TEPHROCACTUS

Incl. Maihueniopsis, Cumulopuntia and related genera

Austrocylindropuntia verschaffeltii. Photo by Martyn Collinson.

STUDY GROUP

Vol. 6 No. 1 March 2000

Secretary's Page

Welcome to the New Millennium 2000! I hope the bug did not catch up with you! This is the start of Vol. 6 of our Journal and a big "Thank You" to all our members who continue to support the TSG. This year several new members have joined and I would like to wish them a hearty "Welcome", they are: Petr Czessal of the Czech Republic, Richard L. Marriot of Allestree, Derby, Bill Morris in Cambridgeshire, Bernard Werbrouck of Tournai, Belgium and Dr. Gottfried Gutte of Berlin. I hope they will all take an active part!

All articles and comment should be send to the co-editors:
Alan Hill, 8,Vicarage Road, Grenoside, Sheffield S35 8RG - or
William Jackson, 60, HardwickRoad, Sutton Coldfield, W. Midlands B74 3DL

MEMBERSHIP FEES were DUE 1. JAN. 2000

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From my Post Bag

From Switzerland
Cyril Hunkeler tells me...that he is experimenting with seed raising under artificial light, as the seasons in South America seasons are reversed to ours. Because seed of South African plants seem to germinate better during our autumn, it may follow that there is a co-relation to this with seed from South America.
We look forward to hearing from him, in due course, about the result of his endeavours!

From the UK
Kevin Lear writes...he too, like me, has had difficulty in flowering *T. bolivianus/pentlandii* and seed is also difficult to germinate. He is also intending to build a garden fame for the hardier plants.

Paul Hoxey...would like to obtain copies of The Chileans Nos. 1 – 18, 30, 35, 38-45, 49-51. He is also looking for some of the Mammillaria Society issues and American Journals. If any one can help him, please ring 1223 503382.

Royston Hughes... tells me of his success with raising T. ovatus from seed with 100% success rate with seed of his own cross-pollinated plants. Seeds were sown on the 5th November with some bottom heat. By the New Year germination was complete and the heat turned off.

Even if you are not able to write full articles for our Journal, please write and tell me of your experiences, because little snippets of information like the above are of interest to members.

Please remember we have a One – Day Meeting on Sunday 6. August 2000.

René Geissler
Hon. Sec.

COMMENTS ON PREVIOUS JOURNALS

A. verschaffeltii PM308 (Vol. 5. No. 1. p.306, No. 2 p.318 etc.)

Having now grown this plant for a year along with rooted offsets I can now report that Bill Greenaway's original comments appear (amazingly) to be correct. Having repotted the plant into my normal (soil based) compost the new growth was "typical" verschaffeltii i.e. fairly narrow, cylindrical shoots, darkish green with few spines. All of the rooted offsets have elongated to produce the same type of growth. The previous growth shown (p.309) has now shrunk dramatically and apart from the long spines is even now almost unrecognisable. I cannot believe that light or air can be responsible for this phenomenon (Vol. 5 No.4 p.359) as this plant was grown on the top shelf of my greenhouse with maximum light. Therefore it must be something to do with the soil but any further comments would be welcome. You really have to see the transformation to believe it!

Flowering Tephros (yet again!)

I make no apologies for returning to this subject, as I am sure that it is one which interests and baffles us all. Some people have had success by watering in the winter but I just cannot bring myself to water any cacti in the winter, especially as the vast majority of my Tephros are grown without heat. Even with heat I would be reluctant - one really cold spell could spell disaster. However when I read habitat climatic descriptions like those of Klaus Gilmer (Vol. 5 No. 1 p.307) I am at a loss to explain it.

That said I did have a few more flowers last summer on plants that had not flowered before but I think this can be put down partly to maturity and partly to being slightly potbound - the old theory that a potbound plant will flower better than one that has been repotted and therefore puts all its energy into new growth. Notable successes last year were A. verschaffeltii "spineless" form (one beautiful red flower – see Front Cover illustration), T. dimorphus v. pseudorauppianus (five flowers over several weeks), C. planibulbispina (two) and C. moelleri (two). These last two are very similar if not the same plant.

M. rossianus, A. subcompressa and O. erectoclada all flowered again after a gap of four years!! I guess the motto here is never give up hope.

Hardiness (Vol. 5 No. 2 p.320, Vol.5 No 4 p.347/8)

I start watering in early March and yes, even on the south coast, we usually get at least one severe frost in April but if the weather turns cold I just light up one of the heaters (I still use paraffin) for the duration of the cold spell IF my plants have been recently watered. I may of course be "teaching my grandmother to suck eggs" here! In practice cold spells at this time of year are usually very short lived and I suspect the vast majority of "our" plants would be unaffected.

An unheated greenhouse will only be slightly warmer than the outside temperature during the first part of the night and presumably by early morning there will be no difference but in my experience cold frames seem to do better in this respect although I can offer no logical explanation. I keep some of my bonsai trees in a small coldframe and when pots outside are frozen hard those inside the frame are often still moist.

Seed Raising (Vol. 5 No. 3 p.342)

A fascinating article by Elton Roberts giving us more food for thought about this knotty problem. Once again heat seems to be the key but more articles from TSG members who have had success in this area would be welcome I am sure. Of all the seed I received last year I only had one seedling come up - a T. geometricus. I have kept the seed and of course hope to get more up this year.

T. viridis? (Vol. 5 No.3 p.339, Vol. 5 No. 4 p.350)

Yes I would agree that this plant is almost certainly M. rossianus v. fauxianus (compare with my plant shown Vol. 3 No. 1 p. 163). As the plant matures more spines are formed. This is one of my favourite plants and makes a handsome 6-8" bowlfull in about 5 years and it will flower, although in my experience rather erratically. If you haven't got this one get hold of a cutting.

Martyn Collinson

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DEFINITION OF A SPECIES.

Mr. I. Crook raised this issue on pages 357-358. My own working definition is as follows...

A *species* is a population of organisms, believed to be of common genetic heritage, which is discontinuous from related species. Its component individuals and subpopulations share common, definable, morphological structures.

A *subspecies* is a geographically distinct part of a species population, with definable, morphological characters that are a subset of of those of its parent species, but not necessarily discontinuous from it either geographically or morphologically.

***Corollary 1:* Taxa which cannot be uniquely defined (in a diagnosis) are not species or subspecies.**

***Corollary 2:* Species and subspecies do not need to be homogenous, Ie. subpopulations of it may be geographically discontinuous, and not sharing genes with their neighbouring subpopulations of the same species.**

***Corollary 3:* Individuals selected from within a species for aberrant, but horticulturally interesting characters (Eg. flower colour) are to be treated as cultivars. No other ranks beyond Species, Subspecies and Cultivar are necessary.**

***Corollary 4:* Characters used in the definition of a species vary in importance. It follows, therefore, that taxonomists may vary in their evaluation of those characters. All concepts of species, narrow or broad, have equal validity, but precision should be valued and the *law of parsimony* applied. (No more characters should be used than are necessary to account for the facts). If segregation of a taxon with a suitable, workable diagnosis cannot be acheived, then it should not be created. If you can't key it then forget it! Such is the difference between good and bad taxonomy.**

A *genus* is an aggregate of species sharing common, definable, morphological and/or genetic characters. Although an artificial construct, necessary for the purpose of binomial nomenclature, it must also be monophyletic because it is also an essential part of the hierarchical classification of living organisms.

R.Mottram .

Monophyletic = (taxon) arising from a single ancestor :
"Glossary of botanical terms" by U. Eggli. Ed.

ERRATA.

Due to the mirror effect, (and not enough study of the photograph), I unfortunately transposed the names of the plants shown on page 361 of the last issue, Vol. 5 No 4 Fig. 6. The first two are the "boliviana plants". The one on your right of the picture, as you look at it, is the "pentlandii". Apologies for the error and thanks to Roy Mottram for informing me of the mistake. Ed.

TEPHROCACTI IN NORTHERN CHILE Part 2.

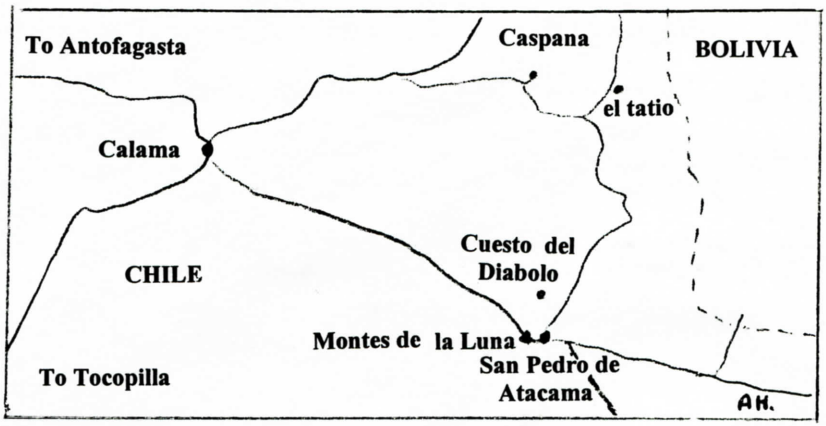
(The expedition now moved a distance of about 300km if measured in a direct line south from Colchane to San Pedro de Atacama. Ed.)

After a rather anxious drive, when we were worrying about running out of petrol in the middle of nowhere, despite carrying what seemed adequate reserves, we next headed for San Pedro de Atacama, a pleasant village which would be a good base for anyone interested in visiting the area. There is a petrol pump there, only when we arrived they announced they were out of petrol, and would not have any for three days! This started a sequence of events, which proved very frustrating. Graham and Roger drove back to Calama, a round trip of two hundred Kilometres, to get petrol, while Chris and I stayed in San Pedro. They had not been gone twenty minutes when the petrol tanker arrived. As it happened, Graham and Roger called in at a place called Montes de la Luna and Roger gave me a fruit he had collected there. We were planning to go there later, however, as it was now late we decided that next day we would go to Custa del Diabolo. This is a known site for Maihueniopsis conoidea, which we duly found in some numbers, Fig. 2. We now decided to go next day to see the geysers at el Tatio, a famous tourist attraction. This however involves setting off at 4AM in order to arrive at the geysers at daybreak, when they are at their best. Unfortunately, when crossing a ford on the way there we got stuck, having got water into the air intake. This was subsequently to cost us two thousand pounds for repairs, not covered by insurance. What a pity we did not have a Land Rover. That would not have been bothered by six inches of water!

Eventually we got a replacement vehicle, but having lost time we were unable to go back to Montes de la Luna, so I was unable to see the plant from which Roger Ferryman got the seedpod. However, we now retraced our route towards El Tatio, but carried on towards Caspana. On the way we saw many "Tephros" which all of us took in most cases to be just different colour forms of the same species. In particular, the red and golden spined plants growing together, Fig 3. Imagine my surprise, when we got back home to find that seeds from the red and golden spined plants had totally different seed types. The red spined plant has seed of the glomerata or Maihueniopsis type, i.e. rather like a large tomato seed, lenticular in shape and covered in a fine hairy coating, whereas the seed of the golden spined plant is of the tear drop shaped sort and is very hard. I now believe that the golden spined plant is Cumulopuntia ignescens, Fig 5, but I do not have a name for the reddish spined plant, which is extremely common. To further confuse the issue, the seed pod which Roger Ferryman gave me was dry, whereas the pods we collected from the red spined plant were full of mucilage. One of the differences between Maihueniopsis and Cumulopuntia is, according to Ritter, that Maihueniopsis has a fleshy fruit and Cumulopuntia a dry fruit. I had expected that the seed, which Roger Ferryman gave me, would be from a red spined plant and indeed, now that I have germinated both types of seed, the seedlings look identical. My identification of C. ignescens seems to agree with the BLMT expedition to Bolivia, but seed collected by Ralf Hillman near El Tatio and distributed as C. ignescens produces seedlings identical with those from our red spined plants. The seed from the golden spined plant has not yet germinated, which is par for the course for this type of seed.

That concludes the story of a trip to Chile. Who is going to volunteer to go and find the answer to the many outstanding puzzles?

Roger Moreton.



Members are reminded that comments on articles or photographs are welcome. Has anyone any ideas on the identity of the unknown plants photographed in habitat by Roger Moreton? Is the queried plant really hystrix? Ed

BEDDING PLANTS

I have been growing cacti for over 45 years, since I was 11 years old in fact. Over the years I have done the usual, trying to grow everything and finishing with nearly eight hundred plants in a 12' x 8' greenhouse. I have had seven different greenhouses and in each one I have reserved a small area for bedding out, so the plants could grow to their hearts' content.

In 1990 life dictated that I should part with all my plants except just a few to keep the interest alive. I did away with all the staging and bedded out the whole greenhouse. The collection has grown to about 200 plants, all growing wild.

"What has all this to do with Tephro's?" you ask. Through all this time I have had a love affair with Opuntias and Tephro's. This has now reawakened, particularly since I received a box full of cuttings from Royston Hughes. The point of all this is...

"Do any of you grow Tephro's bedded out?"

If so then..... How do they grow? Do they keep their tight forms? Do they flower?
The 60 or so that I grow are the usual run of the mill. I keep them on high shelves, they get a small amount of heat, which is really for the other plants, and I grow them in 50/50 J.I. and grit. So...
"Have any of you grown them in a bed?" and "What are your opinions?"

J. Cox.

Fig 1. Maihueniopsis conoidea. Ritter. Near Caspana.

All phots, Fig. 1 – 6, are by Roger Moreton.

Fig 2. Maihueniopsis conoidea. Ritter Cuesta del Diabolo.

Fig 3. Cumulopuntia iggnescens,Rit. and C. hystrix (?), Rit. Cuesta del Diabolo – Caspana Rd.

Fig. 4. Cumulopuntia/Maihuenia sp. Cuesta del Diabolo. 3000m.

MAIHUENIOPSIS (Spegazzini) amended Ritter.

The genus MAIHUENIOPSIS was erected by Spegazzini in 1925 for a type of clump-forming Opuntia with an aberrant form of growth (Molfinoi Speg 1925). The joints of this species are only divided in their upper half, and are attached to each other at the lower half. This species was found on the puna of Sta. Catalina, on the northern tip of Jujuy province, near the border with Bolivia, at approximately 22 degrees latitude, at an altitude of 3650 metres. Drawings made by Spegazzini are portrayed in Backeberg's Cactus Lexicon, page 605. If one disregards the attached joints, the illustrations and statements made are typical of a group of clump-forming OPUNTIAS, which are found in cooler or colder regions of 49degrees latitude in Argentina (Species darwinii) to 20 degrees latitude in Bolivia (Species hypogaea). The majority of the recognised species are found West of the Andes watershed, in Chile. The MAIHUNIOPSIS molfinoi, is according to the illustrations and statements made, apparently closely related to one published as OPUNTIA hypogaea, which likewise comes from the high ground in Jujuy. The essential difference is with the attachment of the joints of M.molfinoi. Such growth occurs in other species of the indicated related group only as an exception in some joints. This attachment of the joints can possibly be the result of a single mutation and the establishment of a separate species, solely on this account, would not be justified. MAIHUENIOPSIS molinensis apparently shows a slight deformation of the joints (according to the photograph of TEPHROCACTUS molinensis .BACKEBERG in his "Die Cactaceae" Vol 1 Page 282. The whole of the named family group however, shows so many deviations from other OPUNTIAS, that one must interpret them as a particular genus. The connection lies apparently with MAIHUENIA, with which it has so many similarities. Up to now no species have been found, which mediate between MAIHUENIA and another genus of Opuntioideae. Apparently it is a completely independent branch of development, which emerged out of the primary stage of the Opuntioideae. Accordingly it is also never to be expected that a hybrid of MAIHUENIOPSIS with another known genus will ever be found. Up to now the so far classified species have been placed under TEPHROCACTUS by Backeberg and under OPUNTIA by Britton and Rose.

That the special taxonomic position had not been recognised sooner, was due to a shortage of field experience by the hitherto existing workers and upon the great over-rating of the flower. I referred to this over-rating of the flower in my notes on the Opuntioideae. MAIHUENIOPSIS is a genus of the Opuntioideae which forms small to very large clumps. Joints are mostly compact, occasionally placed loosely side by side, mostly grey-green, branching at ground level, laterally or near the top. Joints seldom grow together in their lower halves (Species molfinoi). Their consistency is fairly soft, somewhat jelly-like, similar to MAIHUENIA. Young joints firstly grow long, barrel-shaped, later they become more or less conical, whilst their increase in diameter occurs only in their lower half. According to species, fully grown joints are 1.5 – 9cm long and 1 – 3cm thick at the base. In the first instance, the joints are conspicuously slightly tuberculate, later without tubercles and smooth. (Maihuenia is also included in this connection) or, instead of tubercles, there are small depressions in the joints, in the middle of which the areole sits. Areoles are mostly round or also elongated, fairly small, getting larger from the base of the joint to the top. They grow right to the lower end of the joints, in contrast to both

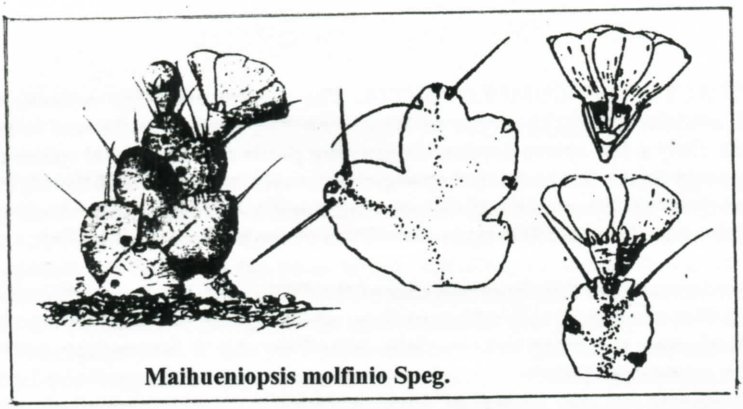
TEPHROCACTUS and CUMULOPUNTIA. The areoles are often sunken, with small deciduous acicular leaves. The lower areoles frequently develop additional larger clusters of glochids. Only a few spines develop on growing joints and additional spines develop on the fully grown joints, one to several strong central spines, round to flattened, in addition, mostly one to several short, downward-pointing small spines below the central spines. The lower areoles are often spineless up to the middle of the joint, or even higher.

