seed; and whether or not the habitat itself seems under any immediate or potential threat of destruction.

On this basis of preliminary assessment, about one-third of the total endemic taxa (209 species and subordinate taxa) currently recognized by me (Hunt, 1981) appear to be relatively widespread and 'not threatened', one-third restricted or rare, and one-sixth 'vulnerable'. The remaining one-sixth I regard as insufficiently known for lack of basic taxonomic or distributional data.

An exercise such as this brings home to one very painfully the lack of documentary distributional and environmental information on what is, by common consent, the most popular of cactus genera in cultivation. The lack of preserved voucher material, including type specimens, for the Cactaceae as a whole is proverbial, and even when documented living material and illustrations, and reliable literature references, verbal reports and first-hand observations are taken into account, the 'data-base' is extremely small. Nevertheless, one has to begin somewhere, and I have done so by

assigning each of the endemic Mexican taxa to one of the four categories mentioned in the previous paragraph.

The table summarizes the totals for each category, plus a total for non-endemic taxa. The lists which follow record the names of the taxa placed in each category in the preliminary assessment.

Notes on the lists

List 2. 'Restricted/rare', does not necessarily mean 'few in number of individuals', but that the actual distributional data, or inference from the type of habitat in which the taxon occurs, suggests it may be narrowly endemic. The high proportion of subordinate taxa placed in this category is to be expected, since most such taxa are geographical variants of narrow range.

Many *Mammillarias* are positively known from a single locality or collection, or in cultivation only. As a 'rule of thumb', I have placed many of those described up to about 1945, i.e. included in Craig's *Mammillaria Handbook*, as 'Insufficiently Known'. The more recent species known from one locality only, and better-documented older ones, I have treated as rare, since the available information seems more reliable.

List 3. 'Vulnerable' species as here understood, are those of restricted distribution which are prized by collectors and in some cases known to be seriously depleted by collecting. In some cases, the decision whether to include a species on the 'Vulnerable' rather than the 'Rare' list is more subjective than others. Few would argue, for instance, that *M. pectinifera* should be on the 'Vulnerable' list, and some regard it as 'Endangered'. The IUCN definition of this category is interpreted to include 'species with populations so critically low that a breeding collapse due to lack of genetic diversity becomes a possibility'. I very much doubt that *M. pectinifera* is depleted to this extent. More likely candidates for the 'Endangered' category seem to me 38b. *M. louisiae*, 98c. *M. aureiceps*, 113a. *M. sanangelensis* (described since the compilation of my 1981 list) and 119b. *M. yucatanensis*.

List 4. 'Insufficiently Known'. These are mainly species described sometime ago which are of interest to collectors but for which distributional data is particularly sparse or vague. The dual inference is that they may be rare or restricted, and might be vulnerable if they were more accessible. There are also some whose taxonomic status is uncertain.

List No.	Category	Recognized species	Subordinate taxa	Total
1	Not threatened	58	11	69
2	Restricted/rare	42	28	70
3	Vulnerable	24	11	35
4	Insufficiently known	28	7	35
5	Not endemic	17	7	24
	Total taxa	169	64	233

LIST 1. Not threatened (nt)

Species (numbering as in Hunt, 1981):

1. *M. candida*
2. *M. beneckeii*
3. *M. longimanima*
12. *M. poselgeri*
13. *M. senilis*
23. *M. barbata*
28. *M. fraileana*
29. *M. occidentalis*
30. *M. mazatlanensis*
31. *M. sheldonii*
36. *M. schumannii*
42. *M. armillata*
43. *M. phitauiana*
53. *M. sinistrophamata*
54. *M. mercadensis*
55. *M. jaliscana*
56. *M. zacatecasensis*
61. *M. erythrosperma*
62. *M. bocasana*
64. *M. leucantha*
66. *M. pygmaea*
68. *M. wildii*
75. *M. picta*
76. *M. vetula*
77. *M. gracilis*
91. *M. spachelata*
94. *M. elongata*
96. *M. densispina*
98. *M. rhodantha*
99. *M. polythele*
101. *M. discolor*
105. *M. spinosissima*
106. *M. nunezii*
108. *M. rekoii*
112. *M. ericantha*
113. *M. haageana*
118. *M. albilanata*
120. *M. geminispina*
121. *M. perbella*
124. *M. muhlenpfordtii*
127. *M. formosa*
128. *M. sempervivi*
135. *M. melanocentra*
136. *M. uncinata*
138. *M. petterssonii*
139. *M. gigantea*
140. *M. standleyi*
146. *M. sonorensis*
150. *M. scrippsiana*
151. *M. compressa*
152. *M. winterae*
154. *M. magnimamma*
155. *M. brandegei*
157. *M. baxteriana*
162. *M. karwinskiana*
165. *M. carnea*
166. *M. sartorii*
167. *M. mystax*

Subordinate taxa:

- 38a. *M. hutchisoniana*
- 49a. *M. guillauminiana*
72. *M. prolifera* var. *arachnoidea*
- 75a. *M. viereckii*
91. *M. sphacelata* var. *viperina*
- 98a. *M. fera-rubra*

- 98d. *M. pringlei*
- 99a. *M. kewensis*
- 118c. *M. tegelbergiana*
- 131c. *M. gummifera*
- 154a. *M. vagaspina*

LIST 2. Rare/restricted (R)

Species:

