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Jean-Marie Delavay (1834-1895), His Botanical Collection in Yunnan and Relationship with the National Museum of Natural History at the End of the Nineteenth Century: Cooperation, Interactions, and Contributions

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Abstract Jean-Marie Delavay (1834-1895), a missionary of the Missions étrangères de Paris, was one of the most influential botanical collectors in Yunnan and China. He sent his collection to the Muséum national d'histoire naturelle, where Adrien Franchet (1834-1900) identified the specimens. This article examines Delavay's collection in Yunnan and the scientific collaboration between Delavay and the Museum, based on seventy-three of his letters and other archives. It highlights the cooperation between the French state, religious orders, and scientific institutions in the nineteenth century, which contributed to advancements in the natural sciences.

Keywords Jean-Marie Delavay. Missionnaire-collecteur botanique. Yunnan. Go-between scientific cooperation. Natural sciences.

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1 Introduction

The history of botanical collecting in China by the French, spanning from the late seventeenth century to the early 1950s, can be divided into two main categories based on the use of plants in the recipient country. On one side, there is the collection for practical purposes – whether for economic, horticultural, agricultural, culinary, or medicinal use – and on the other, there is the collection driven by botanical herborisation, following a taxonomic system. A pivotal moment for this second category came in 1740 when Pierre Nicolas Le Chéron d'Incarville (1706-1757) began collecting for Bernard de Jussieu (1699-1777), one of the pioneers of taxonomic botany.[1] Starting from this date, and for the next two centuries, a significant number of French collectors in China would dedicate themselves to this scientific mission. Among them, at the end of the nineteenth century, one collector stands out as the most eminent in the field of Chinese plants: Jean-Marie Delavay (1834-1895), a missionary with the Missions étrangères de Paris (MEP), who spent fourteen years in Yunnan (1882-95). During his time in the province, he sent approximately 200,000 specimens to the Muséum national d'Histoire naturelle (Muséum), according to a report by Adrien Franchet (1834-1900), which still needs to be validated. This collection included 80,000 herbarium specimens, representing around 4,000 species, 1,500 of which were new to science (Franchet 1896b, 150).

The Muséum was virtually the sole recipient of Delavay's collections, to which Adrien Franchet, a distinguished taxonomist specialising in East Asian flora at the institution, made a crucial contribution as the principal botanist responsible for studying his herbarium. Situated at opposite ends of the Eurasian continent, Delavay and Franchet formed an inseparable partnership, embodying an exemplary collaboration between a field collector and a laboratory researcher. Their cooperation thus made a significant contribution to the discovery of Yunnan's flora and to the advancement of botany in France at the close of the nineteenth century. At this stage of the analysis, three key questions arise: in what context and through what mechanism did these two figures – one a Catholic missionary and the other

This article was translated by Elvis Buckwalter, associate professor at Paris Nanterre University.

This article complements another study forthcoming, entitled "Jean-Marie Delavay (1834-1895) parmi les missionnaires français collecteurs botaniques en Chine: tradition, réseaux et héritage".

1 For a historical analysis of these two types of collections in China, as well as of the major taxonomic missionary collectors between 1740 and the early twentieth century, cf. Li, forthcoming.

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an institutional scientist – establish this bilateral collaboration despite their vastly different roles? By what means and how did they concretely carry out their joint work? And, finally, in what ways did their collaboration contribute to the progress of botany, which was experiencing significant growth at the time?

These topics remain largely unexplored. Existing research on Delavay mainly focuses on presenting the contributions of his collections and the outcomes of Franchet's research, without examining the course of their collaboration, which is key to understanding how these contributions and results were obtained.[2] To undertake such research effectively, it is crucial to have access to detailed documentary evidence, and Delavay's letters, especially those linked to the Muséum, represent one of the most valuable sources in this regard.

The Muséum has preserved seventy-three handwritten letters from Delavay,[3] written over thirteen years. The first letter is dated May 31, 1883, more than a year after his arrival in Yunnan, and the last one is from December 9, 1895, sixteen days before his death. Here are some essential details **[tab. 1]**.

Table 1 Recipients of Jean-Marie Delavay's letters preserved at the Muséum

Recipient	No. of letters	Date	Location
Armand David	4	May 31, 1883-October 27 1885	Dali (1), Mosuoying (1), Dapingzi (2)
Édouard Bureau	1	March 16 1885	Mosuoying (1)
Adrien Franchet	41	September 24, 1885-April 25, 1890	Dapingzi (37), Mosuoying (2), Dali (2)
	6	September 24, 1890-April 2, 1891	Hong Kong (2), a place near Lao Kay (Tonkin) (1), and Kunming (3)
	13	September 26, 1891-May 15, 1893	(France): Montbeton (12), Lyon (1)
	8	May 29, 1894-December 9, 1895	Chengfengshan (2), Kunming (6)
Total	73		

Among the recipients, Armand David (1826-1900), a Lazarist missionary and prominent zoological, botanical, and mineralogical collector

2 For the studies on these topics, cf. Franchet 1896a; 1896b; Flamary 1929; Lennon 1988, 2004; Kilpatrick 2014, 65-131.

3 AM, Correspondance Franchet, Delavay (J.-M.) 103-173, 3 Cartes & Documents sur Mong-tsé 174-177.

in China during the 1860s-70s, who acted as an intermediary between Delavay and the Muséum, received four letters. Édouard Bureau (1830-1918), a professor of botany at the Muséum, received only one. The remaining sixty-eight letters are all addressed to Adrien Franchet. Clearly, these letters represented correspondence with all three recipients. Due to the absence of letters written by David, Bureau, and Franchet, the analyses in this study can only rely on Delavay's letters.

Delavay's letters were written over the course of three different periods according to his activities. First, there were forty-six letters written over eight years from May 1883 to April 1890, at Dapingzi 大坪子 (Ta-pin-tze [in the French transcription of the time]), his main residence in Yunnan,[4] and at two neighbouring locations: Mosuoying 摩梭營 (Mo-so-yn), another Christian-administered community, and Dali 大理 (Ta-li or Ta-li-fou 大理府), a prefectural city. Next, there were nineteen letters written during the period in which he was under health care, from September 1890 to May 1893, in Hong Kong, at a place near Lao Kay (Vietnam), in Kunming (the capital of Yunnan; referred to as Yunnan-sen 雲南省 under the Qing dynasty), and in France. Finally, there were eight letters written during his return to Yunnan, from May 1894 to the end of 1895.

As one of the few firsthand documents, these letters from Delavay have provided us with rich information about his botanical collection in Yunnan and his relationship with the Muséum, particularly with Adrien Franchet. On the one hand, these letters, which go hand in hand with the herbaria and the labels attached to the herbaria, form a set of works associated with Delavay's collection: the herbaria present the physical plants, the labels provide brief collection information (date, location, soil type, etc.), and the letters give more detailed information about the collections and collected plants. On the other hand, it is only from these letters that we can recognise Delavay as a true botanist, where morphological and biotope descriptions, identifications, and discussions about plants from his collection are almost omnipresent. Additionally, in some letters, his exchange with Franchet on certain botanical theories can be read. Finally, in many letters, Delavay described his shipments of herbaria and other specimens to the Muséum, showing the trilateral efforts made by Delavay, the Muséum, and the MEP to ensure scientific collaboration between Delavay in Yunnan and Franchet in Paris.

In 1896, four months after Delavay's death, Adrien Franchet expressed his appreciation for this great botanical collector in a memorial dedicated to him:

4 For the history of the Christian community of Dapingzi and the MEP mission in Yunnan, see Li 2020.

> Father Delavay was not only a great collector; he was also a sage observer, a true scholar, drawing often profound inferences from what he saw. His botanical correspondence, which will undoubtedly be published one day, provides undeniable proof of this.[5] (Franchet 1896a, 145)

Franchet's declaration about publishing his material 'someday' has indeed lasted a long time since it has not seen the light of day.[6] This study aims to reconstruct Delavay's collaboration with the Muséum based on the following aspects: his botanical collecting, the shipment of herbarium specimens and other types of samples; his reports and scientific exchanges with David, Franchet, and other scholars at the Muséum and in France; and the financial and logistical support provided by the Muséum and the MEP. More fundamentally, our goal is to shed light on the social and scientific mechanisms through which a botanically inclined clergyman and the religious order to which he belonged engaged in and integrated themselves into a scientific vocation, in collaboration with a state-supported botanist and research institution.

2 Before Yunnan: Delavay's Early Botanical Pursuits and Collections

Delavay's status is grounded in four closely interconnected elements characteristic of the final two decades of the nineteenth century: he was a Frenchman, a missionary, and a plant collector who simultaneously pursued his apostolic and botanical endeavours in a specific region of Yunnan, China. His remarkable success can be attributed to the dynamic interaction of these factors: within a context conducive to the advancement of natural sciences in France and the expansion of Christianity in China, his personal dedication to botany was seamlessly integrated into his apostolic mission, all within a region distinguished by its exceptionally rich flora.

5 All quotations from works originally written in French have been translated by the author, unless otherwise indicated.

6 Having remained silent for a century, Delavay's letters have seemingly drawn the attention of only three researchers: Antoine Flamary, Jean Lennon, and Jane Kilpatrick. Cf. footnote 3. In 2000, I obtained a copy of excerpts from Delavay's letters, kindly provided by Gérard Depuy, a friend from Les Gets, Delavay's hometown. I later realised that these excerpts were likely compiled by Jean Lennon. In 2019, I located the original letters in the archives of the Muséum. We are in the process of preparing a publication of these letters.

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2.1 The Stakes of Botanical Collection by Missionaries in the Second Half of the Nineteenth Century

With the rapid rise of botany in Europe during the second half of the nineteenth century, scientific circles, state authorities, and religious orders jointly mobilised in a dynamic pursuit of research and discovery focused on exotic plants and animals. Their efforts were aimed specifically at contributing to the universal construction of global taxonomic systems. China, renowned for the extraordinary richness and diversity of its flora – currently accounting for 30,000 documented species of flowering plants – yet still largely unexplored from a taxonomic perspective, became a favoured destination for numerous European collectors, primarily French, British, and Russian. These collectors, whether scientists or amateurs, came from diverse professional backgrounds: botanists, merchants, doctors, missionaries, diplomats, customs officers, explorers, and others.[7] Among the French, it was the missionary botanical collectors from three major congregations who made the most significant contributions: the Jesuits, who even founded a natural history museum in Shanghai,[8] the Lazarists, represented by Armand David, and the priests of the MEP active in southwestern China. The latter, distributed across the four missions in Sichuan, Guizhou, Yunnan, and Tibet, found themselves at the heart of a true botanical kingdom – much like Yunnan, which is home to 14,500 plant species, belonging to 2,100 genera and 299 families (cf. Zhongguo kexueyuan Kunming zhiwu yanjiusuo 2000, 1). According to a non-exhaustive estimate, between 1868 and 1934, a span of sixty-six years, foreign collectors gathered more than 400,000 herbarium specimens in Yunnan alone (cf. Bao, Mao, Yuan 1995, 3), a significant portion of which was collected by MEP missionaries. From the 1880s onward, a considerable number of missionaries in southwestern China distinguished themselves as a community of botanical collectors, with their collections primarily destined for the Muséum.[9]

Through their missionaries in the field, the three religious orders mentioned above occupied a prominent position in advancing scientific activities in China. The example of Armand David is particularly

7 For an overview of European collectors in China during this period, cf. Bretschneider 1898, vol. 2, and Ma 2020, 2-29. For a general exploration of the history of botanical and zoological collections by Westerners in China, primarily between 1840 and 1940, cf. Luo 2005. For a comprehensive study on the diversity of English collectors during the Qing dynasty (1644-1911), cf. Fan 2004.

8 This refers to the Museum of Heude, founded in 1868 by Pierre-Marie Heude (1836-1902), a Jesuit and zoological collector who resided in Shanghai from 1868 until his death in 1902.

