

RUDOLF SCHLECHTER'S SOUTH-AMERICAN ORCHIDS VI. SCHLECHTER'S "NETWORK": BOLIVIA, PARAGUAY, CHILE, ARGENTINA, AND URUGUAY

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ABSTRACT. The sixth and last chapter of this series about Rudolf Schlechter's South American network covers Bolivia, the last of the tropical Andean countries, and continues into the partly tropical and subtropical regions of South America: Paraguay, Chile, Argentina, and Uruguay. Although Bolivia has a high biodiversity and a large orchid flora, the remaining countries (except for parts of Paraguay and a small part of northern Argentina) have mostly terrestrial orchids and were historically visited only by a relatively few European botanists. The number of travellers mentioned in this chapter is therefore much lower than in previous ones. As in previous chapters, the biographies and accomplishments of these travellers are preceded by brief geographical and historical introductory outlines for each country. Again, a few figures, such as August Weberbauer, already mentioned in the last chapter, are omitted here.

KEY WORDS/PALABRAS CLAVE: biography, biografía, history of botany, historia de la botánica, Orchidaceae

Bolivia. The country is one of the two landlocked countries in South America (the other being Paraguay). It was named after Simón Bolívar (1783–1830) (Fig. 1), South America's great liberator and first President of Bolivia. It is bounded to the north and east by Brazil, to the south by Paraguay and Argentina, and the west by Chile and Peru. The country's topography includes the Eastern Andean Cordillera Oriental, which bisects Bolivia from south to north, and the Western Andean Cordillera Occidental, which runs along the border with Chile. The Cordillera Occidental features the extinct stratovolcano Nevado Sajama, at 6542 m (Fig. 2), Bolivia's highest peak.

Between the two mountain ranges lies the Altiplano, a highland plateau where Lake Titicaca is located. The lake is crossed by the border between Bolivia and Peru. To the east and north of the Cordillera Oriental are the valleys of the Yungas, a region of amazing scenic views, which slowly descends into the lowland plains of the Amazon Basin by what is called 'the most dangerous road in the world' (Fig. 3). The south-eastern part of the lowlands, on the border with Paraguay, is part of the Gran Chaco (Fig. 4), a sparsely populated hot and semi-arid natural region of the La Plata River Basin, divided between Bolivia, Paraguay, Argentina and Brazil.

Bolivia is thus a country of extremes, whose extremely high biodiversity is the result of the great number of microclimates ranging from the Altiplano, at over 4000 m, to the Amazon Basin and the lowlands of the Gran Chaco (Fig. 5).

Botanical exploration 1750–1800: The botanical exploration of Bolivia began with Joseph de Jussieu (1704–1779), who had taken part in the expedition of La Condamine to Ecuador between 1735 and 1747. After the expedition disbanded, he travelled to Lima before moving to La Paz, in Bolivia, in 1750 where he spent the next five years (Ossenbach 2020). De Jussieu's collections are mostly labeled *Perou*, but without exact provenance. Since Bolivia did not exist as an independent state at this time and was part of the Viceroyalty of Peru, we cannot determine if there were any Bolivian plants amongst his specimens. The Czech Thaddaeus Haenke (1761–1816), after leaving the expedition of Alessandro Malaspina in the port of El Callao in 1790, intended to cross the continent and meet Malaspina again in Buenos Aires or Montevideo. Instead, he stayed in Bolivia and remained there for the rest of his life. He died in the city of Cochabamba in 1816. A large part of his botanical collections were described by Carl B. Presl in *Reliquiae Haenkeanae* in 1839 (Presl 1830).



FIGURE 1. Simón Bolívar (1783–1830), Liberator and first President of Bolivia. Unknown artist.



FIGURE 2. Nevado Sajama volcano with the Altiplano in the foreground. Photograph by Léo Guellec.



FIGURE 3. The road to los Yungas, the 'most dangerous in the world'. Photograph by Coroico Tours.



FIGURE 4. The Gran Chaco. Photograph by Llosuna.

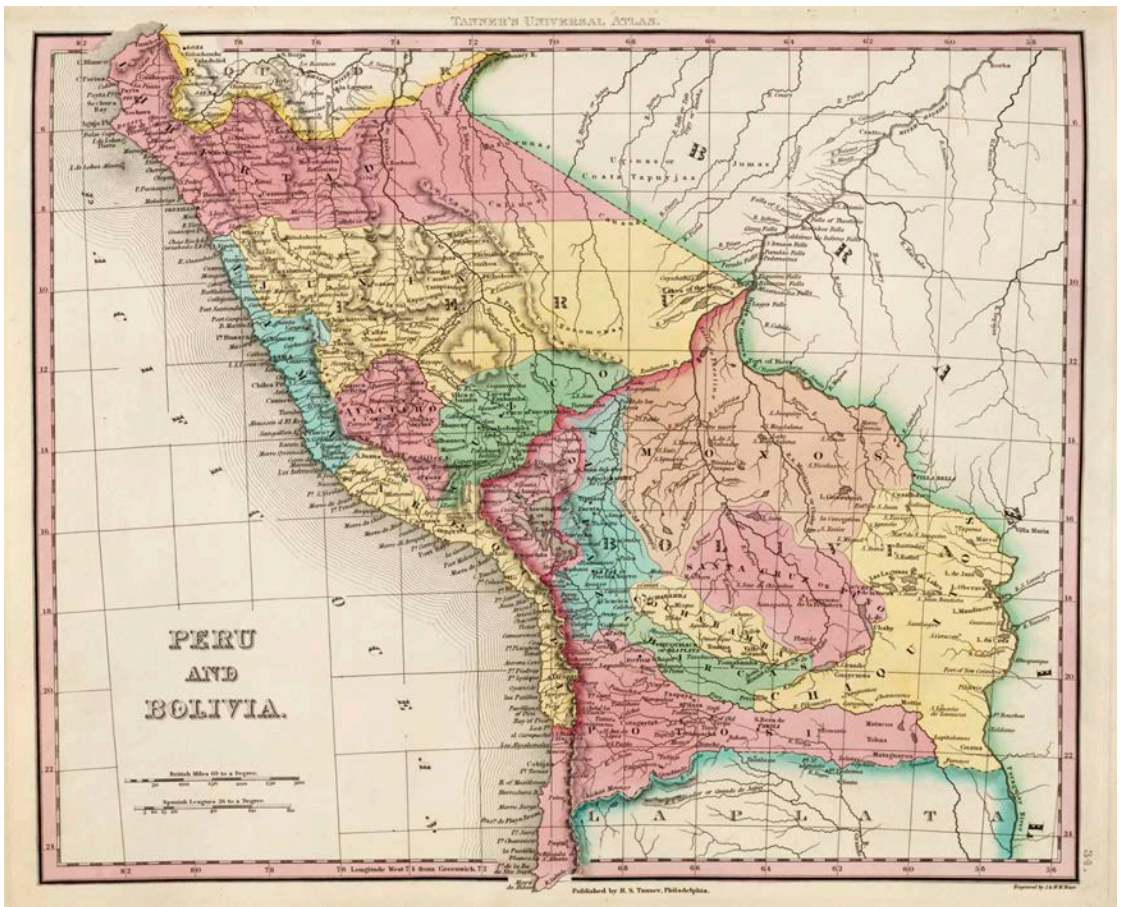


FIGURE 5. Map of Peru and Bolivia, 1836. By H.S. Tanner.



FIGURE 6. Henry Hurd Rusby (1855–1940). Botany Libraries of Harvard University. In Rossi-Wilcox, 1993: fig. 1.

Alcide D'Orbigny (1802–1857) botanized in Bolivia and border regions of Brazil for the Natural History Museum in Paris between 1830 and 1833. After him came Thomas Bridge (1807–1865), who arrived in Bolivia in 1844 and collected plants for the Kew Herbarium until 1846. Many new species found amongst his collections were described by Lindley in his *Folia Orchidaceae* (Lindley 1852?). Hugh Algernon Weddell (1819–1877), a member of Castelnau's expedition, came from Brazil to Bolivia in 1845 and botanized in the country intermittently until 1851.

One of the most prolific orchid collectors in Bolivia was Gustave Mandon (1799–1867), who visited the country from 1848 to 1861. He collected a total of over 1800 specimens. The Orchidaceae were described in 1878 by Reichenbach *f.* in his *Orchideae Mandoni-*

anae (Reichenbach 1878). Henry Hurd Rusby (1855–1940) collected in 1885 and 1886 and was instrumental in interesting Miguel [Michael] Bang (1853–1896) in continuing his work. Bang made large collections of orchids from 1886 until his death ten years later. The results were described by Rusby in a series of articles entitled *An enumeration of the plants collected in Bolivia by Miguel Bang*, published by the Torrey Botanical Club between 1893 and 1896.

Finally, Carl Ernst Otto Kuntze (1843–1907) visited Bolivia during his second South American journey in 1892. Alfred Cogniaux described a total of four new species among his Bolivian collections.

Henry Hurd Rusby (1855–1940), Miguel (Michael) Bang (1853–1895 [1897?]) and Robert Statham Williams (1859–1945) (collected 1885–1886, 1884–1895, and 1901–1902, respectively)

Sent in 1885 by Parke, Davis & Co., once America's oldest and largest drug maker, on an expedition to Peru and Bolivia to gather supplies of coca leaves, Henry Hurd Rusby (1855–1940) (Fig. 6) was one of the pioneers in the advancement of pharmacy and medicine.

Rusby had developed an early interest in botany and in 1871 began collecting plants in Essex County, New Jersey, under the guidance of C. H. Fuller. He was admitted to the Torrey Botanical Club and in 1880 was hired by the Smithsonian Institution to investigate the botany, natural history and archaeology of New Mexico. After returning from New Mexico in 1882, Rusby studied for a year at the College of Physicians and Surgeons of Columbia University and later at the Medical College of New York University, where he received a Doctorate in Medicine in 1884 (Rossi-Wilcox 1993: 1–4).

In January, 1885, Henry H. Rusby embarked in New York City for the port of Arica, in northern Chile. Over the next two years, he would cross the continent, botanizing in Peru and Bolivia before travelling down the Amazon to the Atlantic (Fig. 7). He returned to the United States with 45,000 botanical specimens, of which about 20% were new to science (Fig. 8).

Over the years Rusby would take part in several other expeditions to South America: in 1893 to the Orinoco Valley in Venezuela, in 1917 to the Magdalena River in Colombia, in 1919 to Bolivia and Brazil



FIGURE 7. Henry H. Rusby in the Amazon Region, 1886. NYBG Library Archive. In Williams & Fraser, 2008: fig. 2.

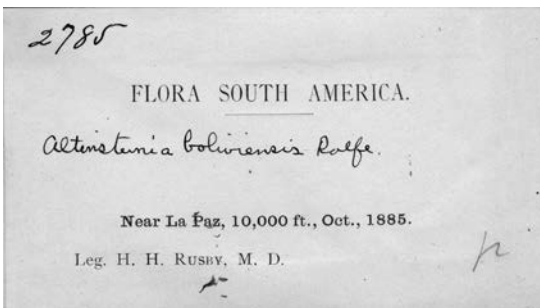


FIGURE 8. Henry Rusby herbarium label. Oakes Ames Orchid Herbarium, Harvard University.

again, and finally as leader of the Mulford Biological Expedition to the Amazon Basin in 1921. However, he had to abandon this last expedition due to ill health and returned to the United States in December of that year.

Rusby travelled from Chile to La Paz in March 1885. He returned briefly to Valparaiso in Chile but in June was back in the capital of Bolivia. There he col-

lected in the region of the Yungas and around of the village of Sorata, about 150 kilometers northwest of La Paz. In the first months of 1886, he left Bolivia and continued through Brazil to the Atlantic.

In 1890, Dr. Rusby was one of the first scientists to be appointed to the staff of the newly founded New York Botanical Garden, an association he maintained until he died in 1940. Simultaneously, he occupied the position of Dean of the New York College of Pharmacy at Columbia University and was Vice-president and then President of the Torrey Botanical Club.

Among Henry Rusby's collections of orchids, Schlechter described two new species: *Elleanthus setosus* and *Habenaria yungasensis*. Rolfe determined as new to science *Liparis rusbyi*, *Oncidium rusbyi* (Fig. 9), *Pleurothallis rusbyi*, *Stelis rusbyi* (collected by M. Bang for Rusby), and the new orchid genus *Rusbyella* (the only orchid genus endemic to Bolivia) with its type species *Rusbyella caespitosa*. Other



FIGURE 9. *Oncidium rusbyi* Rolfe, as *Cyrtochilum cimiciferum* (Rchb.f.) Dalström. Photograph by Lourens Grobler.

species of this genus have been found in later years, among them *Rusbyella aurantiaca* by G. Gerlach and T. Franken (Fig. 10). Finally, Rolfe described *Oncidium rusbyi*.

Henry Hurd Rusby's expedition to Bolivia would bring additional results: during his time in La Paz he met Bang, who worked in the suburbs of the city (Fig. 11), and a few years later came into an agreement with him to make extensive botanical collections. Fifteen years later, Rusby was again instrumental in securing botanical collections from Bolivia for the New York Botanical Garden by arranging the South American expedition of Robert Statham Williams (1859–1945). Both events would result in substantial contributions to our understanding of the Bolivian orchid flora.

In his enumeration of the plants collected in Bolivia published between 1893 and 1896, Henry H. Rusby wrote about Bang: "The study of the Bolivian flora, as represented in the collections made by myself in the years 1885 and 1886, the enumeration of which is still proceeding in the pages of the Bulletin, proved



FIGURE 10. *Rusbyella aurantiaca* G.Gerlach & T.Kramer, as *Cyrtochilum aurantiacum* (G.Gerlach & T.Kramer) Dalström.

so interesting to Dr. Britton and myself that we became very desirous of having the collections continued. An opportunity to gratify this desire was found in 1889, when Mr. Miguel Bang consented to carry on the work which I had begun. Mr. Bang is the son of a Danish clergyman, educated in gardening at Kew, who went to Bolivia somewhere about the year 1883, for the purpose of collecting and sending to England living orchids. The enterprise proving unsuccessful, Mr. Bang engaged in other pursuits in the vicinity of La Paz, where I met him in 1885, and formed the acquaintance from which the present arrangement has resulted. Since Mr. Bang began collecting, the work has been pushed as steadily as circumstances would permit. It was hoped that the proceeds from the sale of specimens would more than pay the expenses of collection, so that Mr. Bang might derive more or less profit from the enterprise; but unfortunately, such has not been the case. Despite every effort and economy, I have found it necessary to supply a considerable deficiency, while Mr. Bang has received nothing beyond



FIGURE 11. La Paz, ca. 1900. Unknown photographer.

his expenses. Indeed, owing to a lack of ready funds, it has not been possible to fully utilize the time in collecting.” (Rusby 1893: 1).

No other biographical data are known about Miguel Bang. From his herbarium labels, Rolfe’s descriptions and Rudolf Schlechter’s brief historical account (Schlechter 1922), we gather that he collected from 1883 to 1890 in the vicinity of La Paz (the villages of Coripata and Coroico in the Yungas valleys are often mentioned). In 1891 we find him in Cochabamba, in 1892 in Tipuani and in 1893 at the Mapiiri River. All these places are in the Department of La Paz.

By the time Bang met Henry Rusby, he had made already a substantial start on the classification of the Bolivian flora. He collected hundreds of new species and several unknown genera, described by H. H. Rusby in four separate instalments in the *Memoirs of the Torrey Botanical Club*. Bang’s large collection of orchid specimens was studied and determined chiefly by R. A. Rolfe. Schlechter described additional species collected by Bang in his orchid flora of Bolivia (Schlechter 1922).

Duplicate sets from his herbarium were later distributed by Rusby and N. L. Britton to most of the main American and European herbaria. In his later

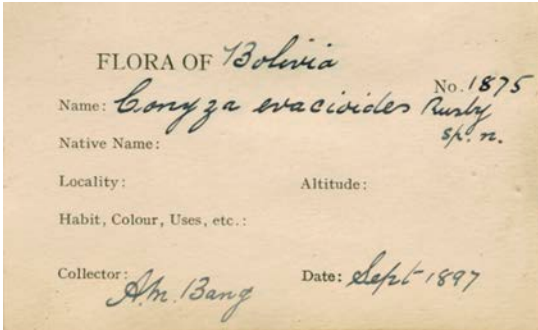


FIGURE 12. Herbarium label of *Coryza evacioides* Rusby, with collection date given as Sept. 1897. Kew Herbarium # 000221757.