5. *M. melaleuca*
6. *M. baumii*
7. *M. carretii*
8. *M. surculosa*
11. *M. halei*
27. *M. yaquensis*
34. *M. insularis*
35. *M. boolii*
37. *M. blossfeldiana*
38. *M. goodridgii*
40. *M. multidigitata*
41. *M. capensis*
45. *M. angelensis*
46. *M. albicans*
47. *M. neopalmeri*
48. *M. fittkauii*
51. *M. moelleriana*
52. *M. pennispinosa*
58. *M. weingartiana*
59. *M. stella-de-tacubaya*
60. *M. mathildae*
- sub 68. *M. anniana*
69. *M. oteroi*
70. *M. glassii*
92. *M. tonalensis*
100. *M. wiesingeri*
102. *M. backebergiana*
103. *M. meyranii*
104. *M. matudae*
107. *M. guerrerensis*
110. *M. magnifica*
111. *M. xaltiangensis*
137. *M. rubrograndis*
144. *M. micgiana*
145. *M. tayloriorum*
148. *M. marksiana*
156. *M. peninsularis*
158. *M. petrophila*
159. *M. evermanniana*
160. *M. johnstonii*
161. *M. knippeliana*
168. *M. variaeaculeata*

Subordinate taxa:

- 10a. *M. maritima*
- 10b. *M. setispina*
- 28a. *M. slevinii*
- 30a. *M. patonii*
- 42a. *M. estebanensis*
52. *M. pennispinosa* var. *nazasensis*
- 66a. *M. pubispina*
70. *M. glassii* var. *ascensionis*
- 98b. *M. mollendorffiana*
- 99c. *M. obconella*
- 100a. *M. erectacantha*
- 101a. *M. esperanzaensis*
- 105a. *M. pilcayensis*
- 106a. *M. bella*
113. *M. haageana* var. *schmollii*
- 118a. *M. fuauixiana*
- 118b. *M. reppenhausenii*
- 119b. *M. yucatanensis*

- 128a. *M. pseudocrucigera*
- 131a. *M. gaumeri*
- 155a. *M. glareosa*
- 157a. *M. marshalliana*
- 162a. *M. nejapensis*
- 163a. *M. collinsii*
- 163c. *M. beiselii*
- 167a. *M. casoi*
- 167b. *M. huajuapensis*

LIST 3. Vulnerable (V)

Species:

9. *M. heidia*
14. *M. longiflora*
15. *M. saboae*
16. *M. theresae*
17. *M. napina*
18. *M. deherdtiana*
20. *M. guelzowiana*
24. *M. zephyranthoides*
80. *M. plumosa*
81. *M. carmenae*
82. *M. schiedana*
83. *M. humboldtii*
84. *M. laui*
85. *M. lenta*
86. *M. aureilana*
87. *M. herrerae*
88. *M. pectinifera*
89. *M. solisioides*
90. *M. krachenbuehlii*
114. *M. supertexta*
115. *M. crucigera*
116. *M. huitzilopochtli*
117. *M. dixanthocentron*
123. *M. klissingiana*

Subordinate taxa:

14. *M. longiflora* f. *stampferi*
15. *M. saboae* f. *haudeana*
15. *M. saboae* f. *goldii*
18. *M. deherdtiana* var. *dodsonii*
21. *M. wrightii* f. *wolfii*
- 38b. *M. louisiae*
- 82a. *M. dumetorum*
84. *M. laui* f. *dasyacantha*
84. *M. laui* f. *subducta*
- 98c. *M. aureiceps*
- (113a.) *M. sanangelensis*

LIST 4 Insufficiently known (K)

Species:

10. *M. pondii*
39. *M. swinglei*
49. *M. zeilmanniana*
50. *M. bombycina*
57. *M. rettigiana*
63. *M. aurihamata*
65. *M. nana*

References

- HUNT, D. R. (1981). Revised Classified List of the genus *Mammillaria*. In CSJGB 43(2/3): 41-48.
- (1982). Whatever happened to Conservation? In CSJGB 44(2): 31-35.

67. *M. painteri*
71. *M. schwarzii*
73. *M. pilispina*
74. *M. albicoma*
79. *M. magallanii*
95. *M. microhelia*
97. *M. decipiens*
109. *M. duoformis*
122. *M. hahniana*
125. *M. parkinsonii*
126. *M. chionocephala*
132. *M. grusonii*
133. *M. zeyeriana*
134. *M. coahuilensis*
141. *M. hertrichiana*
142. *M. lindsayi*
143. *M. canelensis*
147. *M. bocensis*
149. *M. craigii*
153. *M. rosealba*
164. *M. polyedra*

Subordinate taxa:

3. *M. longimamma* var. *uberiformis*
- 13a. *M. diguetii*
- 63a. *M. longicoma*
- 97a. *M. campotricha*
- 99b. *M. durispina*
- 101b. *M. schmollii*
- 134a. *M. albiarmata*

LIST 5. Not endemic/not Mexican (none threatened in Mexico)

Species:

4. *M. sphaerica*
19. *M. tetrancistra*
29. *M. wrightii*
22. *M. viridiflora*
25. *M. mainiae*
26. *M. thornberi*
32. *M. microcarpa*
33. *M. grahamii*
44. *M. dioica*
72. *M. prolifera*
78. *M. lasiacantha*
93. *M. pottsii*
119. *M. columbiana*
129. *M. mammillaris*
130. *M. nivosa*
131. *M. heyderi*
163. *M. voburnensis*

Subordinate taxa:

21. *M. wrightii* var. *wilcoxii*
72. *M. prolifera* var. *haitiensis*
72. *M. prolifera* var. *texana*
- 119a. *M. ruestii*
- 131b. *M. hemisphaerica*
- 131d. *M. meiacantha*
- 163b. *M. eichlamii*

Comments on Rizzini's 'Melocactus no Brasil'

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Kew, Richmond, Surrey

Brazilian botanist Carlos Toledo Rizzini has kindly sent us his 142-page account of *Melocactus* in Brazil*, which deserves some comment in view of the recent notes on the genus by the present author. Rizzini presents a diverse study, including aspects of general morphology, regeneration and vernacular nomenclature, a general bibliography and a systematic part accompanied by more than 50 excellent half-tone illustrations, many depicting plants in the field.