9 For the botanical collections by missionaries from these three congregations, cf. Li, forthcoming.

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telling: at the request of the Muséum and the Minister of National Education, the superior of the Lazarists granted him exemption from his religious duties during his second and third missions to China (1868-70, 1872-74), allowing him to fully dedicate himself to scientific collecting. In 1882, the year Delavay travelled to Yunnan, the Congregation for the Propagation of the Faith in Rome issued, on behalf of Pope Leo XIII, an official appeal to missionaries worldwide, urging them to "gather anything that could contribute to the knowledge of the natural history of each country, especially in botany, mineralogy, and zoology" (quoted in Zheng, Zheng 2005). As we will demonstrate here and in another study focused on the botanical collecting network within the MEP in China and East Asia (cf. Li forthcoming), a number of missionaries actively engaged in scientific collecting and in collaboration with scholars, research institutions, lay collectors, and colleagues both within their own congregation and from other orders.

In China, during this same period, the situation of missionaries improved significantly after more than a century of anti-Christian regulations (1724-1844), which were gradually lifted between 1840 and 1850. The introduction of articles granting specific privileges to missionaries in the three Sino-French unequal treaties – the Treaty of Huangpu in 1844, the Treaty of Tianjin in 1858, and the Treaty of Beijing in 1860 – allowed them to acquire expanded rights, particularly the freedom to travel freely throughout the country. This freedom of movement created particularly favourable conditions for botanical collection, whether conducted by missionaries or laypersons. However, anti-Christian religious incidents (*jiao'an* 教案) continued to occur throughout these decades. Some missionary collectors became victims of such conflicts, not due to their scientific activities but as a result of socioreligious tensions. Thus, Jean-André Soulié (1858-1905), a missionary and botanical collector from the Tibetan mission, was massacred by Buddhist lamas in 1905 as part of a religious dispute. In the case of Jean-Marie Delavay, his collections appear to have been carried out under relatively peaceful conditions. Aside from two political challenges mentioned in his correspondence – one concerning the Sino-French War over Vietnam's sovereignty, which delayed the shipment of his herbarium specimens,[10] and the other involving "the difficult situation created for us by the current governor of Yunnan", which hindered his collecting trip to Lijiang 麗江[11] – no other events are reported as having disrupted his work. Even the massacre of missionary Jean Terrasse (1848-1883) and thirteen Chinese converts in 1883 at Shafengcun 沙鳳村, a village west of Dapingzi and two days' walk

10 Delavay, letter dated May 17, 1884.

11 Delavay, letter dated March 14, 1888.

away,[12] is not noted as having affected his activities. The only challenges Delavay faced in his plant collection were adverse weather conditions and his often fragile health, two recurring themes in his letters.

The scientific endeavours of missionaries were secondary to their primary religious mission, a task that was often particularly demanding. This is why, as we will observe in the study of botanical missionary collectors in Southwestern China (cf. Li forthcoming), the participation of many missionaries in botanical collecting was characterised by episodic activity, limited to relatively short periods during their mission. Even a minor factor, such as a shift in the political climate in China or the assignment of a new responsibility to the missionary, could interrupt their collecting efforts. However, it is true that a major botanical collector like Delavay emerged only in a context favourable to the apostolic mission, where he could dedicate more time and energy to collecting.

2.2 Delavay: Religious Vocation, Botanical Training, and Early Collections

Unlike the majority of his peers who shared an interest in botanical collecting but remained primarily missionary-collectors of plants, Delavay can also be considered a full-fledged botanist.[13] It is this distinction that enabled him to make such a significant contribution to modern botany.

Born in 1834 in the parish of Les Gets, in the hamlet of Le Chot, in Haute-Savoie, Delavay was, from an early age, chosen by his family to dedicate his life to the priesthood. He first attended the small seminary of Saint-François de Sales in Mélan, and at the age of 17, he entered the Grand Seminary of Annecy. He was ordained a priest in December 1860 and was appointed vicar at Saint-Nicolas-la-Chapelle two years later, then vicar at Allonzier-la-Caille in 1864. He continued to work in his homeland until 1866, before joining the MEP seminary.

Since the 1850s, botanical research was very active in Haute-Savoie, with Annecy and Chambéry being the central cities. Renowned botanists included Louis Bouvier (1819-1908), Baron Eugène Perrier de la Bâthie (1825-1916), Notary Jean-Baptiste Chatelain (1851-1914), Count René de Menthon (1833-1917), Venance Payot (1816-1902), among others. In the religious sphere, Cardinal Alexis Billiet (1783-1873), a confirmed botanist, was influential in the archdiocese of Chambéry and throughout Savoie. All these men promoted the movement to collect plants and study the flora of the Savoyard territory.[14] At that time, bot-

12 For an account of the incident at Shafengcun, cf. Li 2016, 68-9.

13 Regarding Delavay and his botanical studies, cf. Flamary 1929, 97-8; Benoist 1961, 119.

14 For a study on the botanists of Savoie in the nineteenth century, cf. Benoist 1961.

any was studied in all educated circles, particularly within the clergy. At the Grand Seminary of Annecy, Fathers François Puget (1829-1880) and Etienne Chevalier (1826-1914) taught botany to their disciples. As for Delavay, it appears that he began his botanical studies at the minor seminary in Mélan, and later came into contact with Eugène Perrier de la Bâthie in Annecy.[15] However, it remains unclear whether he directly attended the courses of Puget and Chevalier, as the dates of their teaching do not allow for certainty. Two letters written by Delavay, dated May 19, 1886, and May 5, 1887, show that even more than twenty years after leaving Haute-Savoie, Delavay maintained his connection with his mentor Chevalier and his Savoyard botanist friends. He sent them a number of herbarium specimens and seeds from Yunnan. In his letter dated February 4, 1893, he demonstrated his thorough knowledge of the botanist community in Haute-Savoie.

Upon leaving the Grand Seminary of Annecy and during the six years he served as a vicar in two mountain parishes in Savoie, Delavay explored the botanical sites of Northern Savoie and collected plants. E. Perrier de la Barthe's catalogue notes his discovery of eleven previously unrecorded plant sites, such as *Cyclamen neapolitanum* var. salesianum in Allonzier-la-Caille, *Hieracium Sixtinum* at La Tournette, *Phytoma botanicifolium* on Mont Joli, among others (Flamary 1929, 98). In fact, before his departure for China, Delavay was already a professional botanical collector of alpine flora. In his future collections in Yunnan, this experience contributed to his success, allowing him to apply his knowledge of alpine vegetation in the high mountains of Yunnan.

On November 19, 1866, Delavay joined the MEP Seminary. Eight months later, on July 15, 1867, he left for China, joining the Guangdong-Guangxi evangelisation mission for thirteen years (1867-80). He first went to Hainan Island for a year, then to Weizhou Island 瀨洲 (Koui-Ttchéou) and the village of Luofu 羅浮 (La-Fou),[16] until his return to France in 1880 due to his very weakened health. During this period, he collected plants and entrusted his collections to Henry Fletcher Hance (1827-1886), British vice-consul in Canton.[17] However, Hance did not give him due credit: apart from a few rare plants,

15 Barrault 2020, section "Il reçoit" (the book is unpaginated).

16 The current village of Luofucun 羅浮村 is located within the administrative office of Nanmushan Village (Nanmushan cungongsuo 楠木山村公所), situated in the town of Dongxing 東興鎮, within the city of Dongxing, part of the Fangchenggang 防城港 area in Guangxi. For the history of Christianity in Luofu, cf. Peng, Zhu 2007, 115. Jane Kilpatrick's identification (2014, 65) of La-Fou with Malu, which may correspond to Maluzhen 馬路鎮 in the neighbouring region, appears to be problematic. In the village of Luofu, the church built in the mid-nineteenth century still stands today; cf. "Dongxingshi Dongxingzhen Luofu tianzhujiaotang" 東興市東興鎮羅浮天主教堂: http://dongxinglvxingshe.com/news/view-14393.html.

17 For a study on Hance's botanical collection, cf. Fan, 2004, 68-72.

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Delavay's name was not mentioned when his collections were published. In the work of Emil Bretschneider, published in 1898, only one plant collected by Delavay at that time is mentioned, namely *Calophyllum inophyllum* L. (published in the *Journal botanique* in 1879, vol. 9), collected in Qinzhou 钦州 (Kingchow-fu) in Guangxi (cf. Bretschneider 1898, 2: 874). Furthermore, we have identified two other herbarium specimens collected by Delavay in March 1869 at Leizhou 雷州 (Loui-tcheou) in Guangdong, and preserved at the Harvard University Herbaria under the number GH: 00217454: *Solanum hainanense* Hance and *Solanum procumbens* Loureiro.[18]

2.3 Delavay, Armand David and the Muséum

Armand David distinguished himself in his time as a leading scientific collector of animals and plants in China for the Muséum.[19] Before his departure for Beijing in 1862, he established connections with two prominent scholars at the Muséum: the zoologist Henri Milne-Edwards (1800-1885) and the botanist Émile Blanchard (1819-1900). During his first mission in Beijing (1862-66), he sent the Muséum an extensive collection of diverse specimens of animals, plants, and minerals gathered in northern China (Beijing, Hebei, Liaoning, and Inner Mongolia). In 1866, he founded a museum, the *Bainiaotang* 百鳥堂 (Auditorium of Birds), within the Beitang 北堂 cathedral, where he frequently displayed duplicates of specimens sent to the Muséum.[20] Under the influence of Henri Milne-Edwards, the Minister of National Education requested that the superior of the Lazarists release David from his apostolic duties so that he could dedicate himself fully to scientific collecting in China. During his two subsequent missions (1868-70 and 1872-74), David explored and collected in regions of eastern and central China, as well as eastern Tibet in Sichuan. Designated by Rome, these regions fell under the authority of various apostolic missions, both French and from other European countries. Consequently, it was essential for David to establish cooperative ties with local missionaries, enabling him to build relationships with other foreign collectors, whether missionaries or laypersons. A notable example is the Christian mission in Muping 穆坪, located in western Sichuan, where David discovered the giant panda in 1869 with the assistance of Jean-Théophile Pinchon (1814-1891), a missionary of the MEP. The collections David amassed during his three expeditions,

18 https://kiki.huh.harvard.edu/databases/specimen_search.php?cltr=J.%2520M.%2520Delavay.

19 For a study on David and his collections in China, cf. Boutan 1993; Bishop 1990.

20 For an overview of these collections, cf. Hang 2018.

all sent to the Muséum, included an impressive array of 9,569 specimens of insects, arachnids, and crustaceans, 1,332 birds, 595 mammals, and 2,919 herbarium specimens of plants (Boutan 1993). Upon his return to France, David became a central figure in the study of China's natural history and played a pivotal role in facilitating cooperation between scientific collectors in China and the Muséum.

Delavay had met David prior to his arrival in Yunnan. Contrary to the commonly accepted date of 1881 for their first encounter, David explicitly stated that it had occurred earlier, in Hong Kong:

> It is a great satisfaction for me to think that I was the providential cause of this second vocation of Mr. Delavay, which has been a true blessing for science. During a chance meeting in Hong Kong, I had no difficulty discerning his tastes and aptitudes beneath his modesty, and I later succeeded in persuading him to become a correspondent for our Jardin des Plantes. In recognition of his significant contributions, the Professors have already awarded him a decoration and financial compensation, which will help him continue his fruitful research. (David 1888, 9)

Absent from David's journal, this encounter in Hong Kong likely occurred during one of his maritime stopovers between Shanghai and Marseille, either during his second mission to China or his third. At that time, Delavay may have been staying at the MEP sanatorium in Hong Kong while serving in the Guangdong and Guangxi regions. A pivotal moment, however, came in 1881, when Delavay returned to France after completing his mission. He met David, who had reached the height of his renown. During their exchange, Delavay shared details about his collections from Guangdong-Guangxi and voiced to Henry Fletcher Hance his frustration over the perceived injustice in the publication of the plants he had collected.[21] David advised him to send his future collections to the Muséum and recommended him to Professor Édouard Bureau and Adrien Franchet.[22] Although Delavay's selection of Yunnan for his next mission was primarily dictated by health reasons – he could no longer tolerate the subtropical climate of Guangdong and Guangxi[23] – it is not unlikely that David might have suggested he consider Yunnan as an alternative. After spending eight

21 In his letter written to Franchet on May 19, 1886, Delavay says: "Among the ferns I collected in Yunnan, 30 or at most 35 species were sent to England, including *Asplenium yunnanense Franchet*, *Scolopendrum Delavayi*, *Polypore yunnanense Franchet*, etc. But it is unlikely that these species will be published on the other side of the Channel. I told Mr. David how it all happened".

