

INTERNATIONAL ORGANIZATION FOR SUCCULENT PLANT STUDY

I.O.S. BULLETIN

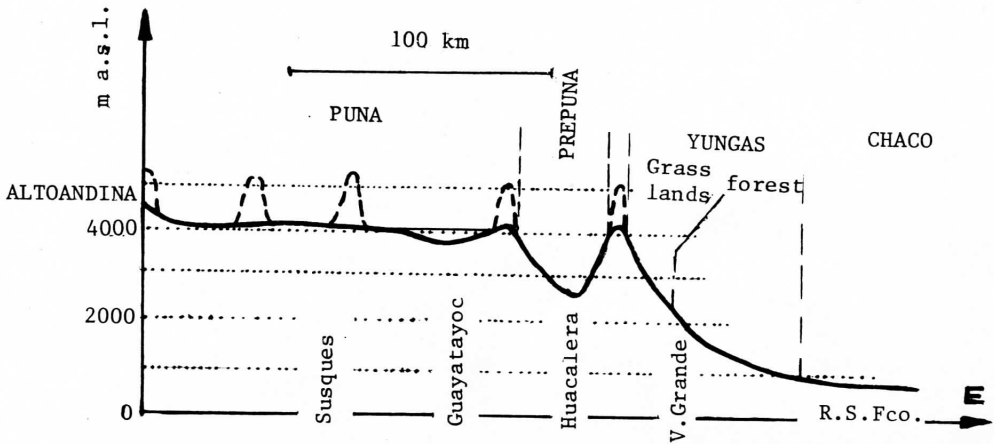
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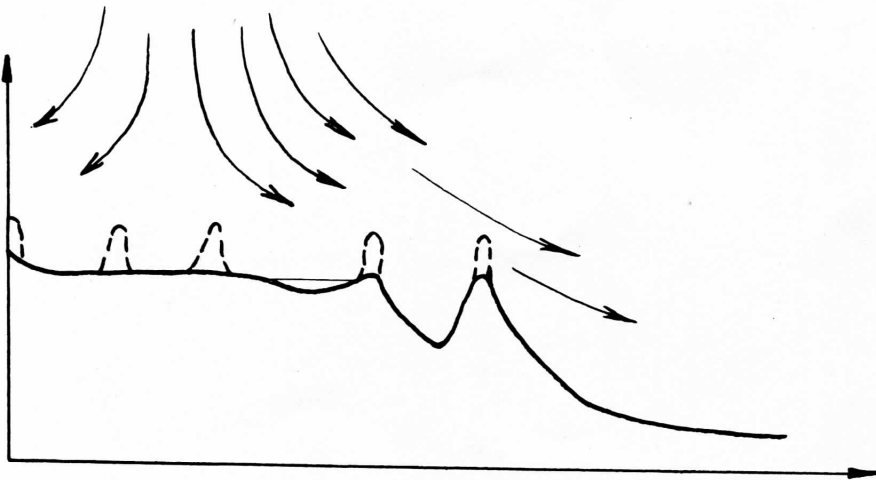
FIELD-TRIP GUIDE

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(translated by DAVID HUNT)

In order to understand the climate and vegetation of NW Argentina, a little background information is needed. Taking a transect along the Tropic of Capricorn, we get the following vertical profile (Fig.1):