The systematic part (p. 45 ff.) is of particular interest since the views expressed are based on observations of populations in habitat, whereas my own 'Notes on the genus *Melocactus* (1): E. Brazil' (CSJGB 42: 63-70, 1980) were based on a study of the literature and field-collected type-material only. Rizzini has followed the majority of my suggestions on the synonymy of Buining's microspecies, but did not see my more recent 'Additional notes' (CSJGB 44: 7-8, 1982) before his book went to press. Though his treatment is not entirely comprehensive (he ignores a number of relevant validly published names), he does consider most of the distinctive taxa in Brazil, and recognizes 13 species, including *M. neryi* from north of the Amazon. I will list the species as they appear in his book and comment as far as I am able on the circumscription adopted.

1. *M. oreas*. Rizzini includes the synonyms given by me, l.c. (1982) but, with the exception of *M. bahiensis* (*M. oreas* var. *bahiensis* Rizzini, comb. inval.), arranges the infraspecific taxa differently. He sinks *M. cremnophilus* and *M. florschuetzianus* into the type variety without distinction, but also includes *M. longicarpus* which is not related (see no. 3). *M. rubrisaetosus* is accorded varietal rank and the new var. *submunitis* described from Rui Barbosa, Bahia. Unfortunately Rizzini pays little attention to the ICBN and all his new names and transfers are invalid for one reason or another.

2. *M. conoideus* is treated as a species with close links with the above, a view that seems reasonable.

3. *M. deinacanthus*. The last remark applies once again, but here Rizzini seems to have missed the obvious relationship of *M. longicarpus* and *M. mulequensis*, which I regard as synonyms of this distinctive species.

4. *M. azureus*. Here Rizzini has taken what is probably a very broad view of the species, although I do not wish to suggest that this is necessarily a bad thing. In effect he

includes all the names I list for *M. levitestatus* under *M. azureus* without distinction. However, *M. azureus* with its more obvious synonyms, *M. ferreophilus* and *M. pachyacanthus*, would appear to differ consistently from *M. levitestatus* sens. lat. in characters of spination and flower-colour. If these two should be combined then it will be desirable to treat the latter as a well marked variety or subspecies. Incidentally the name *M. warasii* was validly published by Pereira & Buenecker in *Bradea* 2(30): 213 (1977) and is not merely a provisional name as I had believed.

5. *M. zehntneri*. Rizzini includes *M. curvicornis* (*M. giganteus*) in his concept, but excludes the smaller growing *M. macrodiscus* and its synonyms. This seems rather inconsistent in comparison to his lumping within *M. azureus*, and I am unable to see any justification for their separation other than on habit.

6. *M. macrodiscus*. See above.

7. *M. salvadorensis*. This is a taxon of uncertain affinity, but the typical plant (from near Salvador) is quite distinctive on account of its slender, pale purplish fruit; it is illustrated by Buining in Krainz, *Die Kakteen*, Lfg 54 (1973). Here Rizzini includes *M. brederooianus* as suggested in my original article. However, I now prefer to see this younger name and its subordinates, as in Taylor (1982), given separate status.

8. *M. lensselinkianus* is recognised by Rizzini, with *M. griseoloviridis* as a synonym (cf. Taylor, l.c. 66, 1980). This treatment may well be correct but the position of *M. brederooianus* sens. lat. needs to be resolved. It may be an older name for this plant as suggested in my recent paper.

9. '*M. margaritaceus*' (Rizzini, sp. nov.). This is an interesting plant with white fruits, suggesting its placement near *M. azureus*, in my Group 1. However, until its seeds have been examined such a relationship must remain doubtful. The plant is growing in a similar habitat to *M. violaceus*, but is perhaps closest to *M. depressus* (cf. Strecker in KuaS 31: 330-333, 1980). The name *M. margaritaceus* Rizzini is invalid for lack of citation of type (Art. 37), as are the two varieties he names.

10. '*M. melocactoides*'. Unfortunately Rizzini insists on retaining this name, which I have disposed of on the grounds that all we know about its typification is that it was supposed to have come from Brazil. Including *M. violaceus* and *M. depressus*, he elaborates a rather complicated system of forms and varieties, some of them new (but invalidly published). The range this

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complex has achieved along the coast from Rio northward explains the infraspecific diversity, assuming, of course, that we are actually dealing with just one species, which I rather doubt. Whatever the case, Rizzini provides some interesting illustrations of this taxon and its varieties.