22 For an introduction to Delavay's connection with the Muséum through David in 1881, cf. Franchet 1896a, 145.

23 Cf. AMEP, 0939 J-M Delavay, letter dated May 2, 1881; Kilpatrick 2014, 66.

months in Muping, David had become very knowledgeable about the rich flora of Southwest China and knew that Yunnan was almost untouched territory for Western botanical collectors.[24]

From Delavay's first six letters from 1883 to 1885, we know that Delavay's initial contact with the Muséum was facilitated through David. Even after his first contact with Édouard Bureau (in March 1885) and Adrien Franchet (in September 1885) and after his initial shipments of specimens to the Muséum, Delavay continued to maintain his contact with David until the end of 1895. In his four letters to David, the following three points are highlighted: 1) report on his collections and shipments, 2) request David consult Franchet's opinion on his future collections, and 3) request David convey his respects to Bureau and Franchet. Thus, in his first letter to David, Delavay talked about his collection activities and his preparation for sending his first herbaria to the Muséum, noting, however, that "[he] would have needed a sum of 180 to 200 francs" for the shipment.[25] David provided him with valuable assistance by requesting a grant from the Muséum from Professor Bureau. In the letter of February 25, 1885, Delavay thanked David for his advice and assistance, and also asked him to ask for Franchet's opinion on his collection.

Delavay no longer received letters from David starting in 1886, with the exception of one letter received on March 4, 1887.[26] In several letters to Franchet, he asked for news about David and sent him his affectionate regards.[27] He also expressed great joy when he received "the splendid volumes of *Plantae Davidianae*", a work that Franchet wrote about the important plants collected by David in China.[28] And, in the letter of November 9, 1891, Delavay, staying at the Montbeton Sanatorium in France, expressed his desire to "write to Father David to ask him to send me a Russian language course", since "Russian has been in vogue for some time. I will study Russian this winter".

24 Before Delavay, only four European collectors had collected plants in Yunnan. 1) J. Anderson (English naturalist), twice in 1868 and 1875 in western Yunnan, in the Tengyue 騰越 region; the number of his collections in 1868 was 800 herbaria (the number for 1875 is unknown); 2) W.J. Gill, in 1877 in northwestern and western Yunnan, in the Deqin 德欽 region and the Dali region (number of herbariums unknown); 3) B.C. Szechenyi (Hungarian), in 1879, in northwestern and western Yunnan, in the Zhongdian 中甸 region and the Dali region (number of herbaria unknown); 4) W.R. Carles (English), in 1881 in the Kunming region. Cf. Bretschneider 1898, 2: 692, 730, 755, 950.

25 Letter dated May 31, 1883.

26 Cf. letter dated March 6, 1887.

27 Cf. letters dated December 12, 1886; January 30, 1887; December 14, 1887; April 25, 1890; April 2, 1891; and September 26, 1891.

28 Letter dated April 25, 1890.

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3 Delavay's Collections in Yunnan

In 1880, Delavay returned to France from Guangxi for medical treatment. He recovered after a year of treatment. In September 1881, he was assigned to the Yunnan mission. After a three-month sea voyage, he landed in Shanghai at the beginning of 1882, then travelled up the Yangzi River by boat, arriving in March at the MEP headquarters in Yunnan, located near Chengfengshan 成鳳山 (Tchen fong chan) mountain in the Yanjin 鹽津 district, in northeastern Yunnan near the city of Yibin 宜賓 (Soui-fou [Xufu 敘府]) in eastern Sichuan. He stayed there for two months.[29] It took him another two months of walking to reach the Christian village of Dapingzi in July, located in a village 50 km north of the city of Dali in western Yunnan.[30] He acted as administrator of the village for eight years until falling severely ill at which point he left Dapingzi in mid-1890, heading to Hong Kong at the end of August,[31] where he stayed for three or four months in the MEP sanatorium. He went back to Kunming in February 1891, again fell seriously ill, and then left two or three months later[32] to return to France towards the end of August.[33] On October 29, 1893 he departed from France arriving back in Yunnan on February 20, 1894,[34] first to the northeastern region where he stayed for five months, then traveling for a month to reach Kunming in October 1894[35] where he died on December 31, 1895.

29 In the letter dated November 6, 1887, Delavay mentions that he collected plants in March 1882 from rocky areas "on the banks of the Yangtze River, opposite the city of Y-tchang [Yichang 宜昌, a port on the Yangtze in western Hubei]". In the three letters dated December 12, 1886, March 6, 1887, and May 26, 1888, he refers to collections made "in the northern part of Yunnan". For the missionaries, the northeastern part of Yunnan is referred to as the "North of Yunnan".

30 In the letter dated July 27, 1888, Delavay states that he collected specimens in June 1882 along the route between Dongchuan 東川 (Tong-tchouan) and Kunming, two nearby cities (about a 100 km apart). It took approximately 15 days to travel from Kunming to Dapingzi. According to two letters dated May 17, 1884, and February 25, 1885, the journey from Yibin to Dapingzi took 38 or 40 days, and according to the letter dated August 29, 1894, the trip from Yibin to Kunming took 23 days. Since he was still on the road between Dongchuan and Kunming in June and then took a few days to rest in Kunming (Le Guilcher 1896, 356), he would have arrived in Dapingzi in July.

31 Delavay wrote his last letter from Dapingzi on April 25, 1890, and in the letter dated September 24 of the same year, sent from Hong Kong, he mentioned that he had arrived there four weeks earlier.

32 In the letter dated February 24, 1891, Delavay announced that he had returned to Kunming, a week earlier. On April 2, 1891, he wrote his last letter to Franchet from Kunming.

33 In the letter dated September 26, 1891, Delavay said "I have been in France for a month".

34 For the two dates, cf. the letters dated September 20 and May 29, 1894.

35 Itinerary announced in the letter dated August 29, 1894.

3.1 Regions and Itineraries of Collections in Yunnan, in Coordination with His Apostolic Mission

Based on the itinerary and collection sites cited in the above letters, as well as those noted on the labels of nearly ten thousand of Delavay's herbarium specimens preserved at the Museum, we can reconstruct the regions where Delavay collected specimens in Yunnan from 1882 to 1895:

- March to June 1882: From Yichang to the apostolic headquarters of the Yunnan mission (zone 1) [fig. 1], and from there along the route to Dapingzi.
- July 1882 to mid-1890 (zone 2 **[figs 1-2]**): The region of the apostolic district of Dapingzi, encompassing the central and southern parts of the current Heqing 鶴慶 (Ho kin) district and the eastern part of the Eryuan 洱源 district (under the name Langqiong 浪穹 [Lan-Kong]). Delavay primarily collected plants during his travels between Dapingzi and Mosuoying, a route he often travelled once a month as part of his religious duties. The route taken to reach Mosuoying was always the same: Dapingzi – Jiangyin – Heishanmen – Mosuoying. For the return journey, he followed two different routes. The first led north, passing through Niujie, where one or two covered families were located: Mosuoying – Niujie – Gualapo ([fig. 2] no. 2) – Yanziya (no. 4) – Songgui – Dapingzi. The second route, taken south, followed this path: Mosuoying – Dengchuan – Shangguan – Dawangmiao (no. 5) – Jishan (no. 6) – Dapingzi. Another region where Delavay extensively collected was the Cangshan 蒼山 (Tsang chan) mountains near Dali. Together, these collecting areas cover an approximate area of 150 km². Occasionally, his collections were also made along the path between Dapingzi and the neigbouring Christian community of Pianjiao 片角 (Pienkiô) in the southern part of the Yongsheng 永勝 district (zone 2 southernmost point for these regions) [fig. 2]. He made one collection trip to Lijiang 麗江 (Li-kiang, zone 2 in the North) **[fig. 1]**.
- From mid-1890 to February 1891. On the route between Kunming and Hong Kong in Yunnan, passing through Mengzi 蒙自 (Mongtse) and Vietnam (zone 3 [fig. 1]).
- From February 1894 to the end of 1895. Six months in northeastern Yunnan during his return to Yunnan (zone 1), on the journey from Yanjin to Kunming, and finally, a few months in the vicinity of Kunming (zone 4 [fig. 1]).

Legendary Toponyms on the Map (Delavay's Notes)

1. Li Kiang xué chan (Lijiang Xueshan 麗江雪山).
2. Koua-La-po (Gualapo 瓜拉坡).
3. Hee chan men (Heishanmen 黑山門).
4. Yen tze hay (Yanziyan 燕子岩).
5. Ta ouang miao (Dawangmiao 大王廟).
6. Kichan (Jishan 雞山).
7. Lo ko chan (Luoguoshan 鑼鍋山).
8. Mao Kou Tchang (Moguchang 蘑菇場).
9. Houang li pin (Huangliping 黄栗坪).
10. Lo pin chan (Luopinshan 羅坪山).
11. Hia lo pin (Xialuoping 下羅坪).
12. (Unmarked, likely Mount Sijiaoshan 四角山).

A A A: This mountain range forms the watershed between the Mekong and the Yangtze River, and further east, between the Yangtze River and the Red River.

Toponyms on the Map (From Top to Bottom)

Pé choui kiang (Baishuijiang 白水江)
Kin cha kiang (Jinshajiang 金沙江)
Suéchan (Xueshan 雪山)
Likiang (Lijiang 麗江)
Kientchouan (Jianchuan 劍川)
Hokin (Heqing 鶴慶)
Songkoui (Songgui 松桂)
Mo-so-yin (Mosuoying 摩梭營)
Lankong (Langqiong 浪穹)
Kiangyin (Jiangyin 姜寅)
Tapintze (Dapingzi 大坪子)
Tentchouan (Dengchuan 鄧川)
Pienkio (Pianjiao 片角)
Chan fong tsen (Shafengcun 沙鳳村)
Yangpy (Yangbi 漾濞)
Tsang chan (Cangshan 蒼山)
Changkouan (Shangguan 上關)
Tali (Dali 大理)
Tchao tchéou (Zhaozhou 趙州)
Hia kouan (Xiaguan 下關)
Ho kiang pou (Hejiangpu 合江浦)

Delavay's collecting areas, as well as those along his routes, cover a vast portion of Yunnan, except for the Northwestern and Southwestern regions, where Delavay did not have the opportunity to collect.

The large quantity of herbarium specimens he gathered, representing over four thousand species, enabled Franchet and other French botanists to develop the first taxonomic system for the flora of Yunnan.