FIGURE 14. *Masdevallia bangii* Schltr. #2424 of a collection named *Plantae Bolivianae a Miguel Bang lectae*. Herbarium of Columbia University. Roy W. Squires.



FIGURE 13. *Epidendrum miguelii* Schltr. as *Epidendrum ibaguense* Kunth. Photograph by Arne and Bernd Larsen.



FIGURE 15. *Scaphyglottis boliviana* Schltr. as *Scaphyglottis graminifolia* (Ruiz & Pav.) Poepp. & Endl. Photograph by Luis Pérez.

years, Bang worked as Curator of Municipal Parks in Cochabamba and remained active in gardening for the rest of his life. The date given for Bang's death is usually 1895, but there are specimens at Kew bearing his name and dated 1897 (Fig. 12).

Among the orchids collected by Bang, Schlechter described *Epidendrum miguelii* (Fig. 13), *Habenaria bangii*, *H. miguelii*, *Masdevallia bangii* (Fig. 14), *Pleurothallis dolichocaulon*, *P. rophalocarpa*, *Scaphyglottis boliviana* (Fig. 15), and *Zygopetalum bolivianum* (Fig. 16).

Rolfe had previously described a large number of species of Orchidaceae collected by Bang in Bolivia (Rusby 1907), amongst them: *Aganisia boliviensis*, *Epidendrum bangii*, *Masdevallia scandens* (Fig. 17), *Octomeria boliviensis*, *Pleurothallis brittoni*, *Pterichis bangii*, and *Stelis bangii*.

Robert Statham Williams (1859–1945) (Fig. 18) is the last in our trilogy of collectors for the New York Botanical Garden. Williams was born in Minneapolis, Minnesota. An adventurous person and fascinated



FIGURE 16. *Zygopetalum bolivianum* Schltr. as *Zygopetalum intermedium* Lodd. ex Lindl. Photograph by Picasa.



FIGURE 17. *Masdevallia scandens* Rolfe. Photograph by Rudolf Jenny.

by nature, he travelled to Montana as a young man, where, as a homesteader, he built the first cabin in what is today the city of Great Falls. He worked for twenty years as a businessman, miner and explorer and even served for short while as a rider for the Pony Express. It was during his time in Montana that he received a subvention from Columbia College, New York to collect bryophytes for Elizabeth Knight Britton.

In 1898, when the ‘Gold Rush’ began in the Yukon Territory in northwestern Canada, Williams joined one of the parties heading to the Klondike. He set himself up in business and made a small fortune. His spare time was spent collecting plants.

In 1899, Williams joined the newly created New York Botanical Garden, directed by Nathaniel Lord Britton (1859–1934). A few months later he brought his botanical collections to New York and, although the Museum Building was not finished and still lacked central heating, he spent the winter of 1899–1900 living and working in it. He would remain in the employment of the Botanical Garden until he died 45 years later.

In his early years with the Garden, he went on several botanical expeditions: Bolivia and Peru in 1901–1902, the Philippine Islands of Luzon and Mindanao in 1903–1905 and finally Panama in 1908. The rest of

his life was spent studying mosses and publishing the results of his studies.

It is Williams’ expedition to Peru and Bolivia which interests us here. It was significant as it was the first expedition to South America by a scientist on the staff of the New York Botanical Garden.

Martin Conway (1856–1937) (Fig. 19), a passionate British amateur naturalist and mountain climber, visited Peru and Bolivia in 1898–1900. He published a narrative of this expedition in 1901, under the title *Climbing and Exploration in the Bolivian Andes*. In it, he describes the journey from Lima to the Andes on the Oroya Railway (Fig. 20), and from there to Bolivia, where he climbed Mount Sorata and Mount Illimani.

With the idea of exploiting the country’s vast mineral resources and its rubber production, he formed the Bolivia Company, which received the approval of the Bolivian Government to start operations in the country from 25 September 1900. Conway set up a team of British scientists to explore the Upper Amazon Basin in Eastern Bolivia but turned to the New York Botanical Garden for a botanical expert to form part of the expedition. Henry H. Rusby was involved in arranging the trip and Robert S. Williams was appointed to accompany the group. The number of plants later described by Rusby with the epithet *conwayi* suggests that Rusby was



FIGURE 18. Robert Statham Williams (1859–1945). In Dorr 1991: 12.

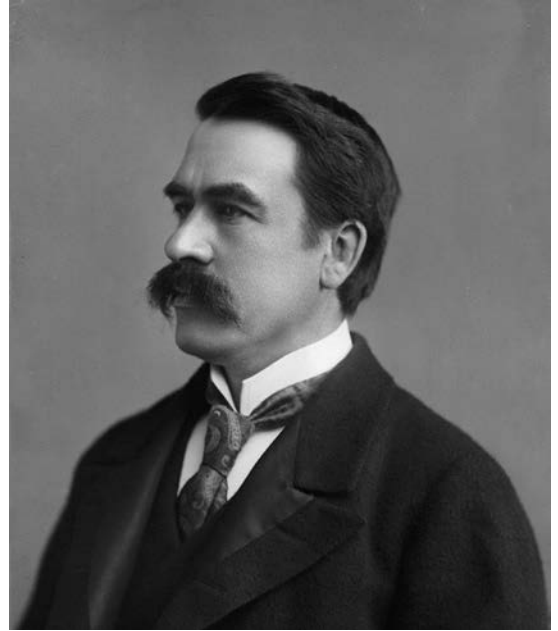


FIGURE 19. Sir Martin Conway (1856–1937). National Portrait Library.



FIGURE 20. Summit of the Oroya Railway. Photograph by M. Conway (1991: 48).

indebted to Conway. In later publications, Rusby often referred to Williams' trip as the "Conway Expedition".

Williams companions, namely, John W. Evans, geologist and head of the expedition, John Turle, mining engineer and G. N. Whatney, civil engineer, were all British subjects and members of the Bolivia Company.

The group arrived at the Peruvian port of Mollendo on 4 August, 1901, took the train to Puno, crossed Lake Titicaca and continued by coach to La Paz, where they arrived on 14 August.

After two weeks in La Paz, planning for their first trip, the expedition went by mule over the Huallata Pass



FIGURE 21. Map of localities visited by Williams during his two trips. In Dorr, 1991: Figure 3.

(4300 m) to the town of Sorata, 2000 m lower. From Sorata they followed the main trail to Mapiri and on 11 September arrived in Tolapampa. Another two-day travel brought them to Mapiri, where their equipment was transferred to *cayapos* (rafts, created by lashing together a number of logs). In September and October, they floated down the Mapiri and Beni Rivers before arriving in San Buenaventura. Here they left the rivers, and after three long months of marching through the most difficult terrain arrived back in La Paz at the end of May 1902. This was Williams' first trip.

Here the party broke up: Evans and Whatney returned to London and only Turle remained with Williams in La Paz. At the request of the Bolivia Company, they went to the village of Apolo, northeast of

La Paz, to Sorata again and keeping to the northwest of their first route returned to Apolo and thence to La Paz (Fig. 21). Williams was on his way back to New York by mid-October. In total, and according to his notebooks, Williams made 2981 numbered plant collections in Bolivia and Peru (Fig. 22).

In 1912 and again in 1922, Rudolf Schlechter described several new orchid species from Williams' botanical collections and named some in his honour: *Beloglottis boliviensis* Schltr., *Bulbophyllum bolivianum* Schltr. (Fig. 23), *Dichaea longa* Schltr. (Fig. 24), *Habenaria williamsii* Schltr., *Maxillaria boliviensis* Schltr., *Oncidium williamsii* Schltr., and *Trizeuxis andina* Schltr.

Williams is commemorated in botanical nomenclature by the genera *Williamsia* Merrill (1908) (*Rubia-*

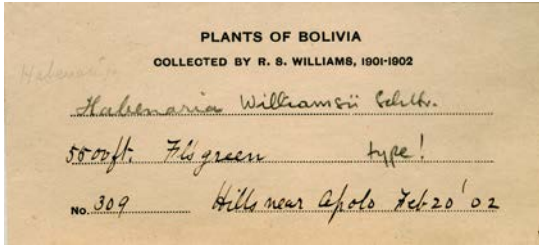


FIGURE 22. R. S. Williams' herbarium label. New York Botanical Garden.



FIGURE 23. *Bulbophyllum bolivianum* Schltr. as *Bulbophyllum weddellii* (Lindl.) Rehb. f. Photograph by Jay Pfahl.

ceae), and *Williamsiella* E. G. Britton (1909) (Pottiaceae), as well as by the names of many plant species.

OTTO BUCHTIEN (1859–1946) AND ERNST CARL FRANZ GÜNTHER (1870–?) (collected 1906–1936, together with Günther 1923–1927)

“In 1922 I published my work on the orchid flora of Bolivia and I could write that the name of Dr. Buchtien would always be named in first place in the history of the botanical exploration of the country. After the here described new botanical successes, it



FIGURE 24. *Dichaea longa* Schltr. Courtesy of Andreas Kay.



FIGURE 25. Otto August Buchtien (1859–1946). Archives of Rudolf Jenny.

becomes clear that nobody has ever done so much for the exploration of this Andean state”. (Schlechter 1929: 28).

Otto August Buchtien (1859–1946) (Fig. 25) was born in Rostock, where he studied Natural History and Mathematics and received his doctorate in 1887. After working for a few years as a private teacher, in 1893 he travelled as a teacher to Chile, where he would stay for the following 13 years. He began his botanical collections in Valparaíso and continued to southern Chile (province of Valdivia). Another excursion took him over the Pass of Uspallata, at over 4000



FIGURE 26. Pass of Uspallata, ca. 1930

m (Fig. 26), to the Argentinian city of Mendoza and later to San Carlos de Bariloche, in the province of Río Negro.

Buchtien collected a few terrestrial orchids in Chile and Argentina, among them *Codonorchis poeppigii* Lindl. from Valdivia (1887) (Fig. 27) and *Chloraea piquichen* Lindl. from San Carlos de Bariloche (1905). However, Buchtien's most important botanical collections were made after he was invited by the Government of Bolivia to organize the National Museum of Natural History in La Paz in 1906.

Covering almost 135,000 km², the Department of La Paz, one of the nine departments that form the Republic of Bolivia, extends from the heights of Lake Titicaca to the lowlands of the Amazon Basin. It has, therefore, a rich variety of climate and vegetation zones. As Director of the Museum, Buchtien had ample time to explore the region in all directions; during his thirty years in the country, he seldom ventured

outside this area. He amassed a large collection of botanical specimens and from the first day the orchids were his favourites.

Albert Spear Hitchcock (1865–1935) (Fig. 28), a well-known botanist and specialist in grasses from Harvard University and the New York Botanical Garden, was sent to Peru and Bolivia in 1923 to study the grazing industry. In Bolivia he could not have found a better guide than Otto Buchtien, who he mentions in his report of the expedition (Hitchcock 1925).

One of Hitchcock and Buchtien's excursions took them to the region of the Yungas; Hitchcock wrote: "I had been in correspondence with Dr. Otto Buchtien, the well-known German botanist, long resident in Bolivia, who was then in southern Peru [Buchtien was at that time in Arequipa, on a collecting expedition with Ernst Karl Günther, see below]. I was fortunate in having his company on my next trip, which was to the Yungas, the montaña region lying to the north and east of La Paz

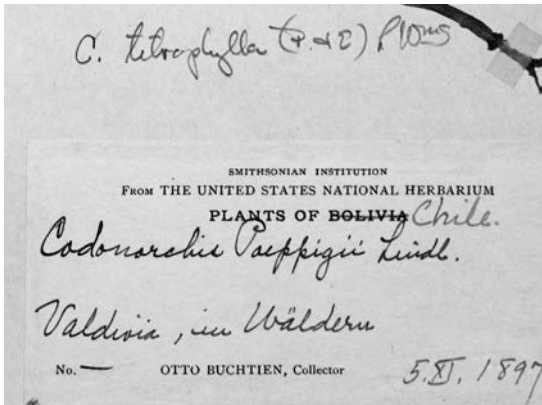


FIGURE 27. Buchtien herbarium label from Valdivia, Chile, 1897 (*Codonorchis poeppigii* Lindl.). United States National Herbarium.

over the eastern Cordillera. Sr. Aramayo, the director general of the Yungas railroad, aided very efficiently by furnishing passes for Dr. Buchtien and myself to Pongo and mules and a man for our trip through the Yungas [...] Dr. Buchtien was widely acquainted in the region and we were able to stop at several plantations with his friends". Hitchcock had previously collected several orchids in British Guyana and Ecuador but no orchid specimens are known from his journey to Bolivia. He is remembered in *Epidendrum hitchcockii* Hágsater & Dodson and *Pleurothallis hitchcockii* Ames.

Buchtien's excursions were sponsored by the Ministry of Colonization, but when the available funds ran out in 1935 Buchtien had to abandon his position at the Museum, returning to Germany the following year. Perhaps through contacts established during the visit of Albert S. Hitchcock, Buchtien was able to sell his entire herbarium to the United States National Herbarium.

In 1910, Buchtien published an important work on the flora of the country, *Contribuciones a la Flora de Bolivia (Parte I)*. Further volumes were unfortunately never published. Only eleven orchid species were described here by F. Kränzlin, although Buchtien warned that at the time of publication many orchid specimens still awaited determination.

In 1908, Kränzlin described new species collected by Buchtien (*Neue und kritische Arten*) and again in 1928 (*Orchidaceae novae Boliviana*).

Rudolf Schlechter determined an important number of Buchtien's orchids in 1912, under the title *Ad-*

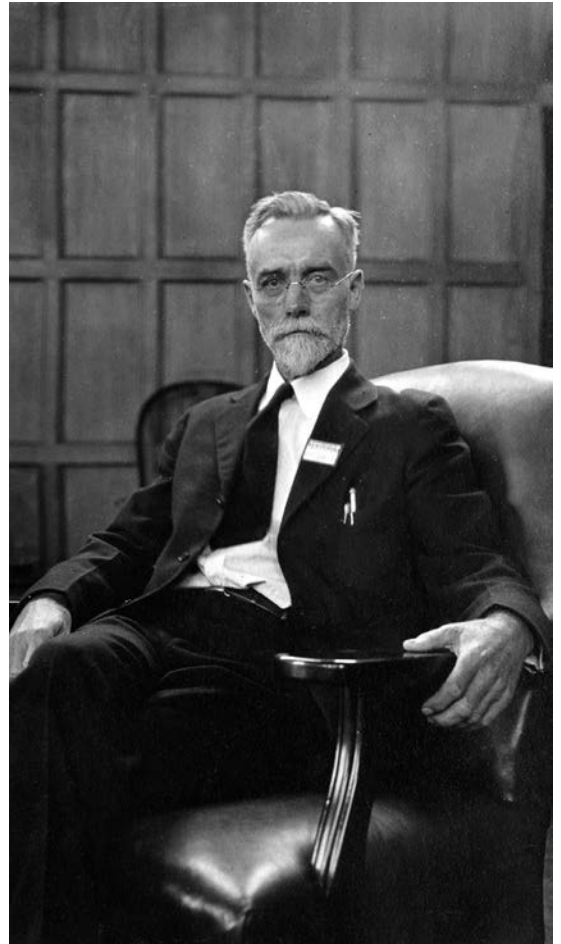


FIGURE 28. Albert Spear Hitchcock (1865–1935). Unknown photographer.

ditamenta ad Orchideologiam Bolivianum, which was followed in 1922 by additional specimens described in *Orchideenflora von Bolivia* and, posthumously, by *Orchidaceae Buchtienianae* in 1929.

Kränzlin and Schlechter described between them around one hundred and twenty new orchid species from Buchtien's collections. Among them, an important number were dedicated to Otto Buchtien; by Kränzlin: *Catasetum buchtienii* Kraenzl. (Fig. 29), *Cycnoches buchtienii* Kraenzl., *Houlletia buchtienii* Kraenzl., *Sigmatostalix buchtienii* Kraenzl. (Fig. 30), and *Xylobium buchtienianum* Kränzlin.