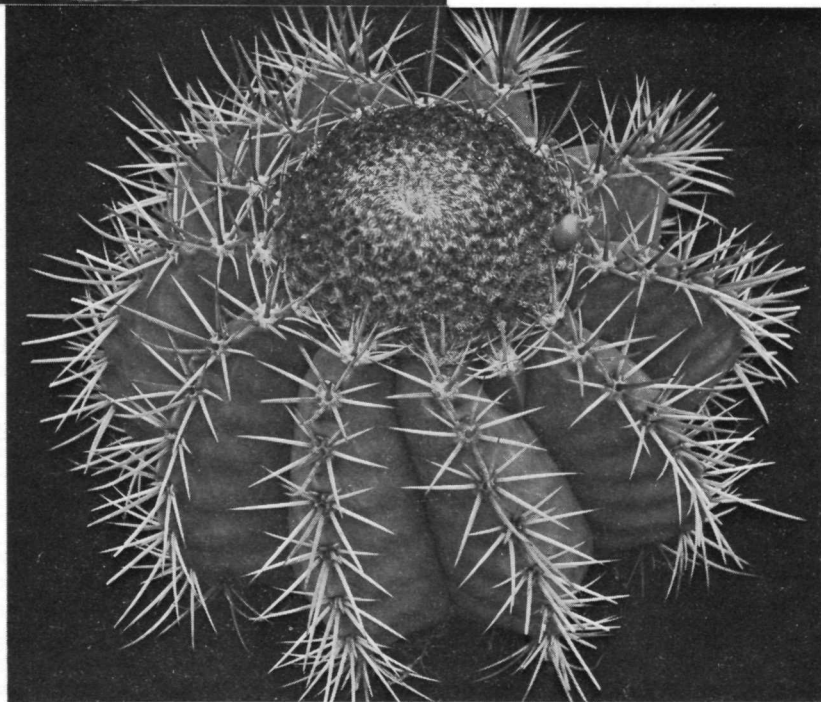
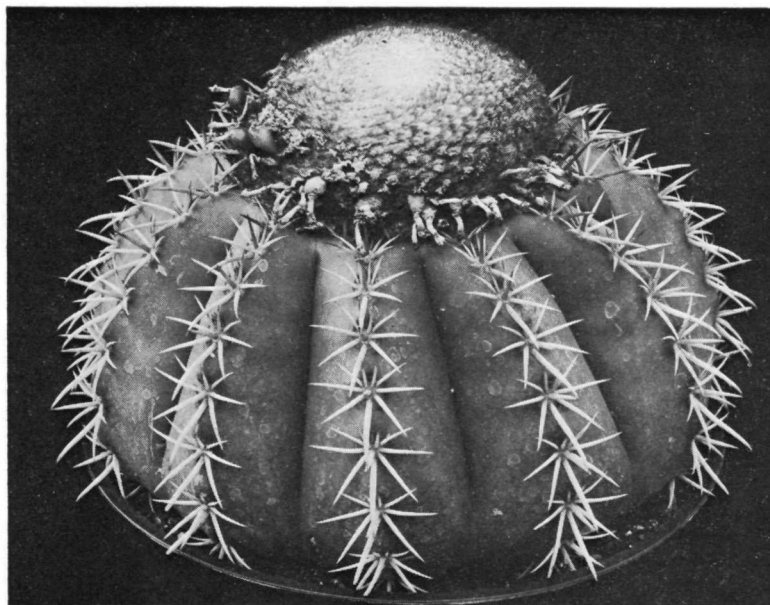
Rizzini lists three more species in his key (pp. 47-49)—*M. glaucescens*, *M. concinnus* & *M. neryi*—but does not

consider them any further. The first is quite distinctive and at present known from one locality only. The second and third occur inland but come near the coastal *M. violaceus* in character, as do the disjunct *M. schulzianus* Buin. (Surinam) and *M. matanzanus* Leon (N. Cuba).

Melocactus enthusiasts are strongly recommended to obtain this book.

Melocactus conoideus

(photo: Tribble)



M. lensselinkianus

(photo: Tribble)

The Name Game again

The Rule-Book has been rewritten !

by D. R. Hunt

Last year Will Tjaden penned a piece in the National Cactus & Succulent Journal (vol. 36: 87. 1981) entitled 'Nomenclature is a Bore', a tongue-in-cheek title presumably chosen to reflect the majority viewpoint, since, judging from the amount of time and effort he himself gives to it, it is obviously one of his happiest pursuits!

Even at Kew, Will would probably find a large majority of the botanists in agreement with his title, though some, like me, might be inclined to change it to 'Nomenclature is a chore', or something like that. The purpose of Nomenclature, that is to say the rules of nomenclature embodied in the International Code, is clear enough, and completely unobjectionable: to provide a simple, universal, precise and stable system of naming plants, to put the nomenclature of the past into order and to provide for that of the future.

Once upon a time the rules were reasonably simple, but they weren't universal, precise or stable. From 1930, when the American and European schools of thought were finally reconciled at the Cambridge Congress, they can be said to have become universal, even though certain cactologists may have considered themselves above the law. Since 1950, when the Code assumed its present general format, they have been gradually getting more and more precise. Revision is possible every four years at successive International Botanical Congresses. Unfortunately, precision is being achieved at the expense of simplicity. One of the most trying problems is that several different rules or 'Articles' may have a bearing on a particular case, with resultant scope for the legalistically-minded to play off one rule against another.

Because of the Code's increasing complexity, most recent Congresses have been reluctant to make any but the most minor changes, and so it began to look as if the Code would at least be universal, precise and stable, though not simple.

The Sydney Congress, held in August 1981, may have changed all that. It was the first International Botanical Congress in the southern hemisphere, which could be why they turned everything upside down; or maybe it was the effect of Australian beer.

Anyway, as Gordon Rowley has lamented, the last edition of the International Code, published in 1978 at about £18, is now completely out-of-date, and the printers will be rubbing their hands.* Undoubtedly, the rules are now more logical and precise than before,

but with several important changes and with innumerable matters in abeyance while being discussed by high-powered committees, the average botanist, even the minority who reckon to be *au fait* with the rules, will be brave to pronounce on any but elementary matters without first seeking legal advice from some acknowledged expert, and even the experts seem to disagree as often as they agree. The two Kew spokesmen try, I think, to present a united front, but one, an Irishman with a degree in law (formidable qualifications!) has the flexibility of a commonsense outlook, while the other, a 'northerner', is clear-headed, scrupulously logical, and inclined to give no quarter. An excellent balance, no doubt, but commonsense and logic do sometimes point in diametrically opposite directions!

That's enough of a cynic's-eye-view to be getting on with. What are the specific rule changes that affect us?