With the exception of a single excursion to collect in the alpine region of Lijiang, his collections were always carried out during journeys associated with his religious missions, regardless of the reason for travel, or of the region of his apostolic administration. Regarding the latter, the dates and place names written on the herbarium labels clearly reveal the close link between his collections and his headquarters in Dapingzi and the other Christian communities under his responsibility: it was in these areas and their surroundings, as well as along the routes to and from these locations, that he collected most of his plants. On this subject, Jean-Marie Le Guilcher (1828-1907)[36] left us some very precious memories in his obituary for Delavay, especially about Delavay's first journey from Kunming to Dapingzi in 1882, an almost month-long trip they made together:

> Mr. Delavay was a distinguished botanist; he would frequently get off his horse to pick a flower that had caught his attention. Above all a missionary, he knew how to make the most of the earliest possible moment to carry out his spiritual devotions: so, whenever we arrived at a stop, he was always in God's good graces, and while waiting for our frugal supper, he would contentedly show me the precious flowers he had filled his travel pouch with. [...] He loved botany, but it was just an enjoyable side activity for him that he pursued it with a supernatural spirit. (Le Guilcher 1896, 356)

Ultimately, his apostolic mission took priority. In the same obituary, Le Guilcher also quotes Delavay's words:

> He said to those in his confidence: When the needs of my Christians call me, I immediately think: I would go to the mountain if I hoped to find a rare plant there, and I would not rush to the aid of my Christians in need! (357)

It should be noted, however, that during the last two years in Yunnan, upon his return in 1894, he devoted himself entirely to botanical collecting, before being able to travel to Mosuoying, where he had wished to spend the remainder of his life.

36 Le Guilcher was a pioneering missionary in Dapingzi, serving as its administrator for over 20 years (1853-74) before evangelising in Dali for more than 30 years (1874-1906). Cf. Li 2020, 282-3.

3.2 The Quality and Diversity of Delavay's Collections

Delavay's collections centred on the flora of Yunnan, especially those from his apostolic region. His meticulous approach involved gathering multiple specimens, sometimes dozens, for each species. This was done not only across different seasons, years, and localities but also with careful attention to morphological variations, including the plant, flower, seed, and even root forms. Franchet's evaluation of Delavay's specimens is particularly noteworthy in this context:

> On the other hand, the condition of the specimens, always admirably chosen for study, that is to say, collected in flowers, fruits, and often with roots; the care taken in writing the labels, all bearing a number and always mentioning the exact origin, the indication of the terrain, the altitude, the color of the flower, etc., make Father Delavay's collections the most perfect model of a herbarium collection. (Franchet 1896a, 145)

Delavay's collections were distinguished by their exceptional diversity. Beyond plants, he also collected seeds and specialised samples of flora and fauna for French experts. Among these, he gathered beetles and a few butterflies for David and Franchet's son (later passed on to Fairmaire), fungi for the mycologist Patouillard, lichens for the lichenologist Hue, mosses for the bryologist Bescherelle, shells for the conchologist Heude, and small mammals for the mammalogist Milne-Edwards. While some specimens were sent to Heude in Shanghai and a few herbarium packets and seeds to Annecy, the majority were dispatched to the Muséum. In his letters to Franchet, Delavay often reported the challenges he faced in collecting specific specimens, noting the rarity of beetles in his mission area but emphasising the abundance of fungi.

Delavay, as a taxonomic collector, did not engage with traditional or popular Chinese botany, despite its potential appeal. This general tendency to disregard the practical and utilitarian dimensions of plants was typical among taxonomic collectors of his era. His correspondence contains only sparse references to locally utilised plants, categorised by their common uses. Medicinal plants he noted included *Corydalis delavayi*, *Aconitum episcopale*, and *Crotalaria capitata* Benth. Those with applications in textiles and dyeing comprised a species of *Pueraria*, *Urtica nivea*, cotton, hemp, *Gerbera delavayi* Fr., and a species of *Rubia*. Two plants were identified as sources for papermaking: a bamboo species and *Broussonetia papyrifera*. Additionally, some plants were used as food, notably the young shoots of a tree he

tentatively identified – likely *Aralia chinensis* L. – and a species of morel mushroom.[37]

4 The Muséum's Allocation to Delavay and Delavay's Shipments to the Muséum

Botanical collecting and the shipment of herbarium specimens, along with other items, were primarily a matter of economics. A recent study by Samuel Gicquel shows that Armand David was the first missionary to receive a financial allowance from the Muséum in 1862, during his first mission to China, in addition to the stipend provided by the Ministry of Public Instruction. By 1870, the total amount allocated to David by these two institutions had reached 37,000 francs. Subsequently, between 1884 and 1913, fourteen missionaries benefited from the financial support of the Muséum (Gicquel 2023, 133-5). Delavay was among the first to receive it, starting in 1884, thanks to David's intermediary role. As evidenced by the accounts in some of his letters, Delavay indeed relied on the Muséum's funding to send his collections.

4.1 The Allocation of the Muséum to Delavay

From 1884, Delavay received an annual allowance of 2,000 francs from the Muséum.[38] However, he considered this amount "too large and beyond my needs, even assuming more numerous trips and more considerable shipments", as he mentioned to Franchet in a letter dated May 19, 1886. For the 1887 allowance, he declared that "I have no need for it, as the 1886 allowance is still untouched and will only arrive here at the beginning of next year".[39] Nonetheless, the Muséum continued to deposit the money from 1887 to 1889 into his managed account, despite his annual insistence that he had very few expenses and did not need the allowance every year. For the surplus funds during these years,[40] he asked Franchet to dedicate a portion to "adding some plates" to the work on *Plantæ Delavayanæ*, which Franchet had initiated in 1886, and for its publication.[41]

37 Cf. Delavay's letters dated May 5, August 13, October 6, November 6, 1887; September 12 and October 15, 1888; January 7, April 5, and November 18, 1889.

38 Letter dated May 17, 1884; May 19, 1886; and October 6, 1887. Note that 1 franc in 1880 is equivalent to 3.80 euros.

39 Letter dated September 6, 1886. Cf. also the letter dated May 5, 1887 which expresses the same idea.

40 Letter dated October 6, 1887; June 16, 1889.

41 Letter dated July 6, 1886; March 6, 1887; and May 26, 1888.

It seems that in 1890, the Muséum did not provide the allowance to Delavay, even though he spent 200 francs on a copy of *Plantæ Delavayanæ* for "a friend to aid in the identification of plants in this country",[42] as well as a significant sum for the purchase of Hooker's *Genera Plantarum*.[43] This led him into a financial crisis in 1891 upon his return from Hong Kong to Kunming. In a letter from that year, he informed Franchet that to carry out his project of collecting in Lijiang again, "I have no money at all" and "I can only make this trip if I receive the allowance you mentioned".[44] Additionally, to send a hundred of his large herbarium packages left in Dapingzi, he announced that he needed 700 or 800 francs.[45] Franchet quickly resolved the issue.[46] His last letter on this matter dates from October 10, 1893, barely twenty days before his departure for Yunnan. In this letter, Delavay expresses his refusal of an allowance from the Société de Géographie, while also indicating that the Muséum seemed hesitant to grant a new allowance.[47] Prompted by Franchet, the Muséum ultimately allocated 900 francs to him in December 1894.[48]

4.2 The Shipments of Herbarium by Delavay and Their Quantification at the Muséum

Financed by the Muséum, Delavay seemed to be bound by an agreement stipulating that he had to send his collections. In the letters dated May 19, 1886, and June 16, 1889, he writes:

> Outside of the Muséum, I do not send any plants except for very small shipments to a few old friends in Savoy and Switzerland, shipments that contain only the specimens listed in your catalogues, and on this point, I have made an exception only for Canon Chevalier of Annecy, who also receives your descriptions.[49] (Letter dated May 19, 1886)

42 Letter dated February 27, 1890. Cf. also the letter dated September 24, 1890.

43 This probably refers to *Genera Plantarum* (Bentham and Hooker), a seven-volume work published from 1862 to 1883, presenting Bentham and Hooker's classification.

44 Letter dated February 24, 1891.

45 Letter dated April 2, 1891.

46 Letter dated October 17, 1891 and November 29, 1891.

47 Letter dated October 10, 1893.

48 He writes in the "Minutes of the Professors' Meetings" from the session of December 4, 1894, regarding this allocation: "Abbé Delavay, who is returning to China, and whose shipments have allowed for the knowledge of the two distinct floras of Yunnan and Sichuan". On the same page, there is also the mention of 1,000 francs to Faurie in Japan, 1,000 francs to Farges in Sichuan, and 900 francs to Bon in Vietnam. Cf. AM16, no. 11.

49 In Delavay's obituary, Franchet (1896a, 145) confirmed this fact: "he committed to sending henceforth to our national Herbarium all the collections he could gather in China".

Franchet confirmed this commitment in the obituary dedicated to Delavay: "He undertook to send all the collections he could gather in China to our national Herbarium". [50] However, the total number of herbarium specimens and other botanical samples sent by Delavay to the Muséum is subject to several differing estimates, which still need to be examined and clarified.

Firstly, there are the two versions reported by Franchet in his articles in tribute to Delavay, published within a short period in 1896, one on April 16, and the other after on April 28:[51]

> From 1885 to 1896, the Muséum received 7,300 plant numbers from Father Delavay, representing nearly 3,500 species, in addition to 100,000 herbarium specimens. The number of new species for the flora of China discovered by him is estimated at 2,500, and the number of entirely new types is nearly 1,800. No exploration has yielded such results, especially considering that the exploration field visited by Mr. Delavay was scarcely half the size of one of our departments. (Franchet 1896a, 145)

> Thus, the number of specimens sent exceeds 200,000, with well-prepared herbarium parts reaching 80,000, of which the Muséum retains about a quarter. The number of species, both phanerogams and cryptogams, is over 4,000, and, a surprising fact in botany, at least in our time, the number of entirely new species to science is not less than 1,500. The total number of species by which Father Delavay has increased the flora from China can be estimated at 3,000. (150)

A 'plant number' in Delavay's collection refers to a number assigned to an herbarium specimen, often accompanied by a number of duplicates. In his letter of May 5, 1887, Delavay clearly states that the five packages in this shipment contained numbers "ranging from No. 2500 to No. 2607, with a certain number of duplicates interspersed". In his letter of August 13 of the same year, he mentions that "this year I will have at least 15 large packages to send you, mostly duplicates or nearly so".[52] In the three volumes of the herbarium receipt registers of Delavay, held at the Phanerogamie Library of the Muséum, a total

50 Letter dated June 6, 1889.

51 The first, titled "Le R. P. Delavay", appeared in the *Journal de botanique*, 8, while the second, "Notice sur les travaux du R. P. Delavay", was published in the *Bulletin du Muséum national d'histoire naturelle*, 4, which includes the minutes of the "11th meeting of the Muséum naturalists" held on April 28, 1896.

52 For the duplicate herbarium specimens, cf. also the letters dated November 11, 1886; May 5, 1887, June 16 and October 13, 1889.

of 6,165 numbers are recorded,[53] whereas the "7,300 plant numbers" mentioned by Franchet likely reflect a more exhaustive accounting, including additional supplements.

It is quite possible that, if the second article was written shortly after the first, Franchet re-examined and recalculated the number of Delavay's specimens. Thus, three figures have been modified: from 100,000 to 80,000 for the number of herbarium parts, from nearly 3,500 to more than 4,000 for the number of species, and from 1,800 to 1,500 for the number of new species. It should be noted that in research concerning Delavay's contribution, the figures from the second series are most frequently cited. Regarding the total of 200,000 specimens, aside from the 80,000 herbarium sheets, the remaining 120,000 specimens must, for the most part, consist of seeds, as evidenced by the numerous shipments mentioned in his letters.

There is also a third version, initially presented in an article by Olivier Colin and Brigitte Fourier, according to which Professor Gérard Aymonin states that the Muséum owes Father Delavay approximately 33,000 herbarium sheets, currently housed in the 'Asia' herbarium of the Phanerogamy Laboratory (Colin, Fourier 2008, 223). This figure was recently refined by Samuel Gicquel, who notes that the Muséum's plant entry files record 37 shipments from Delavay, totalling 33,196 herbarium sheets. The author challenges Franchet's version in his first article (100,000 herbarium sheets), though it is unclear whether Franchet was exaggerating or relying on a different accounting (Gicquel 2023, 126).