And by Schlechter: *Cyrtopodium buchtienii* Schltr. (Fig. 31), *Dichaea buchtienii* Schltr., *Encyclia buchtienii* Schltr., *Epidendrum buchtienii* Schltr., *Habenaria buchtienii* Schltr., *H. ottonis* Schltr., *Macradenia buch-*



FIGURE 29. *Catasetum buchtienii* Kraenzl. as *Catasetum barbatum* Lindl. Unknown photographer.



FIGURE 30. *Sigmatostalix buchtienii* Kraenzl. Archives of Rudolf Jenny.



FIGURE 31. *Cyrtopodium buchtienii* Schltr. as *Cyrtopodium virescens* Rehb. f. & Warm. Photographed *in situ* in Bolivia by José Luis Panozo.



FIGURE 32. *Buchtienia* sp. Photograph by Sylvio R. Pereira.

tienii Schltr., *Masdevallia buchtienii* Schltr., *Maxillaria buchtienii* Schltr., *Microstylis buchtienii* Schltr., *Notylia buchtienii* Schltr., *Octomeria buchtienii* Schltr., *Oncidium buchtienii* Schltr., *Physurus buchtienii* Schltr., *Pleurothallis buchtienii* Schltr., *Sobralia buchtienii* Schltr., *Stelis buchtienii* Schltr., and *Warmingia buchtienii* Schltr.

In addition, Schlechter described a new genus, which he named *Buchtienia*, with the type species *Buchtienia boliviensis* Schltr. (Fig. 32).

“A German merchant, Herr Günther, kindly took me under his wing and made me his guest during the time of my stay. He owns an India-rubber forest in the Mapiiri district.” (Conway 1901: 200). Ernst Carl Franz Günther (1870–?) (Fig. 33) had established himself in the 1890s in the village of Sorata, to the northeast of La Paz, where he bought the famous residence of the

Richter family. Günther belonged to a class of rich merchants with interests in the rubber industry and in mining, among whom Günther and Otto Richter ranked among the most prominent. Ernst Carl Günther was the owner of the Hacienda San Carlos, a rubber plantation with over 200 workers. But he was also a successful merchant, and imported luxury goods from Europe to Bolivia, which involved transportation along dangerous roads from the Pacific port of Arica to the Bolivian highlands (Fig. 34).

Otto Buchtien must have met Günther in Sorata in the early 1920s. In 1922, Schlechter described *Dichaea buchtieni*, collected by Buchtien in San Carlos, Mapiiri, undoubtedly a reference to Günther’s hacienda. Herrera (1939: 28) mentioned that Günther and Buchtien collected in 1923 in the hills of Mollendo, near Areq-



FIGURE 33. Ernst Carl Günther (1870–?). Archives of Rudolf Jenny.

uipa, Peru, which is coincident with Hitchcock's mentioning that Buchtien was in southern Peru at the time of his arrival in Bolivia (1923). And in his *Orchidaceae Buchtienianae* (1929), the majority of Buchtien's collections were labeled "Mapiri" or "San Carlos".

Buchtien was not only Günther's guest at Sorata, he also awakened in his countryman a love for nature and for orchids. In Buchtien's herbarium we find his own labels ("Dr. Otto Buchtien- Herbarium Bolivianum" (Fig. 35)) and a separate section of plants collected by Günther with the label "Ernesto Günther – Herbarium Bolivianum", but always with the note "legit. Buchtien" (Fig. 36). This was undoubtedly a special arrangement between Buchtien and Günther of which nothing further is known.

In the final months of 1898, Ernst Günther, in partnership with another German, Franz Rehder, founded the "Cervecería Alemana" ("German Brewery") in Arequipa, southern Peru. A long story of success followed, including the establishment of a new brewery, the "Cervecería Cusco", and the foundation of the "Corporación Cervesur" in 1926. Cervesur, managed

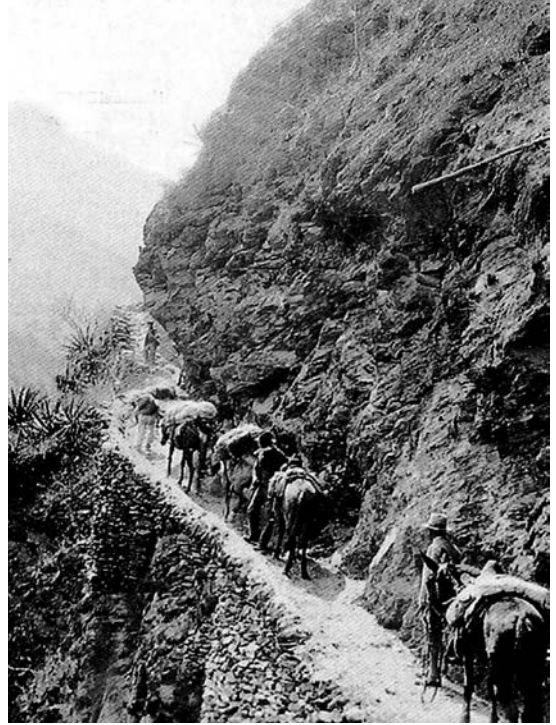


FIGURE 34. Road from Arica to La Paz, ca. 1910. Unknown photographer. Gismondi private collection.

by Günther's heirs, is today still in business and has become one of the most powerful corporations in Peru.

Despite his business commitments, Günther maintained his interests in Sorata and continued botanizing, organizing a very successful expedition in the first months of 1927, in the company of Otto Buchtien, to the district of Mapiri. The headquarters for this excursion was Günther's Hacienda San Carlos.

Several new orchid species were named in honour of Ernst Carl Günther. The first was *Pleurothallis guentheri* Schltr. (Fig. 37) collected around 1922–1923 and described by Schlechter in his *Orchidaceae Buchtienianae* in 1929. All others were described by Kränzlin because they were collected in the above-mentioned expedition of 1927 after Schlechter's death; among them we find *Catasetum guentherianum* Kränzlin., *Epidendrum guentherianum* Kraenzl. (Fig. 38), *Habenaria guentheriana* Kraenzl., *Maxillaria guentheriana* Kränzlin., *Octomeria guentheriana* Kraenzl., and *Stenoptera guentheriana* Kraenzl..

If you ever travel to Sorata, do not miss a visit to its town square. The city is proud of its beautiful gar-

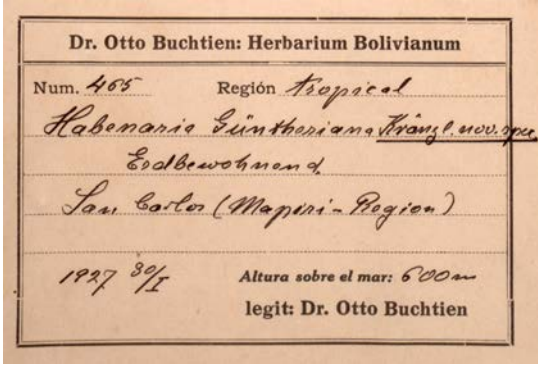


FIGURE 35. Buchtien herbarium label, *Habenaria guentheriana* Kraenzl.

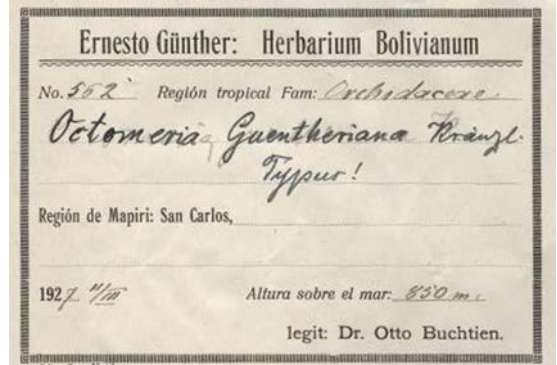


FIGURE 36. Günther herbarium label, *Octomeria guentheriana* Kraenzl.



FIGURE 37. *Pleurothallis guentheri* Schltr. (right) as *P. obovata* (Lindl.) Lindl. Xenia Orchidaceae, vol. 3: plate 247.



FIGURE 38. *Epidendrum guentherianum* Kraenzl. as *Epidendrum compressum* Griseb. Photograph by Ecuagenera.

dens. Once there, you will find on one of the corners an old, somewhat run-down but still beautiful building. It is the old mansion built by Otto Richter in the last decades of the 19th century and later acquired by Ernst Carl Günther; it is, therefore, better known nowadays as “Casa Guenther”. It is today a boarding house named “Residencial Sorata”; a news reporter who once spent a holiday in the city called it “the hotel where history never sleeps” (Fig. 39).

Theodor Carl Julius Herzog (1880–1961) (collected 1907–1912)

Following a line of research like that of Dr. Otto Buchtien, Theodor Carl Julius Herzog (1880–1991) (Fig. 40) took upon himself the task of carefully studying and describing the different vegetation zones of Bolivia, especially in the regions on the eastern slopes of the Andes.



FIGURE 39. “Casa Guenther” in Sorata. In the foreground the gardens of the townsquare. Unknown photographer.

Herzog visited Bolivia twice. An Argentinian railroad company (‘Sindicato del Ferrocarril del Oriente Boliviano’) invited him in 1907 to take part as botanist in an otherwise purely economic expedition through eastern Bolivia. He took ship from Buenos Aires in March of that year to cross Paraguay to the Brazilian-Bolivian border at Puerto Suárez. He continued for several months through the province of Chiquitos until arriving in Santa Cruz in the month of June. He then travelled north to the Río Blanco, where he would report that the expected rubber and cinchona trees were not to be found. Having thus fulfilled his mission, he returned over the route from Cochabamba and Oruro to the Pacific port of Antofagasta. After travelling to Buenos Aires to deliver his report to the railroad company, he returned to Germany in February 1908.

His second expedition, this time financed by himself, extended from September 1910 to January 1912. Herzog travelled from Buenos Aires by train to Ledezma, the endpoint of the Argentinian Railroad, and continued on the Pilcomayo River over Villa Montes and Charagua to Santa Cruz, arriving in December 1910. He made Santa Cruz his headquarters for several months and explored the forest in the vicinity of the city until

March 1911, when he left for Cochabamba (Fig. 41) to again explore the Cordilleras surrounding the city.

In September 1911, while in Cochabamba, Theodor Herzog met C. Seelig, a friend from Zürich - like Herzog an accomplished mountain climber - to explore the Cordillera of Quimsa Cruz, southeast of Lake Titicaca. Together, Herzog and Seelig climbed several Bolivia's highest peaks (Fig. 42).

In the first days of November, Herzog, back in La Paz, ended his expedition. He then travelled over Oruro again to Antofagasta, before returning to Germany with magnificent botanical collections in January 1912. The botanical results of Herzog's second Bolivian adventure were published in 1923 as *Die Pflanzenwelt der bolivianischen Anden und ihres östlichen Vorlandes* (= The vegetation of the Bolivian Andes and their eastern foreland) (Herzog 1923, Schlechter 1922: 12, Mägdefrau 1962: 74). Orchids in this work are mentioned only in a very general way as lists of those genera that can be found in the different vegetation zones.

Rudolf Schlechter described 29 new orchid species collected by Herzog in Bolivia in the second part of his *Additamenta ad Orchideologiam Bolivianam* in 1913. Schlechter's descriptions of Herzog's orchids continued

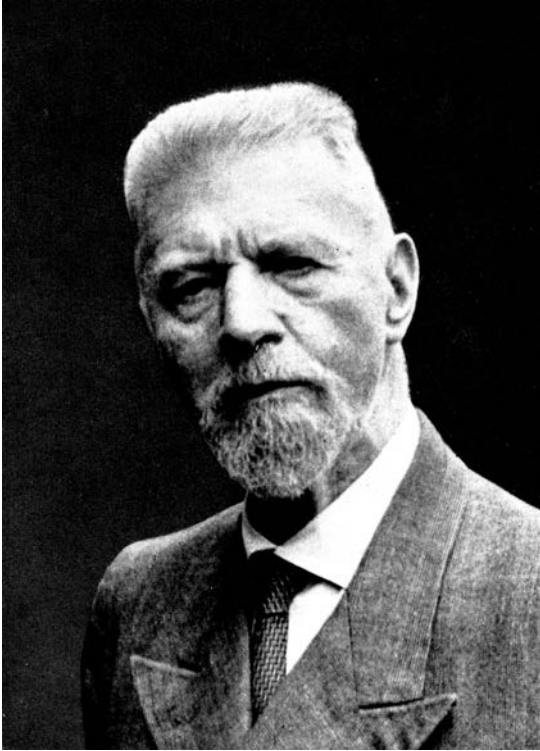


FIGURE 40. Carl Julius Theodor Herzog (1880–1961). From Mägdefrau, 1962: 76a.

in 1916 and were published in Leiden as *Die von Dr. Th. Herzog auf seiner zweiten Reise durch Bolivien in den Jahren 1910 und 1911 gesammelten Pflanzen* with the descriptions of 31 new orchids. We find again Herzog's orchids in 1922 in Schlechter's vol. V (Bolivia) of his *Orchideenfloren der Südamerikanischen Kordillerenstaaten*; an additional species, *Sarcoglottis herzogii*, was published in 1925 in Schlechter's long series *Orchidaceae novae et criticae* (Schlechter 1925). Over 60 new orchid species were collected by Herzog in Bolivia.

The greater part of Herzog's botanical collections was made in the provinces of Santa Cruz and Cochabamba (Fig. 43), on the eastern slopes of the Andes descending to the Amazon basin, at elevations between 250 and 3000 m.

Schlechter named a dozen new orchid species in honour of Theodor Herzog: *Epidendrum herzogii* (Fig. 45), *Habenaria herzogii*, *Masdevallia herzogii* (Fig. 46), *Neodryas herzogii* (Fig. 47), *Oncidium herzogii* (Fig. 48), *Pachyphyllum herzogii*, *Physosiphon herzogii*, *Physurus herzogii*, *Pleurothallis herzogii*, *Sarcoglottis herzogii*, *Sobralia herzogii*, and *Stelis herzogii*. Carlyle Luer followed suit in 1998 with *Lepanthes herzogii*.

All of Herzog's new orchid species were collected during his second journey to Bolivia. His her-



FIGURE 41. Tramway in Cochabamba, ca. 1910. Photograph by Adolfo T. Zamudio.



FIGURE 42. Cordillera of Quimsa Cruz – Unknown photographer.



FIGURE 43. Valley of Cochabamba. Photograph by 'rafapc.'



FIGURE 45. *Epidendrum herzogii* Schltr. as *Epidendrum secundum* Jacq. Photograph by Jay Pfahl.



FIGURE 47. *Neodryas herzogii* Schltr. Photograph by Eric Hunt.



FIGURE 46. *Masdevallia herzogii* Schltr. as *Masdevallia bicolor* Poepp. & Endl. Unknown photographer.

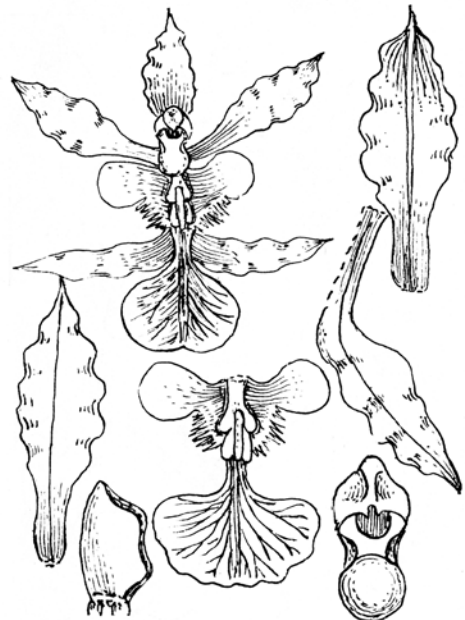


FIGURE 48. *Oncidium herzogii* Schltr. Analytical drawing by Schledchter in Schlechter & Mansfeld, 1929, plate 58, illustration 57.