Not the most important from our point of view, but one that exemplifies both the abandonment of commonsense in favour of logic, and how one rule can negate another, is that concerning the typification of genera. The Code used to say 'the type of the name of a genus is a species', whereas, of course, the type of the name of a species is an individual specimen, etc. (Please remember that it is the *names* we coin that have to have types, not the species themselves; Nature doesn't know anything about the type method). The new ruling provides that the type of a generic name is also to be a *specimen*, usually the type specimen of the *name* of what was hitherto the 'type species'. This is a logical change, since it extends the idea of typification by a single specimen or element to the names of genera (and intermediate and higher ranks, incidentally) as well as species. Previously, names of genera were typified, not by a specimen, but by a *concept*, i.e. a particular species regardless of the name cited for that 'type species'. In the vast majority of cases, the change makes no practical difference, because there is no doubt as to what species an author intended as the type of his new generic name.

But consider the case of the Golden or Chinese Larch, which used to be called *Pseudolarix*, until an American, the late H. E. Moore, proposed a new generic name for it, *Chrysolarix*, in 1966. The Sydney ruling has at last vindicated Dr. Moore's argument. The problem with the name *Pseudolarix* is that although the author, George Gordon, clearly described the plant we know as the Golden Larch, and even identified herbarium specimens as such, he got its name wrong, due to an earlier misidentification by Lindley and others who got it muddled up with the Japanese larch, which

A talk given at the IOS British Section Meeting, Kettering, 25 April 1982.

*The new edition should be off the presses early in 1983.

is a species of *Larix* proper.

So, after proposing a new genus and generic name, *Pseudolarix*, for the Golden Larch, Gordon proceeded to cite the name of the Japanese larch, that is to say a name whose type is identifiable as the Japanese larch, not the Chinese Golden Larch.

Now, commonsense tells us it was a simple mistake and Gordon's intention was clear, to name a new genus for the Golden Larch, not the Japanese larch. But Dr. Moore and the logicians argued that of the two elements confused by Gordon, the Japanese larch was nomenclaturally the more important, since he actually cited it by name and used its specific epithet in a new combination. The new rule change supports this view: preference in the choice of a lectotype must be given to the type of a name cited by the original author. As things stand, therefore, *Chrysolarix* is the correct name.

In the Cactaceae, the case of *Mitrocereus* is, I think, almost exactly analogous but even more involved*. When Backeberg proposed the subgeneric and subsequently generic name *Mitrocereus*, he named the type as *Cereus chrysomallus*, which had long been misidentified with the species from near Tehuacan he thought he was talking about but was in fact the Grenadier's Cap, from Colima and Michoacan, currently known as *Backebergia militaris*. By the commonsense interpretation of the old rules and Backeberg's obvious intentions, the Tehuacan species later became *Mitrocereus fulviceps*, taking a specific epithet known to apply to it. Under the new ruling, I'm afraid, Buxbaum is vindicated in having 'transferred' the name *Mitrocereus* to the Grenadier's Cap, which must be known as *Mitrocereus militaris*, and in having coined *Pseudomitrocereus* for the Tehuacan plant, which is correctly, therefore *P. fulviceps*.

So, for once, Buxbaum apparently scores a clear victory over Backeberg. I wonder where they are fighting it out now. The fact is that unfortunately the war is not over yet. The *Pseudolarix*-*Mitrocereus* problem (and there are an estimated 50 similar cases) is actually no nearer a solution after Sydney than before. There seem to be two valid ways in which *Pseudolarix* and *Mitrocereus* could be restored to their intended use. The first, and more obvious, is by conservation, which in the nomenclatural sense, is the arbitrary preservation of a particular usage not otherwise sanctioned by the rules, generally to preserve a better-known name over a lesser, and obviate loads of new combinations where the name of a large genus is at risk. It is quite possible that conservation proposals would succeed in these cases, but I understand that the arguments would have to be individually presented for each case on its merits; no *en bloc* treatment for all the analogous cases can be countenanced.

The second and more curious, if not downright contradictory, provision of the rules which could be

invoked to preserve *Pseudolarix* and *Mitrocereus* is to be found in Article 8 which allows that a lectotype can be overruled if it is in conflict with the protologue. There is obviously such a conflict in the cases we are considering since the generic description (which alone constitutes the protologue in both examples) is of something other than the type of the species name cited—otherwise there would have been no problem in the first place.

So, after all the argument, we are back at square one.

There is, of course, one simple way round the *Mitrocereus* problem: let's join the lumpers and bury it in *Cephalocereus*!

To move on now to other rule changes, the one which will probably affect most cactus names is that concerning 'autonyms' and their priorability. When a species is divided into, say, two varieties, the typical variety, i.e. the one containing the nomenclatural type of the species, automatically repeats the specific epithet, so for instance, the typical variety of *Lobivia rossii* Boed. is *L. rossii* var. *rossii*. This is termed an autonym. Prior to the Sydney Congress these autonyms did not count for purposes of priority. Since, under a long-standing rule, no epithet has priority outside its own rank, this produced a very inconvenient anomaly. If, to use Gordon Rowley's example from 'Name that Succulent' an author decides that *Lobivia rossii* is no more than a variety of *L. pugionacantha* Rose & Boed., published a couple of years earlier, he might well fall into the trap of publishing the new combination *L. pugionacantha* var. *rossii*, as indeed Walter Rausch did. But in 1956 Backeberg had divided *L. rossii* into varieties, including var. *carminata*, *salmonae* and *sanguinea*. Under the rule as it stood and was quoted by Rowley, Rausch should have taken up one of the three epithets mentioned. Although var. *rossii* was already in existence, from 1956 by implication, the autonym had no status for priority. Now, however, the rule is changed so that an autonym does and must take priority over the name or names, epithet or epithets that brought it into existence, so *L. pugionacantha* var. *rossii* (Boed.) Rausch is now vindicated and correct. This rule-change is undoubtedly an advantageous one, but those who have had a whale of a time reducing species to varieties in recent years, notably Donald and Rowley, are now faced with quite a mess to unpick. Walter Rausch, though he's by no means 'in the clear', might well argue that where ignorance is bliss, 'tis folly to be wise.