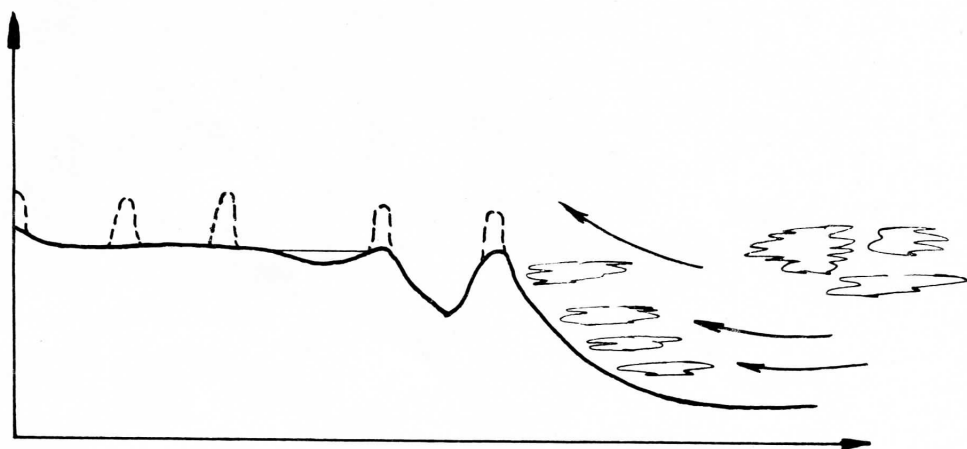


In winter, the mountains and high plateaux of Argentina, N Chile and Bolivia become cool as does the atmosphere there. A centre of high pressure is produced (fig.2):



The air from the upper atmospheric levels descends to the lowlands. It is cold, very dry air, with a relative humidity of almost 0%. As there are no clouds, the sun is intense during the day and heats up the soil and plants. At night, the temperature falls to several degrees below zero (-10 C to -15 C). There is no rain during this season.

In summer, the contrary obtains; the highlands become hot, producing a low-pressure centre (fig.3):



Winds blow mostly from the east and also from the south. They are humid, because they come off the Atlantic Ocean, conserving their moisture as they cross half the continent. The humidity then falls as rain on the eastern slopes of the mountains, producing a tropical forest (Yungas). Above this forest zone, temperatures are lower and there is an herbaceous vegetation with hundreds of spring-flowering species.

Further east, in a belt some 500 km wide, there are lowlands which are very flat and almost level. This the botanical province known as the Chaco. It is an open, dry forest with numerous cacti.

Crossing the first mountains to the west, we come to valleys which do not get as much rain as the eastern slopes, and these have a xerophilous vegetation in which candelabrifform cacti of the genera Trichocereus ('cardones') predominate. This botanical province is known as the Prépuna.

The high mountains, over 3500-4000 m.s.m., have a very cold and humid climate all the year round. The vegetation is very low, like that of the high Alps. It is called the Altoandina.

Between the cordillera which forms the boundary with Chile, that is the Andean cordillera in the strict sense, and the other

mountains which form parallel ranges to the east, there are wide, flat highlands of sedimentary **rocks**. This is the zone called the Puna. In the Puna there are freshwater and extensive saltwater lakes.

In each of our excursions we will cross more than one zone and it is interesting to observe the transitions and differences from one to the next. The simplified scheme described here is in reality much more complicated. The change from one botanical province to the next is gradual and the transitional zones sometimes very wide.

EXCURSION TO TASTIL

We start from the city of Salta at c.1200 m.s.m. in the middle of a tropical forest (Yungas). The route to the south-west goes through a broad valley cultivated for the most part with tobacco and vegetables, until the Quebrada del Toro (quebrada = narrow valley) begins at Campo Quijano and runs in a generally SE--NW direction. From Camp Quijano the natural vegetation begins to be seen. It is the upper limit of the forest, where the Aliso (Alnus jorullensis), Nogal Criollo (Juglans australis) and Sauco (Sambucus peruviana) grow, along with Erythrina dominguensis, which makes splashes of red on the slopes when it flowers in springtime. Carnaval, Cassia spectabilis (C. carnaval), is a tree which is covered with yellow flowers from February to March.

Above the forest zone are the humid mountains clothed with herbaceous plants, beginning at over 3000 m. Hundreds of species grow here. A very large grass which hangs from the rocky walls is Lamprothyrus hieronimii. Grasses, composites, Rosaceae, Gentianaceae, Verbenaceae and others intermingle to form a multicoloured garden from mid-spring to mid-autumn (November to March).

Three species of cacti used to grow in Campo Quijano: Gymnocalyx marsoneri, Echinopsis ancistrophora and E. silvestrii. Because of the expansion of the town they are found there no longer, and only in similar habitats further away.

In the Quebrada del Toro, in the exuberant vegetation, one can already find a species of Rebutia. In rock crevices there is Parodia nivosa and another Rebutia (Aylostera), with Echeveria peruviana and large cushions of Abromeitiella breviflora.

A few kilometres further up is Chorrillos, a locality where the railway ascends many metres in a few kilometres, thanks to a special zig-zag layout. This railway is famous as a work of engineering and for the views of the landscape that can be seen from it. It is called the 'Tren de las Nubes' (the train from the clouds).