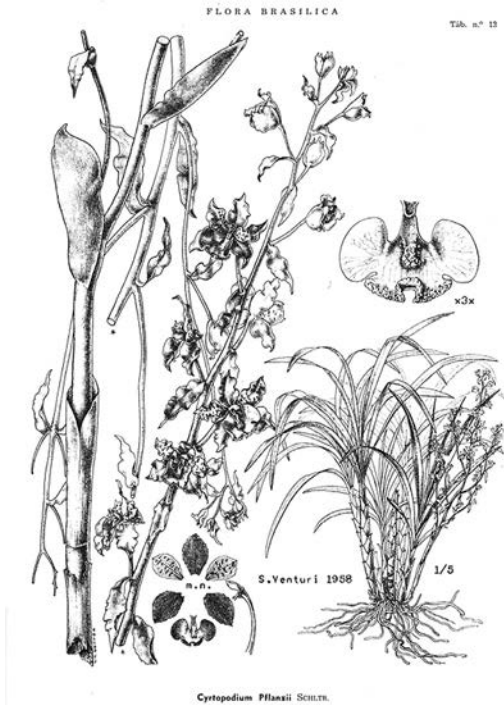


FIGURE 49. *Cyrtopodium pflanzii* Schltr. From F. Hoehne's *Flora Brasiliica*, plate 13.

barium labels read: '*Plantae in itinere secundo per Boliviam lectae*'.

Theodor Herzog moved to Zürich in 1914, where he worked during World War I (WWI) as a private lecturer. In 1920, he was offered a position as Professor of Botany at the University of Munich, the place where he had received his doctorate in 1903. Finally, from 1925 to his retirement in 1948, he held the chairs of Botany and Bryology at the Friedrich-Schiller University in Jena. He passed away in Jena on 6 May 1961.

KARL PFLANZ (1872–1925) (collected 1907–1925)

A relatively minor figure in this story, Karl Pflanz (1872–1925) belonged to the category of amateur botanists to whom Rudolf Schlechter so often resorted to obtain new orchid material from South America. Born on the island of Rügen, off the German Baltic coast, he was the son of a wealthy factory and farm owner. He worked as a merchant in Berlin, Paris, London and Hamburg before travelling to Mexico, where he worked on several cattle farms and coffee plantations. In 1904, he contin-



FIGURE 50. *Encyclia pflanzii* Schltr. Photograph by Cecilia Kramer.

ued to Argentina to study cattle-breeding and took a position with an Argentinian-Chilean trading company in 1905. He travelled widely through Argentina and southern Chile before moving to Bolivia in 1906. In 1915, he was appointed German vice-consul in Villa Montes, in the department of Tarija in southern Bolivia. At the same time, he became a partner of the German trading company Staudt & Co. During the period of inflation after WWI, he established a foundation in Germany which sponsored young researchers in botanical studies.

Karl Pflanz made botanical collections in Argentina and Bolivia which mostly went to the Botanical Museum in Berlin. He drowned on 20 April 1925 while crossing the Río Piedras near Salta, Argentina. His last botanical collection consisted of 150 herbarium specimens from Villa Montes, received in Berlin a few months before his death (Anonymous 1825, Frahm & Eggers 2001).

Among Pflanz's botanical specimens, Rudolf Schlechter determined three new orchid species, all named in his honour: *Catasetum pflanzii*, *Cyrtopodium pflanzii* (Fig. 49), and *Encyclia pflanzii* (Fig. 50).



FIGURE 51. José Steinbach (1875–1930). Archives of the Steinbach family.

JOSEPH (JOSÉ) STEINBACH (1875–1930) (collected 1913–1929)

José (Joseph) Steinbach (1875–1930) (Fig. 51), from the city of Lindlar, in the German state of North-Rhine Westphalia, went to South America in 1902, a member of a scientific expedition from the Museum of Sciences of the German Empire sent to explore northern Argentina. After two years he continued alone to Bolivia with the purpose of collecting objects of natural history, especially flora and fauna, and he would spend the next 25 years restlessly exploring that country. He established himself in the small village of Buena Vista, in the lowlands of the department of Santa Cruz, today the gateway to beautiful Amboro National Park (Fig. 52).

Steinbach, besides working as a farmer and cattle rancher, made a living by selling his natural history collections to museums and university herbaria around the world. Among his large botanical collections, more than 30 species were dedicated to him, including several orchids. He also collected zoological specimens in large numbers; the Carnegie Museum of Natural History in Pittsburgh acquired some 3000 bird skins from



FIGURE 52. Amboro National Park. Unknown photographer.

him in 1920. Steinbach's large collections remaining in Bolivia formed the basis of the Museum of Natural History in Cochabamba in 1930 (founded just before his death at the early age of 56); this comprised around 100,000 insects, a herbarium of 5000 different plant species, 800 birds, 140 reptiles and 100 mammals.

Having decided to spend the rest of his life in Bolivia, Steinbach married a Bolivian lady, Juana Moreno Jiménez, and raised a family of nine children. The family name is still well known in the country.

Steinbach gained considerable recognition both in Europe and the United States and corresponded extensively with scientists at the institutions to which he sent his collections. He became a member of the North American National Geographic Society in Washington, the Carnegie Museum of Pittsburgh and the American Museum of Natural History in New York.

The following orchid species were dedicated to José Steinbach: *Encyclia steinbachii* Schltr. (Fig. 53), *Epidendrum steinbachii* Ames (Fig. 54), *Fernandezia steinbachii* Ormerod., and *Stelis steinbachii* Luer. An avenue in the Bolivian city of Santa Cruz was named after him 'Avenida José Steinbach'.

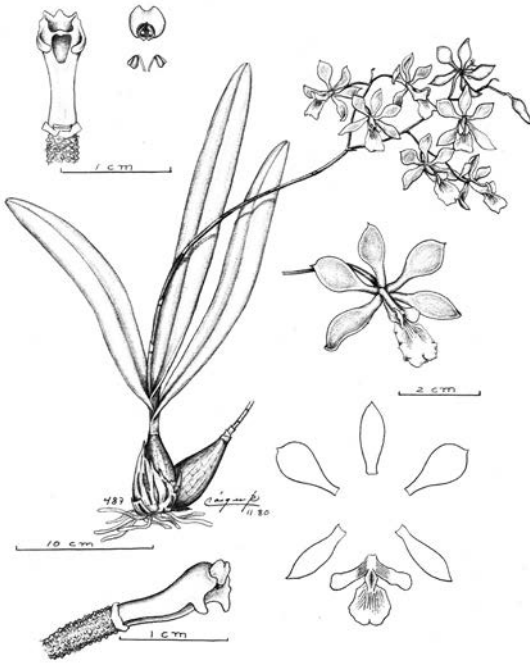


FIGURE 53. *Epidendrum steinbachii* Schltr. Icones Plantarum Tropicarum, ser.2, vol.4, 1989, plate 323.

Paraguay

Paraguay and Bolivia are the only landlocked South American countries. Paraguay borders Brazil (north and east), Argentina (south) and Bolivia (north and west). The Paraguay River, which flows from north to south, divides the country into distinct eastern and western regions that gently slope toward the Paraguay River. The eastern region, known as the *Paraneña*, extends from the Paraguay to the Paraná River, which forms the border with Brazil and Argentina. It is home to about 95% of Paraguay's population and is a mixture of plateaux, rolling hills and fertile valleys. Most of the region lies below 300 m elevation with a few higher points reaching 700 m near the northern border with Brazil. Dense forests cover the plateau of Alto Paraná, which occupies about one third of the region and extends to the east to the Paraná River. The Saltos del Monday (= falls of the Monday River, a tributary of the Paraná) (Fig. 55), are one of its most attractive geographic landmarks.

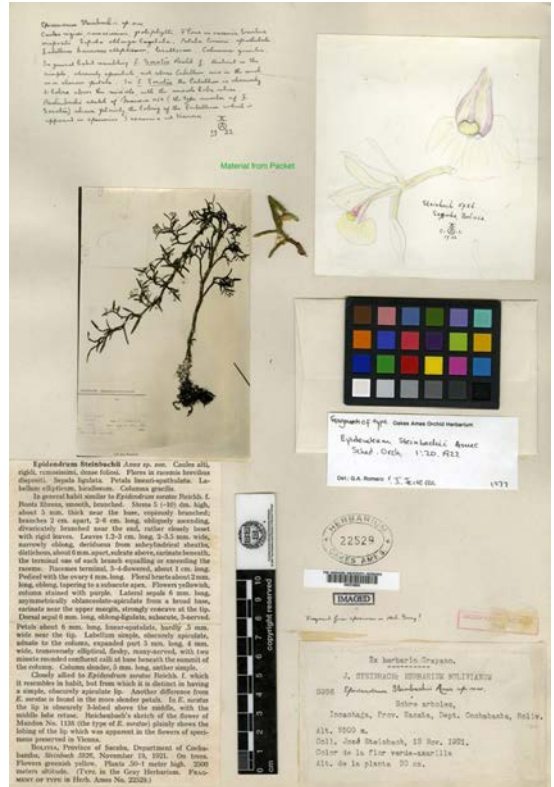


FIGURE 54. Holotype of *Epidendrum steinbachii* Ames. Harvard University Herbaria.

The western region, the Chaco Plain or *Gran Chaco*, is a tract of flat and infertile scrub forest. Along the banks of the rivers there are grassy plains and clumps of palms, but the land becomes drier toward the west and is almost desert in the northwest. It is divided among eastern Bolivia, western Paraguay, northern Argentina and a portion of the Brazilian states of Mato Grosso and Mato Grosso do Sul, where it is connected to the *Pantanal*, the world's largest wetland area, the main part of which is located in Brazil but it extends into Paraguay and Bolivia (Fig. 56).

Paraguay straddles the Tropic of Capricorn and experiences both tropical and subtropical climates.

BOTANICAL EXPLORATION 1757–1885: Paraguay's geographical location, far from all trade and exploration routes during the 17th and 18th century, is the reason for it being virtually botanically unknown until the last decades of the 19th century. As to orchids, probably the earliest description of a new Paraguayan species was



FIGURE 55. Salto del Monday, Department of Alto Paraná, Paraguay. Photograph by Dennis García.



FIGURE 56. The 'Pantanal'. Photograph by Adriano Gambarini.



FIGURE 57. *Spiranthes paraguayensis* Rchb.f. as *Skeptrostachys paraguayensis* (Rchb. f.) Garay. Photograph by Julio Omar Barcala.

Reichenbach's *Spiranthes paraguayensis* (Reichenbach f. 1852: 230) (Fig. 57).

The first scientific explorer of Paraguay was Louis Antoine de Bougainville (1729–1811), who had to interrupt his circumnavigation of the globe in 1767 in the port of Montevideo, where one of his ships had to undergo repairs. He used the time to visit Paraguay and the Jesuit missions. A member of Bougainville's expedition was the French botanist Philibert Commerson (1727–1773), who would later discover some new orchids in Patagonia. Aimé Bonpland (1773–1858), Humboldt's companion during their famous expedition across northern South America, settled in the province of Mendoza in 1816, when it was a territory disputed by Argentina and Paraguay. Bonpland would dedicate himself mainly to the cultivation of *yerba mate* (*Ilex paraguariensis* A. St.-Hil.), still today the favourite drink of Paraguayans, Argentinians and Uruguayans. He remained in the region until his death in 1858. Agustin de Saint Hilaire (1799–1853) arrived in Rio de Janeiro in 1816 and remained in South America until 1821. During this time, he made several excursions to Paraguay and Uruguay, but did not collect any new orchid species. After returning to France, Saint Hilaire published his *Histoire des*



FIGURE 58. Emil Hassler (1864–1937). In Hochreutiner, 1939.

plantes le plus remarquables du Brésil et Paraguay (= History of the most noteworthy plants of Brazil and Paraguay) (Saint-Hilaire 1824). Unfortunately, only one of two planned volumes was ever published, and we must assume that the family Orchidaceae would have been included in the second one. Finally, Alexander Caldcleugh (1795–1858), merchant, miner, botanist and mineralogist, travelled across Brazil, Argentina, Uruguay, Paraguay, Chile and Peru between 1819 and 1821. No botanical collections from him are known from Paraguay.

Hassler, Emil (1861-1937) (collected 1895-1937)

Born in Aarau, in Swiss-German-speaking Switzerland, Emil Hassler (1861–1937) (Fig. 58) attended the elementary and secondary schools of his hometown and afterwards studied medicine in France. Before finishing his studies, he moved to Brazil, where he obtained his degree at the University of Rio de Janeiro (Hochreutiner 1939: 1). In 1884, he began practicing medicine in Cuiabá, the capital city of the state of Matto Grosso, where he soon began exploring the region pursuing his initial ethnographical interests. After three years in Cuiabá, Hassler moved to Paraguay in



FIGURE 59. Emil Hassler (1864–1937) in 1914. Photograph by R. Chodat.

1887 to take a position as a physician at a hospital in San Bernardino, near the capital Asunción.

Hassler's interests soon turned to botany and his first collections were made in 1895 and 1896 (Vischer 1938). After a short interlude in Switzerland, he returned in 1897 to Paraguay settling in San Bernardino, where he built his first house in a suburb popularly known as the *Bierschlucht* (= Beer canyon) as it mostly housed German immigrants. He travelled regularly to Switzerland, where in 1898 he published the first part of his series *Plantae Hasslerianae* in the *Bulletin de l'Herbier Bossier* (Geneva); further parts were published through 1907 (Chodat & Hassler 1898).

Hassler's plants were determined by Robert Hipolyte Chodat (1865–1934), a Swiss botanist and phycologist, who was director of the botanical institute at the University of Geneva. Chodat established a close personal relationship with Hassler that lasted to the end of his life. In his botanical excursions, Hassler always travelled with his assistant Teodoro Rojas and often with German botanist Cornelius Osten. We will read of both further on in this chapter.

An important milestone in Hassler's life was the visit of Robert Chodat and his assistant William Vischer to Paraguay, in what was known as the *Mission*



FIGURE 60. From left to right: R. Vischer, E. Hassler, R. Chodat in Paraguay (1914). Unknown photographer.

scientifique Suisse au Paraguay. Hassler had returned in the meantime to Switzerland but was happy to join his friends. From July 1914, over the following three months, Hassler, Chodat and Vischer explored the country in all directions (Fig. 59–60). They returned to Switzerland with a rich botanical collection which, as with most of Hassler's plants, was deposited at the herbarium of the Conservatory and Botanical Garden in Geneva.

In 1919, after WWI, Hassler returned to Paraguay, built a new home in San Bernardino, which he named *Villa Mon Repos* ('My resting place'); he would remain there for the rest of his days (Fig. 61) apart from occasional trips to Switzerland on short visits for scientific or medical purposes.

In 1921, Hassler took part in the foundation of the *Sociedad Científica del Paraguay* (Scientific Society of Paraguay), of which he became honorary President. In 1932, during the Chaco war between Paraguay and Bolivia, he established and directed a hospital for the wounded in San Bernardino and was awarded the honorary rank of a Colonel in the Paraguayan army. The hospital was closed in 1935 at the end of the war. Emil Hassler returned one last time to Switzerland before he died two years later in Asunción. He is buried in the cemetery of San Bernardino.



FIGURE 61. Hassler's *Villa Mon Repos* in 1987, two years before being demolished. Photograph by Lorenzo Ramella.

It is estimated that 90% of Paraguay's botanical species are represented in Hassler's collections. About 13,000 different species can be found there, with a total of some 60,000 specimens. Hassler's botanical collections constitute, without doubt, the foundation of scientific knowledge of the flora of Paraguay. A complete catalogue of these collection, including other collectors' related specimens from Paraguay, have been published as *Catalogus Hasslerianus* (Ramella & Perret 2008–2010); this includes many new species published in the *Plantae Hasslerianae* as well as in subsequent publications by Emil Hassler and others. Hassler's specimens were extremely well prepared and include all parts necessary for identification.

The Herbarium of the Geneva Conservatorium and Botanical Garden holds a total of 18,263 botanical specimens collected by Emil Hassler in Paraguay. Of these, a surprisingly low number are Orchidaceae: only 371 orchid specimens. However, 19 of these orchid specimens represent species which were new to science, 10 of which were named in honour of Hassler. They were mostly described by Alfred Cogniaux but a few of them were contributions by Rudolf Schlechter.