The discrepancy between the figures for the herbarium sheets received by the Muséum – ranging from 100,000 to 80,000, and then to over 30,000 – is substantial. Which figure is the most reliable? The analysis of Delavay's letters, which detail each shipment, along with the register of Delavay's herbarium receipts, provides us with a pertinent answer.

It should first be noted that, in order to send herbarium specimens and seeds, Delavay made his own "strong boxes" that were "well tied" in two sizes: the "large package", intended for plant specimens, and the "small package", reserved for seeds.[54] For herbarium specimens, Delavay specified that each package contained between 80 and 100 species, with herbarium sheets measuring 45 cm by 28 cm and weighing about 4 kg.[55] However, he did not specify the size of the small packages, and on occasion, he inserted small packets of seeds in letters. Additionally, for certain herbarium shipments, he also used, as

53 Archive of the Bibliothèque de Phanérogamie, Muséum national d'histoire naturelle: CR-GF-124.

54 Letter dated April 4 and December 12, 1886.

55 Letter dated April 4 and December 12, 1886.

mentioned in several letters, "small postal packages" from the Chinese post. At the Muséum, the register only records the receipt of herbarium packages, on which we base the following analyses.

After receiving his first allowance in early 1884, Delavay sent his first shipment to David: "It contains about a thousand species, generally well-dried and in good condition, packed in two equal boxes forming a small load for a horse".[56] From then on, until Delavay's death, his herbarium specimens were almost entirely sent to the Muséum, "except for a few small shipments to some old friends from Savoie and Switzerland" (as mentioned above). For all the large packages sent until April 1890, he listed them in three consecutive series: first from ME·A, ME·B... to ME·Z (ME written  in the manuscripts of Delavay, including the Missions étrangères), then from ME·AA, ME·AB... to ME·AZ, and finally from ME·1, ME·2... to ME·11.[57] However, in his letters after April 1890 at the time of his departure from Dapingzi, we no longer find any mention of the enumeration of the packages: he could no longer continue this inventory system for the packages left in Dapingzi and those of the newly collected herbaria up until the eve of his death in 1895.

The shipments of herbaria and other specimens by Delavay to the Muséum were frequent and enormous.[58] Here are some examples mentioned in his letters. In the letter dated February 25, 1885, he announced the shipment of four crates (packages) containing herbaria of 1,500 species. In the letter dated November 11, 1886, he reported four shipments: four packages in March (nos 1711-2030), five packages on May 20 (nos 2031-2063), one small package on June 16 (nos 2069-2085), and one package on September 11 (nos 2086-2108). In five letters from 1887, he announced the shipment of five packages (nos 2500-2607 plus duplicates) on May 5, a package of seeds on August 13, four or five large packages on November 3, and three packages on December 30. In the letter dated March 14, 1888, Delavay noted that it was his nineteenth shipment, and five months later, he sent another 20 large packages.[59] Then, in the letter dated October 15, he announced two more shipments, one via San Francisco and the other via Suez, saying that "I still have at least 25 large packages to prepare and send". After his departure from Dapingzi, in a letter from 1891 written in Kunming, he informed Franchet "my plant

56 Letter dated May 17, 1884.

57 Letter dated November 6, November 30, December 14 and December 30, 1887, January 22, 1888, and April 25, 1890.

58 In his letters, Delavay informs us that a Chinese postal courier regularly came to Dapingzi – most likely once a month – to collect his letters and plant specimens for shipment.

59 Letter dated September 12, 1888.

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collections from Yunnan are in Tapintze and contain about a hundred large packages with many good specimens".[60] Finally, upon his return to Yunnan in 1893, the shipments during his last two years of life were also abundant: six or seven packages announced in the letter dated August 29, 1894, five packages in the one dated October 27, 1895, and another seven new packages in the letter shortly before his death, dated December 9, 1895.

In addition to his own shipments, starting in 1891, Delavay sought help from three individuals to send a significant portion of his samples. Firstly, Jean-Marie Le Guilcher and François Ducloux,[61] his colleagues in Dali and Dapingzi, were entrusted with sending his herbaria left in Dapingzi (about a hundred large packages).[62] Secondly, there was Prince Henri d'Orléans, who was exploring Yunnan in 1895. Delavay mentioned his request for assistance: "As Prince Henri d'Orléans was sending a five-horse load of several trunks and crates to the Muséum, I added one package of plants destined for the Muséum to each horse, asking the consul of Mengzi to pack these packages with the Prince's shipment".[63]

The following table gives an overall estimate of the number of packages, mainly herbaria, mentioned in his letters.

Table 2 Number of Delavay's packages (herbariums) sent to the Museum between 1884-1895 (shipments mentioned in Delavay's letters)

Period of Shipments	Number of Packages	Sender	Place of Shipment
March 1884-April 1890 (Delavay in Dapingzi)	63 (ME·A to Z, ME·AA to AZ, ME·1 to 11)	Delavay	Dapingzi
1891-1893 (Delavay in France)	100 (approximately) (specimens left in Dapingzi)	Le Guilcher and Ducloux	
1894-1895(Delavay in Yunnan)	15 (approximately)	Delavay	Yunnan
1895	5	Prince d'Orléans	Yunnan
Total	183		

The Herbarium Library of the Muséum (Bibliothèque de Phanérogamie) houses an archive titled "CR-GF-124 (1) and (2)", which contains the catalogues of Delavay's herbarium numbers, written on several large sheets and in three notebooks, as well as the register

60 Letter dated April 2, 1891.

61 François Ducloux (1864-1945), missionary of the MEP and successor to Delavay at Dapingzi (1890-93), superior of the MEP minor seminary in Kunming (1895-1908), and provicar of the Yunnan mission (1908-34).

62 Letter dated April 2, 1891, October 23, 1892, and February 4, 1893.

63 Letter dated October 27, 1895.

of herbarium packet receptions, written on a cardboard sheet, front and back **[fig. 3]**.[64]

We record 38 shipments in this register, 37 of which were sent during his years in Yunnan and 1 in 1896, after his death. The first ones primarily correspond to Delavay's mentions of his shipments in his letters. For example, in the letter of March 14, 1888, Delavay announces that this is his nineteenth shipment, and in the register, the nineteenth shipment is dated May 31 of the same year, while the last recorded package number is ME·Z. Concerning the number of herbaria in certain shipments, the figures provided by Delavay and those in the register can be either identical or, more often, different. In the former case, we can cite the example of a small postal package mentioned in the letter of June 16, 1886, containing numbers 2069 to 2085, while in the register, the herbaria received on December 18 of the same year are exactly 17. In the latter case, the number given by Delavay is often an approximate estimate, such as the 1,500 species (herbaria) in four crates announced in the letter of February 25, 1885, while the Muséum received only 1,200 herbaria on December 21. Finally, it is important to note that in the register, all duplicates have been recorded, although their quantities are often absent from Delavay's accounts. This is the case with the five packages mentioned in the letter of May 20, 1886, where only 33 numbers are listed, from 2031 to 2063, to which several hundred duplicates must be added. If a package contains a hundred herbaria, this likely corresponds to the 750 received on May 6, 1887, as listed in the register.

Thus, we can supplement certain information recorded in the register:

1. The first fourteen shipments, without numbering, correspond to some unnumbered packages and those numbered ME·A to ME·M in the ME·A to Z series. This can be explained by the fact that shipments from 1884 and 1885 were addressed to David and Bureaux before being forwarded to Franchet. Additionally, in the N to Z list of the register, one package numbered ME·U is missing.
2. In the ME·AA to ME·AZ series in the register, the numbers AP of July 23, 1888, and AC of April 1, 1889, are incorrect; they should be replaced by AF and AG. Furthermore, six packages are missing: the first five, ME·AH, AI, AJ, AK, and AM, as well as another one, AW. According to the letter of October 13, 1889, three of these packages were lost during the shipping process, while the other two must be those received on May 31, 1889, but without a number in the register. As for package AM, the reason for its absence remains unknown.

64 I had the opportunity to consult and photograph this register in October 2015.

3. The 15,600 herbaria received on April 10, 1893, came from around a hundred packages left by Delavay at Dapingzi and sent by Le Guilcher. The 795 herbaria received on January 9, 1895, seem to be those from the six or seven packages mentioned in the letter of August 29, 1894. The 1,100 herbaria received on February 25, 1896, would have come from the five packages mentioned in the letter of October 27, 1895 (sent by Prince Henri d'Orléans), as well as from the seven packages noted in the letter of December 9 of the same year. Finally, the number of herbaria received on July 4, 1896, sent after his death by the Yunnan mission, remains unknown. It is unlikely to be very high, as it was from Delavay's collection made only a few days between December 9 and 15, 1895, that is, between the date of his last shipment of herbaria to Kunming and his return to Kunming after collecting in the surrounding mountains, two weeks before his death.[65]

With the exception of the three lost parcels and the two unrecorded ones (ME·U and ME·AM), the total of 33,198 herbarium received by the Muséum through the 37 shipments from 1884 to 1896 – an amount noted in pencil and circled at the end of the reception list – is accurate and reliable. To this, we must add the final shipment from 1896, whose number must be very small. The figure of 37 shipments corresponds to the number mentioned by Delavay in his letters, while the number of specimens, even Delavay himself could not know with such precision. Regarding Franchet's estimations, his figures of 100,000 or 80,000 herbarium specimens are not reliable. They represent a rough and exaggerated estimate, without accurate accounting of the preserved specimens or consideration of Delavay's mentions in his letters. The note written at the end of the list of reception of shipments, referencing the date of Franchet's death (in 1900), suggests that he did not have the opportunity to consult this register, which was carefully drafted after his passing. In this regard, it seems necessary to reconsider Franchet's estimates of the total of 200,000 specimens from Delavay, as well as his estimates of 3,500 to 4,000 plant species represented and the 1,800 or 1,500 completely new species.

According to Professor Gérard Aymonin, the Muséum currently holds 15,000 herbarium specimens from Delavay, which are now housed in the 'Asia' Herbarium of the Phanerogamy Laboratory (cf. Lennon 2004). Another portion, of similar size (15,600 specimens),

65 In the notes on Delavay's death, Dr. Paul-Richard Deblenne writes: "Father Delavay, still unwell, had gone back to collect plants in the mountains and had returned to the mission about fifteen days ago". Cf. Deblenne, P.-R. (1895). "Notes sur la mort de Jean-Marie Delavay". AM, Correspondance Franchet, Per K 123, Delavay (J.-M.), n° 173.

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has been exchanged or sold and is held at the *Harvard University Herbaria & Libraries*.[66] These herbarium specimens often bear two seals: one indicating "EX HERBARIO MUSEI PARISIENSIS," signifying specimens from the Paris Museum, and the other "GRAY HERBARIUM HARVARD UNIVERSITY" or a similar stamp **[fig. 4]**. As for the remaining specimens, which number around three thousand, they are distributed across several herbaria in France and around the world, including China, where 303 specimens have been identified through exchanges, with 7 found in Yunnan.

4.3 Itinerary and Organisation of Shipments

According to several letters from Delavay, during his years in Yunnan, his shipments typically followed the same route, divided into four stages, taking six months or more:[67]

- From Dapingzi to Kunming (first leg, 15 days), then from Kunming to Yibin (second leg, 23 days): transport by land route (38 or 40 days).[68] Delavay first bought a horse, then rented more horses, and paid one or more men to transport his crates of samples. In Kunming, the procurator of the Yunnan mission handled the subsequent transport.
- From Yibin (near zone 1 [fig. 1]) to Shanghai (third leg): shipments ensured by the Chinese postal service along the approximately 3,000 km river route of the Yangtze River. In Shanghai, the procurator of the MEP, Mr. Martinet,[69] was responsible for sending Delavay's crates to Marseille.
- From Shanghai to Marseille (fourth leg): shipments ensured by maritime mail via Suez. In Marseille, the procurator Mr. Beauté[70] took over and sent the crates from Marseille to Paris by post.

