

in which it was laid out in 1545. It is true that the encircling wall and the gates were not completed until the first years of the eighteenth century, but the authorities were wise in constructing a small arboretum outside the Garden proper and in not attempting to grow too many trees in the Garden itself. The same applies to the few glass houses, one of which was built to protect a Palm much admired by GOETHE. This rather ugly structure does not mar the beauty of the almost miraculously preserved garden, while it did not serve to prevent the Palm being killed to the ground in the great frost of 1947-48. Now, however, the tree is throwing up several new heads from the base. (Fig. 242.)

Circular gardens are very rare, and none contemporary with the Paduan garden now exists; although a sixteenth-century print of DUPÉRAC'S shows another circular garden, built inside the so-called Mausoleum of Augustus, within which is a series of concentric flower-beds bordered with Lavender or Box. The entrance is a rusticated porch surmounted by a gigantic head. Creepers and Espaliers grow on the walls.

This garden has long ceased to exist; but it may have been inspired by the garden at Padua.

Walking through the Paduan garden past the innumerable little flower-beds, each with its particular plants, one is continually reminded of the great English herbals. It is a surprising thought to realize that this Garden was already matured when those comparatively ancient books first left their printers. With its mellow beauty, its fountains and shade, grateful after the torrid pavements of the city, the continual surprises which it holds for the visitor in the shape of new plants and the intriguing patterns of its flower-beds, it is indeed a place of enchantment.

I am greatly indebted to SIGNOR GIUSEPPE GOLLA for leave to quote from his history of the Orto Botanico written to celebrate the fourth centenary of its foundation.

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## PLANT COLLECTING IN THE MOUNTAINS OF ANDALUCIA

*Vernon H. Heywood, B.Sc.*

### PART II

THE classical areas in Sierra Nevada for plant collectors are the schistose screes and alpine meadows in the region of the three great peaks—the Veleta, Mulchacén and Caballo—and the outcrop of limestone called the Cerro Dornajo whose slopes provide many of Spain's fine plants such as *Convolvulus nitidus*. (Fig. 249.) These we visited again with encouraging success adding scores of plants not seen in 1947. Two of the notabilia were *Chaenorrhinum glareosum*, an exceedingly attractive alpine which has flowered well at Wisley, and *Linaria glacialis*, a curious annual with fleshy whorls of glaucous leaves from which rise overlange mauve corollas.

There is one area which has been singularly neglected—the Cerro Trevenque whose white dome can be seen from many parts of the Sierra projecting in the seemingly inaccessible distance. The intrepid Swiss botanist, BOISSIER, visited it, as did many other collectors during the golden age of Spanish botany—WILLKOMM, DEL CAMPO, BOURGEOU, and FUNK—but in recent times the Trevenque appears to have been overlooked. It was for us an unknown quantity—rumour had it to be a barren pile covered with *Erinacea Anthyllis*—yet by blind faith we were certain that *Scabiosa pulsatilloides* would grow on it (one of the results of hurried preparations, else we should have known that it did); and it was limestone.

On our last night in the Veleta area we did some rapid bargaining with the shepherds who brought goats' milk to the Albergue Universitaria where we were staying, and secured two mules for an improbable hour the next morning. Although we were over an hour late in starting it was still dark when we left and bitterly cold. Stumbling blindly into the valley of the Rio Genil we could collect only plants such as *Verbascum* which were sufficiently large to be obvious. The climb up the other side of the barranco was dangerous for the beasts; the loose sand of the track frequently subsided and the mules laden with our accumulated collections had to be dragged forcibly to safety.

Soon the sun was high above us and the red sand merged into the grey and white of limestone; and beyond a crest we saw our goal, the Cerro Trevenque, a gleaming white cone rising cleanly above the surrounding plains. The approaches were of sun-scorched shrub—*Erinacea Anthyllis*, *Ptilotrichum spinosum* and its rarer relative *Vella spinosa*, Genistas, Thymes and Honeysuckle, and the giant fruiting spikes of *Asphodel* each with its cluster of spherical capsules.

A halt was made for lunch at the base of the mountain in a small forest of *Pinus sylvestris* var. *nevadensis* which partly covers the eastern slopes. The Pine is stocky and resembles little the northern-European plant in habit; most authorities accept it as truly native thus making the Cerro Trevenque its meridional limit. Evidently it reached this area in its retreat south during the Pleistocene Glaciation.