For 160 years Paraguay was a possession of the order of the Jesuits. They named it in Spanish 'Provincia Paraguaría' (in Latin *Paraquaria*) and it was one of the southernmost provinces of the Viceroyalty of Perú. A beautiful map of the province was made in Rome by Giovanni Petroschi (1715–1766), which was dedicated to Francisco Retz (1673–1750), Superior General of the Society of Jesus. It bears the Latin inscription *Provincia Paraguarie Soc. Jesu, anno 1732* (Fig. 62).



FIGURE 62. Map of the Jesuit Province of Paraguaría, 1732, by Giovanni Petroschi.

The name 'Paraguaría' has been used in scientific circles up to the present, and this is the reason for Hassler labelling his botanical specimens as *Plantae Paraguariensis* (Fig. 63).

Emil Hassler's new orchid species include: *Campylocentrum hasslerianum* Hoehne, *Cranichis hassleri* Cogn., *Epidendrum hassleri* Cogn. (Fig. 64), *Galeandra paraguayensis* Cogn. (Fig. 65, 66), *Habenaria amambayensis* Schltr. (Fig. 67), *H. hassleriana* Cogn. (Fig. 68), *H. integripetala* Cogn., *H. subfiliformis* Cogn., *Oncidium emilii* Schltr., *Oncidium hassleri* Cogn. (Fig. 69), *Pogonia hassleriana* Cogn. ex Chodat & Hassl., *Ponthieva hassleri* Schltr., *Sarcoglottis hassleri* Schltr., *Spiranthes hassleri* Cogn., *Stenorhynchos albicans* Cogn., *S. pedicellatus* Cogn., *S. vaginatus* Cogn., *S. ventricosus* Cogn., and *Zygopetalum hasslerianum* Kränzlin.

Karl August Gustav Fiebrig (1969–1951) (collected 1902–1951)

Kränzlin was responsible for sowing some confusion when he published his *Orchidaceae andinae imprimis peruvianaee Weberbauerianae* in 1906. It is only

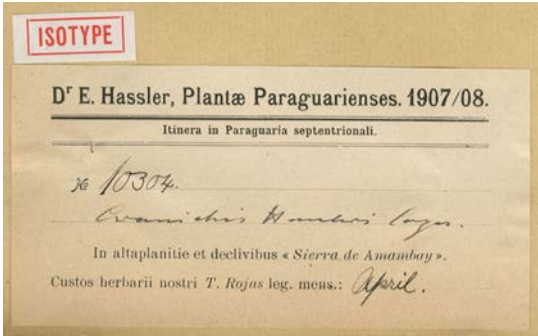


FIGURE 63. *Cranichis hassleri* Cogn. Hassler herbarium label, *Plantae paraguariensis* 1907–1908. MNHN Paris.



FIGURE 64. *Epidendrum hassleri* Cogn. Photograph by M.A. Campacci.

by chance that the reader will find in this article not only the description of new orchid species that were not collected by Weberbauer, but that were not even collected in Peru! Together with Weberbauer's orchids we find five new species collected by Karl August Gustav Fiebrig (1902–1951) (Fig.70) in southern Bolivia.

Fiebrig studied natural history in Berlin under Adolf Engler, and it was Engler who sent him to South America in 1902 on a scientific expedition on behalf of the Botanical Garden and Museum of Berlin (Schuurmans Stekhoven 1955: 151). Fiebrig travelled

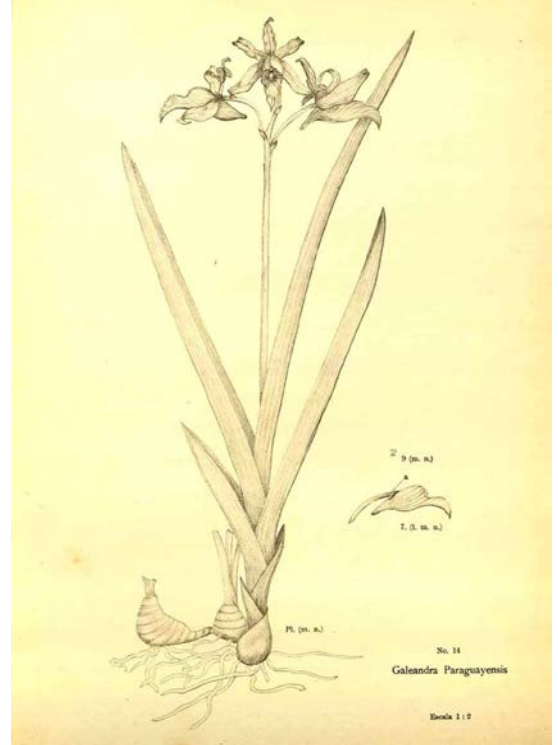


FIGURE 65. *Galeandra paraguayensis* Cogn. Drawing by F. Hoehne.

across Paraguay to southern Bolivia, where he made his botanical collections. He also made important observations on the phytogeography of Bolivia, which he would publish in 1911 as *Ein Beitrag zur Pflanzengeographie Boliviens* ('A contribution to the geography of plants in Bolivia'); this would serve Rudolf Schlechter in his description of the Bolivian orchid flora (Schlechter 1922). Like Kränzlin before him, Schlechter described seven new orchid species from Fiebrig's Bolivian collections.

Amongst Fiebrig's Bolivian orchids, described by Kränzlin, are: *Chloraea boliviana*, *C. calantha*, *C. fiebrigiana*, *C. ignea*, and *Stenoptera elegans*. Schlechter described *Aa fiebrigii*, *A. microtidis*, *A. sphaeroglossa*, *Galeandra fiebrigii* (Fig. 71–72), *Habenaria bermejensis*, *H. leptantha*, *Liparis otophyllon* (Fig. 73), *Pelexia fiebrigi*, and *Pterichis boliviana* as new to science.

Afflicted by tuberculosis, Fiebrig remained in South America and moved to San Bernardino, in Paraguay, where he would live and work over the next thirty years.



FIGURE 66. Holotype of *Galeandra paraguayensis* Cogn. Herbarium of the Belgian National Botanical Garden.



FIGURE 67. *Habenaria amambayensis* Schltr. Photograph by G. Léotard.

The year 1910 was pivotal in determining his professional future. He received two offers simultaneously: the first was to work in East Africa for the German Colonial Office; the second, the Government of Paraguay offered him a chair at the ‘Colegio Nacional’ and at the Faculty of Medicine. Fiebrig decided to accept the Paraguayan offer, moved especially by an additional proposal by Paraguay’s President, D. Manuel Franco, to establish a Botanical Garden and Zoo in the suburb of Trinidad, in Asunción, the capital.

The garden, designed in collaboration with his wife Anna Gertz, was finally inaugurated and opened to the public in 1914, during the Presidency of Eduardo Schaerer. It encompassed over 600 hectares and became soon a popular attraction (Fig. 74). Fiebrig gave the garden the Guaraní name *Yboty rendá*, ‘the place of flowers’, and remained in his position as Di-

rector until 1936. The University of the German city of Marburg awarded him an honorary doctorate in 1923 for his work in South America.

On the premises of the Botanical Garden stood the second residence of Carlos López, the original owner of the land. This was built around 1860 as a two-story structure called ‘la Casa Alta’ (the high house) (Fig. 75), to differentiate it from the original house built ca. 1845, a single-story structure aptly known as ‘la Casa Baja’ (the low house). While the ‘Casa Baja’ today houses the Natural History Museum, the ‘Casa Alta’ was occupied by the Herbarium, the collection of plants in spirits, and offices where Fiebrig, Hassler and Teodoro Rojas worked. It was also Fiebrig’s residence. He contributed to the herbarium with a large collection of plants from Paraguay and neighbouring countries. In the following years the collections were



FIGURE 68. *Habenaria hassleriana* Cogn. Photograph by Martín Caballero.



FIGURE 69. *Oncidium hassleri* Cogn. as *Gomesa longipes* (Lindl.) M.W. Chase & N.H. Williams.

enriched by the contributions of Teodoro Rojas and Cornelius Osten.

For a short period, from 1934 to 1936, Fiebrig was also Director of the Paraguayan Department of Agriculture. He gave up this position to return to Germany as professor at the 'Ibero-Amerika Institute' in Berlin. After the war, in 1948, he returned to South America to work at the 'Instituto Miguel Lillo', a branch of the National University at Tucumán, Argentina, where he died on 25 October 1951.



FIGURE 70. Karl August Gustav Fiebrig (1869–1951). At the Ibero-America Institute in Berlin around 1940. Unknown photographer.

Karl Fiebrig's botanical work in Paraguay concentrated mainly of the expansion and consolidation of the Botanical Garden in Asunción. He certainly contributed to the flora of Paraguay with large numbers of herbarium specimens; there were, however, very few new species among them (Fig. 76). The International Plant Names Index shows only five plant species described by Fiebrig.

As to orchids, both the Geneva Herbarium and Ratmella & Perret's *Catalogus Hasslerianus* (vol. 1, 2008) show over a hundred orchid specimens collected by Fiebrig. Despite this, there was only one new orchid collected by him, originally described by Slazchek (1995) as *Pelexia collocaliae* (Fig. 77).

Karl Fiebrig's *magnum opus*, a 2700 page-long manuscript on the vegetation of South America, remained unpublished after his death.

Teodoro Rojas Vera (1877–1954) (collected 1902–1954)

Born in Asunción, Teodoro Rojas Vera (1877–1954) (Fig. 78) was the son of Jose M. Rojas and Dolores Vera. He studied at national schools in Pilar and Limpio, near San Bernardino. After failing to gain admittance at the Colegio Nacional in Asunción, he returned to San Bernardino, where he worked at the local German Brewery.

In 1887, when Emil Hassler moved to work at the hospital in San Bernardino, Teodoro's mother went

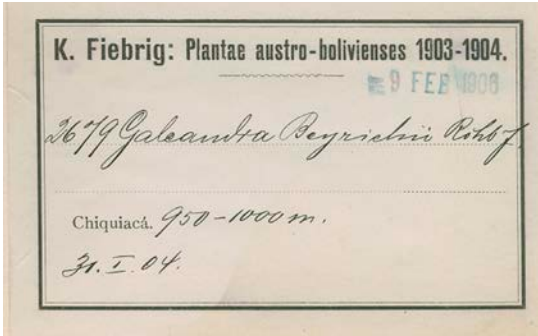


FIGURE 71. Herbarium label of an isotype of *Galeandra fiebrigii* Schltr. Fiebrig determined this plant as *Galeandra beyrichii* Rchb. f. Royal Botanic Gardens Kew. The collection is from Fiebrig's first South American excursion to Bolivia.



FIGURE 72. *Galeandra fiebrigii* Schltr. as *Galeandra beyrichii* Rchb.f. Photograph by Luis Filipe Varela.

to work as his housemaid and Teodoro, then only 11 years old, was hired by Hassler as gardener. This was the beginning of a long and close relation between the Swiss scientist and Teodoro Rojas, who would become one of Paraguay's most relevant botanists.

Ten years later, in 1897, Teodoro was invited by Hassler, then in Geneva, to study herbarium techniques at the Geneva Conservatorium and to research the large collections of the herbarium. He learned German and it is said that he always spoke it with a strong Swiss accent. After returning to Paraguay, he accompanied Hassler on numerous botanical expeditions across the country. His first herbarium specimens were prepared in 1906, during his participation in the Argentinian-Paraguayan Pilcomayo River Border Commission (Fig. 79).



FIGURE 73. Isotype of *Liparis otophyllon* Schltr. Herbarium, Royal Botanic Gardens Kew.

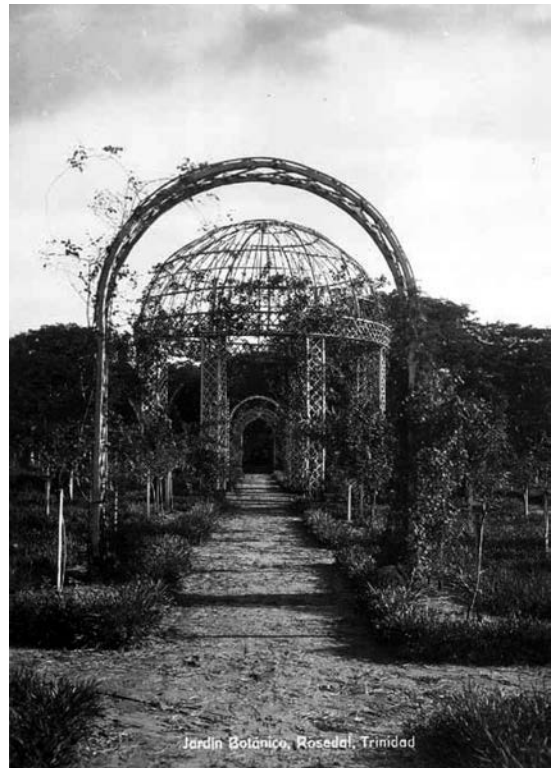


FIGURE 74. Rose garden at the Botanical Garden in Asunción ca. 1920. In Junta Municipal de la ciudad de Asunción, 2014: 39. Unknown photographer.



FIGURE 75. 'La casa alta' (the high house). In Junta Municipal de Asunción, 2014: 12. Unknown photographer.

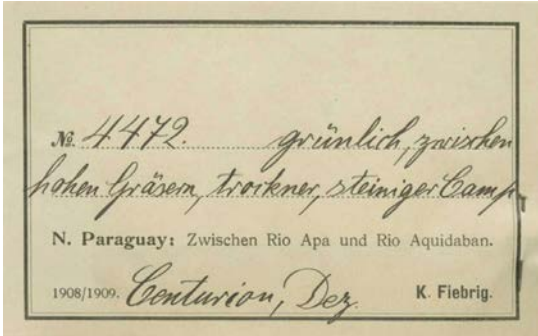


FIGURE 76. A Fiebrig herarium label from his yerars in Paraguay.

Teodoro Rojas collected for Hassler and took part in the botanical excursions with R. Chodat and W. Vischer in 1914. In 1915, he accompanied Cornelius Osten, a German botanist residing in Montevideo, on a long excursion along the Paraná River and to the Iguazú Falls.

In 1916, he was offered the position of Chief of the Botanical Section at the Botanical Garden of Asunción, of which Karl Fiebrig was the first director. Rojas organized the herbarium, including those of Hassler, Fiebrig and his own collections. While

Fiebrig lived in the 'Casa Alta' of the Botanical Garden, Rojas moved with his family into a modest house only a few blocks away (Fig. 80).

Rojas continued exploring the country and increased his botanical collections, although the Botanical Garden entered a period of decline as a result of a series of military interventions that led to continuous changes in the Government of Paraguay. His career was overshadowed by military administrators. Fiebrig was deposed from the directorship and left Paraguay in 1936, never to return. In 1944, Teodoro Rojas moved to Argentina, where he worked for the Instituto Miguel Lillo, in Tucumán; he would be joined in 1948 by Karl Fiebrig.

Near the end of his life, Rojas returned to Paraguay, where in 1952 he was awarded the title of Doctor *Honoris Causa* by the University of Asunción. He passed away in Asunción on 3 September 1954. Since 1993, the scientific journal of the Department of Botany of the National University of Asunción carries the name *Rojasiana* in his honour.

A total of 79 orchid specimens collected by Rojas are deposited at the Geneva Herbarium as collected by 'E. Hassler & T. Rojas'; among them is the type speci-



FIGURE 77. Type of *Pelexia collocalliae* Szlach. Herbarium of the Geneva Conservatorium and Botanical Garden.

men for *Epidendrum hassleri* Cogn. (Fig. 81). The last line at the bottom of the label reads in Latin: *Custos herbarii nostrii T. Rojas leg. mens April*, which translates as ‘The curator of our herbarium T. Rojas collected this in the month of April’.

Other new orchids collected by Rojas and dedicated to him were *Bulbophyllum rojasii* L.O.Williams (Fig. 82), *Epidendrum rojasii* Cogn. (Fig. 83), *Microchilus rojasii* Ormerod, and *Vanilla rojasiana* Hoehne (Fig. 84) (Schinini 2005, 2010).