Moreover, from the beginning of 1888 until the end of 1895, Delavay also sent a certain quantity of specimens, of seeds in particular, via

66 Search engine: HUH - Databases - Botanist Search, with the search for the name "Delavay" (`https://kiki.huh.harvard.edu/databases/botanist_index.html`).

67 Cf. the letters dated the following dates: May 31, 1883; May 17, 1884; February 25 and March 16, 1885; April 4, 1886; March 6, 1887; and October 29, 1894.

68 For transit days, cf. note 32.

69 Jean-Baptiste Martinet (1844-1905), Procurator of the MEP in Shanghai between 1876 and 1891.

70 Louis Beauté (1851-1905), Procurator of the MEP in Marseille between 1879 and 1904.

San Francisco according to Franchet's instructions.[71] Through both shipping routes, the specimens intended for the Muséum could be doubly ensured.

In 1885, Delavay encountered some difficulties with his shipments due to the Sino-French War, which took place between 1884 and 1886 and was related to the protectorate of Vietnam.[72] In a letter dated May of that year, he mentions the refusal of the prefect of Dali to grant him a travel permit for his crates, noting that without this document, "it is very difficult to pass through the numerous customs along the route". Worse still, "no caravan leader, no one, wants to take responsibility for my shipment, regardless of the price".[73] His concerns at the time mainly revolved around the potential loss of parcels[74] and the hostility of certain officers in the river post office at Yibin in Shanghai, about whom he cautiously stated, "I did not dare to put an address in European characters".[75] However, the fact that only three parcels were lost in 1889 – without knowing at which stage of the relay this occurred – gave him some confidence in the Chinese postal system: "It is not the custom of the Chinese post to lose the items entrusted to it", he asserted in a letter towards the end of his life.[76] In reality, as he expressed in numerous letters, the real problem he faced lay in the delays in shipments and the irregular duration of deliveries to the recipients.

In his letters, Delavay mentioned eleven people who assisted him with the shipment of his parcels, almost exclusively intended for the Muséum, as well as with the management of his allocation account. The list of these individuals is provided in table 3 **[tab. 3]**.

71 Cf. the following letters: January 22, May 26, and September 12, 1888, June 6, 1889, March 18 and December 9, 1895.

72 This concerns the second phase of the French expedition to Tonkin in 1884 and 1885, a war between France and China that took place in northern Vietnam for its protectorate. French missionaries in Yunnan felt strong pressure, as Delavay mentioned in the letter of May 17, 1884: "In the meantime, news arrives of the war between France and China in Tonkin, and a certain agitation of minds against Christians and missionaries".

73 Letter dated May 17, 1884.

74 Letter dated December 12, 1886.

75 Letter dated March 16, 1885.

76 Letter dated June 11, 1895.

Table 3 People who contributed to Delavay's shipments

No.	Name	Congregation and position	Service provided to Delavay	Letters
1	Armand David	Lazarist, organiser	Transferred the first shipments	May 31, 1883; May 17, 1884; February 25, 1885; October 27, 1885
2	Jean-Baptiste Martinet (1844-1905)	MEP, procurator in Shanghai	Shipment relay	December 12, 1886; November 18, 1889
3	Meugnot	Lazarist, procurator in Shanghai	Shipment relay	October 27, 1885; March 6, 1887
4	Louis Beauté (1851-1905)	MEP, procurator in Marseille	Shipment relay	April 4 and December 12, 1886; May 5, 1887
5	Maurice Chirou (1828-1911)	MEP, procurator and superior in Paris	Shipment relay; management of allocation account	December 12, 1886; October 6, 1887; September 12, 1888; February 27 and September 24, 1890; October 17, 1891; June 4 and June 11, 1895; October 6, 1895
6	Pierre Fleury (1851-1918)	MEP, procurator in Paris	Managed allocation account	November 22, 1891
7	Prosper-Bernard Delpech (1827-1909)	MEP, superior in Paris	Managed allocation account	September 12, 1888
8	Jean Joseph Fenouil (1821-1907)	MEP, vicar in Yunnan	Financial aid in 1890	September 24, 1890
9	Jean-Maire Le Guilcher	MEP, missionary in Dali	Sent the parcels left in Dapingzi in 1890	April 2, 1891 and November 22, 1891; October 23, 1892; February 4, 1893
10	Émile Rocher (1846-1924)	Consul in Mengzi	Sent from Mengzi	June 16, 1889
11	Henri d'Orléans (1867-1901)	Explorer	Transported the five parcels in 1895	October 27, 1895

The table presents a competent network responsible for Delavay's shipments and the management of his account associated with this activity, consisting of nine religious individuals – seven members of the MEP and two Lazarists – along with two laypersons. Notably, the role of the MEP procurators is highlighted. From Kunming, where the procurator's name is absent in Delavay's letters, to Shanghai, Marseille, and Paris, the four MEP procurators took turns handling Delavay's shipments to the Muséum. Even at the MEP headquarters in Paris (128 Rue du Bac), superiors assisted Delavay by performing various tasks related to financial expenses and other aspects of the collection, such as sending botanical documents and subscribing to

the *Journal de Botanique* for the year 1891.[77] Regarding the two Lazarists, Armand David acted as the intermediary for Delavay's first shipments to the Muséum, while the procurator in Shanghai took charge of sending beetles to David. As for the two laypersons, Émile Rocher, consul in Mengzi, worked to establish a new shipment route from that location, and Prince Henri d'Orléans, during his 1895 expedition, carried five of Delavay's parcels as part of the transport of his own collections from Kunming to Mengzi. More broadly, this network can be seen as a condensed reflection of the collective enthusiasm and collaborative organisation that characterised the engagement of the French elites in botanical science at the time, where individuals from diverse backgrounds united their skills and efforts for a common scientific vocation.

5 Delavay and Franchet: Interactions and Research on Delavay's Collections

Adrien Franchet was a taxonomist botanist at the Muséum. Born in Loir-et-Cher, he was a pharmacy student at the age of twelve, and in 1857 he became the curator of the collections of the Marquis de Vibraye at twenty-three years-old, a position he held until 1880. However, around 1872, he began studying Japanese plants collected by Louis Savatier, his collaborator and friend.[78] His publication on this work from 1875 to 1879, titled *Enumeratio plantarum in Japonica sponte nascentium*, caught the attention of Professor Bureau at the Muséum. Franchet was nominated to the Muséum in 1881 as an auxiliary botanist and began studying the collection of Chinese plants by Armand David, resulting in the two volumes of *Plantæ Davidianæ* published in 1884 and 1888 (Franchet 1884; 1888). In 1886, Franchet was officially affiliated with the Muséum as a lecturer as the Chair of Botany at the Laboratory of Advanced Studies (classification and natural families). From the arrival of Delavay's first herbaria in 1885, Franchet continuously worked on identifying and classifying the plants collected from Yunnan until his death in 1900. He also worked on herbaria of other collectors from Southwest China and other East Asian countries.[79]

The correspondence between Delavay and Franchet was essential for their cooperation. On Franchet's side, Delavay's letters provided rich explanatory information about plants that were often difficult

77 Letter dated December 12, 1886 and October 6, 1887.

78 For Savatier's collection, cf. Bretschneider 1898, 2: 826-7.

79 Del Castillo 1900, 158; 161; 167. For Franchet's study, cf. `http://www.rhododendron.fr/articles/article42.pdf`.

to identify, and on the other side, Franchet's inventories of the identified herbaria were a mandatory indication for the continuation of his collection. In some correspondence, they also exchanged reflections on other botanical subjects, such as the origin and distribution of certain plants by genus and species.

5.1 On the Collection and Lists of Collected Plants

As an already experienced collector in France and in the regions of Guangdong-Guangxi where his first mission took place, Delavay was well versed in the general criteria for collection as it applied to Yunnan. Furthermore, his correspondence with Franchet discussed special criteria to complete and improve the quality of his collection and the cataloguing of flora in Yunnan. Thus, in his letter addressed to David on February 25, 1885, Delavay asked Franchet for comments on his "poorly described" herbaria: "I will be all the more pleased to receive his feedback since it makes me focus on specific points and stimulates my interest that sometimes tends to wane". On October 6, 1887, he asked Franchet to show him what plants to collect: "You would do me a great favour by indicating in the margin with any conventional sign the species you especially wish to receive in number". In the letter of March 6, 1887, Delavay echoed a request from Franchet about duplicates: "I can see from your letter that the number of duplicates is insufficient. I will make a good collection of them for you in the coming seasons".

Plant flowers represented an important phase of the collection, whose remarks from Paris Delavay took into account very early on. Already in a letter of 1885, he asked David to give him an "idea of the colour of the flowers". In the letter of May 26, 1888 addressed to Franchet, he emphasised the lack of flower collection:

> As I was convinced that many species could not be identified without the flowers, and since these always eluded my research, I indeed neglected the collection of these plants, but I will rectify this omission.

The lists of Delavay's plants established by Franchet were a recurring subject in Delavay's letters.[80] Indeed, Delavay had his own list of unidentified herbaria, which continued to grow over time. It was actually only Franchet who had the list of Delavay's identified plants;

80 Delavay, letters dated February 25, 1885; January 13, April 4, September 6 and December 12, 1886; November 30, December 4 and December 30, 1887; May 26, January 12 and September 12, 1888; January 7 and July 13, 1889; and October 23, 1890.

this list was itself constantly being updated. Delavay depended on the lists sent by Franchet to better locate a particular plant in his vast collections. Here are the two passages in question.

> I would very much like you to send me the names of all the plants I will be shipping; this will real help me navigate among the large number of genera and species that I will have to classify. It would also help me a lot in my herbarium work. Thanks to this classification, I will better recall the locations to visit for such and such a species to collect the flower or the fruit. (Letter dated February 25, 1885, to David)

> As you can well imagine, the list of new plants was particularly enjoyable. I hastened to verify and label most of the species. For some, the notes from my initial shipments were poorly recorded. I could not identify them: such was the case, among others, for *Viola hookeri*, *Polygala triphyllea*, *Guldenslactia delavayi*, *Morina delavaya*, and *Cyananthus renifolius*. These are the main species I could not find, along with a few ferns. (Letter dated January 13, 1886)

In order to carry out well-organised collections, Delavay required precise lists, including duplicate seed samples: "My attention would thus be kept more alert, and little by little I will be able to meet your request".[81] Concerning the herbarium duplicates acknowledged by Franchet, Delavay needed "the largest possible list of new species".[82] As for species like *Primula listeriaque*, *Indigofera tinctoria L.*, and *Astragalus brachycephalus*, he asked Franchet to indicate the location and date of collection.[83] In response to Franchet's request about a large *Serisia*, Delavay made a general request: "if you could send me the nomenclature of Yunnan plants – for each family in the same way you kindly did for the grass family, I would really like to have this list as soon as possible, because I am floundering in the midst of this jumble of unknown plants".[84]

Each time he received lists, Delavay could not hide his joy and expressed his thanks, as evidenced in the letter of May 26, 1888: "I sincerely thank you for sending the list of grasses and some *Compositae*. Nothing after your letters gives me more pleasure". However, it was not uncommon to encounter difficult moments of waiting, where Delavay became impatient: "You probably already know this, but I

81 Letter dated April 4, 1886.

82 Letter dated December 12, 1886.

83 Letter dated January 12 and January 26, 1888

84 Letter dated September 12, 1888.

repeat: no printed list or brochure has reached me".[85] In the following two passages, we even see a stern Delavay:

> Please send me everything you have published on the plants of Yunnan as soon as possible. You will not lose out because these publications will put me on the track of a multitude of interesting species that I had completely lost sight of. (Letter dated November 30, 1887)

> I have long desired and even somewhat hoped to receive a rough list of the plants I have sent, so that I can identify them myself, even in my spare time. (Letter dated January 7, 1889)