The flowers present the full characteristics of the OPUNTIA blossom, demonstrating that OPUNTIA flowers are of very old breeding, which hardly allows, within their type, a further distinction regarding genera. (It is something else if for example NOPALEA or TACINGA experience a flower transformation as a result of the method of pollination). The cross-section of the flower of Cumulopuntia pampana compared with one of MAIHUENIOPSIS hypogaea shows only little further development, for example the insertion of the funicle of CUMULOPUNTIA reach to the bottom of the seed vessel, which is ribbed externally. The areoles sit on small protuberances, the scales are acicular, not triangular, the stamens differ sharply between the bottom and the top, the petals are yellow, as far as the flowers are known.

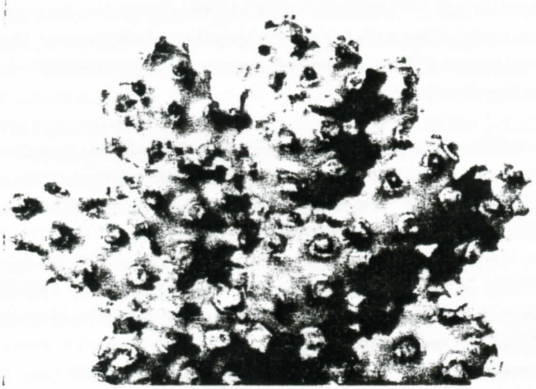
Fruits are inverted turbiniform to ovate, scarcely tuberculate, green to yellow, with white, tufted areoles, mostly with glochids, more often with fine spines. The seed capsule is thick walled and filled with a sourish slimy pulp, never dry. In contrast to CUMULOPUNTIA and TEPHROCACTUS, never with glochids inside.

The seeds are the most primitive amongst the Opuntioideae. The end of the funicle is surrounded by a ring shaped seed structure, before it joins onto the seed from the basal side. At the ripening of the seed, this lower part of the funicle hardens and forms the hard seed coat (aril) which covers the whole of the seed on the outside. With MAIHUENIOPSIS this development is not altogether completed. Often seed cases are found between the hard seeds which only carry the original testa, or the seed coat is rather fragmented on the flat sides of fairly flattened seeds, as the coats on their flanks are generally thin and sometimes rather soft; they are in contrast to the other OPUNTIA genera. The hardened cylindrical funicle is still recognisable as a ring, which runs over the edge of the flat seed. In any case the seed of M.atacamensis and M.crassispina portray their primitive nature. With them the hardened funicle- shown by me as axil rings or circular arils, is still very slender and forms no increase in the thickness of the original seed coat (aril). The most derivative species is M.archiconoidea, in which the hardened funicle (aril-ring) is thick, protruding and prominent. MAIHUENIOPSIS, through its flattened seed form, differs sharply from all other species, which have more or less spherical seeds, that is to say the genera TEPHROCACTUS, CUMULOPUNTIA, AUSTROCYLINDROPUNTIA and TACINGA. The seed, especially its periphery can be covered with wooly hair or can be smooth. Up to now 22 species have become known, only one of them extends from Argentina to South Bolivia (hypogaea) and only one so far reliably from Argentina to Chile (ovata). More have been found in Chile than in Argentina.

From "Kakteen in Sud Amerika" by Ritter. Translated by V. Knight and R. Moreton.



Maihueniopsis molfinio Speg.



Tephrocactus molinensis (Speg.) Backbg

COMPOST.

No one writes to me. What is it? Have I offended you? I hope not. We can't have a Journal without contributions. You must write something. It is a matter of survival. In the hope of getting something going I have a suggestion. Suppose that you all, repeat ALL, wrote to me saying what <u>you</u> use as a potting compost. You all know more about your own compost than anyone else. Just a list of ingredients would do though if you felt like adding a few notes about anything that would be welcome. If you use more than one mixture then list all the recipes. And so on. I could then grind away at the results and produce an article giving statistics about the popularity of various ingredients and their proportions, including fertilizers as well as the base materials. The bulk of any review would be anonymous but, if it turned out that someone had a new, wonder material, I could always telephone to see if they agreed to publishing a bit more detail about that item or about their results. To stimulate your obviously feeble writing glands I will offer a wager. I bet a *nigrispinus* cutting (a small cutting) that there are at least a dozen different base materials. So now, astounded by this generous risk taking, will you please get on with it? And that means; WRITE NOW.

Or even telephone – 0121 3535462.

W.LJackson. Co. Editor.

Further Comments on Seed Raising

A great deal has been written and talked about concerning the problems of germinating Tephrocactus seeds and that of *T. geometric* in particular. I have not heard even one of our members saying that he/she has had very good results with his seed, no matter where it originated. My seed was sown quite some time ago (two seasons ago) and I have had my doubts about it also. The pots have been on the top shelf and were watered regularly during the Summer months. I have been very patient just like every seed raiser must be. It seems to have paid off! I do so hope you have not thrown it all away!

Now I wonder if Elton Roberts in his comments may have had a point and I do hope none of you have yet given up either with the seed I supplied, or that which was obtained through the TSG seed scheme! I too had almost lost any hope of seeing the first seedling of *T. geometricus* I had sown in 1998 and this year, and even almost gave up looking every week as I used to. But is there another problem?

Just a little while ago (end of August '99) I was showing some friends around the greenhouse and we climbed up to my rather lofty bench I had rigged up high under the glass. I still have some pots up there with seed of *T. alexanderi, T. molinensis* etc. that was sown in 1997 and still one or two seedlings pop up in them of *T. molinensis*, although I must have pricked out dozens every year since then. As we were rummaging around up there I spotted two seedlings of *T. geometricus* popping their heads up. Having seen these with great surprise for the first time, we searched further and sure enough found some more.

Now some of this seed has been up under the blazing sun for three summers and it is rather strange that they should have taken that long to emerge. All three Summers they have been kept watered regularly without any sign of live and now all of a sudden they have made their appearance. It really is hot up there right up against the glass as I find out every time I water them. It must be good 120° F (50°C) at times on hot days. Strangely enough it does not do the young seedlings any harm at all though.

Incidentally, I have also noticed that some seed I had sown in 2 ¾" pots were coming up rather patchy and fewer germinated then some of the same seed sown in larger and deeper pots. I guess this makes sense, because the larger pots retain the moisture for much longer then the small ones.

Incidentally, the same thing has happened with Maihuenia seed, some of which can take three or more years to germinate, although a few will do so every year. They are kept dry though the Winter and watered again in Spring when the day are getting hotter and more germinate every year, although fewer each year.

René G.

SEED

Unfortunately the seed Roger Moreton is expecting from South America has not yet arrived. It is expected that the seed list will therefore appear with the next Journal. In the meantime, if you wish, you can contact Roger by e-mail: m01tz400@cwcom.net

TEMPERATURES.

In the June issue last year I admitted that my homemade greenhouse cooled down to within half a degree of the outside temperature. I wasn't too bothered about this. It just struck me as curious. But these few words have provoked a response and I will attempt to reply.
Alan Hill wrote in September suggesting that a half-empty greenhouse had very little material to act as a heat reservoir. He suggested that storing water could rectify this. Carl Garnham wrote in December disagreeing, on the grounds that the effect was too small to be useful.
Dawn Nelson also wrote to R. Geissler in time for the December issue. She made two points. Abbreviated these were: the plants are hardy if dry and temperatures in France can be lower than in the UK, as low as -9C.

To answer Dawn first I have to admit that many authorities have said that these plants are hardy. Down the years I have seen many bits in various journals about what can or cannot be grown cold or even outdoors, and heard various personages advising on this and related matters. However, I have noticed that some of these items come from some of the same people who tell us what names to put on our labels. While I daren't disagree with such august persons I do reserve the right to cherish one or two small, private doubts. So I am checking the effects of temperature for myself.

It is also true that I am not just a Tephro collector. I am actually on a mission of mercy. Mary tries to grow everything. Sometimes this is a great benefit; currently we have *Iris unguicularis* flowering away both sides the front door. Sometimes though, there are casualties. Apart from *O. pycnantha* she has found that she doesn't really like Opuntias. I have rescued all of them. So I have a mixture of hot and cold plants. They are all going to have to learn to live cold or... Just before Xmas the temperature here fell to -8.7C outside and -8.4C inside. We were away. When we got back I went down to supervise the plants in their dormant phase and found damage. It is too soon to be certain but it looks as though I shall have lost *O. tomentosa*, *O. can't remember* and the top nine inches of that big thing like a stretched cucumber, *vestita* is it? More interesting is the performance of a set of rooted *lagopus* cuttings. I have 150 watts of heating cable under the North bench and nothing under the other one. The cuttings on the heated bench appear to be OK. Those on the other side seem very soft. I watered those on the heated side just before we went away. The cable provides very little heat and is thermostated to switch on only below 3C but this seems to have been enough to make a difference.

Then there is this question of drying the plants out. A few years ago I soaked a four-inch pot full of peat based compost, weighed it and then stood it on the central heating boiler to dry out. I measured the weight at intervals and graphed the results. The idea of this experiment was to check those cheap probes which are supposed to tell us when the plants need water. It was quite interesting. One of the two types was completely useless while the other agreed with the weights over the whole range, except when the compost was really wet, more than 100% water. Most interesting though, was the time scale. This was only a four-inch pot, there was no dormant plant or gravel covering the surface and it was on top

of a warm gas boiler. It took 23 days to get down to 20% moisture. I stopped then but it would have taken around another 23 days to get down to about 5% and so on. Remembering that a pot twice the size would take twice as long and smaller pots proportionally less I feel justified in asking everyone, " How do you know your plants are dry?" I stopped watering early in September. Some of the smaller specimens must be very thirsty by now. Some of them look it as well. But I don't really know about the bigger specimens. (I am not going to bash their roots about with a probe.)

Finally I have to admit another doubt. When one seeks advice about damage of various sorts even the most successful growers tend to prevaricate. Others may be quite dogmatic, "That's vine weevil." or "Oh, they all do that, it's natural." The reader can no doubt add other equally useful diagnoses. I suspect that a lot of gruesome failures owe something to low temperature. I bet a fair amount of red spider mite damage is really cold marking. The reason for this suspicion lies with the temperatures themselves. For example: how many of you knew that we had had such a severe frost just before Xmas? Temperature changes are like red spider, quiet and surreptitious, and not detected until the damage is done.

That's enough on that. Now to Alan and Carl. I think that they are both right. A reservoir of heat can help. The actual supply of heat is small as Carl says but I think it can make a difference. The biggest reservoir is, of course, the ground. I think this is where I've gone wrong. I have a hollow wooden floor. A wooden floor covered with cheap lino is very hygienic but the air space does cut off any heat flow into and out of the ground. Carl makes the point that short days do not allow much time for heat input to the reservoir. There is a factor which offsets this. Cold weather is often high pressure, sunny weather. Today my greenhouse was 26C while outside was only just over 4C. Bottles of water can store some of that difference and slow down cooling at night. To settle just how effective they might be I've written a computer program and measured some temperatures. The trouble is that now I've got the maths right I've got to rewrite the program. If it works out I'll write it up.

W.L.Jackson. Feb. 2000.

BCSS NATIONAL SHOW.

We have been invited to stage an exhibition and information stand at the BCSS National Show which is to be held on Saturday, 19th August this year at Springfields, Spalding. If you are going to the Show and could spare some time to help on the stand please will you inform the TSG Chairman: Mr A. Hill, 8, Vicarage Rd, Grenoside, Sheffield, S35 8RG. Tel. 0114 2462311. Email alan.hill6.@virgin.net

Fig 5. Cumulopuntia ignescens, Rit..
The golden spined plant.
Near Caspana

C. ignescens,Rit.

C. hystrix (?) Rit.

Sp.

Sp.

Fig. 6. At Cuesta del Diabolo.

TEPHROCACTUS

Incl. Maihueniopsis, Cumulopuntia and related genera

Puna subterranea (R.E.Fries) R.Kiesling.
Maihueniopsis subterranea (R.E.Fries) E.F.Anderson comb. nov.
Photo by R.Geissler.

STUDY GROUP

Vol. 6 No. 2 June 2000

Secretary's Page

There is not a lot of news to report this time but at this of the year lots of things are happening in the greenhouse, the frame or where ever you grow your plants. I hope some of you have lots of news to report, either with seed raising, flowers, or new plants you have been able to acquire. Please write to the Editor and let other members know!

All articles and comment should be send to either of the Co-Editors. Subscriptions and any other correspondence should be sent to the Secretary. If you write to one of our Officials and expect an answer, please remember to include a S.A.E. Subs. remain at £10.00 per annum for the UK and Europe. Overseas members £14.00. Please make cheques payable in stirling to "Tephrocactus Study Group" (not individuals). May I also remind you to let me know any change of address, tel. number or code.

Our "One-Day Meeting" is on Sunday 6th August this year!

Please make a note in your Diary and try to come! Please let me know beforehand if you intend to come so that I can gauge the numbers for meals etc.

Please make an effort to come!

You can collect you folders for the Journals at the same time.

Rene Geissler. Hon. Sec.

The Officers of the TSG are:

Chairman and Co-Editor:

Alan Hill, 8, Vicarage Road, Grenoside, Sheffield S35 8RG
Tel: 0114 2462311 E-Mail: alan.hill6@virgin.net

Co-Editor:

William (Bill) Jackson, 60, Hardwick Road, Sutton Coldfield, West Midlands, B74 3DL Tel: 0121 353 5462

Secretary:

Rene Geissler, "Winsford", Kingston Road, Slimbridge, Glos. GL2 7BW
Tel: 01453 890340
E-Mail: w.geissler@virgin.net

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THE MEETING ON SUNDAY AUGUST 6th

The meeting will again be held at the Slimbridge Village Hall, commencing at 10 am. After a short business meeting there will be a discussion on M. glomerata, andicola and hypogea. Please bring any examples of these plants or what you consider to be closely related. Also please bring any other plants you think will be of interest or which you would like identified (we will try to help). You are also welcome to bring plants for sale. We ask for 10% of sales to be donated to Group Funds. There is no charge for the meeting. All members of the TSG are welcome and you may bring guests who are not members. Light refreshments will be available at the meeting .We shall be going to a nearby pub which supplies good food for lunch. After lunch we are to have a talk by Martin Lowry on Maihueniopsis he has seen in Bolivia and Argentina. Please let Rene know that you are coming to the meeting.

In Vol. 5 No 3 Sept. 1999 there appeared photographs of M. glomerata (?) and M. glomerata v. andicola (?). In the following issue, Page 360, the descriptions of O. glomerata Haworth and O. andicola Pfeiffer were published to aid pre study of the August topic. Following this note there is a translation of Werdermann's description of O. hypogea. There is some discussion on glomeratus/hypogea in the latest issue of The Chilean's magazine Vol. 17 Number 57. Vol. 17 Nos. 55 – 57 is available in the UK for £15.50 and costs £18.00 /$38.00 overseas. Payment should be sent to R.L.Purves, 19, Brocks Drive, Guildford, Surrey, GU3 3ND, England. Subscription to The Chileans commencing number 58 is also due costing £16.50 UK or £19.00 overseas.

OPUNTIA HYPOGEA by E. Werdermann.

Neue Kakteen (C. Backeberg) 1931.

Half bushy, with long 3 cm thick tap root, even the short dividing branches still underground, almost only the terminal segments above ground and projecting no great distance above the surface. Individual plants ca. 5 to 15 cm diameter. Individual segments small, elongated egg-shape, at most 3 cm long and 1.5 cm thick, usually smaller. Individual segments standing slightly sideways one above the other, elongated egg-shaped, at the most 3 cm long and 1 .5 cm thick, mostly smaller; segments somewhat tuberculate below the sparse areoles; areoles somewhat sunken, with yellowish wool-felt, and numerous pale yellow glochids about 4 mm long, only the uppermost 3 to 5 [areoles] with exclusively just one spine; spines up to 4cm long, about 1 to 1 .5 mm broad, completely flat, whitish yellow or brown at the base, dark brown towards the tip, often almost black or somewhat reddish, bent horizontal close above the areole, interweaving sideways with one another. Related to O. atacamensis Phil.

In Monatsschrift der Deutschen Kakteen-Gesselschaft, 3; 1932, Werdermann stated that the species was discovered by E. Stuemer in the high Andes of Northern Argentina, at around 3000 m. altitude.