The nearer one approaches the Trevenque the more remarkable it appears: ridge after ridge of white and grey limestone and marble, churned into pebbles and even powder, sweep down to the surroundings where slight eminences of the same shades cut off little valleys, so that, cindery under foot, it seems like walking through a lime-kiln! It is difficult to conceive of a more xerophytic habitat; but flowering here was Spain's most elegant species of *Echium*—*E. albicans*, a foot or so high and entirely clothed in dense white tomentum spiked by long pellucid-tipped hairs. The young stalked flowers are red when they open and mature a violet-purple.

Leaving our guides with the recalcitrant mules we climbed the eastern ridge to its steep north face; loose chalk and marble overlying firm chalk formed a perilous substrate and the last few yards had to be scrambled over on all fours. A rich reward was found in three superb *Anthyllis*—silver-leaved and saxatile—*A. Tejedensis* with golden globes of Pea-flowers, another related yellow-headed species, and a third

crimson-flowered with leaves like silver spoons. There was seed on all. *Thymus granatensis* var. *longiflorus* was abundant, as was *Convolvulus nitidus*, and at last the object of our climb—*Scabiosa pulsatilloides*. This dwarf scabious rivals *Pterocephalus spathulatus* in exclusiveness and beauty; it grows to a few inches above the white scree and sends out broad violet-blue heads on short stalks from within its divided silver leaves. The excellent plate in BOISSIER'S *Voyage*\* though remarkably fine does it scant justice. Later in the year I collected sufficient seed to establish *Scabiosa pulsatilloides* in cultivation in this country. Our exaltation was completed by finding, scattered on the slopes *Helianthemum pannosum*, another endemic of note. The small caespitose bushlets were densely formed with shortly petiolate leaves clothed in snow-white felt; most of the croceous flowers had dropped off and the succeeding capsules held ripe seed.

The analogies offered by the flora of the limestone areas of the Sierra Nevada are most interesting, especially by this calcareous outcrop of the Cerro Trevenque, just described, above the *Pinus sylvestris* var. *nevadensis* zone. The habitat is ecologically very similar to that outlined in the Sierra de Cazorla (Prado Redondo), and the parallelism of species is striking. *Pterocephalus spathulatus* is not represented here, but *Convolvulus nitidus* grows with the equally beautiful and much rarer Scabiosad—*Scabiosa pulsatilloides*, endemic to the Cerro Trevenque; its associates include *Arenaria armerina* var. *elongata*, *Teucrium flavum*, a *Centaurea* (apparently the same as the Cazorlan form), and *Helianthemum pannosum*.

Certainly a return visit to this isolated haven of fine plants would be rewarding.

Eastwards to Ronda where our arrival at the railway station caused the porter a problem. Ronda was remarkable for one thing at least—on our first morning there we changed our lodging from a pension to an hotel, and left for Grazalema in the afternoon where we descended the scale by sleeping in the *fonda*!

Grazalema—a white village of flat-roofed houses and steep cobbled streets climbing up the mountainside—lies a few miles within the bounds of the province of Cadiz, adjoining Malaga. Our arrival coincided with preparation for the village's Saint's Day, resulting in a marked reluctance of the *fonda* keeper to give us room; and naturally there was considerable difficulty in finding guides. When our comparative wealth became apparent the situation became eased and we left for the mountains in the morning with two young shepherds who, if not excessively obtuse, certainly appeared so! It soon became apparent that it was useless asking them for information for they remained solidly asinine, and as a result any success in finding desired localities was due to the kindness of the Fates.

Grazalema meant two things to us—*Centaurea Clementei* and *Abies Pinsapo*. As the locality for the former could not be traced the only course open was to cover as much likely-looking ground in the time available. On a limestone ridge, the Peñon Grande, above the village, we soon came across the delicate annual *Campanula specularioides*, its

\* Voyage Botanique dans le Midi de l'Espagne.

deeply five-cleft violet-blue corollas already withered above its globose capsules. *Saxifraga gemmulosa* was dried up almost beyond recognition. On the dry rocks grew an attractive *Rumex*, a glaucous saxatile shrub covered in showy pale pink-white fruits: it should make a useful "foliage plant." Another inhabitant of these rocks was a prostrate and brittle *Chaenorrhinum* with pale-lilac flowers and darker veining; it had all the appearance of *Campanula mollis* and only a closer examination revealed its identity. The *Campanula* grew here also, but no seed of it could be found; indeed *C. mollis* frequently fails to produce viable seed whether in nature or in cultivation.