Such a tone from Delavay is exceptional, as in all other letters he always maintained sincere respect for Franchet, without a single unpleasant word. This highlights the importance of Franchet's work: without the identification lists, Delavay became almost blind in his collecting. It should be noted that a few months later, Delavay received three lists of *Pedicularis*, *Rosaceae*, and *Saxifragaceae*, four sheets of *Plantae Delavayanae*, the drawn and engraved plates, as well as a publication by Franchet on *Cypripedium*. In his letter of July 13, 1889, Delavay sincerely apologised for his unpleasant expressions, saying that "at that time I was a bit unwell". Ultimately, as Delavay exclaimed in a letter from 1893 shortly before his return to Yunnan, "the most important thing is that the shipments wait around too long before being studied and classified because nothing is more discouraging for collectors than not having updates of the plants they have collected and sent".[86]

5.2 On the Identification, Description, and Correction of the Collected Plants

Delavay's work in these areas demonstrates his strong skills as a botanist. The few lengthy letters between 1887 and 1888 can even be considered as botanical research articles. An example of this can be seen in the 11-page long letter from August 13, 1887 in which Delavay addressed the following four subjects: 1) a lengthy description of herbarium specimen no. 171, *Podoon delavayi*; 2) a presentation of the twelve species of the *Conifer* genus in the region of his mission, the areas of his collection, and their main morphologies; 3) a warning of an erroneous identification made by Franchet on herbarium

85 Letter dated September 6, 1886.

86 Letter dated April 11, 1893.

specimen no. 1209, a species of *Aconitum*,[87] and a dissertation on its popular use in Yunnan, where its turnip-shaped root is used as a universal antidote, on cotton in the making of cloth, and on bamboo and *Broussonetia papyrifera* in the manufacture of two types of paper;[88] 4) a geographical presentation of the Mekong in the Dali region, as well as that of Dapingzi; 5) a geographical map of the region of his collection **[fig. 2]** accompanied by an explanatory note of the eleven localities indicating their locations and altitudes, along with the latitude of the five important localities; 6) an indication on the dispatch of about fifteen drawings, most likely of plants.

Often intended to identify new species of plants, Delavay's botanical descriptions often emphasise two essential aspects, morphology and botanical geography. For certain plants, his studies are thematic, found in a single letter such as on four species of *Bauhinia*,[89] or in two or more letters such as on species of *Primula*[90] and *Rhododendron*,[91] on the species *Podoon delavayi*,[92] on five species of *Cypripedium*,[93] etc. Here are two examples:

> (On *Cypripedium luteum* Franch.) Flower colour: slipper yellow with a small number of blackish-purple spots on its upper part. These spots are often absent. Lower sepal and petals are most often streaked with yellow and a brownish-purple colour; sometimes almost entirely yellow. Lower sepal (i.e., the one supporting the slipper) is greenish-yellow finely striped with brown. This species is rare, abundant at Hee chan men (Heishanmen 黑山門) pass and also at Kou-Toui (Gudui 穀堆) in Yang iu chan (Yangyushan 羊芋山) and Fang yang tchang (Fangyangchang 放羊場). Rocky limestone terrain between 2500 and 3000 meters in altitude. (Letter dated October 6, 1887)

87 Franchet identified it as *Aconitum napellus*; it is, in fact, *Aconitum episcopale* Levl.

88 Rarely touched on this subject, Delavay's writings in this letter about the uses of these few plants present a certain ethnobotanical character, as shown by his description of *Aconitum episcopale* Levl: "Also, when they [the Chinese] go to dine with those who might poison them for one reason or another, they start by swallowing two or three roots of Tou-la, so that their treacherous friend will be at a loss. This root is held in high esteem throughout Yunnan, and I have heard several missionaries praise its effectiveness. As for me, I have not had the opportunity to use it, not having the advantage of possessing any friends in China, neither true nor false".

89 Letters dated January 22 and January 26, 1888.

90 Letters dated May 5 and July 4, 1887, October 6, 1888, and September 12, 1889.

91 Letters dated December 12, 1886, August 13, 1887, January 22, 1888, and October 27, 1895.

92 Letter dated August 13, 1887.

93 Letters dated October 6 and November 6, 1887.

> (On *Podoon delavayi*) I would ask you to send me a description of *Podoon delavayi* as soon as possible, because there has been confusion in the numbers here or there. My no. 171 is an herb 60 to 80 cm tall with alternate, oval leaves, very small flowers in a terminal cluster or spike, the fruit seemed to me to be a pod; flower and fruit hidden by bracts, first green, then fading out into a yellowish-white colour. Is this your plant, or is it the one of which I am sending you a small sample in this letter? If it's the latter, it is indeed a small tree or a shrub of 5 to 6 meters or a bit more, armed with strong and long spines (# thorns and not spines)[94] all over the lower part. I had mistaken it for a *Rhamnaceae*. This species is very common on all the surrounding hills in sandstone terrains between 1000 and 1800 meters in altitude, hardly exceeding these two limits. You will find some samples in flower and fruit of this plant in the 1886 shipments. (Letter dated August 13, 1887)

Faced with the immensity of herbaria, especially new species, identification was not simple; there were mix-ups and Franchet as well as Delavay himself inevitably made mistakes. In a single letter written on October 6, 1887, Delavay identified three such mistakes: "I believe you were wrong to give up *Ranunculus taliensis* in favor of *R. affinis*," "The *Viola platyphylla* seems to me to be a distinct species from *V. biflora* L.", or "I made a mistake in attributing it to *Cratævia religiosa* [...] Its foliage closely resembles that of *Cedrela tounia*, but I have never seen the flowers or the fruit". Consequently, the botanical descriptions that Delavay made in letters played a decisive role in rectifying problematic or erroneous identifications, such as one on a species of *Rhododendron*: Delavay corrected his own identification from a hybrid species to a genuine species.[95] Similar descriptions were also made on several errors committed by Franchet, such as on the herbarium specimens of *Parnassia* numbered 1, 2, 71, 72, 73, 74, 75, 76, and 710,[96] on two species of *Primula*,[97] on respective herbarium specimens of *Sophora*, *Lespedeza*, *Delphinium*, and *Viola*,[98] etc. In a letter from January 26, 1888, Delavay even pointed out a flaw in the shape of the leaves in Franchet's drawing of *Flemingia vestita* Benth., providing a detailed morphological description.

Compared to the simple indications of the environment of collected plants on herbarium labels (location, soil, topography, altitude), Delavay's descriptions of his collections in his letters can be considered

94 Written in the margin as an erratum, preceded by a pound sign.

95 Letters dated August 13 and November 6, 1887.

96 Letter dated January 3, 1886.

97 Letter dated May 5, 1887.

98 Letter dated January 26, 1888, and November 3, 1887.

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as a kind of botanical/geographical rendition. The information he provided extends to three categories: 1) biotopes of a number of collected plants, 2) geography of an area or region, such as those concerning mountains like Lopingshan 羅坪山 (Lo pin chan),[99] Cangshan,[100] and Heishanmen,[101] as well as Dapingzi[102] and the Lijiang region,[103] etc., 3) geographic collection maps. According to the sources at our disposal, Delavay also drew four more maps of the Dapintzi region,[104] among which two, in manuscript form, are respectively inserted in the letter of February 25, 1885, and in the letter of August 13, 1887. A third, also in manuscript form but undated, is kept in the Phanerogamic Library of the Muséum.[105] As for the fourth, a printed map titled "Sketch of the regions of Yunnan where plant collections were made from 1882 to 1894 by the late Father J.M. Delavay",[106] is inserted as "Supplement V" in Bretschneider's *History of Botanical Discoveries in China* (1898).

Finally, it should be noted that in the letter of July 13, 1889, Delavay corrected six mis-transcribed toponyms from his letters, toponyms that appeared in a register he received, with the erroneous characters underlined: "Yang-iu chan and not Yang-in chan, Nien-Kia-Se and not Mien Kia Se, Koua-la-po and not Hoa-la po, Kiao-che-tong and not Kia-che-tong, Ta-pin-tze (without an accent), Yang tze kiang and not Yang tche kiang".[107]

5.3 On the Origin of Certain Plant Species and their Distributions

This must have been a reflection initiated by Franchet before 1885 during his studies of the plants collected by David and Delavay up to that time. In his communication on July 24, 1885, to the Botanical Society of France, Franchet (1885, 264-72) presented 20 species of

99 Letter dated October 27, 1885.

100 Letter dated May 31, 1883.

101 Letter dated May 17, 1884.

102 Letter dated January 13, 1886, January 30 and August 13, 1887.

103 Letter dated November 11, 1886.

104 These maps all relate to the Paris meridian and not Greenwich.

105 In note 27 of Li's 2020 article (274), where this map was presented for the first time, an error occurred regarding its dating: the map was confused with the one in the letter from August 13, 1887.

106 The date of 1894 is incorrect because the geographical framing of the map only applies to the region of Delavay's collection during the period at Dapingzi (from July 1882 to mid-1890).

107 The six toponyms in *pinyin* and Chinese characters are: Yangyushan 羊芋山, Nianjiasi 年家寺, Gualapo 瓜拉坡, Jiaoshidong 焦石洞, Dapingzi 大坪子, and Yangzijiang 揚子江.

Primula collected by Delavay (16 new species). Then, a discussion on the botanical geography of this species followed:

> Regarding the previous communication [by Franchet], Cosson remarked that the fact of the localization of a large number of new *Primulaceae* species, noted by Mr. Franchet, is of great interest in botanical geography; because it is known that most of the Himalayan plants known to date have a very wide range. This observation is all the more important because the genus *Primula* is far from being one of the richest in species.
>
> Mr. Franchet said on this subject that the Yunnan region also has a large number of new species in the genera *Saxifrage*, *Gentian*, *Pedicularis*, and *Cyananthus*.
>
> Mr. Cosson added that the vegetation of the Taurus Mountains in Asia Minor presents similar phenomena, and he believes that one cannot account for them without tracing back to the primary causes of species distribution.
>
> Mr. Bureau believes that one might arrive at a plausible explanation for the peculiar character of Yunnan's flora by assuming that prior to the historical period, the mountains of this region were separated from the rest of the Himalayas by the sea, and this hypothesis is moreover made very plausible by the confirmed existence of Tertiary deposits in these regions. (272-3)

Franchet undoubtedly consulted Delavay's opinion, as in the letter of September 6, 1886, which responds to the three letters from Franchet written on February 24, April 8, and May 8 of the same year, Delavay expressed his hypothesis on three points about "identical species at enormously distant points from each other with all the intermediate space missing":

> The first is the invariability of the species during the current geological period, which can be made as long as desired. The state of the atmosphere and the chemical constitution of the terrain having not changed the food of the plants, I will thus constantly find the same, their form should not have varied. According to this aphorism: tell me what you eat, and I will tell you who you are. I do not believe that more or less heat and light alone can vary the plant species. The wheat I saw cultivated in the south of Guangdong at 20° north latitude is exactly the same as that cultivated in the mountains of Savoy.
>
> The second supposition is this: during the first part of the current geological period, the area of each plant species was continuous, extending all around its initial center of dissemination, and there came a time when this area was incomparably more extensive than

> it is now. The greater source of heat that existed then on the earth's surface might perhaps make this second supposition more plausible.
>
> I suppose, thirdly, that a series of revolutions and accidents on the surface of our globe, such as successive cooling, a universal flood, and excessive winters in different regions, subjected plants to such trials that several species could only be preserved in the least damaged areas. Hence these large gaps between the different habitats of the same species, such as *Cypripedium arietinum*. But then one must admit that Yunnan and North America were once connected by a mountain range that later collapsed into the Pacific. (Letter dated September 6, 1886)

Franchet's reflection took several years, with his hypotheses appearing in two articles. In 1891, he demonstrated the unique analogy between the vegetation of the high regions of Central Asia and that of the mountains of central and western Europe (Franchet 1891, 140-50). In 1896, he highlighted that

> it is indeed in Central Asia and more particularly in Western China that the specific centre of most of the genera considered rightly as characteristic of the European alpine flora is located. (Franchet 1896c, 485)

According to Franchet, it is in this area where the maximum number of species and the greatest number of accentuated forms for each genus are found, allowing them to be divided into subgenera and sections. From this hub, they branch out towards the West and the East in increasingly diminishing offshoots, while towards the North, the succession of species occurs in groups without continuous links, and towards the South, there is a sudden halt of these genera that characterise the high regions of the temperate countries of the Northern Hemisphere.[108]

5.4 Research Conducted by Other Scholars and Cultivation of Delavay's Seeds

In an 1889 letter, Delavay granted the Muséum, through Franchet as the coordinator, the exclusive right to study his collections:

> It has always been my intention to place entirely at your disposal, or that of Mr. Bureau, all the plants – both phanerogams and

108 For a study of Franchet's hypothesis, cf. Del Castillo 1900, 159-64. For a general presentation, cf. `http://www.rhododendron.fr/articles/article42.pdf`.