The other point, a minor one, which will nevertheless irritate non-botanists as much as those, like me, who have been trying to apply the rules as they stood, concerns the spelling of adjectival specific epithets commemorating people whose names end in *-er*, like Boedeker, Berger and so on. For years we have been obliged to knock out the 'i' in *boedekeriana*, *zeyeriana* and so on and make them *boedekera*, *zeyerana*, *scheidweilerana* or what have you, under the impression

*See Sanchez-Mejorada in Cact. Succ. J. Amer. 45: 171-4 (1973).

that we were deferring to classical Latin usage. Not so. The genitive form is correct with only one 'i', hence *boedekerii*, not *bodekerii*, but the adjectival form is unclassical without an 'i'. The change back to what was customary for most amateurs till a few years ago (despite the ruling of the Code since 1905) was made at Sydney at the insistence of Professor William Stearn. He influenced the debate at Sydney by saying that 'too late to change' might apply to drunkards, drug addicts and the extremely aged but not to the delegates present. Another case where sailing on in ignorance of the rule may have had something to commend it.

I am not going to go into hybrid nomenclature, where the rules have been to all intents and purposes rewritten, and the term *nothomorph* has been dropped just as I was getting used to it, partly because hybrids don't concern us very much, and their one champion, Gordon Rowley again, has just delivered himself of a voluminous outpouring in the National Cactus & Succulent Journal, complete with details of the rule changes.

Nor is it very necessary to consider the implications of perhaps the most significant change of all to have been made to ICBN at Sydney. The wall of resistance to the idea of conserving specific names has finally been breached, after many years of argument, under the weight of the commonsense of stabilizing the botanical names of plants of major economic importance. None of our plants seems likely to qualify, and in any case, there will be no official list of conserved specific names until after 1987.

For anyone who would like to read about the Nomenclature sessions at Sydney, there is an intentionally light and racy account (by nomenclatural standards) in the February 1982 issue of the journal 'Taxon'. (Volume 31(1): 151-4. 1982). The author, Edward C. Voss, prefaces his article with a quotation from Christopher Smart's 'Jubilate Agno', published about 1760: 'For the right names of flowers are yet in Heaven. God make gardeners better nomenclators'. Amen to that!

Book Reviews

Lyman Benson. *The Cacti of the United States and Canada.* 1982. Pp. ix + 1044, 194 colour and 783 half-tone illustrations, 165 line drawings, 135 distribution maps and 65 text tables; hardback, 280 × 200 mm. (11 × 8½ inches). Stanford University Press, California. Price c.£50.

For its quality of production this book has few equals in the modern cactus and succulent literature. It is almost a local Britton & Rose, and just as authoritative in appearance, but like *The Cactaceae* its impressive opulence conceals a number of basic drawbacks. These may be scarcely apparent to the cactus enthusiast, who could be taken in by the abundance of colour and half-tone illustrations, and by the comprehensive, if not

exhaustive, introductory chapters. However, the more botanically inclined may feel a little cheated, for although at £50 the book is not overpriced, there is, nevertheless, a distinct lack of innovation throughout the systematic treatment Benson presents. This is not to deny that the level of information presented for each species is higher than in any comparable account of cacti, but simply to express disappointment in the lack of progress achieved in the fifty years of study which have been invested. If Benson's classification of N. American cacti is intended to take us into the next century we have a right to expect, as far as possible, an up-to-date, objective treatment. But with *Cereus* employed in a sense as broad as that of the 18th Century's Phillip Miller, and introductory chapters which seem largely to portray a view of cactus research in the 1960s, I doubt the claims that this is really the milestone we had hoped for.

Despite reservations one must bow to the achievement that the book represents. It contains a vast amount of information on all aspects of the cacti to be encountered in N. America north of Mexico, and will surely remain the major source of reference for many years to come. However, here we have a paradox: the less diverse assemblage of extra-Mexican Cactaceae are now much better known than their more numerous allies south of the Rio Grande, yet only when these Mexican plants and their relationships are well understood can we expect those north of the border to be accommodated in a satisfactory system. Why then was not more time, during the 50 years span of Benson's work, devoted to study of the Mexican allies of the quite thoroughly investigated cacti of the United States?

The book is set out in two parts preceded by a historical introduction. This brief insight into those who have furthered the cause of N. American cactology is interesting but decidedly biased towards its American exponents. Somehow Karl Schumann and Franz Buxbaum have escaped any mention at all, yet we owe both a considerable debt for their work, which in its way was the equal of that of Britton & Rose or Engelman. Part 1 is entitled 'Biology, Taxonomy and Ecology' and comprises twelve chapters of diverse content. General morphology, physiology and the chemical attributes of cacti are dealt with, followed, in Chapter 4, by a lengthy discussion in support of the view that the Cactaceae deserve their own Order in the supra-family hierarchy. This is an example of Benson's generally outdated viewpoint, which also surfaces in the short section on pollen morphology (p. 43), where there is no mention of Beat Leuenberger's comprehensive survey published in 1976. Although such examples are rather commonplace, it should not be assumed that all omissions are the fault of the author. It seems that there are very few text references dated later than 1976, and it may be gathered that the main part of the systematic treatment was closed to alteration in 1978. Hence

we must judge it from a 1978 standpoint and accept that a work of this size may be a little out-of-date when published. In a few years' time its protracted gestation will seem less of a handicap than it does now. However, it is less easy to make such an allowance for the outdated ignorance exposed by comments like those on the identity of Old World *Rhipsalis* in Chapter 9, 'Geographic Distribution and the Environment' (pp. 115–116), or for Benson's lack of awareness of the real value of seed studies in *Mammillaria* (cf. the quote from Shurly, p. 54). Chapter 10 takes up 80 pages with an elaborate discussion under the heading 'The Floras and Floristic Associations of North America'. Here one feels, not for the first time, that the author's background, which includes botanical textbooks of much wider scope, has resulted in overdevelopment of these albeit relevant issues. I have no such reservations about the chapters concluding Part 1, which consider the interesting and important issues of the uses of cacti and their conservation.