Two *Phlomis* were collected during the day—*P. crinita* with bicoloured "toffee" hoods and a concolorous form; and the shrubbier *P. purpurea*. Other notabilia included *Biarum arundanum* with both spathe and spadix a shade of maroon; it is apparently endemic to the Ronda-Grazalema region.

Mid day came, and there was no trace of *Centaurea Clementei*; we separated each with a guide: PETER DAVIS to the rocks beyond the Peñon Grande and myself to the Sierra del Pinar, the site of *Abies Pinsapo*. There was no difficulty in finding the Pinsapo for it forms immense dark green masses on the north slopes of the Sierra (1,654 m.). The dense shade afforded by the strong branching of these gigantic trees excludes to a large extent the development of undergrowth: a thick mat of dead leaves and old fruits and seeds covers the floor of the forests. At the present time *A. Pinsapo* survives in an extremely contracted area—on Jurassic limestone in a few mountains in the south, and in Morocco near Xauen. It would seem that the Pinsapo is destined to virtual elimination: Spanish foresters tell the sorry tale of human and animal interference and point to the disappearance of other Mediterranean *Abies* within historic time, such as *A. nebrodensis* from the slopes of Etna in Sicily.

And the *Centaurea*? After a brave search PETER DAVIS came across it on the continuation of the Peñon Grande, 3 or 4 miles south-west of Grazalema. There it sat on treelike stumps of rootstocks emerging from the rock fissures, perennating year after year; its thick woolly-white leaves like paddles and its stems over a foot tall. The vast capitula had shed their yellow flowers, the fruits being surrounded by silvery scales with large shiny brown appendages. A relict and a giant. It is possible that BOISSIER saw these selfsame plants a century ago: a sobering thought indeed.

The evening saw the celebrations of the Saint's Day in full course. Everyone of the villagers turned out for the procession of the Virgin, the Image preceded by tiny acolytes staggering under the weight of heavy crosses three times their height, and accompanied by the Guardias Civiles looking rather self-conscious in their ceremonial green uniforms with canary-yellow belts. Then the singing and dancing long into the night.

Leaving the village next morning, we saw from the bus great clumps of *Centaurea Clementei* looking down majestically from overhanging rocks above the road!

The old and new towns of Ronda face each other across the dramatic

chasm of the Tajo. A path leads down to the river flowing through the bottom of the gorge, and on the conglomeratic cliffs grew *Moricandia Ramburii*, a curious Cruciferous shrub; it is many-stemmed from the base, the leaves thick and glaucous and the flowers purple. We managed to break off a few branches and collected some seed from the long narrow siliquae. Growing in the tufa rocks was the perennial *Linaria melanantha*, a species variable in the colouring of its corolla; the delicate glaucescent plants here retained a few flowers of pale lilac with darker striations, shading to buff on the spur. The lip of the corolla was dark maroon-purple.

Other Tajo plants were *Trachelium coeruleum*, *Campanula mollis* var. (without seed) and a perennial *Chaenorrhinum* with pale violet flowers. Most of the summer flora was dried up, the season being particularly hot and arid.

Motivated by thoughts of finding the pink-flowered *Leucanthemum arundanum*, we left for Yunquera. The journey, by bus, was a dreadful experience: each minute we seemed doomed to destruction by swerving over a precipice or by colliding head on with a lorry on a steep and narrow mountain road. The least concerned person was the driver who sat nonchalantly, one hand at the wheel and a cigarette drooping from his mouth.

Our plan was to hire mules and make our way back to Ronda through the Sierra de Tolox and the Serrania de Ronda. As this meant a double journey for the mules, and thereby cost twice the price, we left with some misgivings. Not far above Yunquera we rode into a *Cistus-Quercus ilex* scrub: species of *Cistus* and *Halimium* formed a constant cover for some miles with large bushes of *Bupleurum spinosum* as one of the dominants. *Coridothymus* (*Thymus*) *capitatus* was present with a white form frequent among the typical lavender-blue-flowered plants; and the dark purple spikes of *Lavandula lanata* showed up here and there in the grey and green herbage.