TEMPERATURES

A long time ago I wrote a bit for the BCSS Journal. I had measured some temperatures and used the results to show that double glazing, with thin plastic film, had halved the heat loss from our second greenhouse. Ever since I have been niggled by the fact that the temperatures didn't follow any simple law. I knew why. The air and the solid materials cool at different rates. But I couldn't see what to do about it. When this discussion started it suddenly dawned. Nowadays you don't solve equations. You iterate them on a computer. It turned out to be surprisingly easy to get a plausible result. It was less easy to show that the result was right but I have done that now and it seems to be making sense. The basic idea was to write a program that would calculate temperatures. The results would depend on the values of certain parameters fed into the program. These could be estimated by comparing calculated results with actual temperature measurements. The method of comparison entailed plotting graphs with the measured results shown as crosses and the calculated as lines. When the lines go through the crosses the parameters used must be about right. Once I had found reasonably sensible values for these the program could be used to evaluate any changes. In particular it might help decide whether there was any real value in putting bottles of water under the benches.

It turned out that the program needed four parameters.

1. Heat transfer between the Air inside the greenhouse and that Outside. Call it Cao.
2. Heat transfer between benches, plants, water etc. and the Air inside. Cba.
3. The effect of heat loss or gain on the bench temperature. Cbb.
4. A heating constant. J.
The program is arranged so that any heating can be entered as a value in kW.

Figure A shows the results of a heating experiment using a borrowed, three kW fan heater to get a quick(ish) change. Inside air temperature and the bench temperature are plotted as crosses against time measured in hours. You don't record heating and cooling results for more than about two hours. You get hot, or cold, and *bored.* You also have to watch out that the outside temperature doesn't go berserk and spoil everything. On this occasion I got two hours of slowly rising outside temperature around three degrees. I've subtracted these values and plotted the excess temperature. The lines through the points are the calculated values. The agreement is good, even for the benches, where the measurement was crude.

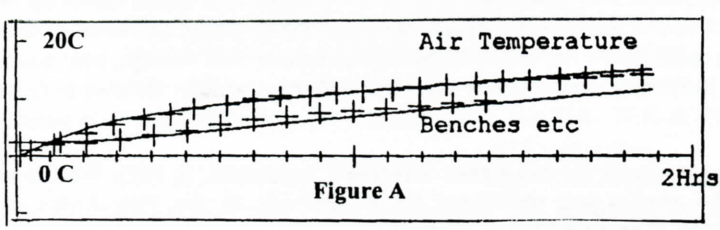


Figure A

It gets better. Figure B shows the results of a cooling experiment and again the agreement between measured and calculated temperature is pretty good. Remember that this calculation used the same constants as the heating experiment. So it seems that these

values do describe this greenhouse. To be sure of this I shall have to do more measurements but that might be some time away. Meanwhile it is interesting to use these to look at the water bottle question. The values are...

Cao = 0.83 Cba = 2.3 Cbb = 5.7 and J = 8.5

None of these are absolute values. There are other multipliers inside the program. But Cao and Cba are comparable. Cba is nearly three times as big as Cao implying that heat transfer to and from the benches and plants is quicker than through the glazing. That seems fair enough, particularly since I have a fairly big fan circulating the air. Moreover, different values of Cbb can be interpreted. Cbb = 5.7 is a large value and represents the fact that the total mass of material inside my greenhouse is fairly small. If I doubled the contents this figure would be halved

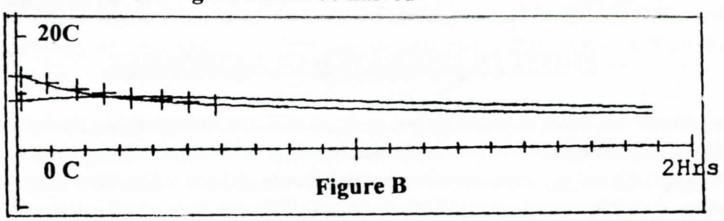


Figure B

Figure C shows a simulation based on 10C starting temperatures for benches and inside air and a cyclic variation in outside temperature. This is assumed to be 15C at mid day and to fall to -5C at midnight. Over 48hrs. both inside temperatures fall to below freezing on both nights.

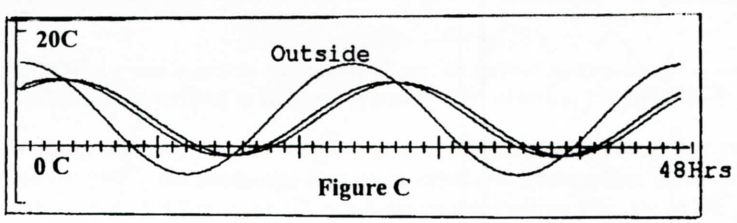


Figure C

Suppose, now, that I put about 30 or 40 litres of water, in bottles, under the benches. This will reduce Cbb to somewhere around 2.0. Figure D shows the result. The inside temperatures still fall but they stay 2 or 3 degrees above freezing, even on the second night. The actual improvement in temperatures is small, as Carl suggests, but it can make enough difference to help any plants which are a bit marginal in hardiness.

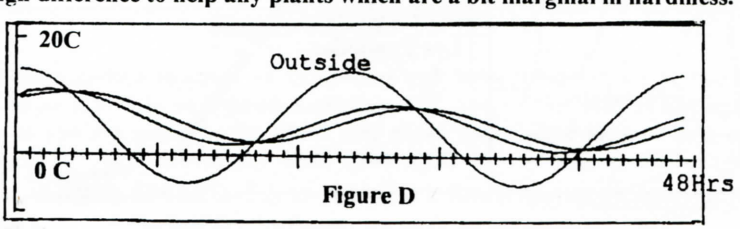


Figure D

This is only a first run through. I shall do a lot of simulations with different assumed conditions. But these conditions aren't daft. In cold weather the outside temperature doesn't reach 15C. But, if it's sunny, the inside temperature often behaves as if it had.

This is the nearest I can get to simulating the Solar Gain. It's not right but it's probably not a mile off and I can run as many different versions as I like. I can't write them up. Alan wouldn't release the space and you lot would probably get sick of hearing about it. But, so far, this is the best argument I have come across for believing in storage heating.

I shall do as I'm told, stop playing with the computer and put some water under the benches.

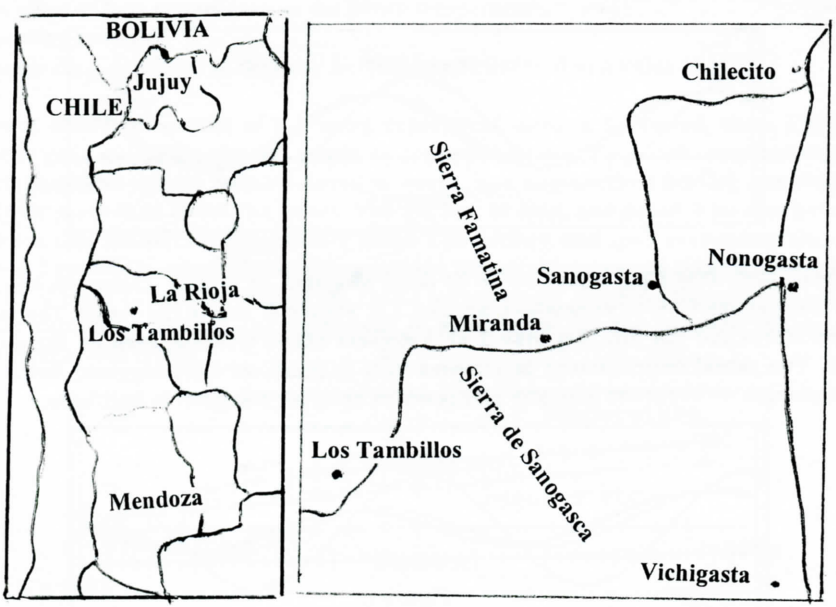
Meanwhile, if anyone thinks it might be worth £5.00 to get a copy of the program and find the parameters for their own greenhouse, give me a ring on 0121 353 5462 and I will provide more information.

W. L. Jackson. Feb. 2000.

FROST IN UNHEATED GLASSHOUSES.

The main reason for frost in glasshouses is dead still air. In my Opuntia house I have an old fan out of microwave. This keeps the air moving and helps a lot. I keep fans going in each of our glasshouses, even in the heated houses; they circulate heat and reduce condensation. I can remember my Father, some *65* years ago, walking up and down his 200ft x25ft glasshouse full of Chrysanthemums twirling a sack above his head to keep the air moving and so reduce the risk of frost, and it did work.

Rob Seward.



ARGENTINA

OPUNTIA (MAIHUENIOPSIS) MINUTA?

Cuesta Miranda belongs to one of the most beautiful landscapes in the province of La Rioja. South of this area of natural beauty lies the village Los Tambillos (altitude1,800 m). Eastwards, there is the lovely mountain range of Sierra de Sanogasta.

After a small snack of home made goat's cheese, bread and Coca-Cola, we decided to go on a short field trip to this range near Los Tambillos. During the trip we found many cacti of different genera, *(Denmoza, Echinopsis, Gymnocalyciums, Soehrensia, Trichocereus and many tillandsias).* At higher altitude (2,300 – 2,700 m) we found other interesting plants: *Eriosyce (Pyrrhocactus) andreana, Lobivia sp.* (not *L. famatimensis),* clumps of *Opuntia verschaffeltii* and other small Opuntias.

One of them was a smaller form of *Opuntia (Cumulopuntia) boliviana* S.D., with bright green joints, woolly areoles and 6-7 white spines and one yellow, up to 4.5 cm long spine per areole (Fig.1).

The smaller Opuntia seemed to be more attractive (Fig.2 &3). I suppose that they were all forms of *Opuntia (Maihueniopsis) minuta* (Backeb.) Cast. As the photograph illustrates, they were very variable and the plants were just a few meters apart. The segments were oval and very small (1 – 1.5 cm long) and formed relatively compact groups. The spination varied considerably. There was one extreme form with almost no spines, but many of this form had yellowish, long tufts of glochids (fig. 2). The second extreme form had almost no glochids, but 3 – 5 very distinct spines up to 1 cm long radials and 1 – 2 central strongly flattened ones up to 3.3 cm long; (Fig. 3). There were also many transitional forms. Seeds were typical for the sub-genus Maihueniopsis, lentil like and smooth.**

But *O. minuta* should grow more to the north (Prov. of Jujuy) and *O. ovata* more to the south (Prov. Mendoza) according to Roberto Kiesling (Darwiniana, 1984)!?!

Although our climb was quite exhaustive on such a hot and thirsty day (37° C in the shade, 19. January 1998), the landscape was most enjoyable and we met many beautiful plants. Of course goat's Cheese and Coca-Cola were waiting for us again at Los Tambillos.

Zlatko Janeba

What are members' views on the plants found? Ed.

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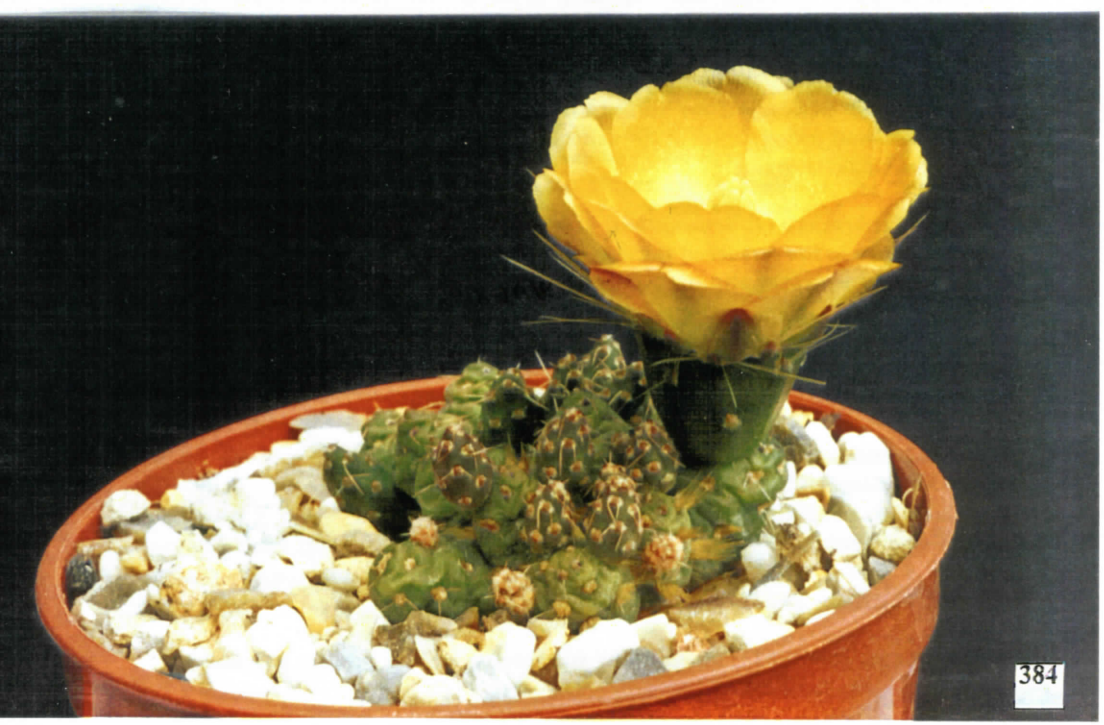
Despite the appeal in the last Journal so far we have no volunteers!

Fig. 1 M. boliviana . Photo by Z.Janeba
Fig. 2 M. minuta ? Photo by Z.Janeba

Fig. 3 M. minuta? Photo by Z.Janeba
Fig. 4 M. minuta. WG 231 Photo by R. Geissler



PUNA. By Roberto Kiesling

Type species: Opuntia clavarioides Pfeiffer.
Flowers solitary, lateral, regular, funnelform. Pericarp fleshy, obconical, scaly, without areoles: scales small, succulent, triangular with hair and wool in the axils. Ovary cavity globose or ovoid, small with numerous ovules having parietal placentation; the funicles are short. Style cylindrical to obclaviform, thick, surmounted by a stigma weakly lobed, short, papillose. Nectary zone small, situated between the base of the style and the first stamens. The edge of the perianth with a row of scales somewhat more expanded than those of the pericarpel, with some bristles in the axils. Perianth rotate, with the exterior thick: sepaloides and the interior thin, petaloid. Androecium with numerous stamens in a spiral disposition. Stamens sensitive, much shorter than the style.

Pollen grains spherical, many pored (ca.12 pores), ca.75µm in diameter. Pores circular or elliptical, 10-20µm diameter, walls 3.1µm thick; tectum continuous, with conical spines and perforations all over the surface; perforations with annular ring (P. clavarioides) or without (P. subterranea)

Fruit dry, pyriform, irregularly dehiscing. Seeds surrounded by an aril with an irregular surface, more or less soft, formed by much elongated cells, placed in parallel and which resemble locks of hair formed into a loose fabric.

Plants very small, with a few (1-5) obconical or cylindrical segments. Areoles tomentose with few or no glochids. Spines pectinate and not barbed.

From the altiplano of Jujuy and adjoining areas of Bolivia and the old mountain valleys of Mendoza and San Juan.

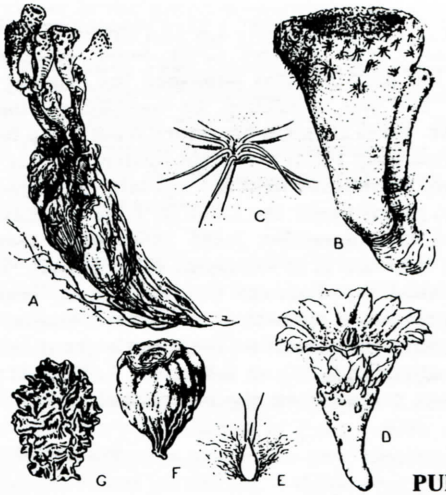
Affinities and differences with other Genera.
The scales of the pericarpel, the spines disposed along both sides of the areoles, in pectinate form and the structure of the aril on the seeds are different in this genus from others in the Opuntioideae.

A group of Tephrocacti (*T. aoracanthus, T. alexanderi and T. bruchii*) shows signs of a similar structure in the surface of the spines. The third skin (tegument) of the seeds of these few species is spongy and recalls the homologous structure in Puna.

The vegetative aspect and the phenology of several species of Pterocactus is similar to that of Puna; also in Pterocactus can be seen the reduction or absence of glochids in several species.

The characteristics of the pollen grains correspond to those of the Opuntioideae with cylindrical stems: Cylindropuntia, Austrocylindropuntia, Tephrocactus and Pterocactus. (According to Leuenberger, B., Pollenmorphologie der Cactaceae in Dissertationes Botanicae, Vol. 31, Ed J.Cramer 1976). I consider that Puna belongs to the group of genera already mentioned which show, in general, globose or cylindrical stems and I consider Puna is related to Tephrocactus.

Hickenia, No.55, July 1982. Translated by R. Moreton and checked by R. Kiesling.



A. general appearance

B. stem above ground

C. areole

D. flower

E. scale of pericarp

F. fruit

G. seed

PUNA CLAVARIOIDES (Pfeiff.) Kiesling.

QUERIES.

As a relative newcomer to Tephrocactus and its related genera, I am finding the name game very confusing. I have several references available, including Kiesling's article in Darwiniana, but I still find it difficult to place species in the relevant groups. Is there a good source of specific names with the 'current' view of which genus to which they belong? I'm sure such a list would be controversial but some of the "good and the great" must have at least private theories which may clarify some of the issues.

The only 'comprehensive' text I have is the second edition of the CITES Cactaceae Checklist (CCC2), which recognises solely *Opuntia* at generic level; a state of affairs which does not, in my opinion, aid understanding of the relationships within the group. I am in general a 'lumper' when it comes to specific names. I think that a broad based species gives a better view of the relationships between plants. If you want to recognise different forms horticulturally, then they can be referred to as cultivars, by locality data or by the relevant horticultural feature, e.g. ginger spines. However, the "mega-genera" like *Opuntia* s.l. and *Euphorbia*, for instance, are not very helpful. I guess it is all a matter of balance.