Part 2 begins on page 251 and comprises the systematic treatment backed up by an extensive documentation section (p. 910) compressed into small type. This is a wise arrangement whereby the essential, though admittedly somewhat dreary details of typification and synonymy, etc., are included but do not overburden or detract from the more useful diagnostic part of the text. The abundance of fine illustrations is unquestionably the mainstay of the systematic account, and in most cases they will greatly aid with identification, or its confirmation. Regrettably not all are correctly labelled: neither illustration purporting to represent *Coryphantha dasyacantha* var. *dasyacantha* is of this taxon. (Colour plate 176 depicts *Escobaria orcuttii* or *C. strobiliformis* var. *orcuttii* sensu Benson, while fig. 889 seems to be *E. (C.) vivipara*.) As already stressed, there is little novelty about the taxonomy Benson presents, although it is clear from the documentation section that many previously unstated details are now recorded, and this will aid future research considerably. Nomenclatural purists have cause to complain about the inconsistent author citations and frequent misuse of 'ex' and 'in'. Furthermore, the publishing author is often ignored in favour of the author who merely coined the name in question. Less excusable is the repeated mis-spelling 'wislizenii', which should have only one terminal 'i' as it is the genitive of Wislizenus, a Latin noun the International Code permits to be declined (2nd declension). Otherwise we would have to write it 'wislizenusii'. The same goes for the adjective *desertus*, which becomes *deserti*, not 'desertii' as Benson has it. However, the blemishes do not end here, for one species, the Eastern Prickly Pear, can be found under two 'correct' names: *Opuntia humifusa* on pages 438–442 & 923–924, but *O. compressa* in colour plate 38 and as the type species of the genus on page 911. Prof. R. A. Howard has recently shown the latter to be correct despite Benson's arguments to the contrary (cf. CSJA 53: 236. 1981). Indeed

his nomenclatural arguments have fallen on stony ground elsewhere in the book. For example, why is the name *Platyopuntia* invalid (p. 911), and how can the name *Coloradoa mesae-verdae* Boissvain be invalid under an article that refers to generic names when it is the specific epithet that needs to be hyphenated (p. 952)? Readers should note that the edition of the International Code used by Benson is now several years out-of-date, another unfortunate consequence of the delay in publication of this book, though the author can hardly be blamed for amendments necessitated by the most recent rule-changes (see Hunt's article elsewhere in this issue), such as that affecting *Echinocereus pectinatus* var. *neomexicanus*, which must now become var. *dasyacanthus*.

Those who abhor the 'name game' may choose to forgive the nomenclatural blunders noted above, but few would also forgive all Benson's taxonomic idiosyncracies as well. The 'back to Miller' treatment of *Cereus* has already been mentioned. Had Benson been guided by the studies of Buxbaum, his view that the cerei are at present beyond comprehension in terms of their generic classification, would be untenable (cf. p. 82). Fortunately his compatriots, Arthur Gibson & Karl Horak, have now brought much sense to the *Cereus* problem, in an excellent paper published in 1979 (Ann. Missouri Bot. Gard. 65(4): 999–1057). Their work clearly established that most of the large N. American cerei can be readily slotted into a handful of natural genera. It is a pity, and rather surprising, that there has not been more contact between workers in this field.

In contrast to his ultra-conservative attitude to *Cereus*, Benson has not hesitated to re-align the globular cacti occurring within the United States. Here I must recall the paradox already identified. Certainly Britton & Rose and Backeberg have erected too many genera, but brave is he who would put them back together without first giving every consideration to the wealth of Mexican cacti not found in the States. This is the only explanation I can suggest for the inconsistencies apparent in Benson's treatment, and for the many inaccurate statements therein.

Of the eighteen genera recognized by Benson, twelve cater for globular species. Though we are still some distance away from a concrete classification of this closely interrelated N. American group, I should like to draw attention to some of the issues Benson's 50 years of study have scarcely begun to resolve. Three genera seem quite acceptable as employed by him, but each has only one species in the United States. These are *Lophophora*, *Ariocarpus* and *Epithelantha* (*E. bokei* = *E. micromeris* by my reckoning). *Mammillaria* is also circumscribed according to modern authors, but its close ally *Escobaria* is submerged into the less related *Coryphantha*, all emphasis being placed on the presence or absence of the tubercular groove, which is only one of a number of characters involved. The simple division of these indehiscent juicy-fruited species into *Mammillaria* and *Coryphantha* is acceptable only when *Escobaria*

is sunk into the *former*. Otherwise three genera should be recognized and an uneven treatment avoided (cf. N. P. Taylor, *Die Arten der Gattung Escobaria*, KuaS, in press). Benson's circumscription of *Echinocactus* is most unsatisfactory. Two species certainly belong here (*E. polycephalus* and *E. horizionthalonius*), but surely the seeds alone of *E. asterias* demand its placement in, and the recognition of, *Astrophytum*. (It should be noted that this genus is yet another synonym of *Cereus* according to the list on page 260—one of many slips of the pen that have survived into the book.) *E. texensis* has a quite different fruit from the other two true *Echinocacti*, and has much more in common with part of the genus *Ferocactus*, viz. *F. hamatacanthus*. *Ferocactus* itself may soon be due for rearrangement. The type species, *F. wislizeni* has a dry interior to the fruit, which opens by a basal pore. This applies equally to *F. covillei*, *F. viridescens* and *F. cylindraceus* ('*F. acanthodes*' of Benson) and is correctly accounted for in the generic diagnosis on page 684. However, *F. hamatacanthus* and *Echinocactus* (*Homalocephala*) *texensis* have a fruit with a very juicy pulp at maturity and do not open via a basal pore. Seed characters correlate with these two fruit types and emphasize their significance. A future paper by the reviewer will deal with this subject in more detail.