After a few miles we came to a zone of *Abies Pinsapo* with *Daphne gnidium* and *Crataegus* draped with mistletoe (*Viscum cruciatum?*). Above the *Abies* were sparse forests of heavily galled *Quercus*, and we started to climb Torrecilla, peak of the Sierra de Tolox. The vegetation was barely interesting floristically—enormous mats of *Juniperus sabina* var. *humilis*, horrid clumps of *Erinacea*, and a touch of colour in *Lactuca viminea*, its pale yellow ligules coppery on the reverse. Evening came and we seemed to have collected not a single plant of note: Torrecilla appeared barren, the scrub and forests below were monotonous. Perhaps we were tired, for Yunquera and its surrounding mountains are noted for the richness of their flora. It seems we had missed not only *Leucanthemum arundanum*, but also *Digitalis laciniata*, *Ononis speciosa* and several others. We reached Ronda by evening, whereupon one of our mules collapsed in a shower of sparks on the cobbled streets throwing our baggage to the ground!

Following a brief interval in Sevilla, we changed our centre to the coastlands and salt flats of Murcia on the south-east seaboard. By now it was late in July and conditions were becoming rather difficult. Théophile Gautier expressed the opinion that one ought to visit

foreign countries in their violent season: from a horticultural point of view this has its advantages when the country is Spain and the region Murcia, for in July nearly all plants have seeded; but the actual plants are mainly shrivelled and useless for botanical collection.

The town of Murcia is dusty above all things else—thick swirling white dust covers everything at the slightest breath of air. It is as though the very buildings are crumbling to powder. Architecturally it has little of distinction apart from the magnificent Baroque façade of its cathedral; botanically and horticulturally it has nothing to offer. The surrounding countryside is steppe, occasionally desert-like, African and barren; great umber mountain ranges break the monotonous skyline.

We took a bus from Murcia through this desolate country towards the coast, halting for a night in the mosquito-ridden port of Torrevieja. Another bus carried us to San Miguel de Salinas, a small village at the edge of the salt marshes. We enquired at the local bar about a thyme which we were looking for—in Spain the country people still show a considerable knowledge of herbs and their medicinal uses. It was not altogether surprising then to be shown a tin full of the Thyme and told that it was used to make a tea-like infusion by putting it through the chromium-plated “express” coffee machine!

Immediately outside the village on the chalky hills along the edge of the Torrevieja road, the Thyme, locally known as *cantueso*, grew in some abundance. The species is a pink-flowered member of the *Pseudothymbra* section and in many respects intermediate between *T. longiflorus* and *T. Funkii*. It has not been previously described but I think it can be accommodated in *T. moroderi* Martinez, based on *T. longiflorus* var. *ciliatus* described by SANDWITH from the Valencian coast. The San Miguel form is not so attractive as the Valencian plant which has sizeable bracts of a dark purple colour, and margined with ciliate white hairs; but we found some good variations here, both as regards flowers and bracts, which should be well worth growing. Little seed was set: the spikes were heavily infested with insects, but up to 90 per cent. germination has been obtained from what seed we did collect.

There were many halophytes amongst the accompanying plants—the fragrant white-flowered *Ptilotrichum maritimum* and orange-headed *Odontospermum maritimum* to mention only two. An interesting find was what purported to be a diminutive form of *Viola arborescens*. Further seawards, on the Salinas de Torrevieja, we collected an unusual *Teucrium* with thick heads of pale lemon-yellow flowers, and several species of *Limonium*—the first of very many.

In the evening we returned to Murcia, only to leave again the next morning, in a large yellow bus, for the naval base of Cartagena where, above the harbour, there grows the magnificent Sea Lavender *Limonium insigne*. In Cartagena the only means of transport available at a reasonable price was a very small taxi. And in this we rode precariously above the harbour to the place known as La Terrosa. Unwittingly we were driving into a protected military zone. Before long we were challenged, but our letters and papers of identity seemed to satisfy the

guards as to our harmlessness, for they allowed us to proceed. Scrambling down the rocks of La Terrosa above the bay, Algameca Grande, it soon became obvious that all was not well: above us soldiers were blasting the cliffs with explosives and great lumps of stone showered down on us! Before our ungraceful retreat we found about ten plants of *L. insigne*; only one was in flower, the rest apparently fruiting, although rarely with seed.

The second locality for the *Limonium* was the eminence above us. Before long another group of guards halted us and this time we were forced to turn back. But the taxi, small as it was, could not turn; nor indeed could it go forward for the engine had stopped. Then followed the harassing experience of freewheeling backwards down the narrow winding road to start up the engine; and as this was not successful we had to continue in this precarious manner all the way down. The brakes, I might add, were very imperfect.