There was an article recently in the American Cactus Journal, which heralded the results of an IOS project on the *Opuntia* group. It looks like the proposal will be to split *Opuntia* into a number of genera, including *Tephrocactus* and *Maihueniopsis* and a genus for the "Airampo". However, I'm not sure where or when the final results are going to be published; does anyone know?

Getting back to the particular driver for writing this letter, I have two plants in my collection about which I would like more information if anybody can help. The first is labelled *Tephrocactus walterspielli.* (Fig.). It looks like a *Maihueniopsis* to me, but I can't find any reference to the name at all. Is it just referring to a collection by a Herr Spiel? The second came to me as *Opuntia berteri*, which the CCC2 says is likely to be mislabelled and should in fact be *Opuntia sphaerica.* . Does anyone know more about the correct names of these plants?

Dave Lambie.

"O. berteri". In TSG Vol. 3 No. 4 P. 201/2 Dec.1997 I gave reasons why this name should be rejected in favour of Cactus berteri Colla being a synonym of Neoporteria/Eriosyce subgibbosa. On page 203 was published the original plate by Colla. For comparison on page 204 was published an untitled photograph of Cumulopuntia berteri (Colla) Ritter. (WG 221). On his return from a trip to Chile in the 1980s Tom Jenkins, partially following Ritter's concept, distributed his collected TJ 16 as Tephrocactus berteri. Tom's published field list was later amended to state TJ 16 was T. dimorphus. However, plants under the name of T. berteri have spread into many collections. In Kakteen in Sudamerika 3:885 1980 Ritter lists several names, including dimorphus sensu Backeberg, as synonyms of C. berteri. These are listed in the above TSG named article. If one discounts C. berteri as an Opuntia then the oldest Opuntia name in Ritter's list is sphaerica. The above-mentioned TSG article was deliberately worded to attract comment on the specific genus and species name of TJ 16. Has anyone please anything to say on this topic? CCC2 has accepted Opuntia sphaerica. Also can anyone comment on the other issues raised by Dave Lambie?

A. Hill, Ed.

NAME CHANGES.

The history of nomenclature in the Cactaceae often shows widely divergent views and even at times hostility between two botanists. An example of the former is the differences between the splitters following Backeberg and the lumpers who later attacked his emphasis on minute differences. An example of the latter is the naming of the same plant by Pfeiffer (articulatus) and Lemaire (diadematus). It is natural and understandable that there should be different views. As knowledge and understanding develops opinions have to be revised although not everyone comes to the same conclusion. Thus the history of the various names presents a confusing picture to the amateur enthusiast who often wants a simple answer to the question "What label do I put on this plant?" Recently a new approach has been developed with an attempt to reach a consensus. The IOS Cactaceae Working Party has tried to come to a consensus upon which names should be accepted in view of current knowledge and the information provided by recent advances in botanical techniques. In some cases there has been complete agreement, in some cases there has been a vast majority in agreement and where there has been a wide range of opinion this has been recognised by leaving, for the moment, certain names "in limbo". The results of this approach can be seen in the CITES Cactaceae Checklist compiled by David Hunt which was published in a second edition in 1999 (CCC2). There is also a series of papers entitled Cactaceae Consensus Initiatives, compiled by David Hunt, which are now twice-yearly bulletins for participants in the "consensus" discussions of the IOS Cactaceae Working Party and for Collaborators on CCC2. Information on how to obtain these bulletins can be obtained from D.Hunt at The Manse, Chapel Lane, Milborne Port, Sherborne, DT9 5DL, England. E-mail: dh@davidhunt.demon.co.uk . Discussion on the nomenclature is on going.

In the Cactus and Succulent Journal (USA) Vol. 71 1999, No. 6 P.324 there appeared an article by Edward F. Anderson, entitled "Some Nomenclatural Changes in the Cactaceae, Subfamily Opuntioideae". In this paper he outlined the present thinking of the IOS Working Party on the subfamily Opuntioideae. The recognised genera are Austrocylindropuntia, Brasiliopuntia, Consolea, Cumulopuntia, Cylindropuntia, Grusonia, Maihueniopsis, Opuntia, Pereskiopsis, Pterocactus, Quebentia, Tacinga and Tephrocactus. The "Airampoa" group is accepted until the nomenclature of the

various plants in the group is clarified. He also made some new combinations to combine several taxa into the genera now believed by the IOS Working Party to be the appropriate ones. Thus Tephrocactus hirscherii, punta-caillon, and yanganucensis are moved into Austrocylindropuntia. T. chichensis, O. corotilla, O. dactilifera, T. fulvicoma, T.mistiensis and O. sphaerica are moved into Cumulopuntia. Puna bonnieae, O. clavariodes and O. subterranea are moved into Maihueniopsis. To save space in this Journal the above list only refers to the basionym, not synonyms, and omits the cited name authority.

Before you rush down to the greenhouse to change your labels it will be worth while to read the extract from a letter by Gordon Rowley which appears below. One of our members recently remarked to me that Puna was going to disappear. This is not the case. Puna is a genus that was correctly described and erected. The IOS Cactaceae Working Party has reduced it to a synonym. The name will live on at least in the history of nomenclature. It might even make a come back. In an e-mail commenting on Roger Moreton's translation of Puna, which appears in this issue, Dr Kiesling commented that although people are now considering Puna is related to (or part of) Maihueniopsis, he has his doubts. I think what is important is that our members are aware of past nomenclature, are aware of present trends, can apply the various names to the plants and make up their own minds on the basis of the presented evidence and their own observations. Please do air your views in this Journal. At least two of our members have a strong input into the IOS Cactaceae Working Party. Perhaps we could be enlightened on the thinking behind the transfer?

A.Hill.

COMMENTS ON TAXONOMY

I sympathise with your problems over the present state of flux of Generic names and lower categories, and recommend caution before rushing to change labels. I have seen so many "saviours" of taxonomy come and go, from cytology in. the early post-war period through numerical taxonomy, cladistics and now DNA sequencing. I confess I was initially awed and swept away by Bob Wallace's championship of the last, and it seemed as if at last we could read the "recipe of life" and regroup accordingly. However, there is an increasing body of feeling that much more sampling has to be done before old classifications are swept aside, and some (myself included) insist that a classification has to be related to practical issues, so that if Anacampseros and Avonia look so obviously different, then no amount DNA evidence is going to convince me that they should be jumbled together again! Personally I back David Hunt in his treatment of Opuntia in the broadest sense in The CITES Cactaceae Checklist (1999), and the numerous generic "splits" treated as subgenera (Tephrocactus among them) or sections. Or maybe that's another way of saying I'm too old and feeble minded now to care or make the necessary changes!

Gordon Rowley.

FREE ROOT RUN.

I have had a free-root-run running down one side of my greenhouse now for the past four years. At the moment it occupies an area of 20 sq. ft., although it seems much smaller since it is only 2ft in width. It is probably a further one foot deep and consists completely of a *50/50* mixture of John Innes No. 2 and grit. Over the course of a whole growing season it will only be watered five or six times since the moisture is held within the compost for very long periods of time. In fact I am convinced it never really

completely dries out since a foot high plant of Ceropegia grows all the year round. Several Opuntia/Tephrocacti have been growing in it with mixed success. I have therefore written this article to record my experiences of growing these plants in this medium. One of the first Opuntias to be given unlimited root space was 0. robusta. When it was purchased it consisted of only two pads, each about 4" in diameter and so of no great size. After only eight months of growth two further pads had grown, each measuring at least 6" in diameter (both of which were much thinner than the existing pads). Due to this rather rapid growth the plant became very top heavy and, in due course, it toppled over and uprooted itself.

Similar experiences have also taken place with other padded Opuntias, including O. quimilo. When finally this plant also succumb to a similar fate as O. robusta, by becoming top heavy and toppling over, I decided to cut the offending plant up into individual pads (some five in all, from only one pad which represented a year's growth) and distribute them at my local branch. I had completely forgotten about this plant until last month when I saw one of the original pads potted up m a friend's collection. Remarkably it had only grown a further two pads in the space of two years, neither of which were anywhere near the size of growth attained in the free-root-run. This has added further to my belief that padded Opuntias are much better if grown so as to pot bind the roots rather than give them unlimited space in which to spread their roots. If given the latter conditions they will simply grow far too fast for their weak root system to support their weight.

The only Opuntia which I have had success in flowering was a plant of 0. leptocaulis grown in my free-root-run. Originally it stood at only four inches but over the succeeding years it attained some four feet in height. By this time it had become very bushy indeed with the total width of the plant being about one metre. This rapid growth finally came to its culmination when four creamish yellow flowers were produced in July of last year. Since this plant represented no challenge whatsoever and the main reason for its purchase (flowering) had been easily achieved, the plant was felled and uprooted by me to make room for a plant of Oreocereus.

Among the Tephrocacti, which I have grown in the free-root-run, has been T. articulatus var. inermis. From a rather small plant of only three segments this quickly grew four further segments all of which were double the size of the original ones. Due to this rapid growth it did make the plant become very top heavy and so consequently this plant needs pruning every so often to keep it upright.

I have found that species such as O. bolivianus, which produce roots from each segment as it crawls along the ground, given unlimited root space double the rate at which they can be grown in pots and so can become very invasive indeed. The actual strength of the spine will also become that much stronger and so they become very dangerous to handle unless held by the root ball. When the time comes to dig these plants up out of the free-root-run it is found, in my experience, that they have a root system that is only second to Agaves in terms of the actual strength, since they send their roots as far down as possible. In some instances it has been found that they have almost become tuberous roots. I could give many other examples of Tephrocacti and Opuntia plants being grown in a free-root-run. However, from just the ones I have recorded above it can be seen that giving this group of plants the treatment they receive in the wild greatly enhances their growing rate, appearance and chances of flowers appearing upon the plant.

Richard L. Marriott

YET MORE ABOUT GERMINATION PLUS GRAFTING.

My interest in cacti and succulents began some thirty years ago but has only been "intense" for the last five years. I like to think of myself as a serious beginner and as a consequence look to other enthusiasts for their expertise. A few questions for the experts:

Many of you will be aware of Gibberellins - a large group of acidic compounds - hence Gibberellic Acids (GA) that have been assigned different numbers according to structure and function. Many are biologically active, affecting a wide range of physiological processes in plants including germination. There are adverts in the CSSA Journal for GA3 plus reference to the work of Dr. Norman C. Deno and the beneficial effects of GA3 in stimulating germination. In Schumannia 2 (1998), before the article by Gilmer & Thomas on *Tephrocactus*, Karl Zimmer gives details of his trials with Gibberellic Acid - in most cases a higher rate of germination was achieved.

Has anyone tried using Gibberellic Acid on *"Tephro"seed?*

I have tried GA3 on *Sclerocactus/Pediocactus* seed which is noted for its failure to germinate. Okay, it was not a real scientific trial with statistical analysis. However, one hundred seeds of several different species were used. Seed soaked in a GA3 solution, concentration lOOOppm for 24 hours prior to sowing, showed a 20% germination rate within days. While this result is not spectacular, untreated seed showed no germination in the same period of time. The seedlings did not flourish on their own roots and had to be grafted.

- **Grafting. Some years ago I would have fitted Miles Anderson's description (Cactus and Succulent Journal (U.S.) Vol. 69 (1997) No. 1 - Grafting Issue) as being a "graftophobic succulentophile". I used to say I would *never* graft cacti. As I approach retirement I realise that some techniques may be appropriate if you wish to see results within your lifetime. In addition I believe there can be real conservation benefits for some species.**

Now for the question - Has anyone used *Pereskiopsis* to speed up the growth in *"Tephros"*? I am aware they are closely related and the technique may be inappropriate. I find *Pereskiopsis* grows like a weed in warm, humid conditions - it does require heat and water throughout the year. Spectacular growth rates can be achieved with some difficult species of cacti if grafted on *Pereskiopsis*, although the expected life of the scion is limited unless re-grafted on suitable stock or rooted.

- **A reservation about grafting. During the last six months I have seen grafted material that appears to be "diseased" without killing the scion or stock. It brings home the need to carefully select material and the importance of cleanliness in any techniques.**
- **Germination again. A lot of work has been done on the way in which gibberellins influence germination in cereals such as wheat including the release of the enzyme amylase.**

As a final (silly?) thought, I wonder if extract of germinating cereals would break dormancy in *Opuntia* seed?

Fred Ward.

TEPHROCACTUS WEBERI

Since turning my greenhouse from North-South to East-West, (Vol. 5, No. 1) everything seems to have improved. In particular T. weberi has flowered. It's a nice flower. I think the red stigma just sets it off. (Fig.6). Notice too the difference between last years spines and those on the two new segments. I have five varieties of this plant and, If you go to the trouble of getting the different varieties, you do want to be able to see where they differ, brown curly spines in this case. A. V. James Oct. 1999.

Fig. 5 M. walterspiellii Photo by R.Geissler.
Fig. 6 T. weberi Photo by A.V.James.

TEPHROCACTUS

Incl. Maihueniopsis, Cumulopuntia Puna and related genera

Austrocylindropuntia floccosa?
East of Huaraz, Peru .
Photo by D. Edwards.

STUDY GROUP

Vol. 6 No. 3 September 2000

Secretary's Page

Well the National Show is over, many of you have visited our stand and it was great to talk to a lot of existing members and we have gained quite a few new ones to swell our ranks. Thank you to all those who have helped on our stand either erecting, manning and taking down. Without so many helpers it would not have been possible to stage our exhibit! Many thanks to everyone! I thought it was a great success and I hope you did too.

This has been the best year ever for flowers and all my plants have done well. Many plants that have never flowered before have done so for the first time. My seed raising has been successful too.

All articles and comment should be send to the Co-Editors:

Subscriptions and any other correspondence should be sent to the Secretary.

If you write to one of our Officers and expect an answer, please remember to include a S.A.E.Subs . remain at £10.00 per annum for the UK and Europe. Overseas members £14.00 or $25.- USA (in $ bills only). Please make all cheques payable in sterling to : "Tephrocactus Study Group (not individuals). May I also remind you to let me know any change of address, tel. no or code.

The Officers of the TSG:

Chairman and Co-Editor:

Alan Hill, 8, Vicarage Road, Grenoside, Sheffield S35 8RG ☎01142 462311

E-Mail: alan.hill6@virgin.net

Co-Editor:

William (Bill) Jackson, 60, Hardwick Road, Sutton Coldfield, West Midlands, B74 3DL ☎ 0121 353 5462

Secretary:

René Geissler, "Winsford", Kingston Road, Slimbridge, Glos. GL2 7BW ☎ 01543 890340

E-Mail: w.geissler@virgin.net

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THE AUGUST MEETING

As usual we began the meeting with a short AGM at which all the Officers were re-elected. The Chairman reported that a member had suggested that the TSG should produce a booklet of definitive photographs and names of recognised species to help members identify plants. Whilst this might be something we might eventually try in the future there is a great deal of study we have to do before we could contemplate such a venture. Another member had pointed out the problems some members have in access to the literature and had suggested the formation of a TSG library. Whilst the problems of building up one's own library are appreciated there are two major problems to the formation of a TSG library. The first is that whilst we are financially solvent and see no need to raise subscriptions next year we do not have the funds to set up a library. Were we to do so we would have the problem of how members were to be able to have access to the books. Posting them out to members on loan was not a practical option. Providing photocopies of requested short extracts from the literature might be possible but it would need organisation and the literature from which to extract. Martin Lowry then pointed out that if one is a member of the BCSS then the library and organisation is in place for members to request and receive such photocopies. Martin is the librarian for the BCSS. Details on how to contact him are on the inside front cover of the British Cactus and Succulent Journal. He urged members of the BCSS to use the service available.

The free advertisement in our Journal for members' plant sales, swops or wants was discussed. It was agreed that this service should continue although it is hoped that individual lists will not be very long.

On behalf of the members who attended I thank Rene for arranging the meeting and lunch at a local pub. I also thank his wife for providing the welcome refreshments in the hall. I also wish to thank all those who attended the meeting. It was agreed that we shall have a meeting at Slimbridge on Sunday August 5 2001.

Chairman.

THE BCSS NATIONAL SHOW.

This was held on the 19th August and at this event we had a display stand. This was a great success because not only did it attract people's attention but it also gained us new members. I thank Bill Jackson for making the framework for the back of the display and thank Rene for providing the plants on display. My other thanks go to the members who came along and helped on the stand. One of the features to attract attention was a free competition to find and name two plants, on the stand, that had no connection with the small Opuntias of South America. The competition was not open to TSG members. David Rushforth was the only person to correctly identify Maihuenia poeppigii (not an Opuntia) and Opuntia pulchellus (from North America). Congratulations to David and I hope that he enjoys his prize – free membership of our group for this year and next.

Chairman.

THE GENUS PTEROCACTUS. K. Schumann

The generic name is derived from the shape of the seed (Greek, *Pteron,* a wing).

R. Kiesling tells us that Pterocactus belongs to the subfamily Opuntioideae and is closely related to Tephrocactus whose species have similar pollen and seeds with a well-developed aril, but Tephrocactus do not have winged seed. But this affinity to Tephrocactus is however disputed by some authorities. Pterocactus all have underground tubers, which can reach easily 10 - 15 cm in diameter. The aerial stems are quite fragile and sometimes detach completely. In habitat they are shed during winter, drying and being blasted off by the strong winds and drifting sands as the tuber retreats below soil level.