The Southern Cone

The Southern Cone (Fig. 85) is a geographic and cultural region, composed of the republics of Argentina, Chile and Uruguay, and in its broadest definition also Paraguay and the southernmost states of Brazil. The territory is located mostly south of the Tropic of Capricorn; to the west is the Pacific Ocean, and on the east is the Atlantic Ocean.

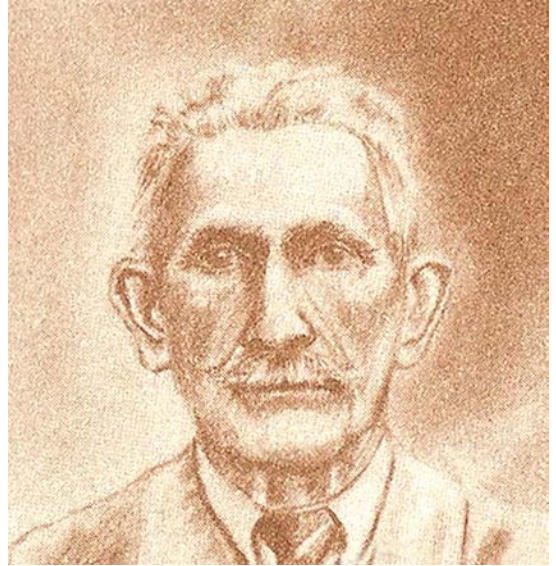


FIGURE 78. Teodoro Rojas Vera (1877–1954). Unknown artist.



FIGURE 79. Pilcomayo River. Unknown photographer.

In this chapter we will consider the Southern Cone in its strict definition, and include only Chile, Argentina and Uruguay because all other South American countries have been covered in this and the previous chapters of the series.

GEOGRAPHY: The southern cone of South America, with its tip pointed towards Antarctica, is a region of over 1.5 million square miles (more than 4 million km²) that includes territory in the republics of Chile, Argentina and Uruguay. The Tropic of Capricorn crosses it in the north. By virtue of its position, it contains high western lands and low eastern lands of middle latitudes, with a



FIGURE 80. Teodoro Rojas and family in the Botanical Garden. Unknown photographer.



FIGURE 81. Herbarium label of *Epidendrum hassleri* Cogn. collected buy Hassler and Rojas. Geneva Herbarium.

marked influence from the Atlantic Ocean and a succession of climates from tropical in the north to cold in the extreme south. In the west rise the imposing Andean and associated mountain ranges. The cold waters of the Pacific bathe the coasts of Chile, forming deserts. The climatic and regional diversity provides abundant resources and various alternatives for the development of a complex biodiversity.

Towards the east, the ‘pampas’ or grasslands of the Southern Cone consist of temperate prairies and savannas, shared by Argentina and Uruguay. To the

north of Argentina and bordering Uruguay and Bolivia, the Chaco region is a system of plains crossed by important river systems. To the south, Patagonia extends from the Colorado River to the region of Tierra del Fuego, which Argentina shares with Chile. South America’s Arid Diagonal, a zone of arid and semi-arid climate, crosses from the desert of Atacama in northern Chile across the mountain chain of the Andes to the Atlantic coast of Patagonia.

In Chile, the central region south of Atacama has a Mediterranean climate and the desert gives way to fertile valleys that reach as far as the Region of the Lakes, with its capital Puerto Montt, in the south. Chilean Patagonia is very similar to its Argentinian counterpart, and both countries come together on Tierra del Fuego, on the shores of the Strait of Magellan.

BOTANICAL EXPLORATION: The botanical exploration of the Southern Cone began with the journey of Louis Éconché Feuillé (1660–1732), who collected plants between 1703 and 1711 around the Chilean city of Concepción. Several remarkable terrestrial orchids were collected by Feuillé in southern Chile (Fig. 86).



FIGURE 82. *Bulbophyllum rojasii* L.O.Williams as *Bulbophyllum tripetalum* Lindl. Photograph by Rudi Hromniak.



FIGURE 84. *Vanilla rojasiana* Hoehne as *Vanilla angustipetala* Schltr. Unknown photographer.



FIGURE 83. Type of *Epidendrum rojasii* Cogn. Reproduced with the kind permission of the Kew Botanic Gardens.



FIGURE 85. The Southern Cone. Unknown author.



FIGURE 86. *Epipactis vulgo piquichen* as named by Feuillée: *Chloraea piquichen* Lindl. Illustration by Louis Feuillée.

Daniel Carlsson Solander (1733–1782) sailed with Joseph Banks in 1768 as part of Captain James Cook's expedition to the South Pacific. They landed in Tierra del Fuego in 1769, where they collected a terrestrial orchid which they named *Arethusa trifolia* (= *Codonorchis lessonii* (Brogn.) Lindl.) (Fig. 87).

Philibert Commerson sailed as botanist in the expedition led by Louis Antoine de Bougainville, which set out from the French port of Nantes in 1767 to circumnavigate the globe. Their first stop was Rio de Janeiro, where Commerson discovered the beautiful *Bougainvillea spectabilis* Willd., a plant that would soon spread across the New and Old-World tropics and would thus perpetuate the name of the expedition's commander. The expedition sailed south to Montevideo and in 1767 was in Tierra del Fuego. They continued along the Strait of Magellan to Chilean Patagonia in 1768 and then set course to Tahiti. Commerson collected orchids in Brazil, Uruguay, southern Argentina



FIGURE 87. *Arethusa trifolia* illustrated by Sydney Parkinson, the artist of James Cook's expedition.

and Chile. We remember him in *Bipinnula commersonii* Lindl., from Uruguay and *Chloraea commersonii* Brongn. from Chile.

José Pavón (1754–1844) was a member of the famous Spanish Botanical Expedition to the Viceroyalty of Peru between 1777 and 1788. Pavón travelled from Peru to Chile in 1782. He collected *Chloraea pavonii* Lindl., one of the most beautiful species of this terrestrial genus (Fig. 88).

Louis Néé (ca. 1734–1807) sailed as botanist with the expedition of Alessandro Malaspina to the Pacific. He made botanical collections on the way, among which we find *Epidendrum elongatum* Jacq. and *Oncidium oblongatum* Lindl. from Uruguay and a species of *Spiranthes* from Chile.

John Miers (1789–1879), a British mining engineer and amateur botanist, came to the Argentinian city of Mendoza in 1818 before settling for a while in Chile. Years later, in 1856, he published an enumera-



FIGURE 88. *Chloraea pavonii* Lindl. Illustration by José Brunete, one of the artists of the expedition. At the Royal Botanic Garden, Madrid, AJB, Div. IV, 1318.

tion of the vernacular names given to several Chilean terrestrial orchids.

Carlo Giuseppe Luigi Bertero (1789–1831), having visited during a first expedition the Caribbean islands, crossed the Atlantic again in 1827 and settled in Chile, where he botanized in the surroundings of Valparaíso. Several species of Orchidaceae are kept at the Museum of Natural History in Santiago, among them two new species dedicated to him: *Asarca berterii* Rchb.f. and *Chloraea berteriana* Kränzlin. Hugh Cuming (1791–1865) travelled along South America's Pacific Coast in 1828, where he collected an important number of Chilean orchids, several of which were described as new to science by Lindley in his *Catalogue of the Orchideae in Mr. Cuming's collection of South American Plants* (Lindley 1834).

French Rear Admiral Jules Sébastien César Dumont d'Urville (1790–1842) sailed from the port of Toulon in 1822 with the mission of circumnavigating the globe. Part of the expedition was the pharmacist



FIGURE 89. *Chloraea incisa* Poepp. Collected by Poeppig near Antuco, Chile. In Poepp. & Endl., 1835–1854: plate I-54.

René-Primevère Lesson (1794–1849). The expedition touched at the Falkland Islands, where a new orchid species was collected: *Calopogon lessonii* Brongn. They continued to Chile, where again several orchid species were collected.

James MacRae (1800–1830) sailed from London in 1824 on the HMS *Blonde* to convey the remains of the Hawaiian monarchs back to their islands. King Kamehameha II and Queen Kamamalu had developed measles during an official visit to England and passed away only a few weeks after their arrival. During their return journey, the expedition stayed for several weeks in the vicinity of Concepción, in southern Chile. Macrae collected several orchid species from which Lindley described no less than six that were new to science.

In the southern suburbs of Buenos Aires, Argentina, the Scottish colony of Monte Grande was established in 1825. Among the 200 Scots selected to settle in the new colony was the gardener James Tweedy (1775–1862),



FIGURE 91. *Chloraea gayana* A. Rich. By Claude Gay, in his *Atlas*, p. Phanerogamia 64.

of the founders of the National Natural History Museum. After a short trip to France, he returned to Chile in 1834 and began writing his multi-volume *Historia Física y Política de Chile*, published by the Chilean government between 1844 and 1871. An *Atlas* to this history was published in 1854, containing not only landscapes (Fig. 90) and scenes of daily life in Chile but also beautiful illustrations of the most relevant plants of Chile's flora (Fig. 91).

Gay travelled to Peru in 1839 and returned to France in 1843. Subsequently, he travelled throughout Russia and Tartary and in 1858 was sent by the French Academy of Sciences to the United States to study the mining system. In 1863, he travelled for the last time to Chile, where he would remain until his death ten years later. Besides *Chloraea gayana* A. Rich., illustrated here, *Asarca gayana* was dedicated to him by Kuntze.

Charles Gaudichaud Beaupré (1789–1854) travelled between 1830 and 1832 to Brazil, Argentina and Chile, where he collected several species of *Chloraea*.

Rudolf Amandus Philippi (1808–1904) came to Chile in 1851, where he would stay for the rest of his life. He established himself in Valparaíso and from

1853 to 1897 occupied the post of Director of the National Natural History Museum, a position he passed on to his son Friedrich when he retired. At the same time, he was Professor at the National University and made extensive botanical explorations of the country. It is said that he collected some 20% of all vascular plants known to Chile. He has been recognized as one of Chile's great naturalists: his name lives on in the orchid species *Asarca philippii* Kuntze, *Chloraea philippii* Lindl., and *Epidendrum philippii* Rehb.f. He also described some 50 new orchid species from Chile. Rudolf's son Friedrich (Federico) Philippi (1836–1910) was, like his father, an avid botanical collector. Only a few orchid specimens are known from his son's collections, however, none of them new to science.

Between 1832 and 1835 Charles Robert Darwin (1809–1882) sailed aboard HMS *Beagle* (Fig. 92) along the coasts of Argentinian Patagonia, Tierra del Fuego and the shores of the Strait of Magellan. After entering the Pacific, the *Beagle* sailed north along the coast of Chile. During his voyage, Darwin collected several orchids, among them: in Patagonia, *Chloraea gaudichaudii* Brongn. at Port Desire (Argentinian Patagonia), *Chloraea magellanica* Hook.f. and *Codonorchis lessonii* (Brogna.) Lindl. (Straits of Magellan and Tierra del Fuego); and *Bipinnula fimbriata* (Phil.) I.M: Johnst. (Valparaíso, Chile). A signed pencil drawing by Darwin graces the sheet of a *Gavilea* at Kew.

Philibert Germain (1827–1913), a French entomologist, arrived in Chile in 1850 and was named interim director of the National Natural History Museum until the appointment of Rudolf Amandus Philippi in 1853. Apart from a short interlude in France, Germain would live in Chile until the end of his life. He made important botanical collections and several new orchid species, such as *Habenaria germainii* were described by Philippi from Germain's specimens.

Willibald Lechler (1814–1856) collected in southern Argentina, the Falkland Islands and Southern Chile from 1850 to 1854. His plants were distributed in Europe by Swiss botanist Rudolph Friedrich Hohenacker (1798–1874), advertised as 'W. Lechler *plantae insularum Maclovianarum*', 'W. Lechler *plantae magellanicae*' (Fig. 93), and 'W. Lechler *plantae chilenses*'. From Lechler's collec-



FIGURE 92. *HMS Beagle* off the coast of Tierra del Fuego. Unknown artist.

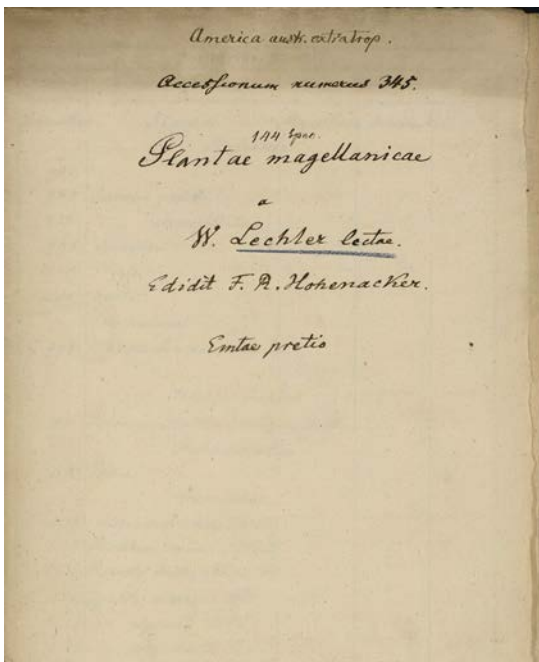


Figure 93. Hohenacker's list of Lechler's *Plantae magellanicae*.

tions Lindley described a new orchid which he named *Cholarea lechleri*.

Finally, two French expeditions explored southern South America: that of Paul Amédée Ludovic Savatier (1830–1891), on board the *Magicienne* (1877–1879), and that of Paul Auguste Hariot (1854–1917), Paul Daniel Jules Hyades (1847–1919) and Philippe Hahn (?–?) aboard the *Romanche* (1882–1883). They collected a few orchids in Tierra del Fuego and southern Chile

This list of botanical collectors in the Southern Cone does not pretend to be complete. A selection was made, taking into consideration those botanists who had shown especial interest in orchids.

Once leaving the tropics and travelling south into the subtropical climate of the Southern Cone, orchid diversity drops immediately. While the northern neighbours of Chile, Argentina and Uruguay count their orchid species by the thousands, the total number of Orchidaceae in these three countries barely reaches 300 species. This is perhaps one of the reasons why Rudolf Schlechter showed relatively little interest in this region.



FIGURE 94. Per Karl Hjalmar Dusén (1855–1926). Unknown photographer.



FIGURE 95. Otto Nordenskjöld (1869–1928). Unknown photographer.

Chile

PER KARL HJALMAR DUSÉN (1855–1926) (collected 1895–1897)

Per Karl Hjalmar Dusén's (1855–1926) (Fig. 94) first encounter with the South American flora took place between 1895 and 1897, when he was appointed as palaeontologist of the Swedish Expedition to the Magellan Territories led by Otto Nordenskjöld (1869–1928) (Fig. 95). In his report on the expedition Nordenskjöld wrote: "The interest that has manifested itself of late in exploration in Antarctic regions was the impulse that gave rise to the Swedish expedition to the Magellan territories in 1895. At a time when the eyes of the whole geographical world were turned towards that portion of the earth, it seemed only fitting that Sweden's sons and explorers, who have had so important and extensive a share in opening up the north polar territories, should be prepared to participate in similar labours in the south, for we may confidently expect results obtained there to elucidate many of those already

established for the north, placing them in their right light and showing their true value and application" (Nordenskjöld 1901).

Dusén sailed from Buenos Aires in October 1895, made a short land excursion in Puerto Madryn and continued to the Strait of Magellan, arriving in Punta Arenas, on Chile's southern coast, in November. Punta Arenas would be the expedition's headquarters. Several short journeys took Dusén to Admiralty Sound, the Páramo Península and the village of Ushuaia before he sailed back to Europe in the summer of 1897.

Although Dusén's work was mainly of a paleontological nature, he also made botanical collections and published an interesting account of the Vascular plants of the Magellan Territories and a contribution to the Flora of eastern Patagonia (Dusén 1900). A total of three orchid species were mentioned in this work: *Chloraea commersonii* Brong. and *Chloraea magellanica* Hook. f., and *Codonorchis lessonii* (d'Urv.) Lindl.