The remaining genera—*Sclerocactus*, *Pediocactus*, *Thelocactus*, *Neolloydia* and *Ancistrocactus*—are all closely related and belong near the true species of *Ferocactus* (those with dehiscent fruits). In all of them, the fruit interior at maturity is either dry or pulpy, but not juicy, and it is commonly dehiscent. Taking all relevant Mexican taxa into account it is very difficult to delimit this complex into generic units, for although it includes considerable diversity there are virtually no significant discontinuities to utilize. However, Benson has maintained six genera of this affinity and so we are entitled to enquire whether these narrowly defined units are genuinely natural groups of species. Patently they are not, as is evident from consideration of the following Benson placings: *F. setispinus*—why in the narrow sense is this not an *Ancistrocactus*? Does *Neolloydia conoidea* really belong next to the *Echinomastus* spp. included with it? Indeed, how does '*Echinomastus*' differ from *Sclerocactus*? And what about *Pediocactus papyracanthus*—doesn't it have the seedcoat of a *Sclerocactus* rather than of a *Pediocactus*? For that matter, aren't seeds the only real difference between these two genera, both of which have received detailed study by Benson? Certainly it is hard to disagree with Gerald Arp's amalgamation of the two.

Leaving generic definition behind we come to Benson's species concept. Here I find myself in considerable agreement for the most part, since he has pursued an admirably conservative attitude towards this rank. Benson's penchant for defining species broadly but dividing them into numerous geographical varieties is certainly a more informed approach than the alternative of hordes of narrow species favoured by splitters like

Britton & Rose and Backeberg in the first sixty years of the century. But consistency is elusive: How can there be so many 'species' of *Sclerocactus* when there is only one species recognized for the *Echinocereus triglochidiatus*—*E. coccineus* complex? Likewise, how is the upgrading of *Ferocactus eastwoodiae* to be justified when the difference between *F. viridescens* and *F. cylindraceus* (*F. 'acanthodes'*) is less than certain in Baja California?

The above criticisms may seem in sour contrast to the fulsome praise bestowed on Benson's book by some dazzled (and not always entirely disinterested) reviewers. If nothing more, my remarks should warn the unwary that the book is not all it may seem, that it is not an overview of modern research nor new ground for the author himself. Nor is it in any way a practical book; its sheer size and fineness effectively prohibit its use as a field-guide or manual of identification. But as a testimony to one man's highly methodical study and documentation over half a century of part of a group hitherto shunned by orthodox taxonomists it is magnificent, and will undoubtedly gain a well-deserved place among the classics of succulent plant literature.

N. P. TAYLOR

Haage, Walther. *Kakteen von A bis Z*. Pp. 751, numerous photographs in colour and black and white and line drawings; 240×165 mm. Leipzig, Verlag Neumann. DM 85 (about £20). In German.

This is an attractively produced book which invites perusal, but I confess I am not clear that it merits any particular slot in a discerning enthusiast's library. Whilst the dictionary approach and price seem to put it among the reference books, there is rather little in the text to which one might feel compelled to refer in preference to Backeberg's *Cactus Lexicon* (in whose recent editions Haage has also had a hand) and general books on cultivation, etc. As an encyclopedia it seems to me too superficial: like a Chinese meal—plenty of bulk and variety but not very sustaining.

The alphabetic treatment of genera and species is on much the lines of Backeberg's *Cactus Lexicon*, though less concise and authoritative. With Backeberg one at least feels the information is first-hand, however much one disagrees with his taxonomy and method. None of the additional features by which Haage personalises his A–Z seem very useful to me: invented popular names; coded habitat data (based on the literature, not fieldwork, and often arbitrary if not actually off-beam); and miscellaneous specific epithets interpolated in the main alphabetic sequence and cross-referenced to the relevant genus or genera.

The classification appears broadly to follow Backeberg and takes little note of modern trends. There are inconsistencies too, e.g. seeds of '*Schlumbergera truncata(a)*' are illustrated on p. 617 but the species is included in *Zygocactus* on p. 748.

The dating of species descriptions is without apparent method: some are dated, some not, and there is no

documentation of e.g. type localities, places of publication, etc., essential nowadays to a serious student, amateur or professional.

Also in the one alphabetical sequence are articles on botanical terms and cultural methods, brief biographies of authors, collectors, etc. (often so short as to be virtually useless) which may make for happy browsing but little more. Standard works and journals are listed separately at the end of the book, but again the omissions, dating errors, etc., make the list unreliable.

The text is leavened with numerous attractive thumbnail sketches of plants, etc. These are without any indication of scale. Pests are also depicted without any indication of size. There are also numerous coloured half-tone pictures, useful for identification purposes but not of quite the quality of the Cactus Lexicon and some other recent works. The comparative plates of seeds (pp. 617-622) and portraits of personalities (pp. 412-416) are of interest.

Altogether my impression is of a well-intentioned, undigested, and rather old-fashioned miscellany, none too reliable or helpful in points of detail, a good deal less dry than (and without the polemics of) Backeberg, but unlikely to be a best-seller should there be an English edition.

D.H.



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