K Schum. has described Pterocactus in the publication Monatszeitschrift f. Kaktenk 7:6 (1897):" Tuberous roots, usually large, up to the size of a fist and form underground stems up to ground level, where they branch into aerial stems. These are small, globose, cylindrical or ovate, not more than 10 cm in length and 2 cm *0,* green, brown or purple. The epidermis is usually papillate. The leaves are subulate, small and quickly deciduous. Spines are acicular, subulate or papery. Glochids are numerous, few or absent. Flowers emerge at the apex of the stem-segments, are round, yellow, and have sensitive stamen. Fruit are dry, umbilicate and splitting transversely, with spines similar to those on the stems. Seeds are irregularly arranged in the fruit like pages in a book, smooth, with three integuments, the outermost expanding, forming a light brown papery wing. The seed is wind-dispersed. The type species in *Pterocactus kuntzei* K Schum."

It would be true to say that at least one of the Pterocacti could be found in most cacti collections and that will probably be *P. kuntzei* (or the syn. *P tuberosus),* which is certainly the most widespread in Argentina and is also the best known in cultivation. Even though it is well known, few of us regard it as a plant of beauty in the past and of course very often the top growth seems to drop off, particularly in winter. However, this is a natural occurrence with most Pterocacti in habitat. If grown in a heated greenhouse, it may retain this top growth and unless it is removed the plant will not flower. Unless grown under cold conditions, but in a sunny place, it will not develop to its full potential and in all probability won't flower either. If the top growth does not fall off by itself, it should be removed in early spring. Only the new growth will produce the flowers and they will be in profusion. Flowers are always formed on the apex of the stem. There are forms with flowers of varying shades from almost white, yellow to orange. The colour of the style can also vary from pale yellow to deep red. Without proper treatment it will either be neglected or even discarded in the end. Most of the other species or forms, less well known to some, are more interesting and have stunning flowers in various shades of luminescent white, yellow, rose, red or even red-brown.

Cultivation

Pterocacti, if grown under the right conditions, are very rewarding and undemanding plants for our collections. All have more or less tuberous roots and in cultivation it is usual not to bury the roots completely. Almost a third of the tuber should be left exposed. For young plants it is advisable to repot annually into an open gritty compost.

The best position would be a top shelf in a cold greenhouse, garden frame or they can even be left outside during spring and summer, exposed to the weather and full sun. The latter is most important, because it is only the fullest exposure to sun that will produce an abundance of flowers. In winter too, they should be placed in the sunniest spot and kept cold and completely dry.

Pterocacti grow mainly in the south western regions of Argentina at a height of around 2500 m. Those with thin stems grow in the northern region *(P.* Kuntzei) and the ones with thicker stems (P australis or P. hickenii) more in the southern areas.

Flowers are mostly produced on the growth of the current year. Sometimes shoots continue to grow the following year and then also produce the flower on the new growth and seed may be produced shortly after. For some reason P. fischeri is somewhat reluctant to flower until well established.

Propagation

Pterocacti can be grown from seed and the procedure is more or less as for Tephrocacti, but it is a slow affair and considerable patience is required. A much quicker and more satisfactory method is to root cuttings from the previous year. They will root easily in spring. Insert the cuttings in an open gritty or sandy compost, spraying lightly during the first few days, then water more freely and keep in full sunlight (top shelf). Under these conditions cuttings should root in a couple of weeks or so. Then pot up and grow them on in the same way as normal seedlings in good light. They will soon form a small characteristic tuber in the same year and be capable of flowering the year after.

There is no need at all to graft Pterocacti. I always propagate quite a number of *P. kuntzei* from cuttings and find them extremely useful as grafting stock for other slow growing plants. Plants grafted on these tubers tend to keep their character.

Brief Description of the Species: (according to R. Kiesling)

***P. araucanus* Castellanos, stem segments globose to elongated, 2-3 cm long, 1-3 cm 0, greyish-purple to brown. Spines sparse. Flowers 4 cm *0,* reddish-brown. Found mainly around Chubut.**

***P. australis* (Weber) Backeberg, segments 1-1.5 cm *0* and 8 cm long, greenish-brown or purple, 1-2 central spines, thick, mostly upward pointing, brown to black Flowers yellowish-brown. Occurs southwest of Chubut to south of Santa Cruz. (Fig. 5)**

***P. fisheri* Britton & Rose, stem segments cylindrical upward pointing, 10-15 cm, 1-1.5cm0, greyish-brown. Numerous papery spines, straw-coloured to blackish. Flowers coppery-yellow to brown. From the north and south of Neuquen. (Fig. 3)**

***P. gonjianii* Kiesling, thick tuberous root, stem branching at soil level, exposed stems 5 - 10cm long, 1 -1.15 cm *0.* Spines short and light brown. Flower cream or yellow, edged brown. From west of San Juan.**

P. hickenii* Britton & Rose, stem segments globose to cylindrical 2 - 3 cm long and 1-1.5 cm 0, spines straight, stiff and numerous, yellowish. From Chubut and Santa Cruz. (This includes the synonym *P. skotsbergii)

P. kuntzei K. Schumann, aerial stem 7 –13 (-20) cm long and 8 – 15mm O, brown or greyish-brown. Flowers 3-5 cm 0, yellow to coppery. Stigma pink to dark red. This is the most widespread species, from Salta down to the extreme S. Buenos Aires. (Figs1 & 2).

P. Kuntzei f. lelongii Ruiz Leal ex Kiesling, more slender stems then f. *kuntzei,* (5-7 mm) *0.* Flowers lemon-yellow with green stigma

P. tuberosus Britton & Rose (Opuntia tuberosa Pfeiff.). Doubtful species

P. megliolii Kiesling, underground tuber to 15 cm long, stem 1-8 cm long and 0.5-1 cm *0.* Spines less than 2 mm long. Areoles very woolly. Flowers 3 cm 0, yellow. From around the town of San Juan. (Fig.4).

P. reticulatus Kiesling, stem segments globose, 2-3 cm long, 1-2 cm *0,* greyish or brown to olive-green with rhomboid tubercles. 0-1 central spine, radial spines 2-5 mm long. Flowers are 4-5 cm 0, pearly white and lightly tinged pink. From the valleys of Calingusta and Uspalata in full sun.

P. valentinii Spegazzini, roots enlarged, stem segments globose to cylindrical, short 2-3-5 cm long and 1 cm 0, completely covered by yellow, bristly 1-2 cm long spines. Flowers 2 cm 0, yellow or coppery. From Chubut and Santa Cruz.

P. fischeri and ***P. australis*** have rather similar spination and particularly in the case of plants grown in collections It is sometimes difficult to distinguish the two from one another. There appear to be transitional plants even in habitat between to two. Both have sometimes flattened central spines although Backeberg in his key states that ***P. australis*** never has central spines.

It is also interesting to note that in the case of ***P. hickenii,*** in cultivation the shoots keep on growing from year to year, rather then shed the top growth as certainly is the case with P. ***kuntzei***

The North American genus M***arenopuntia*** that has only one species ***(M.*** Marena) closely resembles ***Pterocactus,*** although its similarity is superficial which is called "convergent evolution", Kiesling states that this undoubtedly is a species derived from ***Cylindropuntia. M. marena*** can equally withstand cold in cultivation as long as is given some protection from the rain and is kept dry during winter. It does not shed the top growth, but the flowers are also born at the tip of each stem as in Pterocacti.

Rene Geissler

M. WALTERSPIELII.

In TSG Vol. 6 No. 2 P.386 a query was made from Dave Lambie asking for details about this plant, as he could find no information about it. On P 391 Fig. 5 a picture was printed of a plant which is circulating in Britain labelled *M. walterspielii.* John Arnold has written to say that *Lobivia (cinnabrina var.) walterspielii* (WR 73) comes from the

area of the Walterspiel Mine near Potosi in Bolivia. It would appear from the name, therefore, that the Maihueniopsis might come from the same place. John also says that unfortunately, Rausch only rarely lists any Opuntias in his field list so there is no corroboration there as to whether or not it is a Rausch collected plant. However, Brian Bates and Martin Lowry have been to the area of the Walterspiel Mine and found no evidence of the plant.

The plant looks to have strong affinities with the southern group of *glomeratus*, which was displayed at the August meeting. Compare Fig. 5 P391 with the plant labelled "*T. glomeratus v. andicolus?*" on P346 in TSG Vol. 5, No. 3. Dr R. Kiesling in his email, mentioned under the discussion on glomerata in this issue, says Fig. 5 corresponds to his idea of *glomerata*. The Walterspiel Mine is about 300 km north of the Bolivian/Argentinean border. Martin Lowry states that the northern edge of the particular *glomerata* form, to which the plant obviously belongs, is about 900 km south of the border. Martin is sure that, despite the name on the label, the plant can have no connection with the Walterspiel Mine.

We have therefore an Argentinean plant being distributed with a name on the label that suggests that it has some connection with an area of Bolivia. It will be noted, however, that the specific name ends in an "ii" not "ensis". This suggests that the plant is named after a person rather than a place. The query arises whether the name is a valid one or is it simply a Nurseryman's invention? Does the label have the correct plant attached? Just before this issue went to print Graham Hole said that the name originated in the German Tephrocactus Robin and that the plant, according to Klaus Gilmer's list, is from nursery stock. It appears possible, therefore, that a German has simply named a selected clone after himself. Please will members make further comments? I am sure that some one can give more information.

A. Hill.

A VISIT TO PERU

My journey to Peru in August 1999 was to undertake a circuit of the Cordillera Blanca with the mountain of Alpamayo at the centre.

We had a short three-day trek at first due east of the mountain town of Huaraz. At about 4,500m I saw the first of many clumps of a densely hairy cactus with yellow fruits of three-quarter inch diameter. The plants also had a few red flowers. All the clumps of the plants were eighteen to twenty four inches in diameter. Whatever valley we happened to be walking through the plants occurred between 4,300m – 5,500m. I presume the plant to be some form of Austrocylindropuntia/Tephrocactus floccosus but I have never seen anything so densely hairy. (Please see photograph on the front of this issue. Ed.)

Thirty Km due west of Huaraz in the Quebrada del Bamba at 4.600m we saw an unidentified Tephrocactus. (Please see Fig. 6. Ed.). This was the only plant of its kind that we saw. It was growing about 100 metres from A. floccosa plants.

David Edwards.

Please will members suggest a name for the unidentified plant? Ed.

Fig. 1 P. kuntzei. Photo by R. Geissler.

Fig. 2 P. kuntzei. Photo by R. Geissler.

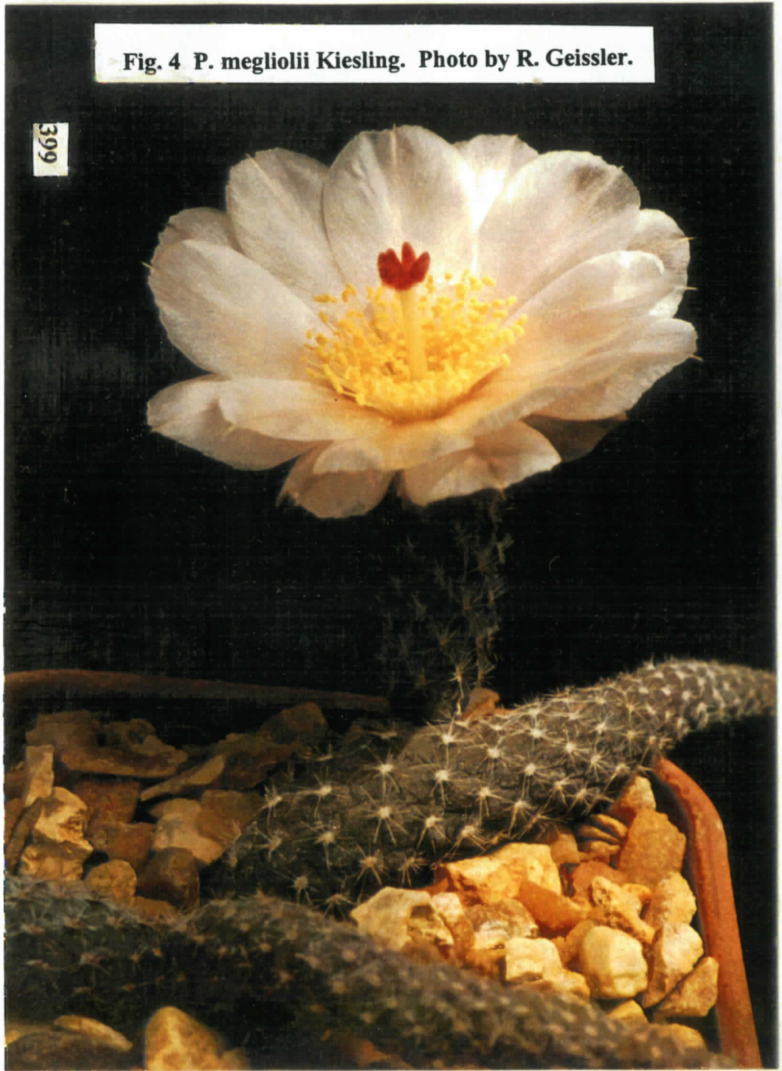

Fig. 4 P. megliolii Kiesling. Photo by R. Geissler.

Fig. 3 P. fischeri Britton & Rose. Photo by R. Geissler.

OPUNTIA GLOMERATA, ANDICOLA AND HYPOGAEA.

The above names were the subject chosen in August 1999 for discussion at the August meeting 2000. To aid members prepare for the discussion translations of the original descriptions of *O. glomerata Haworth (1830), O. andicola, Pfeiffer (1837)* were given in TSG Journal Vol. 5 No. 4, P. 360. Similar information was given on *O. hypogaea Werdermann* in TSG Vol. 6 No.2, P378. To give some idea of the type of plant to be discussed two photographs were published in TSG Vol. 5, No. 3, P346. The photographs were chosen to illustrate two different forms of plants. The first one is a compact plant with a straight spine that grows at an angle tending to grow down towards the body of the segment although not tightly adpressed to it. The second form has larger, longer segments with the spines tending to grow at an angle up from the areoles away from the body segment.

Although the original descriptions were made for single taxa Backeberg made *andicola (Pfeiff.)* a variety of *glomerata (Haw.)* and considered *hypogaea (Werd.)* to be a synonym of *glomerata (Haw.)*. Ritter, however, recognised *hypogaea (Werd.)* as a separate species making it *Maihueniopsis hypogaea (Werd) Ritter*. In the CITES Cactaceae Checklist Second Edition, (which does not state authorities) *hypogaea* is given as a synonym of *O. glomerata* whilst there is no mention of the name *"andicola"*, even in the section on "Names in current usage". The basic problem is that the written original descriptions are open to interpretation and there is no attached illustration or deposited original plant material. Various authors have therefore interpreted the descriptions in different ways. For example, Backeberg cites *O. glomerata Haw.* as the basis for his erection of *Tephrocactus glomeratus (Haw) Backbg.* Backeberg was saying that he was simply changing Haworth's *Opuntia glomerata* into a Tephrocactus. However, Ritter, when giving the synonyms of *Maihueniopsis Hypogaea (Werd.)* Ritter, lists *O. hypogaea Wer*d. and *T. glomeratus sensu Backeberg* but non *O. glomerata Haworth*. Thus Ritter is saying that Backeberg made a mistake when trying to identify which plant Haworth described. In other words Ritter thinks Backeberg's "glomerata" is not Haworth's "glomerata". Of course it could be Ritter who is wrong.

In our discussion we have not been concerned with a generic name but simply the species names and to what kind of plant do the names refer. Are there three different species, two (in which case which two names should be combined) or just one? At present, within our group, we have three views presented to us.

1. Dr R. Kiesling in Darwiniana 25 (1-4) P171 – 215, erected *Maihueniopsis glomerata (Haw.) Kiesling* citing *O. glomerata Haw., O. andicola Pfeiff.* and *O. hypogaea Werd.* amongst the synonyms. In a recent email, to Rene Geissler, Dr Kiesling stated:

***Opuntia hypogaea* in my impression is a synonym of *Maihueniopsis glomerata*, perhaps the most abundant Maihueniopsis in NW Argentina and the high mountains of Chile but also in SW Bolivia (although I have not specimens or notes to prove the last statement). This species is very variable in the size of the stems and the spines. The spine colour is very often white with a black top but the proportion of the colours change and can be found from absolutely white spination to completely black; with all the intermediates in the same populations. Also there are amber coloured spines and other variations will not surprise me. The main characters to identify it easily are the pointed segments (with a dark green colour) and the flat (triangular) spines. Photos 3 and 5 of TSG Vol. 6, No 2, correspond to my idea of *M. glomerata*. Seeds are lentil like and smooth.**

2. Royston Hughes writes:

I tend to look back to the original descriptions, done with the Tephrocactus book by Leighton-Boyce and Iliff. We know that the original descriptions give too little information to be certain, by modern standards, of the plant being described. As a hopefully useful exercise I tried to see how the "British Standard Glomerata" = "BSG" (bottom photograph in TSG Vol. 5, No. 3, P346) compared, line by line, with the original glomerata and andicola descriptions.