Although Dusén would return once more to Patagonia in a new expedition in 1905 -without significant



FIGURE 96. Inside cover of Reiche's *Orchidaceae Chilenses*.

botanical results- he made his largest contributions to the orchidology of South America while living in Brazil between 1901 and 1916.

KARL (CARLOS) FRIEDRICH REICHE (1860–1929)
(collected 1889–1911)

In the introduction to his series on the orchid floras of the South American Andean states, Schlechter wrote: “Since -not too long ago- a quite useful orchid flora of Chile was published by K. Reiche [Reiche 1910], I have decided not to write another account of the orchids of this country, especially since few noteworthy novelties could be expected (Schlechter 1919: 3). Schlechter was right: Reiche, in his *Orchidaceae Chilenses* of 1910 (Fig. 96) lists 75 different orchid species distributed in 7 genera. One hundred and seven years later, after many species were transferred back and forth from one genus to another and some fell into synonymy, Bevilacqua (2017), in her article about Chile's orchid flora, lists 72 species, in eight different genera. This is again an example of the well-known fact that while in the epiphytic world of



FIGURE 97. Karl Friedrich Reiche (1860–1929). Archives of Rudolf Jenny.

tropical orchids dozens of new species are discovered and described every year, it often takes decades until a new species is found among the subtropical terrestrial orchids. Schlechter not only described *Microstylis reichei* among the orchids collected by Reiche during his time in Mexico, but used his work often as reference, which is the reason why Reiche is mentioned as an indirect member of Schlechter's network.

German botanist Karl Friedrich Reiche (1860–1929) (Fig. 97), or Carlos as he was known, was head of botany at the National Museum of Natural History in Santiago, Chile. He worked to organise the treasury of specimens deposited at the museum at this time, especially those from the collections made by Rudolf Amandus Philippi and his son Friedrich, by Claude Gay and by Carlo Luis Bertero during the better part of the 19th century. Born in Dresden, Saxony, Reiche studied the natural sciences, gaining a Ph.D from the University of Leipzig in 1885. He occupied a position as Professor at the same university between 1886 and 1889. The Chilean government contracted him to teach mathematics, physical and natural sciences and illustration at the recently founded school in Constitución, about 260 km southwest of Santiago in the region of Maule. He took up this post in 1889 and from the first day began to study the Chilean



FIGURE 98. *Asarca littoralis* (Phil.) Reiche = *Gavilea littoralis* Phil. Photograph by pabloendemico.

flora, a subject to which he would dedicate the next twenty years. Reiche undertook numerous excursions throughout the country, collecting specimens and conducting investigations for future publications. He was appointed as head of botany at the National Museum of Natural History in 1896 and moved to Santiago to work at their herbarium under the direction of Rudolph Amandus Philippi. Reiche began studying the ample collections contained there, including those of Philippi and his son Federico, preparing taxonomic revisions for what would be his most important work: the *Estudios críticos sobre la Flora de Chile*. With the help of Federico Philippi and F. Johow, he completed and published six volumes, but the work was interrupted when Reiche left Chile in 1911 (Turrill 1920: 63). Unfortunately, the treatment of the Chilean Orchidaceae was among those parts that were never completed.

In 1911, Carlos Reiche was chosen to be the next director of the museum, after the death of Federico Philippi the year before, but he turned this down since he did not agree with the policies set by the Chil-



Figure 99. *Chloraea leptopetala* Reiche. Photograph by Pato Novoa.

ean authorities of that time. Instead he accepted a post offered to him by the Mexican government. This was unfortunate because Reiche's knowledge of the museum and its collections was unparalleled at the time.

Reiche was professor of botany at the Mexican School of Higher Studies from 1911 to 1924, when he returned to Germany and took a position in Munich as a researcher at the Staatssammlung Museum. Aside from a brief return to Mexico in 1926 to complete his teaching and research, he remained in Munich and was named curator of the phanerogamic collections at the same museum in 1928, the year before his death. Reiche is commemorated in the epithet of the genus *Reicheella* Pax (Hectorellaceae).

In his *Orchidaceae Chilenses* of 1910, Reiche described several new orchids from Chile, namely *Asarca cardioglossa* Phil. ex Reiche, *Asarca grandulifera* var. *illapelina* Reiche, *A. littoralis* Reiche (Fig. 98), *Chloraea leptopetala* Reiche (Fig. 99), and *Chloraea viridiflora* var. *reticulata* Phil. ex Reiche.

In addition, Carlos Reiche illustrated the flowers of 17 Chilean orchids (Fig. 100) in the same work.



Figure 100. Plate I of Reiche, 1910: 1. *Asarca sinuata* Lindl., 2. *Chloraea ulanthoides* Lindl., 3. *Asarca odoratissima* Poepp. & Endl., 4. *Chloraea galeata* Lindl., 5. *Chloraea multiflora*, 6. *Chloraea cylindrostachya* Poepp., 7. *Chloraea fonckii* Phil., 8. *Chloraea disoides* Lindl., 9. *Chloraea grandiflora* Poepp., 10. *Chloraea nudilabia* Poepp.

However, the quality of the illustrations is not of the highest standard.

Little more can be said about Schlechter's network in Chile, besides the previously mentioned orchids collected by Per Hajlmar Dusén.

Argentina

The Faculty of Exact, Physical and Natural Sciences at the National University of Córdoba, Argentina (various collectors 1870–1896)

Domingo Faustino Sarmiento (1811–1888) (Fig. 101) served as President of the Republic of Argentina from 1868 to 1874. He gave great impulse to the modernization of the country. He paid special attention to the improvement of communications and built infrastructure that included 5000 km of telegraph

lines across the country. He was also responsible for the construction of the so-called Red Line, a railway connecting the interior of the country with Buenos Aires to bring goods to its harbour and facilitate trade with Great Britain. Sarmiento's main achievement, however, concerned his promotion of education. He increased educational subsidies to the provincial governments and established over 800 educational institutions. By the end of his presidency over 100,000 children were attending school. In 1869, shortly after assuming the presidency, he passed a law enabling the Executive to hire up to twenty professors to teach sciences at the University of Córdoba (Acosta 2015: 75). Sarmiento approached Karl Hermann Konrad Burmeister (1807–1892) (Fig. 102), a German naturalist who was Director of the Public Museum of Buenos Aires, to take on the responsibility of engaging German scholars for this task.



Figure 101. Domingo Faustino Sarmiento (1811–1888). Unknown photographer.

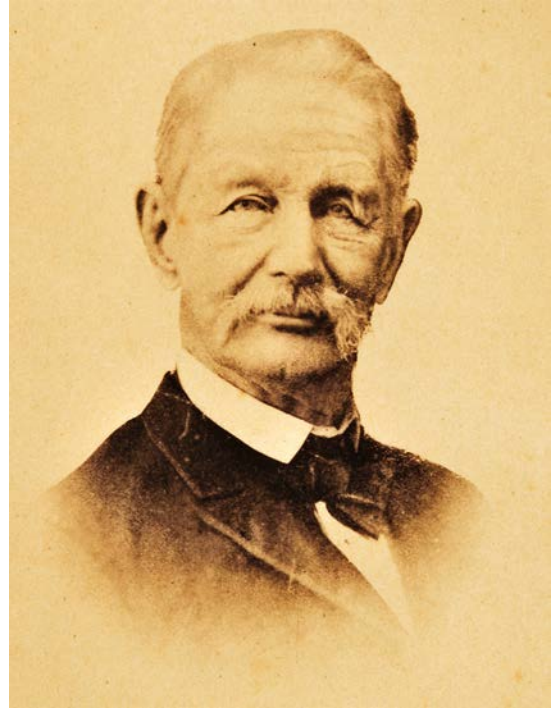


Figure 102. Karl Hermann Konrad Burmeister (1807–1892). Unknown photographer.

Burmeister accepted and immediately began appealing to his contacts in Germany to convince a number of young German scientists to abandon their positions and travel to Argentina to create the new Science Faculty. The first to accept were Paul Lorentz (Botany), Carl Schultz-Sellack (Physics), Hendrik Weyenbergh (Zoology), Max Siewert (Chemistry), Christian August Vogler (Mathematics) and Alfred Stelzner (Mineralogy) (Fig. 103). They all arrived between 1870 and 1873, when the first students were received and teaching could begin (Fig. 104). Georg Hans Emmo Wolfgang Hieronymus (1846–1921) (Fig. 105) arrived in Córdoba in 1872 as assistant to Lorentz.

Soon after Lorentz arrived in Córdoba he was joined by Stelzner and, since the Faculty was not yet in condition to begin classes, they travelled north-east at the invitation of Federico Schickendantz (1837–1896) (Fig. 106), a German Chemist who had arrived in Argentina some ten years earlier and was a professor at the National College at Tucumán.

Born in Kahla, Saxony, Paul Günther Lorentz (1835–1881) originally studied Theology but changed

his mind and went to the University of Munich, where he received his doctorate in Botany in 1860. He arrived in Córdoba in 1870. His first botanical excursion with Stelzner, which lasted five months, took him through the provinces of Santiago del Estero, Tucumán and Catamarca. Lorentz brought a large collection of vascular plants, which he sent to Grisebach for determination. Of these, 923 were published by Grisebach as *Plantae Lorentzianae* in 1874 (Grisebach 1874, Vervoorst 1972: 66). Only two orchids were mentioned in this work: *Oncidium batemannianum* Parment. and *Stenorrhynchus speciosus* Rich.

Lorentz lost his position at the University in Córdoba in 1874, after strong differences of opinion with the new Minister of Culture. Georg Hieronymus was named Professor of Botany in his place. Lorentz then moved to the small town of Concepción, on the banks of the Uruguay River. The new government under President Nicolás Avellaneda appointed him as professor at the local school, and he seemed to have regained a comfortable economic position. His health, however, had deteriorated and, although he was still able to publish a small



FIGURE 103. From left to right, standing: Paul Lorentz, Carl Schultz-Sellack, Hendrik Weyenbergh; sitting: Max Siewert, Christian August Vogler, and Alfred Stelzner

work on the vegetation of the north-eastern regions of the province of Entre Ríos and took part in the 1879 expedition led by General Roca to the Río Negro, he never recovered. He died in Concepción in the first days of October 1881 (Stelzner 1882: 463–468).

Georg Hieronymus arrived in Córdoba in September 1872 at the age of 26. He had studied medicine and natural sciences at the universities of Zürich, Berlin and Halle before being chosen to assist Paul Lorentz, whose position he assumed after Lorentz was dismissed in 1874. During his years in Córdoba, he travelled a few times to Germany until in 1883 he decided to leave Argentina. He settled in the German city of Breslau and continued his botanical studies. He was later named curator of the Botanic Museum in Berlin under the direction of A. Engler. After difficult years during WWI, during which he lost his wife and his eldest son, he passed away in Berlin in January of 1921.

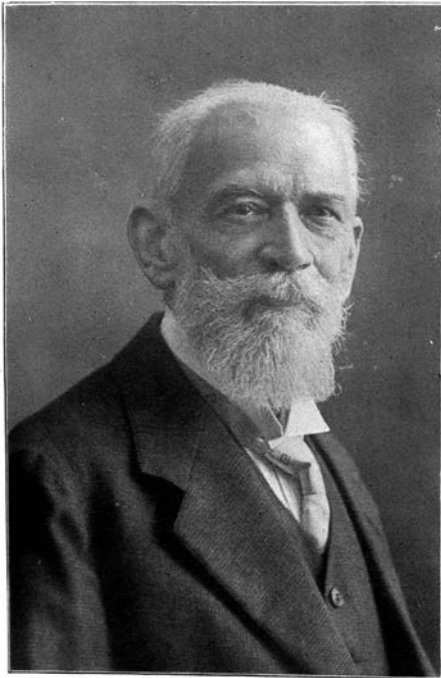
Immediately after the arrival of Hieronymus in Córdoba, Lorentz organized a second expedition with his new assistant. This would take them to the north-west for the next 16 months. Lorentz was again to visit the provinces of Catamarca and Tucumán, but this time Salta, Tarija and San Lorenzo as well. Just as after Lorentz's first expedition of 1871, the botanical collections were sent to Grisebach, who described 2,263 plants in a second work: *Symbolae ad floram Argentin-*



FIGURE 104. University of Córdoba, ca. 1875. Photograph by Academia Nacional de Ciencias, Argentina

ae, published in 1879 (Grisebach 1879). Several new orchid species described therein must be attributed to both Lorentz and Hieronymus. Among them we find: *Chloraea biserialis*, *Cranichis micrantha* (Fig. 107), *Sigmatostalix brachycion*, *Spiranthes saltensis* (Fig. 108), *Spiranthes sellilabris*, and *Stenorrhynchus argentinus*. *Aa lorentzi* was dedicated by Schlechter to Lorentz from a collection in the Sierra of Tucumán. Kränzlin dedicated *Habenaria hieronymi* to Hieronymus, and Cogniaux would follow with *Altensteinia hieronymi* and *Microstylis hieronymi*.

Although only a minor figure in this story, a final word must be said about Friedrich (Federico) Schickendantz (1837–1896). Born in Landau, in the Rhineland, he studied chemistry in Heidelberg, Munich and Oxford. He decided to go to Argentina in 1861, where he joined a mining company for a term of ten years. He taught physics and chemistry at the 'Colegio Nacional' of Tucumán, was director of 'Oficina Química Municipal' and became a member of the National Science Academy in Córdoba. He was about to take charge of the 'Oficina Química' in Mendoza when he died in 1896. Schickendantz developed a secondary interest in botany, specializing in cacti. He also amassed an herbarium of vascular plants from which Schlechter described and named in his honour the new orchid species *Aa schickendantzii*.



G. Hieronymus.

FIGURE 105. George Hieronymus (1846–1921). Unknown photographer.

CARLOS LUIGI SPEGAZZINI (1858–1926) (collected 1881–1925)

A leading figure in Argentinian natural history, Carlo Luigi Spegazzini (1858–1926) (Fig. 109) was born on 20 April 1858 in Bairo in Torino, northern Italy. He took courses at the school of Viticulture and Oenology in Conegliano (Venice), where he graduated in 1879. Thinking that botanical studies in Italy were well covered and completed by other botanists, he decided to explore other countries and sailed to Argentina and in December 1879, disembarking in Buenos Aires. In 1881, soon after his arrival, he took part in Lieutenant Santiago Boves' expedition to Tierra del Fuego. After numerous adventures, including swimming ashore with his botanical collections after a shipwreck, he returned to Buenos Aires in September 1882 with a collection of over 1100 botanical specimens.



FIGURE 106. Friedrich Schickendantz (1837–1896). Unknown photographer.

In 1884, he was one of the founders of the La Plata National University. He took the position of Professor of Natural Sciences, Agronomy, Chemistry and Pharmacy and created the university's botanical garden and arboretum. Over the years, he would intensify his botanical collecting, taking part in over 20 expeditions, some of them taking him as far as Brazil, Paraguay and Chile.

The American mycologist William A. Turrill, who visited Spegazzini in his residence in La Plata in 1924, wrote this beautiful biographical note: "Dr Spegazzini is an old man, but strong in body, young in thought, and still full of the spirit of adventure. He has just returned from Tierra del Fuego, is planning to go to Europe next year, and promises me to come to the United States the following year 'if nothing happens'. He was born in a village in Italy and was a student of the fungi there before coming to Argentina. He has described a great many South American plants in various groups,



FIGURE 107. *Cranichis micrantha* Griseb. = *Cranichis candida* (Barbosa) Cogn. Photograph by Amerigo Docha Neto.



FIGURE 108. *Spiranthes saltensis* Griseb. as *Pelexia bonariensis* (Lindl.) Schltr. Photograph by Maria Ogrzewalska.