Near Chorrillos one begins to see Trichocereus terscheckii, T. shaferi, Parodia stuemeri (this is the type locality), Cleistocactus hyalacanthus (= C. jujuyensis), Lobivia kuehnrichii

and Austrocylindropuntia verschaffeltii.

In the driest area, near Tastil itself, the vegetation in general shows the typical character of the Prepuna, with Trichocereus pasacana, Prosopis ferox (Churqui), Cassia crassiramea, Adesmia spp., Bulnesia spp. (Zygophyllaceae), etc. Among the cacti, apart from the Cardon, Trichocereus pasacana, we find Opuntia aff. soehrensii, O. sulphurea, Maihueniopsis minuta (= M. mandragora), M. glomerata, Pyrrhocactus umadeave and Lobivia chrysantha.

After the railway station of Tastil (Puerta Tastil), a rapid climb to Tastil begins, passing through Alfarcito. Growing in this zone are Maihueniopsis boliviana and M. glomerata. It is also possible to find Lobivia ferox (= L. longispina) and L. (Soehrensia) korethroides, but the principal populations are found more towards S. Antonio de los Cobres.

Tastil is now only a small town of shepherds and goatherds and much reduced agricultural activity. In ancient times, not only before the arrival of the Spanish but even before the Incas, there was a very big city here, whose ruins can still be seen. This city was a trading centre between the indian cultures of Chile, the cultures of the lowlands to the east, the important ones to the south (now Catamarca; the Calchaqui indians) and those of the north (Omauacas, Humahuaca valley). We will visit the small but interesting museum at the ruins before returning to Salta.

FIELD-TRIP I. CAFAYATE, TAFI DEL VALLE & CACHI

Day 1. Salta to Cafayate

Going out of Salta to the south, we again cross cultivated areas with tobacco and vegetables. Natural vegetation starts after La Vina, and of a more xerophilous type. Here the Quebrada del Rio Las Conchas (also known as Q. de Cafayate) commences.

The vegetation belongs to the botanical province known as Monte which extends from the south of the province of Buenos Aires and northern Patagonia up to here. It is characterized by Zygophyllaceae of the genera Larrea (L. divaricata and L. cuneifolia, Jarilla or Creosote Bush) and Bulnesia (B. retamo), and various Leguminosae (Prosopis, Acacia and Cercidium). On the dry river-bed Prosopis spp (Algorrobos) predominate, trees which depend on underground supplies of water to survive. Actually this is not typical Monte vegetation, but intermediate with the Prepuna.

In the driest parts, near Cafayate, there are multicoloured clays, eroded into curious formations like castles, pyramids, animals, amphitheatres and so on.

At Alemania (a town so-called because some of the original settlers came from Germany), a beautiful form of Cleistocactus baumannii occurs with golden spines; Trichocereus thelegonus

reclining on the dry slopes; Gymnocalycium saglionis and G. schickendantzii growing in the shade of the acacias (A. furcatispina, etc.); Lobivia fallax, Parodia microsperma (P. 'elegans'), Opuntia aff. retrorsa, etc.

Further on, in the neighbourhood of El Sapo, there is a Trichocereus, with yellowish spines and epidermis: T. angelesii. Blossfeldia liliputana is frequent in the lateral valleys, in crevices of the vertical rock walls, but it is very difficult to find.

Near Cafayate, in the sand, it is possible to find Tephrocactus molinensis, Pterocactus kuntzei (P. tuberosus auctt.) and Gymnocalycium spegazzinii. On the hills beside the road there is Denmoza erythrocephala in its most southerly station, also Acanthocalycium thionanthum and Parodia 'heteracantha' (P. piltziorum), with rigid spines. (In our view, the whole of the P. microsperma complex comes down to no more than 2-3 species, with innumerable forms or varieties occurring in more or less homogeneous populations.) At Santa Barbara, but several hours climb above the road, grows Parodia herzogii, a pretty species which seems to be intermediate between the P. microsperma and P. penicillata groups.