***O. glomerata. Howarth.* 1830.**

"With branches packed together in a clump." – A good description of a BSG.
"The central spines, single, straight, tapering to a fine point, flat on both sides, very long." – Another good description of a BSG.
"Found in Brazil, grows well in London without flowering." – Obviously only sent from Brazil. BSG plants always appear to grow well in Britain but rarely flower.
"A woody form." – Older plants of BSG, as with other Tephrocacti, could be described as woody.
"The whole plant is a rounded hemispherical mass." – A good description of a BSG.
"Individual stem segments somewhat pointed terete." - Another good description.
"Tightly filled out with flesh, greenish." A good description of a BSG whose segments always seem to have green, smooth skins even when not watered for some time.
"Hardly 1.25 cm thick." – Plump segments on good BSG plants of mine tend towards 1.6cm diameter by 3.8cm to 1.6cm long.
"Areoles normally with very short dense uniform bristles." – The lower areoles of a BSG have tufts of glochids about .3cm long, sometimes with a few thin spines upto 1.6cm long. These tufts become small towards the top of the segment where the glochids become miniscule hidden in the areole wool.
"One horny spine more or less central, horny colour, 5cm long hardly weak yet not rigid, but capable of being bent into a curve." – The translucent white with perhaps a yellow to brown or black tip of a BSG spine could be termed horn coloured. The single spine is a good description of a BSG although we now know plants often have two spines. 5cm spines that appear rigid but are flexible enough to be bent in a curve is also appropriate to a BSG plant where the spines vary from 3.8cm to 5.4cm.
Additionally Pfeiffer says that "the stem segments of O. glomerata are hardly 2.5cm long" and that "Mendoza is the probable habitat from where the plant came." - 2.5cm long segments sound more like a hypogaea plant (which was undescribed at that time) than glomerata. (The first plant pictured on page 346 fits my concept of hypogaea.) Stating "Mendoza" as a probable habitat is also likely to be correct at that point in history.

***O. andicola. Pfeiffer.* 1837.**

"A prostrate densely romose Opuntia." – A good description of a BSG with its many "branches".
"Elongated cucumber shaped segments." We are told that this means stem segments with a 1 to 4 ratio of diameter to length which applies to a BSG.
"Glossy brownish green." – Glossy olive green better describes a BSG.
"Eventually woody." Describes a BSG (see O. glomerata).
"Areole bristly." Above comment applies.
"Rather close set." Compared to what?
"3 – 4 thin white hardly stiff spines." - Could refer to radial spines or maybe longer glochids as mentioned in O. glomerata.
"1 to 2 longer spines, white, flattened towards the base." - A good description of a BSG.

Stem segments 8 to 12 mm thick." – This seems rather small for a BSG. However, my plant from Chris Hall that was identified as coming from Abra Pampa appears to be the same in all respects to the BSG except the segments normally are smaller being similar in size to the larger bodied hypogaea.
"The lowest spines 3.75 - 5cm long." This is a good description of the BSG spines but why are the lowest spines quoted unless they were the longest on his plant.
Pfeiffer says the plant comes from Mendoza. Spegazzini says it is not uncommon in the mountains around Mendoza. – So the habitat appears to be the same as for O. glomerata.

Overall I would say that these two descriptions refer to the same species. Other people, having a different emphasis, could claim the opposite.

I germinated a number of seeds of PW 6473 collected as a Tephrocactus from Paso El Choique, Mendoza at 1600m. As the seedlings first developed I thought that they were B.S.glomerata type plants. They were much spinier than I would have expected but I took this to be a juvenile form of growth. However, two other seedlings of a similar age, that came from commercial seed as T. glomeratus, developed with a quite different look to them and much more likely to become BSG plants. My PW 6473 seedlings now look as though they are developing into plants of a spiny darwinii form. At present the largest segments are 3.2 cm long by 1.9 cm diameter. The spines being stiff sharp pointed, broad at the base, directed upward and outward. At one areole I counted one central spine 4.5 cm long, 3 other major spines to 3 cm long and 4 lesser spines. A single segment had 17 areoles with similar spines to those just described. In comparison, a segment on a BSG plant may have its one or two thin spines from 15 areoles. The spines look whitish, without the translucent look described as horn coloured. They contrast well with the segments that tend to vary from olive green to a purple brown colour. I can recognise my platyacantha forms as distinct from my darwinii forms. Likewise the above described spiny darwinii forms can be recognised as being different from the normal darwinii forms. My seeds of PW 6085 collected as a Tephrocactus from Las Lenas 2,800m are developing into platyacantha forms.

The BSG plants grow easily in cultivation into nice hemispherical humps quite quickly apparently unlike some other Tephrocacti that seem to acquire a cultivated growth different from that seen in habitat. However, it is reported that BSG plants grown hard develop much smaller segments. A plant of mine, through neglect rather than hard growing, now has segments 2 – 2.7cm long by 1 – 1.3 cm diameter.

***Hypogaea* forms are about with small segments to tiny segments and short to long spines even though its range appears restricted to Jujuy and nearby Salta areas. I have not seen seed of it yet but it appears to belong to the *glomerata* group.**

<u>3. Graham Hole</u> brought many of his plants to our August meeting and laid them out on a "floor map" to illustrate the geographical location from which they were collected. Two different groups of forms then became apparent. In the south and west there was the larger clumping, more elongated segment type with the spines tending to grow upwards rather than down. In the north there was the smaller segmented type with a broader, more dagger like single spine coming from the areole. The spines on the latter group tended to be adpressed towards the segment.

Graham stated that there was great variation in the spine colour of the southern group (which experiences a wetter climate than the north). Various names have been given to the forms in this group. However, in Graham's view these Argentinean forms with the

cucumber segments are all *andicola*. In his view andicola has no connection with *glomerata*. These Argentinean Andean plants have more than one spine at the areole and show glochids. Some of the spines tend to curve. In his experience fresh seed easily germinated. Cuttings acted like seedlings as they rooted, with the new young juvenile segments not developing glochids. Then when the taproot has grown the plant develops big spines and glochids.

According to Graham's perception the *andicola* group come from the eastern flanks of the Andes from Mendoza in Argentina up into Bolivia but with a very sparse isolated population in the latter due to climate change. Then in North Argentina and Southern Bolivia one finds the other plants and these are from the Bolivian plateaux area not the Andean Mountains. These are the ones which Graham identified the plants as *glomeratus/hypogaea*. In this much harsher terrain the plants do not grow as large as the ones to the south. Some are mounds and some are not but are flat to the ground with a very distinct taproot. The spines are triangular in cross section whereas andicola spines are flat. The plants do flower in the wild. However, in cultivation Graham has tried all the various methods of watering (plenty, none etc.) but without success with any flower buds aborting. The plants experience very hot summers with infrequent, thundery, heavy rain. In the cold winters they have very little water.

Graham also pointed out some of the problems in trying to identify plants from descriptions. Although sometimes the descriptions give locations the latter are not always helpful. Due to landslip and other factors roads change so reference to these cannot always be relied upon. Also frontiers change. Areas of Bolivia in the past are now in Peru or Argentina. Thus a statement written in the past that a plant grows in "Bolivia" does not necessarily mean the area of modern Bolivia. Colour of spine can be different in cultivation than in habitat. When studying plants Graham advocates looking first at similarities not differences. Then look at the differences.

At our meeting a query was raised about the statement one sometimes hears that one can differentiate between *glomerata* and *hypogaea* because *hypogaea* has a purple patch below the areole. The original description makes no mention of a purple patch. Martin Lowry said that the purple patches that develop on some plants are a response to local weather/environmental conditions and depend if the plant has had water. Purple patches are not a permanent feature but develop sometime in plants under stress as a result of an accumulation of carotenoids in the plant. The purple coloration deflects red light away from the epidermis of the plant thus helping to decrease a build up of heat in the plant.

Summary

If one accepts that the plants are all one species then this is a very broad concept with no differentiation between the Northwest Argentinean forms and the more northerly Bolivian plateaux forms. All the plants are therefore *O. glomerata Haw.*. If one argues that the *O. glomerata Haw.* and *O. andicola Pfeiff.* descriptions refer to the same species and then recognise *O. hypogaea Werd.* one accepts two groups. *O. Glomerata Haw.* has precedence over *O. andicola Pfeiff.* so we have *O. glomerata Haw.* in the south and *O. hypogaea Werd.* in the north. If the southern group is regarded as *O. andicola Haw.* and the northern group is O. glomerata Haw. /hypogaea Pfeiff. then precedence dictates we have *O. glomerata Haw.* as a name for the northern group.

What do you think?

A. Hill.

OBSERVATIONS ON VOL. 6, NO. 2.

Congratulations on the Puna subterranea, with magnificent floration, photo on the cover. Let me note a small mistake: Maihueniopsis subterranea (Fries) Anderson was a new combination in the Cactus Journal of USA, not in your magazine; thus the literal transcription ("comb. new") is a mistake - very frequent in cactus literature.

About the note of Zlatko, and his photos:

0. minuta in my impression is a species growing sporadically at Salta (Tastil), and Jujuy (medium part of Humahuaca Quebrada, on the way to Susques). In fact it looks like a small M. glomerata, but as it is always small, with small spines and a few segments, I considered for my paper in 1984, to keep it as a separate species. Perhaps its area of distribution is bigger, but with the small size of the plant it is difficult to see in the field.

The photo published on page 383 as M. minuta? is exactly the plant I named M. ovata, a difficult one for me, because each plant looks different; some times spiny, others not, with others spiny only at some segments. The spines are cylindrical or flat (!!?) and it astonished me; in fact it is always less spiny than the other species of Maihueniopsis. Also the segments are variable, but apparently mostly the glochids are in big prominent tufts. I suspect M. ovata is a species of a hybrid origin and not very homogeneous genetically, as the stems and spines variation shows, and also the seeds; I have seeds from different localities that look too different (smooth vrs. very rugose). The area I know of it is Mendoza and San Juan. I do not remember it from Cuesta de Miranda, but it is possible that it is there.

The plant in fig. 3 on page 384 is perhaps M. glomerata. At least it looks like a typical one. It is too spiny to mention the name minuta (and perhaps too big, but there is no scale). The fig 4 of the same page really looks like minuta in my concept; but easily can be also a young form of M. glomerata.

The note of Zlatko mentions having found these plants close together and variable (in my concept one can be M. glomerata, the other M. ovata, and other perhaps minuta, perhaps glomerata). All this gives the impression he found a place where glomerata and ovata are growing together and where the plants can hybridise; perhaps a very interesting place to do more biological studies.

If you have received the magazine, published by David Hunt with interesting news about Opuntioids, you will know there will soon be publication of Succulent Plant Research volume 4, devoted to Opuntioids, also by D. Hunt. In it will also appear interesting research of several colleagues.

Extracted (with permission) from an email from R. Kiesling

SOME LIMITED BUT INCONCLUSIVE SUCCESS WITH GIBBERELLIC ACID (GA3)

I recently posed the question as to the effectiveness of GA3 on "Tephro" seed. As a result I decided upon a small trial. Roger Moreton kindly sent me some seeds and the following were used:

Tephrocactus alexanderi Los Colarados, La Rioja
Maihuenia poeppigii Volcan Chilan
Maihueniopsis sp. Nr. Caspana, Chile (Roger Moreton's own collected seed)

All the seed was cleaned using a solution of Chinosol. In addition, the unsterilized seed compost (standard cactus mix) was pre-treated with Chinosol. For each of the species - prior to sowing:

10 seeds were soaked in GA3 lOOOppm for 36 hours

10 seeds were soaked in rainwater for 36 hours.

Temperature - throughout the trial period:
Night-time 15* - 20*C Day-time 25* - 30*C

Artificial lighting - approx. 16 hours/day.

The "results" after one month are as follows:

	GA3 treated	Untreated
Tephrocactus alexanderi	3/10	0/10
Maihuenia poeppigii	0/10	0/10
Maihueniopsis sp.	5/10	0/10

I would tentatively suggest that under some circumstances Gibberellic Acid can effect the germination rate of "Tephro" seed but further trials are needed.

Fred Ward

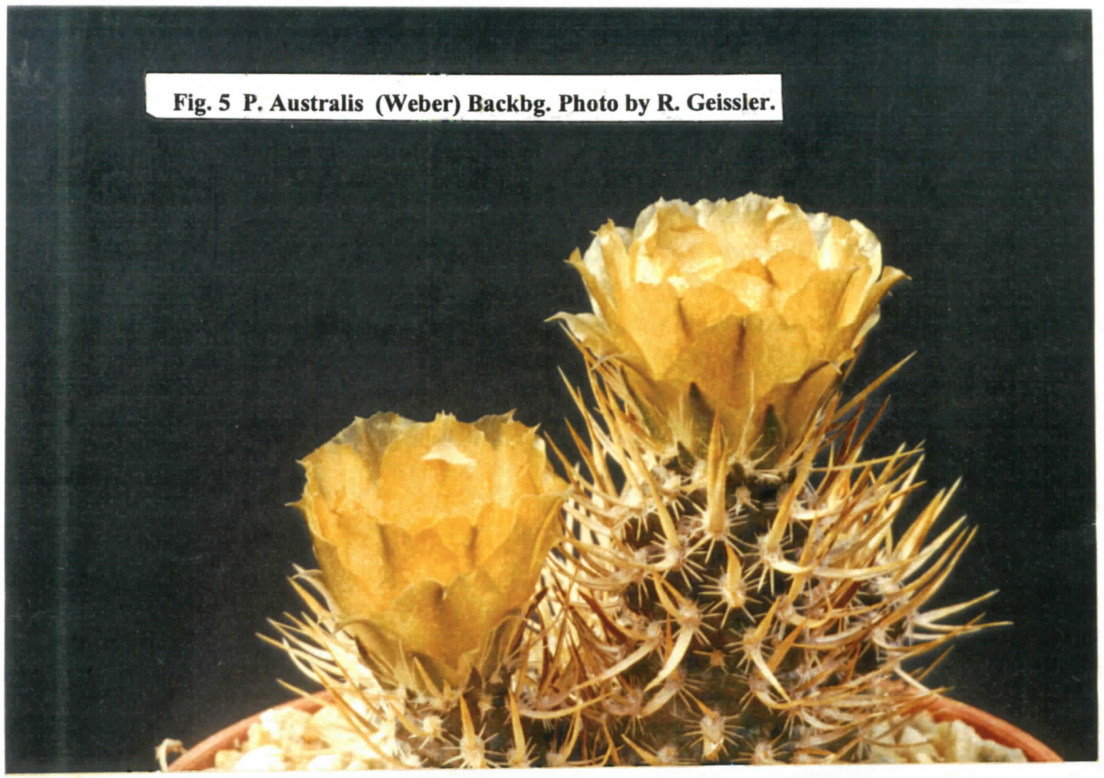

Fig. 5 P. Australis (Weber) Backbg. Photo by R. Geissler.

Fig, 6 Maihueniopsis/Cumulopuntia sp Photo by D. Edwards.

TEPHROCACTUS

Incl. Maihueniopsis, Cumulopuntia, Puna and related genera

Opuntia platyacantha Pfeiffer?
Photo by R. Geissler.

STUDY GROUP

Vol. 6 No. 4 December 2000

Secretary's Page

Four more members have joined us since the last journal: Arnold Biewenga from The NETHERLANDS, Richard Michlick from Tucson, U.S.A., Philippe Corman from FRANCE and Tim Bunt from Benfleet in Essex. I hope they will soon enjoy taking part in our activities and tell us about their collections.

All articles and comment should be send to the Co-Editors:

Subscriptions and any other correspondence should be sent to the Secretary.

If you write to one of our Officers and expect an answer, please remember to include a S.A.E.

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E-Mail: alan.hill6@virgin.net

Co-Editor:

William (Bill) Jackson, 60, Hardwick Road, Sutton Coldfield, West Midlands, B74 3DL ☎ 0121 353 5462

Secretary:

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BOOK REVIEW.

Tephrocactus und andere Feigenkakteen/Tephrocactus and other prickly pears

Eigenverlag Michael Kießling, Schnaitsee, Germany, [7 Oct] 2000. 319 pp., 279 colour photos; 25.0 x 17.8cm., hardbound in publisher's decorated laminated boards, with colour photo covers. Price DM 74, £25, or EUR41.
German and English bilingual. A very colourful, alphabetically arranged photographic record of a selection of 125 Opuntias and one *Maihuenia*, including many cultivars, with brief descriptions. The first 15 pp. or so offer general notes on cultivation, plant diseases, and so on.

The main value of this book is its photos, which are clear and of a consistently high quality. The publication of descriptions and illustrations for the first time of a number of cultivars, hitherto only seen as catalogue names, is also worthy of note.
The coverage of the book is fairly accurately described by the full title, although it must be said that there is a heavy weighting towards the outdoor hardy Opuntia group, which includes a preponderance of North American species of the *fragilis*, *polyacantha*, *erinacea* alliance. There is also a scattering of randomly selected Opuntias of Section *Opuntia*, such as *microdasys*, Section *Consolea* (*moniliformis*), and so on.
South Americans are however well represented. I counted 67 species and varieties of South American cacti, i.e. roughly half the total. Pterocactus features some unusual species in full flower. A fair few airampoas appear, many under new cultivar names, which is probably the best way to treat these variants.
The author has had some problems with nomenclature, and let's face it, who doesn't? Apart from *Maihuenia*, everything else is named as an *Opuntia*, even the *Pterocactus*, but the subgeneric or sectional names are indicated. Curiously, these are mainly called `Unterreihe' which ought to translate as `Subseries,' inappropriate enough, but they appear in the English as `Suborder,' a rank that is way higher than Family in the botanical sense.
It has to be said too that the English generally is understandable, but has not been polished properly, and includes words and phrases that would not normally be used.
Species and variety identifications are reasonably accurate. There are no obvious howlers, though some cases of doubt do appear. For instance, I am doubtful if either of the two photos on p. 221 are really *platyacantha* (the other three of this species seem OK).
The author rounds off the book with a short piece entitled "Oh yes, just before I forget to tell, why a book about Opuntia." He concludes that "there is an unbelievable variety of forms that may flower in our climate in a breathtaking, sumptuous manner. . . . I have written this book to make other people feel the way I do. It is important to me to find out (as far as possible) about this completely misunderstood group of plants and I hope that 20 years of intense observations and love for these cacti have been worth it." No doubt every member of the TSG will echo those sentiments.