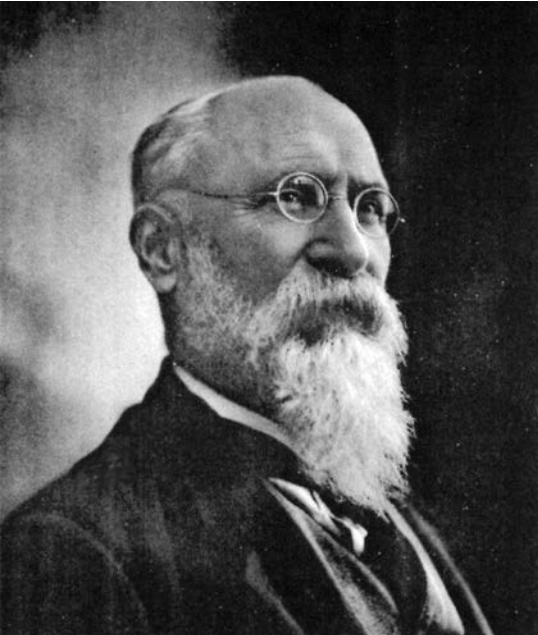


FIGURE 109. Carlo Luigi Spegazzini (1858–1926), in a photo taken on his 65th birthday. In Katina *et al.* 2020: 183.

but his work is poorly known elsewhere and few of his specimens have been seen by other botanists. ... The Doctor is exceedingly genial in manner and very kind-hearted. He and his son stayed with me all day long, showing me specimens, photographs and publications; giving me anything I wanted for our herbarium; taking me out to a sportsman's club for lunch; visiting the museum; and going on a short collecting trip in the woods.



FIGURE 110. *Chloraea chica* Speg. ex Kraenzl. Photograph by Bastian Gygli.

We talked French, German, English, Latin and Spanish indiscriminately and recklessly, keeping up a continuous flow of conversation lest our ignorance in certain languages be discovered” (Murrill 1924).

According to Katina *et al.* (2020), a total of 11 new orchid species were described by Spegazzini, many in co-authorship with Kränzlin: *Chloraea albo-rosea* Kraenzl. ex Speg., *Chloraea chica* Speg. ex Kraenzl. (Fig. 110), *Chloraea cholilensis* Speg. & Kraenzl., *Chloraea hookeriana* Speg. & Kränzlin. (Fig. 111), *Chloraea hystrix* Speg. & Kraenzl., *Chloraea phoenicea* Kränzlin. & Speg., *Chloraea pleistodactyla* Kränzlin. & Speg., *Chloraea praecincta* Speg. & Kraenzl., *Pleurothallis aurantio-lateritia* Speg. & Kraenzl., *Re-*



FIGURE 111. *Chloraea hookeriana* Speg. ex Kraenzl. as *Chloraea alpina* Poepp. Photograph by Hernán Tolosa.



FIGURE 112. *Leochilus spegazzinianum* Kraenzl. = *Gomesa brieniana* (Rchb.f.) M.W.Chase & N.H.Williams. Photograph by K.H.Senghas.

strepia cogniauxiana Speg. & Kränzlin. (Katinas *et al.* 2020: 197). *Epidendrum argentinense* Speg. & Kränzlin. was collected by his son Rutilo A. Spegazzini.

Several other orchid species were named in Spegazzini's honour: by Kränzlin, *Chloraea spegazziniana*, *Habenaria spegazziniana*, *Leochilus spegazzianus* (Fig. 112), and *Maxillaria spegazziniana*: and by L. O.Williams, *Pleurothallis spegazziniana*.

It may seem somewhat far-fetched to include Lorentz, Hieronymus, Schickendantz and Spegazzini in Schlechter's 'network'. However, we consider that their botanical collections contributed to Schlechter's knowledge of the Argentinian orchids. Not only did Schlechter have the opportunity to study Grisebach's herbarium at Göttingen, but additional material reached him at the Berlin Botanic Garden through Kränzlin and Hieronymus. The species determined by Schlechter and dedicated to Lorentz and Schickendantz, as well as modifications of several of Kränzlin's determinations, such as the names *Aa hieronymi* (Cogn.) Schltr. and *Oncidium spegazzinianum* (Kraenzl.) Schltr., are proof of this.

The arrival in Argentina of European scientists in all disciplines was a phenomenon that began with President Sarmiento in 1864 and continued well into the first decades of the 20th century.

The story of Rudolf Schlechter's network of orchid collectors in South America is close to its end. We began with Schlechter's men in the southern states of Brazil and through 322 pages we travelled north across the Amazon basin and into the three Guyanas. We then turned west, across the mighty Orinoco and the Magdalena River through Venezuela and Colombia, turned southwest into Ecuador and Peru, and, after crossing the tropic of Capricorn in Bolivia and Paraguay, arrived finally in the southern cone, where we now will talk about Schlechter's collectors in Uruguay; after this we can consider the circle closed.

Uruguay

At just over 176,000 km², Uruguay is the smallest country in South America after Surinam. Only about 50



FIGURE 113. Cornelius Osten (1863–1936). In Legrand, 1936. Frontispiece.



FIGURE 115. *Oncidium ostenianum* Schltr. = *Trichocentrum cepula* (Hoffms.) J.M.H.Shaw. Photo by Lidyanne Aona

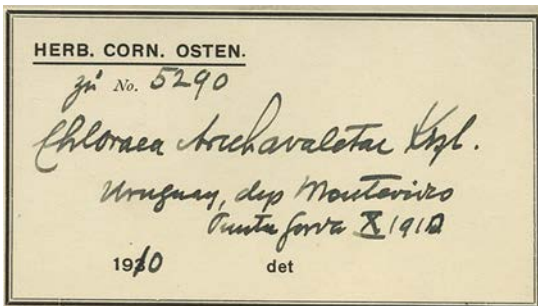


FIGURE 114. C. Osten's herbarium label of *Chloraea arechavaletae* Kraenzl. Harvard University Herbaria.

different species of orchids in 13 genera can be found in its territory and only two noteworthy names of local botanists can be mentioned in relation to Schlechter's network. Both were of German origin.

CORNELIUS OSTEN (1863–1936) (collected 1885–1934)

The German botanist Cornelius Osten (1863–1936) (Fig. 113) was born in the northern German city of Bremen. He had shown a great passion for botany from childhood and at the age of 22 emigrated to South

America, where he lived in the province of Buenos Aires, Argentina. He built a successful business as an import-export merchant, an activity he maintained throughout his life. In 1887, he moved to Uruguay which would become his country of adoption.

Osten took part in excursions to the Argentinian provinces of Córdoba and Mendoza with his brother, the astronomer Hans Osten, and started amassing a herbarium, which by 1907 already contained 2000 specimens. However, his most fruitful travels were in Paraguay with Emil Hassler and his student Teodoro Rojas in 1914–1915. He sent many duplicates of his collections to the museums of Berlin-Dahlem (where they first caught the attention of Rudolf Schlechter), Washington and Buenos Aires. Osten was known as extremely open-minded, always directing his efforts toward improving the quality of his knowledge in all areas of the sciences, arts and geography; he also had a good knowledge of classical languages. Cornelius Osten worked with the famous Spanish-born botanist José Arechavaleta (1838–1912), director of the Natural History Museum in Montevideo. Following Arechavaleta's death, Osten continued his *Flora Uru-*

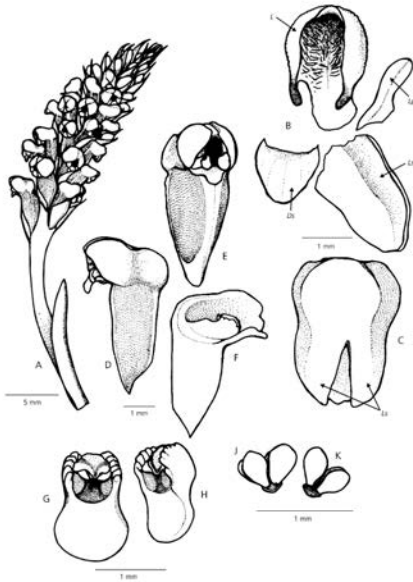


FIGURE 116. *Prescottia ostenii* Pabst. Drawing by R. Singer.

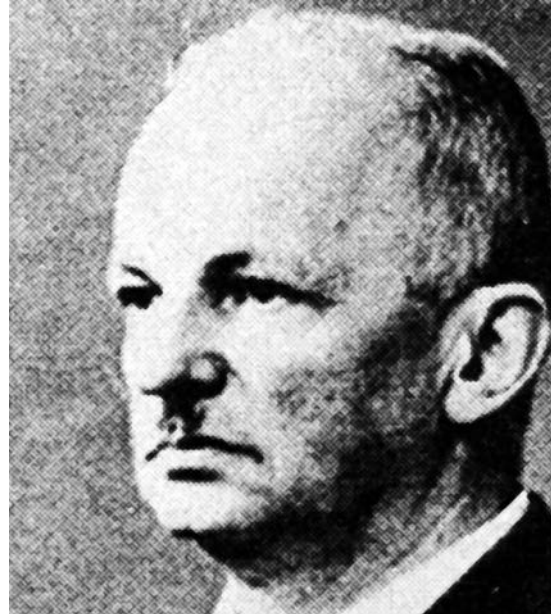


FIGURE 117. Wilhelm Gustav Franz Herter (1884–1958). Archives of Rudolf Jenny.



FIGURE 118. Downtown Montevideo, ca. 1920. Unknown photographer.

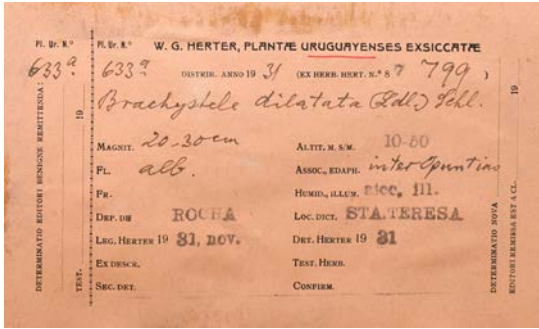


FIGURE 119. W. Herter's herbarium label of *Brachystele dilatata* (Lindl.) Schltr. From his herbarium.

guaya (Arechavaleta 1901), collaborating on this project with Wilhelm Herter, of whom we will talk later. Arechavaleta and Osten have been considered the two botanists who established the basis of botanical knowledge in Uruguay.

Osten was awarded an honorary doctorate by the University of Goettingen and commended for the prestige he had brought to German sciences in southern South America. By the time of his death, his herbarium, which he bequeathed to the National Museum of Natural History of Montevideo, numbered around 28,000 specimens (Legrand 1936: 8).

The Oakes Ames Orchid Herbarium at Harvard University holds a large number of orchids collected by Osten in Uruguay (Fig. 114). No new species are among them; however, Rudolf Schlechter and Guido Pabst dedicated to him *Oncidium ostenianum* (Fig. 115) and *Prescottia ostenii*, respectively (Fig. 116).

The plant genus *Ostenia* (Alismataceae) was named in honour of Cornelius Osten by Franz Georg Philipp Buchenau.

HERTER, WILHELM GUSTAV FRANZ (1884–1958) (collected 1907–1950)

Wilhelm Gustav Franz Herter (1884–1958) (Fig. 117) was a German botanist who lived in Uruguay for a large part of his life. Born in Berlin, Herter studied medicine and natural sciences in Freiburg im Breisgau, Berlin, Paris and Montpellier. In Berlin, he received a doctorate, submitting a thesis on the genus *Lycopodium* in 1908.

In 1907 and between 1909 and 1910, he spent short periods of time in Montevideo, Uruguay, as an assis-

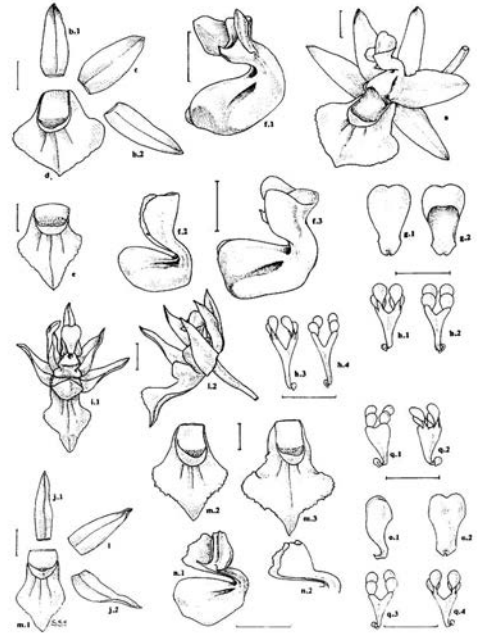


FIGURE 120. *Phymatidium herteri* Schltr. as *Phymatidium microphyllum* var. *herteri* (Schltr.) Toscano. Drawing by A. Toscano de Brito.

tant in the agronomy faculty at the University of Uruguay; between 1912 and 1913 he was at the Agronomic University of Porto Alegre, Brazil.

Herter worked as head of the grain processing laboratory at the Berlin Agricultural College during WWI, but in 1923 decided to return to Uruguay, where he made important botanical collections and worked with Cornelius Osten on the continuation of Arechavaleta's *Flora Uruguayana*. In 1925, Herter became a citizen of Uruguay and occupied different positions over the following years at the university and the ministries of education and public health, as well as at the Montevideo Botanical Gardens and Museum. Montevideo became his second home (Fig. 118). In 1927, he began the publication of his series *Estudios botánicos en la region uruguayana*, part of which was an inventory of the Uruguayan flora with C. Osten (Herter 1927–1957).

Herter not only taught botany but lectured students on Greek antiquity and promoted the study of mycology. He was happily married to Meta Puchert, who sometimes collected plants with him (Fig. 119) and founded the *Revista Sudamericana de Botánica*, which went through ten volumes.

Only one new orchid species, *Phymatidium herteri* Schltr. (Fig. 120), was described by Schlechter among the many specimens of Orchidaceae collected by Herter. Helped by the Uruguayan government, Herter travelled to Europe early in 1939 planning to visit the European herbaria to study their Uruguayan specimens. However, the outbreak of World War II (WWII) made it impossible for him to continue his work and to return to Uruguay. He spent the war as director of the Institute of Botany at the Jagiellonian University in Cracow, in occupied Poland. At the end of the conflict, as the German Reich retreated and abandoned Poland, Herter was held directly responsible for the considerable losses suffered in the field of Polish botany, in terms of both men and materials. Indeed, the Polish botanists Wladyslaw Szafer and Bogumit Pawlowski insisted that Herter be brought to account before the Polish courts in 1945, though this never occurred.

Immediately after the war, his wife having died in 1946, Herter returned to Uruguay but found himself without an occupation and made his living selling plants. In 1959, he was granted a retirement position by the Uruguayan government and named honorary consul in Bern, Switzerland. In 1954, he finally moved to Hamburg, where he died four years later.

ACKNOWLEDGEMENTS. Once more, many thanks to Mark Budworth, for his philological revision of the text. We assume that he is as glad as we are that this series has finally seen its end. To Franco Pupulin and the editorial staff of *Lankesteriana* and to all anonymous reviewers for their patience and encouragement during the publication of the six chapters of this series.

In memoriam: Rudolf Jenny (1953-2021)

In the last days of July, I was corresponding with Rudolf Jenny and going through the final observations of the editors of *Lankesteriana* to Chapter V of this series. Finally, early in August, the article was published, and Rudolf and I rejoiced about the outcome. We had started this project back in 2019, and at the start-line, had the optimistic idea that Schlechter's South American orchids would extend over one, two articles at the most. We were now nearing the end; after more than two years and close to 300 pages, the end seemed near, and we were already discussing new ideas for future publications. It was for me the culmination of more than 20 years working with Rudolf and learning from him, and we had big plans for the near future.

Some weeks later, my last e-mail to Rudolf came back with the laconic answer: "I am in the hospital and have no access to e-mails. I will answer as soon as I am back at home". And then came the sudden, tragic news about his death, at the still young age of 68. We had developed a good working agreement in which Rudolf was the untiring researcher while I did most of the writing. We would then go through our articles, reviewing and modifying the texts and the illustrations. But I did never fool myself: without Rudolf, all this would simply not have happened. His passion for orchid history was contagious, and 'Bibliorchidea', Rudolf's monumental brainchild, was an inexhaustible treasure chest of information. Unfortunately, all this had now come to an abrupt end.

I am mourning for Rudolf, as is the worldwide orchid community. He is and will remain irreplaceable. May this final article in the long series about Schlechter's South American network serve as a final homage to a man who was for me and for all who knew him a generous friend and an unforgettable teacher. May he rest in peace.

C. Ossenbach, December 2021.

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