If the above episode sounds like a comic-opera-way of collecting plants, the events that followed during the tracking down of *L. caesium* must be classified as farce. All the information we had about this plant can be summed up as "near Elche."

Elche is easily reached from Murcia by a road which meanders through a Moroccan countryside of undulating sand, and if the palm-shaded landscape suggests North Africa the blue domes and the minarets amidst the flat-roofed white-washed houses confirm the impression.

Our plan in Elche was to produce a specimen of the *L. insigne* from Cartagena and enquire where a similar plant was to be found nearby. The Spanish love this sort of thing; they will stop the normal routine of life and conspire amongst themselves to arrange what seems to the uninitiated a gigantic hoax. The ritual unfolded as follows: one man said that he knew where the plant grew and would return later to show us; another said that it grew by the roadside at the edge of the town. We hired a taxi to investigate. We found blue *Limonium*, white *Limonium*, tall and short, fat and thin *Limonium*, but no *L. caesium*. A third man took us to his house and did in fact produce the desired plant—from a vase where it was being used, very successfully, as an Ever-lasting. He did not know where it grew. As the first man did not reappear we were forced to seek him out (in a taxi—the same driver—he had become interested); not unexpectedly he produced for our examination a common blue *Limonium*, and insisted, ably supported by the taxi driver, that it was what we were looking for. We were only botanists, we could not argue.

The time grew late; the absurdity increased. Every species of *Limonium* that grows in Spain seemed to have appeared in Elche, and we made expensive taxi journeys to see them! The end was reached after a long day of conference, intrigue and bribery—often beyond our comprehension. The characters involved included a rapacious farmer, a minor government official and a garage proprietor.

A few miles from Elche on the salty flats of El Salvador, near the Palm oases, *L. caesium* grows in wide acres. We were led there by a young man who had collected the plants for the last ten years to spread on the streets of Elche during the festivals of Corpus Christi.

The *Limonium* had long since seeded, covering the sand with a deep layer of fruits; almost unlimited quantities of seed could be scooped up there like wheat from a granary floor.

*L. insigne* and *L. caesium* are amongst the most beautiful and showy of plants. I cannot refrain from quoting WILLKOMM again: of the former he says, "Planta eximia, generis species elegantissima ac pulcherrima!", while the latter is "Species pariter perpulchra." *L. insigne* is the larger-flowered of the two—the tube of the corollas reaching the magnificent proportion of 4 lines diameter—but its panicles of two-flowered spikelets are smaller and less floribund. And in turn, although the flowers of *L. caesium* are almost half as small as in the other, its profusion of pink one-flowered spikelets forming great pyramidal panicles makes it such a spectacular sight when in full flower that, for me, it is the finer plant.

After Elche we continued our tour of the Spanish Levante and returned through the steppes of Albacete to Madrid.

Many plants and happenings of our journey must be omitted here, such as the intriguing *Teucrium pumilum* found near Alcoy with its procumbent stems appressed to the rocks; *Digitalis mariana* in its *locus classicus*, the rocky hills at the gorge of Despeñaperros in Ciudad Real, looking for all the world like a Mullein; the distant enticing sierras which there was never time to explore; the nightmare journey on the footplate of a railway engine; the sight of our drying paper blown from the roof of our hotel in Madrid being wafted down to the Puerta del Sol. . . .

It would take many, many months to exhaust the wealth of the Spanish flora; we attempted to skim off the cream; but what we left is indeed rich.

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## THE WHITE BOUGAINVILLEA

*R. O. Williams, O.B.E.*

FOR many years the White Bougainvillea was no more than a myth but it was not uncommon to meet or be told of people who were convinced that they had seen one.

In 1919 I searched an old monograph of the genus Bougainvillea at Kew but could find no mention of a white species, although I did find reference to some with such uncommon colours as greenish and pale yellowish but, so far as I remember, the bracts were small and inconspicuous. In 1922 I placed on record my subsequent enquiries in the Bulletin of the Department of Agriculture, Trinidad and Tobago, pp. 121–122, which were briefly as follows:—

A lady from Rangoon volunteered the information that a white Bougainvillea was in cultivation in Burma, but the reply to enquiries was that none of the Botanists, Agriculturists or Forestry Research staff had heard of, or seen the plant in Burma. Someone suggested to try Mauritius but on making enquiries of the Director of Agriculture there