Roy Mottram

I have only recently bought a copy of this book and so have made no deep study of it. However, there are a number of things that caught my attention during on my initial reading. There must be a number of TSG members who have now obtained the book. Please can we have some comments about some of the contents: things you agree with and others where you differ from the author or where you can add additional

information or where a query for more informtion is raised in your mind. Michael Kiesling is to be congratulated in producing this book and I am sure that he will be pleased if it can generate discussion on his favourite plants. Ed.

COMMENTS ON PREVIOUS ISSUES.

TEMPERATURES

I found the article on temperatures on P.379 and 380 very interesting. However, it is all a little academic though, because Maihueniopsis, Cumulopuntia, Airampoa, Puna, Maihuenia etc., can take all these differences in temperatures in their stride as long as they are kept totally dry during the winter months. Ventilation, moving air, (as Rob Seward explains on p.381) and maximum light seem to be far more important then temperature. All these plants mentioned seem to even benefit from temperature fluctuations and low temperatures are almost necessary for their winter rest.

FREE ROOT RUN

For those that can afford to give their plants free root run it seems to be the ideal solution, although there can be a few problems with that too, as Richard Mariott has illustrated in his article p.388/9

If they are to be grown in a greenhouse it would be most important that the glass goes right down to the ground, or more light will be lost in addition to that already lost through the glass and the struts above. A southern aspect would be ideal. I would prefer a raised bed, rather than growing them low down. The other points to consider always is to take great care in selecting plants of similar habit. Planting a Maihueniopsis or Puna next to or in the vicinity of an *Opuntia engelmannii* or *O. robusta* for instance would be folly. Large padded Opuntia grow so fast and tall in a matter of one year in free root run that they will almost completely exclude the light and overshadow low growing plants beneath, not to speak of the fast spreading roots. As soon as that happens the smaller plants will etiolate and be most reluctant to flower. It even seems to matter how far away a plant is from the glass. As always, light and good ventilation are of critical importance. When we consider how much more exposed to the light they would be in their habitat and probably at a much higher elevation too.

A friend of mine grows the smaller Opuntia extremely well in a large greenhouse in the very south of Germany, on the foothills of the Alps where the lighting conditions are so very much better. His book will be out very soon and you will be able to judge for yourself how well they flower under his conditions! Before you give your plants free root run consider how large for instance a *Maihueniopsis pentlandii* will grow as well. I have had one in a 30cm (12") pot and have had to consign it the compost heap when it demanded an even larger pot. Some cuttings ensured the survival of the clone that will soon be in a 10" pot again. It all depends how much space you have available to give your plants. Mine have to put up with a garden frame where they do quite well in their pots.

M. WALTERSPIELII

I am afraid the saga about this plant may continue for a while yet (p.396/7 and a photograph on p.391)! Whilst I am not at all sure how the name originated and it certainly is not a valid one, I can accept that the plant may be in the "glomerata" group, but it really does not look at all like *M. glomerata v. andicola.* It grows much more open, with joints almost horizontal, spination on older joints is much stronger

and sparser than on *andicola*. Young joints are much longer and almost devoid of spines. Even the flower structure is quite different too. You will notice that Michael Kießling in his book lists it under *Maihueniopsis leoncito*, which makes it even more of a puzzle. One needs to grow the two plants in order to observe the differences.

But how did this name originate and where does this plant really come from? It looks so different to almost any other plant in my collection and it flowers extremely profusely, almost from the first couple of joints from a cutting. My plant did come from a continental source as a cutting, but without any provenance. For the time being its real origin must remain a mystery!

AUSTROCYLINDROPUNTIA FLOCCOSA (cover page V.6, No.3)
That this plant is in the *floccosa* group, there is no doubt. The habit of the plant and the flower would confirm this. *Opuntia Floccosa* S.D. (Bl. für Kakteenkunde) says that it grows in Central Peru 4000m with long white hairs, flower orange/yellow and yellow fruit. *Opuntia lagopa* K. Schum., on the other hand is described with much longer hair that is dark honey-coloured, from Southeastern Peru 4000m.

The most hairy of all the *A. floccosa* type plants I imagine would be *A. malyana*. It has a red flower as shown in the photograph (Vol.6, No.3 cover), but the hair is very dense and has an almost yellowish tinge. The plant in the photograph seems to be in the resting stage and no leaves are visible. It is very difficult to judge by a photograph (see P.249), because the colour rendering may be different with some films, but some one else that has visited this locality may be able to throw some more light on it.

TEPHROCACTUS WEBERI
The plant on p.391 appears to be a dwarf form of *Tephrocactus weberi* and some of these dwarf clones seem to flower extremely well in good light. But there are a great many different forms and they all flower eventually, although the larger ones need to be a fair age before they really make a good show. There are even some considerable colour variations in flowers and red is fairly common apart from the standard yellow. Spination too varies a great deal from fairly long to almost no spines at all. Spine colour ranges from white, straw colour, to red/brown, some have stiffer spines then others.
Alan James is to be congratulated on getting his plant to flower while it is so small, judging against the size of the label.

GIBBERILIC ACID (p.390)
I have heard quite a lot about how beneficial it is supposed to be for seed germination, and I would like to try using it just to see if it makes any difference. Does any one know where one can obtain it?
No I have not tried using *Pereskiopsis*, but can't think why one should use it at all because all Opuntia grow readily from cuttings – apart from *A. malyana* of course!!!

Rene Geissler.

WANTED

Malcolm Birkett (Doncaster) is a new member, with a very modest collection, who would like to purchase plants or cuttings. Please contact on 01302 771393 or by email m.birkett@ntlworld.com

SEEDS OF MAIHUENIOPSIS, CUMULOPUNTIA AND TEPHROCACTUS COMPARED

Backeberg lists only one species of *MAIHUENIOPSIS* in his work "Die Cactaceae", *M.molfinoi*, a rather problematical plant originally described by Spegazzini, who wrote "fruit unknown" so there was no description of the seed. Ritter has listed many more, some being his own discoveries, other being transferred from Backeberg's concept of *TEPHROCACTUS*. The species given by Ritter are as follows: *M. albomarginata, archiconoidea, atacamensis, camachoi, colorea, conoidea, darwinii, domeycoensis, grandiflora, grata, hypogaea, leoncito, leptoclada, mandragora, molfinoi, ovallei, ovata, rahmeri, tarapacana, crassispina and wagenknechtii.* In the genus *CUMULOPUNTIA*, erected by Ritter, he lists the following: *C. berteri, boliviana, echinacea, famatinensis, frigida, hystrix, ignescens, kuehrichiana, pentlandii, rossiana, subterranea, ticnamarensis, tortispina, and tuberculata.*

Unfortunately, Ritter did not get around to giving his opinion of the remainder of Backeberg's *TEPHROCACTUS* names, so we will never know which he would have put in *MAIHUENIOPSIS* or *CUMULOPUNTIA*. Also he did not seem to take great account of seed differences when defining his genera. Hence it is rather interesting to look at the seeds of as many species as possible. It soon becomes apparent that the species now regarded as *TEPHROCACTUS* sensu stricta, i.e. *TEPHROCACTUS articulatus, T. alexanderi* and their close allies have a very different seed from the remainder, being very soft and sponge-like (Fig. 1). They also germinate fairly readily. One other type of seed stands out- *MAIHUENIOPSIS glomerata*, where the seeds are lenticular in shape and covered in fine hairs (Fig. 2). Also of this type *is M. hypogaea.* and the one I have called *MAIHUENIOPSIS species* from Caspana, Chile, which I collected last year (Fig. 3). These seeds germinate particularly easily. I have never seen the seed of the other species that I suspect is in this group, *M. andicola.*

The remaining species which I have been able to inspect (approximately fifty samples), regardless of what generic name they arrived under all seem to have very hard seeds with a prominent aril. These are the ones that are very difficult, verging on impossible to germinate. A few samples are illustrated (Figs 4, 5 & 6). The question is, what notice should we take of seed type for taxonomic purposes? The genus *GYMNOCALYCIUM* comes to mind, which includes four different seed types, as well as *MAMMILLARIA*, with at least two distinct types. Any comments would be welcomed. R. Moreton.

TSG PLANTS.

In the early years of the group's existence there was a small enough number of members for a plant to be stripped of some of its segments and a cutting to be given to each member at a meeting. These plants were each given a "TSG number". There was nothing special about the plants – they were not rare or all had a Field Number. The idea was that members should all be growing the same plant and could comment on it knowing that we were all discussing the same plant. In recent years there has no new TSG plants although some newer members have obtained cuttings of the early plants. However, there has been no feed back as to how the TSG plants have fared in peoples' collections. There should be some reasonable sized plants by now and it should be possible to make some comment. Have your plants survived, grown etc.? Have you come to any conclusion about the correct names for the plants? Do they look like others in your collection and if so how do the names compare? Have you any photographs we could publish of a TSG plant? In short if you have a TSG plant it should be possible to send in something for us to collate and publish. Please will you do so? Ed.

SOME RANDOM OBSERVATIONS ON TEPHROCACTI.

Are Tephrocacti really that difficult to germinate from seed? That is precisely the question I have been pondering after reviewing this years crop of seed purchased from the TSG June 2000 seed list. From the list I only ordered one packet of *Maihueniopsis Sp.* Nr. Caspana (Chile) but from some seventeen seed I have managed to germinate a more than satisfactory fifteen plants in total. Several other people whom I spoke to at the TSG meeting in August also reported very good germination of this species, some even going so far as to report it was coming up like cress! Was this particular batch of seed relatively easy to germinate for it happened to be of a particular clone endemic to one area only, or was all the seed collected from an individual plant which had particular tendencies to germinate easily?

Has anyone else apart from myself ever been tempted to combine the three species *Tephrocactus floccosa, T. lagopus and T. verticosus* and form one species with two sub-species or varieties underneath it. After studying all three plants though for some time I can well understand why they have been retained as separate species.

A common trait that all three seem to have in common relates to the hair that is produced on each plant. I have found depending upon how much light is given to each species this effects directly the amount of hair that is produced. The greater the intensity of sun the plant is exposed to then the greater amount of hair is produced. Conversely the less amount of light intensity the plant is exposed the less amount of hair is produced. I would conclude from this that the higher the altitude the plant can be found to be growing in habitat, possibly the greater thickness and density the hair that is produced. This hair would not only then protect it from the powerful suns rays but also the cold temperatures experienced so high up in the Andes. Very often though, I have found in my greenhouse that the hair acts as a trap for warm air and so badly mark the plant. This I would have to attribute to the lack of air movement within the greenhouse rather than too higher temperatures. All three species also produce offsets that root readily.

Of the three, *Tephrocactus lagopus* is the most branched, quickly forming cushions and is often thought of by certain authorities as the yellow haired variety of *T. floccosa*. The spines, which are practically invisible to the naked eye, prove to be very sharp once found in the mass of hair. A curious trait that my own particular plant is showing at the moment is what look to be considerably longer, secondary spines produced towards the base of each segment. They are quite flexible and easily broken.

***Tephrocactus verticosus* seems to me to be of a rather short and compact disposition never reaching much more than 8cm in height. The translucent barbed spines are just visible through the wool and out of the three species seems to warrant the most amount of light. If sufficient sunlight is not given during the growing season, the new growth is visibly lacking in copious amounts of nylon like hair.**

***Tephrocactus floccosa* seems to form slightly taller and indeed wider clumps both in habitat and cultivation. Very often when seen from a distance in its natural surroundings you can be forgiven for mis-taking it for a plant of *Oreocereus trollii* that it resembles very closely. The translucent spines can clearly be seen on this species and do not show the slightest bit remorse or mercy if accidentally brushed against. Richard Marriott.**

WANTED: Any cuttings or plants of *T. ovatus, T. russellii* and *Pterocactus megliolii.* Willing to either swap plant material or purchase. Richard Marriott. 31 Pingle, Allestree, Derby, DE22 2GF. (01332) 551289.

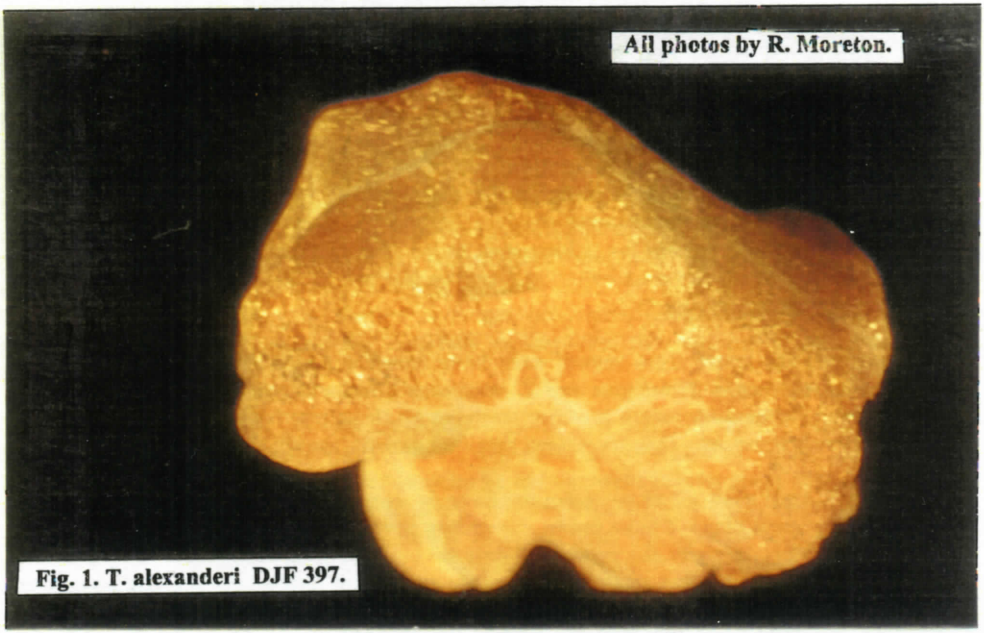


Fig. 1. T. alexanderi DJF 397.

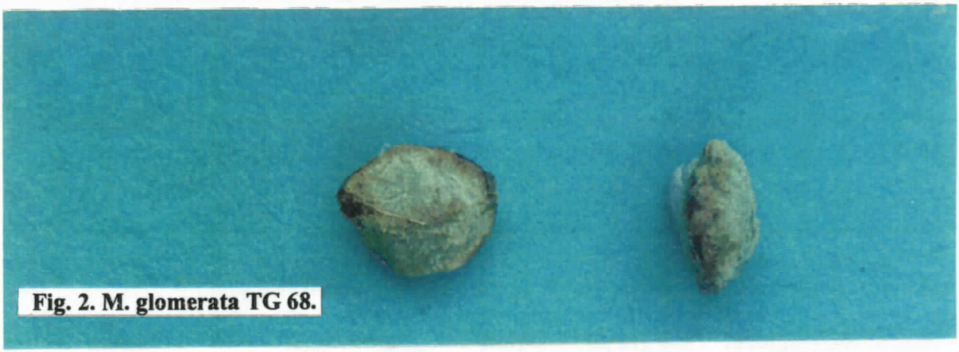


Fig. 2. M. glomerata TG 68.

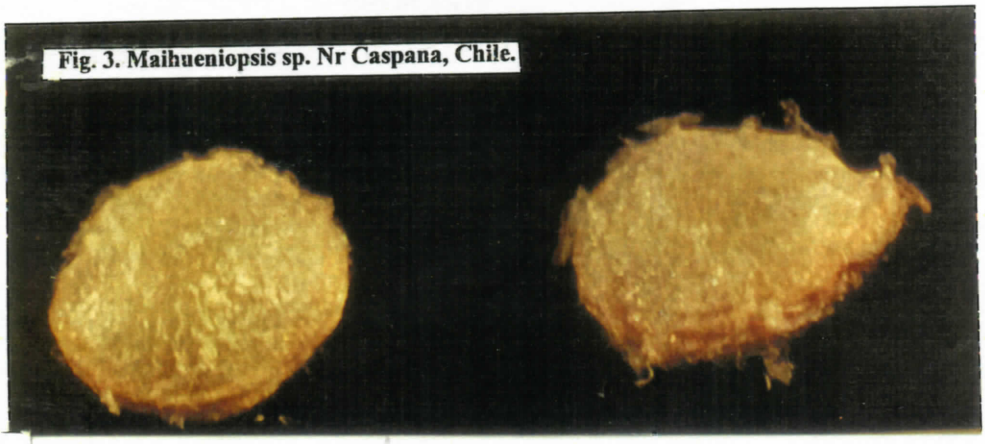


Fig. 3. Maihueniopsis sp. Nr Caspana, Chile.

Fig. 4. M. bolivianus BLMT 110.

Fig. 5. M. ignescens BLMT 117.