Parodia penicillata itself grows in the neighbourhood of Cafayate on the rocky walls of damp valleys. According to Mr D. Herzog, this species is found in all the valleys to the north of Cafayate; possibly it is conspecific with P. nivosa. Also found close to Cafayate are Parodia 'rigida', P. 'rubrihamata' and Acanthocalycium 'brevispinum' (= A. thionanthum).

The valley of Cafayate is watered by the Sierra de Quilmes, to the west, and has an ideal climate for viticulture. The white wines of this area are amongst the most highly esteemed from Argentina. The climate is comfortable all the year round and consequently the town has become a popular place for tourism. In summer it is fresher and drier than Tucuman and Salta; in winter the brilliant sunshine attracts tourists from further south. Our overnight stop will be in Cafayate.

Day 2. Cafayate to Tafi del Valle

This area was settled by many indigenous groups both before and during the time of the Incas. The best-known culture was that of the Calchaqui, and the area between Santa Maria (Catamarca) and Cachi (Salta) is called Valles Calchaquies. It is common to find the remains of old stone walls from these indian cultures, and also pottery and stone mortars. The vegetation is Monte, with Larrea spp. predominating and Prosopis and Acacia also abundant. Cushions of spiny Bromeliaceae (Deuterocohnia longipetala and others) cover extensive slopes.

Cereus aethiops is common here, as are Echinopsis leucantha (= E. shaferi), Gymnocalycium schickendantzii, Trichocereus terscheckii and Parodia aff. microsperma (P. 'dichroacantha'). We move into

the province of Tucuman.

In Quilmes (once the home of an indigenous group which was taken to the south of the city of Buenos Aires by the first Spanish insurgents after a bloody battle), we turn SE, crossing the Rio Santa Maria and passing close to Amaicha del Valle. The road is bordered by a matorral (bushland) of Prosopis, Acacia and Larrea in which grow big specimens of Acanthocalycium thionanthum, Gymnocalycium spagazzinii and also Trichocereus pasacana.

From Amaicha to Tafi del Valle, it is a long climb up to the pass called Abra del Infiernillo, into a spectacular landscape of hundreds of cardones (Trichocereus pasacana). Hiding between the stones is Acanthocalycium 'variiflorum', in reality a small form of A. thionanthum with flowers of various colours. The flower colour often varies according to altitude, and this we think could be something to do with the distribution of its pollinators.

At the pass itself (2900 m.s.m.) can be seen the large, solitary globes of Lobivia grandis, up to 1 m in diameter. Further on, on some of the slopes, grows L. stilowiana. The vegetation here can be regarded as of the Altoandina province.

Going down to Tafi del Valle, the mountains are carpeted with green grasses. Here we find multi-stemmed examples of Lobivia bruchii, completely uniform, and reaching 3 m in diameter. The differences from L. grandis are very slight and the two should undoubtedly be regarded as varieties of a single species.

Tafi del Valle, situated at more than 2000 m.s.m., is cold in winter and very pleasant in summer. It is a tourist resort where people from Tucuman escape the infernal heat of the city and lowlands.

On the way to Tucuman city is the Los Menires archaeological park. The standing stones with bas-reliefs seen there were brought from the surrounding hills a few years ago in 1978. The local government also planted hundreds of Lobivia grandis, L. bruchii, Acanthocalycium thionanthum and Gymnocalycium saglione, the last two species brought from Amaicha where it is much drier. Only the Lobivias have survived. Also around here grows a caespitose Lobivia: L. schreiteri.

If we were to continue further east, we would go down the eastern side of the mountains and cross the tropical forest into the lowlands, where there are extensive plantations of sugar-cane, citrus, tobacco, etc. But we must return to Cafayate.

Day 3. Cafayate to Cachi

Leaving Cafayate in a NW direction, we go through very arid areas all day and some picturesque villages. Larrea spp., Cercidium praecox and other elements of the Monte are intermingled with species from the Frepuna: Trichocereus pasacana, Opuntia aff.

soehrensii, Parodia aureicentra, Fabiana and Cassia crassiramea.

The first town we go through is San Carlos. In this area Parodia piltziorum, Tephrocactus molinensis and Opuntia sulphurea again occur. Different forms of Acanthocalycium thionanthum and Gymnocalycium spegazzinii will be seen all day.

Near Molinos one begins to see Parodia auricentra var. rubricentra along with P. aff. microsperma. Further on there are Lobivia haematantha, Parodia vacae and P. auricentra.

Near Cachi there are Parodia rauschii (a form of P. auricentra) and P. vacae (belonging to the P. rigida group, really P. microsperma with hard spines).

Day 4. Cachi to Salta

We continue in a northerly direction. The landscape is similar to what we have already seen, and again we find Acanthocalycium thionanthum, but with white flowers (A. chionanthum). In the high mountains round about there is Lobivia saltensis. At Payogasta the road turns right and we soon come to the 'Tin Tin Straight'. This broad valley is impressive for the great quantity and density of Cardones (Trichocereus pasacana). The cover photograph of Backeberg's book 'Wunderwelt Kakteen' was taken here. This is truly a T. pasacana woodland. Small rocky hills are the habitat of Parodia auricentra, Lobivia saltensis, Maihuenia glomerata and Echeveria peruviana, and of a small Opuntia, O. aff. soehrensii.

Further on, at Piedra de Molino, the mountains have a grassy vegetation typical of high, cold places, with species of Stipa and Festuca. Amongst the grasses, in the hills, grow Lobivia (Mediolobivia) nigricans and L. saltensis, both hardly visible because they grow very deep-seated in the ground.

From Piedra de Molino, it is a rapid descent to the quebrada known as Valle Encantado and Cuesta del Obispo. Further down, the valley takes the name of a village there, Escoipe.

Valle Encantado is a green valley, formed above the forest. On the way down, where bushy vegetation begins, grow Trichocereus smrzianus, Lobivia walteri and Rebutia (Aylosteria) pseudominuscula. Regrettably, the gangs who clear the roadsides have almost completely destroyed the Trichocereus and Lobivia which were abundant up to about five years ago.

Still further down grow Opuntia schickendantzii, Rebutia sp., Abromeitiella brevifolia, Begonia spp. (Tuberosa group). In the neighbouring hills there are Lobivia nealeana (a form of L. saltensis) and another Lobivia (Mediolobivia) sp.

In the forest, epiphytic on the trees, we find Rhipsalis tucumanensis, R. lumbricoides, R. aculeata, Pfeiffera ianthothele and many tillandsias.

FIELD-TRIP II. HUMAHUACA & ABRA PAMPA

Day 1. Salta to Humahuaca

We head northwards out of the city of Salta. Near Mojotoro there is a pretty form of Parodia microsperma: P. aureispina, growing with Cleistocactus smaragdiflorus.

Further on, the road is fringed with a dense forest containing hundreds of tree species and many epiphytes, similar to but richer in species than that mentioned on the way to Tastil. The Rhipsalis species noted previously are found again: R. tucumanensis and R. lumbricoides, Pfeiffera ianthothele, Tillandsia spp. and other epiphytic bromeliads: Pseudonananas, Aechmea, etc.

The border with the province of Jujuy is the highest point on this route: the Santa Laura pass (Abra de Santa Laura), where Echinopsis ancistrophora and Rebutia senilis grow.

We continue down into the forest until we come to the cultivated areas of the S of Jujuy, and the city of Jujuy itself, which is at the southern end of the Quebrada de Humahuaca. (Lunch stop).

Going up the valley, we see two rivers on the left, tributaries of the Rio Grande, which flow through the Q. de Humahuaca. The first, the Rio Reyes, comes from some famous hot baths or springs higher up, where Rebutia (Aylosteria) jujuyensis occurs. The second is the Rio Yala, which descends from seven small lakes of the same name: Lagunas de Yala.

It is a rapid ascent, with a difference in altitude of 800 m between Jujuy and Volcan. On the left, Trichocereus thelegonoides can be seen amongst the last of the trees. Higher up, after Barcena, there are Cleistocactus hyalacanthus, Parodia chrysacanthion and Austrocylindropuntia verschaffeltii. By Volcan, we are finding A. vestita, Rebutia wessneriana and Lobivia densispina f. sublimiflora. Were we to cross the river, we would find a 'Mediolobivia' and Lobivia jajoiana; and, after climbing for five hours on foot, Lobivia chrysochaete.

Beyond Volcan we begin to get Parodia stuemeri (here called P. pseudostuemeri, P. tilcarensis, etc) and Trichocereus pasacana.