Fig 6. T. pentlandi Atocha

ALSTON HALL 2000 (AND PEAT)

This is a very successful ~~booz~~ conference that has been going on for about 33 years. The official title is "The Northern Weekend". Every two or three years they declare an anniversary and splash out on particularly distinguished speakers. This year they had managed to secure Susan Carter-Holmes, John Lavranos and Pierre Braun. You can't get much more authoritative than that. Moreover, they all know each other and get on well which adds to the atmosphere. I detected three of us; Dave Edwards, Dorothy Minors and myself. It was not a Tephro occasion. Pierre Braun did mention O. inamoena and then shudder and move on quickly. But it was a really good weekend. As an observer of Cactophiles one of the things I particularly enjoyed was simply watching events unfold. It is a delight to see things done well. I'm sure that there must have been the odd frantic moment behind the scenes but the only mess we detected was one of our own making. We were to collect Dr. Braun from Manchester airport. To be absolutely sure that nothing could possibly go wrong Mary rang the airport on Wednesday, gave them the flight number and asked which terminal was used, so that we could be there ahead of his arrival. She should have known. The reply was too prompt. But she didn't. So we went to Terminal 3. The flight was not on the arrivals board. So we went to Information. "Everyone knows that it's Terminal 1. Only half-baked idiots like you could possibly be daft enough to think it was T3." Those are not her actual words, but that is exactly what she managed to convey by her manner. We got him out all right and safely delivered on target but don't it make you mad?

But this is not the real reason for this item. Over the years I have heard a great deal about "They grow in pure minerals" "You want a mineral medium for this" etc. I'm always suspicious of these sweeping, categorical type statements. They can be examples of condensed knowledge and wisdom but they can also be pure horsefeathers. ('Sharp Sand' is one of the latter. Spherical particles give the best possible drainage. Needles almost the worst.) Pierre Braun showed an *Ihave forgottenit* growing in a white material. "They grow in pure quartzite." and, a bit later, "The pH is 3.2." Now I had noticed another Brazilian weed with masses of big, dead, strap like leaves on the same slide and thought that perhaps the quartzite wasn't all that pure. So, at question time, I gritted my teeth and asked (Yes, in front of all those people).
"You said pure quartzite?" "Yes"
"And the pH was 3.2?" "Yes"
"But how? Quartz isn't acid? "Pause."
"Well, the rainfall is around pH4 and there is quite a bit of humus around from the other plants."

Notice first the acid rain. This is not power station fallout. All rain is acid. Our tap water is alkaline. It is time we did something about rainwater collection.

But the meat in this was the bit about humus. This was what I was after. I have often thought that there must be humus, even in the most arid regions. It may not be the damp, fungoid by-product that we see but dead vegetation will blow around until it finishes up in the wind shadow of something. The something will sometimes be one of our type of plant. I have noticed, too, that although "there is no peat in the desert" (another quotation) many growers use it and get good results. Peat will lower pH and does supply dead vegetable matter that has not decayed. So all we peat users have at least some grounds for thinking our methods are not as bad as the Pure Mineralogists try to suggest.

Nor are they as un-ecological as some have claimed. The BCSS Journal quoted some figures a year or two ago. Peat is being formed naturally in many parts of the world. What is more, this formation goes on at a greater rate than the total world usage. And again, when peat is used to grow plants it is taking carbon dioxide out of the atmosphere and putting oxygen back. The reverse is true if it is used for fuel. So, we shall continue to use it without feeling guilty.

Finally there is a word of caution. There are disadvantages in using peat. If it stays wet it becomes very acid. If it is repeatedly dried and re-wetted it becomes compacted. Not all plants want an acid environment. And so on. I don't know about you but I have never seen much information on which cacti like lime and which are acid lovers. Do Tephros grow on limestone? Or are they, like most other plants, likely to do better under slightly acid conditions?

W.L.Jackson. Feb. 2000.

OPUNTIA GLOMERATA, ANDICOLA AND HYPOGAEA.

It is planned to do a follow up article on this topic, which was outlined in the last edition of the Journal, P 400 to 403. Members are therefore asked to please send in any comments/observations. Ed.

PROPOSED INDEX

When lingering before the labels I have often thought "There was a picture of that in last years Journal." But on the way back, worrying about the endless maintenance of the garden, I then forget all about looking it up. So I started to make a list of all the plants that have figured as pictures. That fizzled out. Then it suddenly dawned that what I really needed was an Index. Then I thought that all other journals have one anyway. Then I thought that I might try and make one. The result so far is enclosed in this edition as a separate sheet. I like it and plan to carry on back to the beginning. This could be made available as a small cheap booklet. For the future, each year's worth could be added to the fourth issue or the first issue of the following year. There is, however, a catch. It is like decorating. You have to make decisions about what to discard. So the end result is a bit personal and subjective. So, I have to ask:

1. Do you want an index?
2. Would you spend a few bob for an Index of back numbers?
3. Is the level of information in the sample good enough?
4. Have you any constructive suggestions or criticisms?

Please write to me or telephone, but we do need to get a response on this.

W.L. Jackson. Nov. 2000. Co. Editor.

NEXT YEAR'S MEETING TOPIC.

At the August meeting this year it was agreed that at the meeting in August 2001 we would discuss T. darwinii, T. hickenii and T. platyacanthus. To aid preparation for the discussion I give below Henslow's description of T. darwinii. Darwin did originally find the plants but he only took a single joint as he intended to return the following day to collect more specimens. However, his ship sailed before he could do so. The Rev. J.S. Henslow was a friend of Darwin and he described the plant from the single joint. Britton and Rose described T. hickenii from a collection by Dr C.R. Hicken. The original description of T. platyacantha was made by Pfeiffer although one can see, by studying the discussion in the book by G. Leighton-Boyce and J. Iliff, that "revisions" /additions by later authors has caused some confusion. It is hoped that members will be able to make specific study of these plants via the literature and observation of plants in their possession. Those members who are able to attend the August meeting will therefore have background knowledge and hopefully will be able to join in the discussion during the particular session of the meeting. Those unable to attend might wish to comment on the plants, via the Journal, before or after the meeting is held. If you have not direct access to the literature Martin Lowry, as explained on P393 in the last issue of our Journal, is able to provide photocopied material.

Opuntia darwinii Henslow, in Magazine of Zoology and Botany, 1:466 (1836-7).

"Prostrate, with globose-ovoid stem-segments, the stouter spines elongate, tricuspidate, flowers large, solitary.

"The terminal articulation (the only one seen) globose-ovate, with distant areolae beset with short tomentum, and those towards the anterior extremity with 4 to 6 stiff spines of various lengths, of which the stoutest are 3.75cm long, evidently formed out of 3 combined, and whose points are free, so that the compound spine appears compressed and tricuspidate. They mostly point forward, but some spread in all directions. Flowers solitary, larger than the articulations which they terminate, yellow.....(A long description of the flower. Ed)

"The specimen figured was gathered at Port Desire, lat. 47* S ... (Darwin) recollects also to have seen the same plant ...as far south as Port St. Julian in lat. 49* S. It is a small species growing close to the ground on arid gravelly plains ... The climate is remarkably dry and clear, hot in summer, but with sharp frosts during the winter nights."

The above is an extract quoted in the book by G. Leighton-Boyce and J. Iliff as is the following description.

Opuntia platyacantha Pfeiffer in Allgemeine Gartenzeitung, 5 : 371 (1837).

"A low ramose opuntia, the branches divergent, cylindrical, hardly tuberculate, glossy brown, with large sunken areoles equipped with bristly tawny wool and diversely formed spines; the lowest spines 3-4, thin, white, appressed, the upper 2-3 longer, reed-like, greyish."

In the "discussion", which is comments by the author after the official description has been made, Pfeiffer says the stem-segments are 2.5-7.5cm long and 16-20mm thick. The

thin spines are 6-8 mm long and the reed-like spines 1.25-2.5 cm long. Pfeiffer states the source of the material is Chile. However, this statement need not be taken as accurate as at that time there was often confusion as to the source location of plant material which had been brought to Europe. Sanzin, referring to 0. platyacantha SaIm-Dyck, stated the distribution was Chile and Patagonia whilst Spegazzini stated that 0. platyacantha S.-D. was common between the Chubut and Colorado rivers which is an area in Argentina.
It should be mentioned here that there are other descriptions of 0. platyacantha. Some of these are as follows:

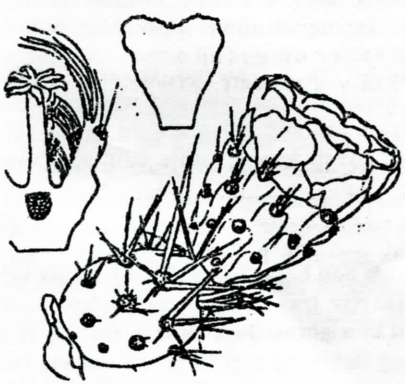
0. platyacantha sensu Lemaire, Cactearum General Nova; 63,72 (1839).
0. platyacantha v. monvillii SaIm-Dyck, Cactae in Horto Dyckensi, ed: 2:245 (1850).
0. platyacantha v. deflexispina S.D. ibid.
T. platyacanthus (S. -D.) Lem. v. neoplatyacanthus. Backeb. Descr. Cact. Nov. : 8 (1956).

Opuntia hickenii Britton & Rose. The Cactaceae, 1:93.

"Low, cespitose, forming clusters 1 meter in diameter; joints globular, 3 to 5 cm in diameter, strongly tuberculate, the lower tubercules usually spineless: areoles rather large, circular; spines 2 to 5, flat and thin, narrow, weak, pungent, 5 to 12 cm long, silvery-coloured but nearly black with age; flowers yellow: fruit unknown"

The type specimen is from Puerto Madryn, Chubut, Argentina. The plant is reported to be common in Chubut and Rio Negro, Southern Argentina. Britton and Rose state that Mr W.B. Alexander suggested that Opuntia platyacantha Spegazzini (not SaIm-Dyck) is probably a synonym of this species.

References. G.Leighton-Boyce & J. Iliff. The subgenus Tephrocactus.P 56— 62.
N.L. Britton & J.N. Rose. The Cactaceae P 92—94.



Opuntia darwinii.
Illustration based on the drawing, by Henslow, of the type specimen.

Opuntia hickenii.
Illustration by Britton & Rose.

Opuntia platyacantha – Please see front cover.

A. Hill.

GROWING AUSTROCYLINDROPUNTIA MALYANA/TEPHROCACTUS MALYANUS ON VARIOUS STOCKS.

Habitat

Just North of lake Titicaca in the province of Puno, round about the town of Macusan and generally above 4,000m. (13,000ft.)

Root Stocks

Figure	Stock	Purchased
7	Echinopsis	27-5-98
8	Pterocactus	12-8-98
9	Cylindropuntia cylindrica	13-8-99
10	Pterocactus	14-8-99
11	Trichocereus	19-8-00

Cultivation

Grown in mixed grit with Phostrogen and rainwater. Outside in full sun in summer but kept in coldframe on dull, rainy days. Moved to greenhouse at night to protect from slugs and other meanies.

Summer Growth

No. 7 has grown one offset in Spring 2000 and a second has just started in October.
No. 8 has just started one offset in October 2000.
No. 9 has grown with extreme vigour and speed, both main body and all seven offsets, starting in May 2000.
No. 10 has gained 25mm (1") in height. No offsets.
No.11 has made good body growth, with 5 offsets, starting in September 2000.

Watering

This was stopped at the end of September except for No. 9. This has, so far, (5-11-00) been watered every ten days, because the stock began to lean over and was soft when squeezed, due to the scion still growing. All plants are still being moved to the cold frame during the day. All are producing bright green leaves, white hair and some indication of spines.

Seed BB 774.01 Espina

I received a small quantity of seed on 6-9-2000. This had been field collected earlier this year. On 8-10-2000 I sowed six of these in a quarter tray. They were surface sown, covered with chicken grit and the whole enclosed in a plastic bag. During the day they are placed on a heated propagator under growing lights. At night they go outside and experience a variety of temperatures. The remaining seeds are stored at room temperature to be sown in Spring 2001.
(Ed has kindly provided two photographs of the seed. These will appear in a future issue. Editor.)

Discussion

To date it seems that Stock No.9 is giving the quickest growth, ideal if additional grafting material is required. However, the tall stock can look ugly; depending on your point of view. So, the next step is to try a graft on a much shorter stock and to see if the

growth is still as vigorous. Nos. 7, 8 and 10 show the slowest growth but look better because they are grafted close to the surface of the growing medium. No. 11, in two months, is showing fast growth, but, once again, is less pleasing to the eye. I have tried to root an offset, which took, but a (*******) slug ate all the bottom away. This was started in September 1999 and was doing well until the terminal damage in March 2000. The growing medium was turkey / chicken grit with a dash of shop bought loam with no nutrients. Having made many contacts who are growing *malyana* and have tried rooting to no avail I have wondered if the difficulty arises because the plant has been grown for so long as a graft. Internal mechanisms may have been altered to make it almost a non-starter on its own roots. I have been informed, from a reliable source in Peru, that *malyana* is growing in pot culture on its own roots starting from both seed and rooted cuttings. But, of course, the real step forward, the Holy Grail, is... well, will it flower in our climate?

E. Fletcher Nov. 2000

Editor's note: (*******) represents an ugly word not suitable for a family magazine.

TEPHROCACTUS FIAMBALENSIS.ZJ 191

In late March of 1998 1 received about a dozen seeds of a completely new Tephrocactus; *T. fiambalensis*. Zlatko Janeba had collected the seed of this plant earlier in the same month in which I received them. Thus I believe the seeds must have been fairly fresh and viable by the time they reached me. All were sown within a week. Inside another three weeks two seeds had germinated. Progress was painfully slow and unfortunately one of the seedling succumb to excess water being applied on my behalf. However, the other seedling was rescued and now resides in a two-inch pot.

The plant is some 15mm in diameter and the same in height. It currently only consists of one head although I am very expectant of it offsetting later this year. The body colour is a dull green with brown tinges encircling each of it areoles. Spines number 4 - 6 per areole and they are of an ice white colour with the longest measuring 15mm. I am told the bodies are up to 10cm in size and display large flowers (about 8-10cm in diameter) rosewhite in colour, though I am sure it will be some time before I can confirm this.

Apart from the little information I have been able to collate from the Internet in terms of where it was originally collected, I have not seen any information published on this plant or indeed seen any plants offered for sale. I would attribute this to the plant being so new into cultivation. Do any other members currently grow this plant, and if so what are your experiences and thoughts on the plant? The information on the Internet now gives the name *Tephrocactus alexanderi fma fiambalensis* for ZJ 191 and states it was found east of Fiambala, Catamarca, Argentina in 1998.

Richard L. Marriott.

FIELD LISTS ON THE INTERNET.

I am indebted to Richard Marriott for the information that a large number of Field List Numbers can be accessed on the Internet. Ralph Martin has constructed the website. I find the easiest/quickest way to find it is to type in "Field Number Query" in the search box of my server portal, press search and then click on to the site named. I have had different versions, shown on my address bar, of the website address. Once on the website it is a simple matter of typing in the collector's Field Initials and the Field Number in which you are interested. Ed.

Fig. 7. On Echinopsis

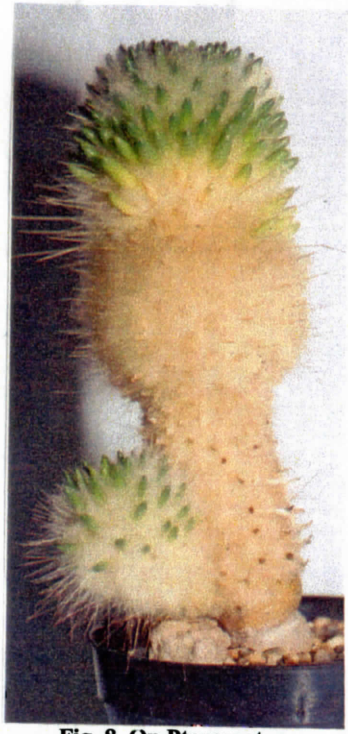


Fig. 8. On Pterocactus.

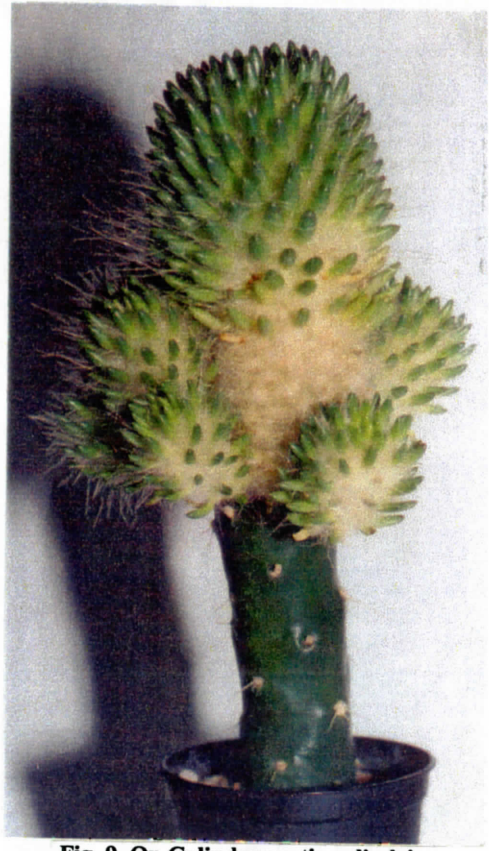


Fig. 9. On Cylindropuntia cylindrica.

Fig. 10. On Pterocactus.

Fig 11. On Trichocereus.

Austrocylindropuntia malyana on various stocks.
Photos by E. Fletcher. Run through a computer. Ed.