Further on there is Purmamarca, a tourist area whose attractions include the clay hills of various colours, the houses, still looking as they did a century ago, and the old church. Lobivia glauca and its var. paucicostata grow on the hills round about, and also Blossfeldia liliputana.

At Tilcara, another tourist place, there are Gymnocalycium tilcarensis, Parodia stuemeri, P. maassii, Lobivia ferox and L. densispina var. pectinifera, and Opuntia sulphurea. One can also see the famous Fucara de Tilcara, a partially reconstructed indian fortress. There is an interesting regional museum of

archaeology in the town and several other museums. In the hills one can find Lobivia jajoiana, L. densispina with yellow flowers, and Echeveria peruviana.

Further north, we cross the Tropic of Capricorn, marked by a monument. Rebutia gonjani and the most southerly examples of Trichocereus tarijensis (T. poco) grow in the hills to the west.

The vegetation here is xerophilous; after Volcan we were already into the Prepuna. Near Humahuaca one can see the typical low woodland of Prosopis ferox (Churqui) with emergent Trichocereus pasacana here and there.

Day 2. Humahuaca to Abra Pampa

Continuing northwards, the landscape is similar to yesterday's. Under the Churqui trees or in full sun there are Austrocylindropuntia shaferi (A. weingartiana), Lobivia ferox and Opuntia aff. soehrensii, and occasional specimens of Oreocereus trollii. The last-named used to be abundant here, but has been dug up in large numbers by tourists and commercial collectors. Fortunately it is still plentiful in places which are difficult of access.

On the flats, it is possible to find Lobivia jajoiana (= L. haagei, L. muhriae) and Puna subterranea, and, in sand, Maihueniopsis nigrispina.

On the Cuesta de Azul Pampa one can see numerous examples of Oreocereus trollii. Lobivia (Mediolobivia) haagei and Maihueniopsis boliviana also grow there.

At Tres Cruces, the highest point on the whole trip, 3500 m.s.m., we come into the Puna. These are big plateaux formed by sedimentation and surrounded by mountains. The landscape is characterized by low, scattered bushes: Parastrephia lepidophylla (Tola; Compositae), Fabiana densa (Tolilla; Solanaceae), Psila boliviensis (Chijua; Compositae) and Adesmia horridiuscula (Anagua; Leguminosae) are the principal components of this vegetation. The llama is common here, and we shall hope to see many groups of them.

Various hills arise from these plains, and on many of them to the north of Abra Pampa there are dense stands of Oreocereus celsianus, making a magnificent spectacle with their attractive habit and covering of white hairs.

We return to Humahuaca, and if there is time we will cross the river and go east towards Palca de Aparzo. On the left is the Cerro Negro, the type locality of Weingartia neumanniana. Unfortunately, some years ago, a commercial collector thought fit to 'clean out' the Cerro Negro of this 'tipo de espinas'. The way continues through a valley, and after climbing the slopes arrives at a place called 'Pucara'. There we can see Oreocereus trollii and Trichocereus tarijensis (T. poco), hopefully still with a few

of their red flowers, and Lobivia jajoiana, the form from here being known as L. iridescens.

Day 3. Humahuaca to Salta

On the return to Salta, we shall stop at places we had to omit on the outward journey. Between Jujuy and Salta we shall take a different route, through areas under cultivation. South of Jujuy and near Salta we will look for Pereskia sacharosa.

The map opposite shows the relative position of the places we shall visit. The scale is 1:2,500,000 (1 cm = 25 km).

What to wear?

The rainy season in the whole of NW Argentina is in summer and we do not expect any rain in April; however, one should take an old raincoat just in case! (The statistics say that in April the Salta area averages 4-6 days with some rain, and Humahuaca, Cafayate and Cachi less. But of course it varies from year to year.)

The climate in Salta is comfortable, with April temperatures between 13-25 C (mid-April: 18 C). Temperatures are lower at Cachi and Humahuaca, with perhaps 20 C at midday falling to 5 C at night (mean temperature approximately 11 C).

We recommend taking strong shoes or short boots and hard-wearing trousers, in view of the spiny vegetation (especially Opuntia spp. and bromeliads) covering some of the terrain.