> cryptogams – that I have sent to the Muséum, so that you may publish them yourself and with the collaboration of Father Hue, Mr. Bescherelle, Mr. Patouillard, or whomever you deem fit. I fully approve of everything you have done in this regard, and I will confirm this if the need arises. (Letter dated June 6, 1889)

In his correspondence, Delavay mentioned sixteen scientists who received, studied, or collaborated on his botanical or zoological samples collected in Yunnan. These individuals are listed in the following table [tab. 4]. Notably, for Franchet and Bureau, letters addressed directly to them are included. Similarly, letters referring to the relevant collections of Hue, Bescherelle, and Fairmaire – whether or not their names are explicitly mentioned – are also taken into account. However, Armand David, who facilitated the transfer of Delavay's herbarium and beetle collections to the Muséum between 1883 and 1885, is excluded from this list, as it focuses on scientific researchers and botanical garden experts. Likewise, Franchet's son, an amateur entomologist who received a number of beetle specimens, is not included. Nonetheless, letters in which Delavay mentions their names in connection with his beetle collections are catalogued in the section dedicated to Fairmaire.

Table 4 Scientists who received, studied, or cultivated the plants collected by Delavay in Yunnan

No.	Name	Field and institution	Letters from Delavay	Contributions to Delavay's collection
1	Édouard Bureau (1830-1918)	Botanist; Muséum	May 17, 1884; March 16, and October 27, 1885; April 4, May 19, 1886; May 5, 1887; July 27, 1888; June 16, July 13, 1889; and October 23, 1890	Organisation
2	Adrien Franchet (1834-1900)	Botanist – Flora of East Asia; Muséum	In 72 letters	Numerous studies
3	Carl Johann Maximowicz (1827-1891)	Russian botanist – Flora of East Asia	July 13, 1889; March 28, 1891	Brochure on *Pedicularis*
4	Louis Morot (1854-1915)	Botanist – Flora of Southeast Asia	November 22, 1891	Morot 1889
5	Henri Hua (1861-1919)	Botanist; Muséum	February 20, and March 1, 1893	Hua 1892a; 1892b

No.	Name	Field and institution	Letters from Delavay	Contributions to Delavay's collection
6	Henri Ernest Baillon (1827-1895)	Botanist	May 26, 1888	A note on *Rosa*
7	Ernest Cosson (1819-1889)	Botanist – Flora of Algeria; Academy of Sciences	July 27, 1888	Funding 1888
8	Etienne Chevalier (1826-1914)	Botanist; Cathedral of Annecy	May 19, 1886; May 5, 1887	Receipt of specimens
9	Narcisse Théophile Patouillard (1854-1926)	Mycologist	October 6, 1887	Patouillard 1886a; 1886b; 1890a
10	Auguste Marie Hue (1840-1917)	Lichenologist; Muséum	September 6, 1886; July 4, August 13, October 6, November 6, December 14, 1887; September 12, 1888	Hue 1887; 1889
11	Émile Bescherelle (1828-1903)	Bryologist	March 31, 1883; March 16, 1885; July 6, 1886; September 12, 1888; January 7, July 16, November 18, 1889; December 9, 1895	Bescherelle 1891; 1892; 1893
12	Léon Marc Herminie Fairmaire (1820-1906)	Entomologist	May 17, 1884; February 25 and October 27, 1885; May 19 and December 12, 1886; January 30, March 6, October 6, and November 6, 1887	Fairmaire 1886a; 1886b; 1887
13	Alphonse Milne-Edwards (1835-1900)	Mammalogist; Muséum	November 11, 1886; May 5, 1887	?
14	Pierre Marie Heude (1836-1902)	Conchyliologist, Jesuit in Shanghai	May 17, 1884; May 19, 1886; November 6, November 30, and December 4, 1887; and September 12, 1888	Heude 1885; 1890
15	Maurice de Vilmorin (1849-1918)	Nurseryman; Muséum	September 24, 1890, June 11, 1895	Planting at the Jardin des Plantes

No.	Name	Field and institution	Letters from Delavay	Contributions to Delavay's collection
16	Alphonse Beck (1822-1902)	Doctor; Société Valaisanne des Sciences naturelles	February 4, 1893	Request for seeds for the botanical gardens in Valais

The table lists eleven botanists, three zoologists, and two botanical garden experts, all of whom are renowned specialists. Among them, only Heude resided in Shanghai, and Beck in the Valais region (Switzerland), while all the others were French, affiliated with the Muséum and Paris. Regarding Delavay's collections, it was primarily David, Bureau, and Franchet, with the latter being the most involved, who received the majority of Delavay's specimens and who also requested him to collect specimens for other specialists, with the exception of those sent to Chevalier, Heude, and Beck due to personal connections.

The research results conducted by both the specialists to whom the Yunnan samples were sent and other researchers quickly enriched global catalogues and highlighted Delavay's achievements. In botany, Franchet is undoubtedly the foremost taxonomist who contributed to the discovery of Delavay's plants: the vast majority of his nearly eighty articles published between 1884 and 1900 were fully or partially dedicated to them (cf. Del Castillo 1900, 169-72). In 1889-90, Franchet published the three-part monograph *Plantæ Delavayanæ* (Franchet 1889-90), although the plants recorded in it represent only a small fraction of Delavay's collection. According to Franchet's original plan, the work was intended to consist of 20 volumes. In addition to Franchet, Hue described 139 lichen specimens in his articles from 1887 and 1889, Patouillard reported 74 mushroom specimens in 1886 and 1890, not to mention Hua's work on *Polygonatum* and *Aulisconema* from Delavay's collection, as well as Morot's studies on the genus *Podoon*.

In zoology, the entomologist Fairmaire recorded 77 new beetle specimens in a single article in 1877.[109] Regarding shells, Heude devoted a significant part of the two volumes of his work on molluscs to Delavay's specimens, marked either as collected under his name or as collected from the Dali region (cf. Heude 1885, 1; 1890, 2), which must have come from Delavay's collection. The receipt of these articles, sent by Franchet or by Heude from Shanghai, was a "true joy" for Delavay;[110] he always asked Franchet to convey his sincere thanks to the authors.

The arrival of Delavay's herbarium specimens at the Muséum and the taxonomic work dedicated to them at the same institution

109 For recent research on Delavay's beetles, cf. Deuve 2022.

110 Delavay, letter dated October 6, 1887.

promptly initiated a current of comparative botanical research on a global scale. For example, take the volumes of the *Journal of Botany* from a single year, 1890, where four studies referenced Delavay's new discoveries. Patouillard, in his research on the mycological flora of Tonkin, presented the relationships of the Balansée variety with *Polyporus delavayi* Pat (Patouillard 1890b, 16). Regarding the Mo-ku-sin (*Lysurus mokusin*), the same author indicated that since the discovery of this fungus by Pierre-Martial Cibot (1727-1780) in the 1770s, research on the *Lysurus* genus from 1822 to the 1880s had been contradictory, while "a new study of Mo-ku-sin became necessary; this is what we have tried to do with the help of specimens collected in Yunnan by Father Delavay".[111] Concerning the genus *Trentepohlia*, Paul Hariot (1854-1917) observed that the species *Trentepohlia aurea* "still exists in Africa on Ascension Island (*Gordon in herb.* Kew), in Yunnan (Delavay), and in Tonkin" (Hariot 1890, 86). Finally, Louis Morot (1854-1915) compared the anatomy of *Podoon delavayi* and *Dobinea vulgaris* to conclude that "there is reason to associate the genus *Podoon* with the genus *Dobinea*" and that these two genera "should indeed be classified in the family *Anacardiaceae*, of which they would constitute a special group" (Morot 1890, 363-4). In other words, the research on Delavay's herbarium specimens conducted by scholars at the Muséum actively integrated these specimens into the development of the botanical system. In this regard, Lu Di's assessment of the role of Mo-ku-sin specimens is quite revealing: "Cibot's article and Delavay's specimens, no doubt, had boosted novel taxonomic ideas and observations within dynamic scientific networks that crossed geographical boundaries and created intellectual connections" (Lu 2022, 101).

5.5 Seeds as Another Contribution of Delavay

Seeds represented another significant aspect of Delavay's contributions. Beyond his herbarium collections, seeds made up the majority of the 120,000 specimens he amassed. In forty-five letters, Delavay detailed his work with seeds, linking them to his botanical collections and shipments to the Muséum, where around twenty genera[112] and forty plant species were documented. Among these, seeds from the genera *Rhododendron* and *Primula* were particularly prominent,

111 Patouillard 1890c, 253-4. For a study on the history of the discovery and research of Mo-ku-sin, cf. Lu 2022, 100-2, for the section concerning Delavay.

112 For a large portion of the plants he collected, Delavay was only able to identify them at the genus level, while the identification of their species had to be completed by Franchet or other taxonomists in Paris.

with eight and ten species mentioned, respectively. Examples include *Rh. cabrifolium*, *Rh. delavayi*, *Rh. bureavii*, *Rh. racemosum*, as well as *P. malacoides*, *P. auriculata*, and *P. bella*. Regarding other species, the list includes *Indigofera pendula*, *Indigofera delavayi*, *Musa lasiocarpa*, *Koelreuteria bipinnata*, *Paeonia lutea*, and *Clematis delavayi*. Delavay often provided cultivation notes for these plants, highlighting their adaptation to Parisian climate conditions, whether in an orangery or outdoors.[113] For certain species, such as *Primula forbesii*, he specifically emphasised the importance of carefully preserving the seeds, given their rarity and difficulty to recollect.[114]

At the Muséum, Delavay's seeds appear to have been catalogued under the account of Maurice de Vilmorin, a renowned horticulturist at the Jardin des Plantes. These seeds were subsequently sown in the Jardin des Plantes and other nurseries, such as the Arboretum des Barres in Loiret, with varied outcomes: some germinated and thrived over time, while others failed to survive. From afar, Delavay frequently inquired about the progress of these plantings in his letters to Franchet, expressing joy upon learning that certain seeds, like *Primula poissonii*, had germinated or were growing successfully.[115] Meanwhile, Vilmorin also sent Delavay's seeds and plants to Kew Gardens in England and the Arnold Arboretum in the United States. Over time, these plants became established in gardens worldwide, with several becoming familiar species. Notable examples include *Rhododendron racemosum*, *Sorbus vilmorinii*, *Corylus chinensis*, and *Ligustrum delavayanum*.[116]

6 Conclusion

The collaboration between missionary-scientific collectors, engaged in their apostolic missions in remote parts of the world, and the Muséum represented a widespread model in the taxonomic research of the latter half of the nineteenth century, particularly in botany and zoology. On a broader scale, other missionaries were also associated with various institutions that, directly or indirectly, maintained ties with the Muséum. Among these were the Heude Museum, founded by Jesuits in 1868 in Shanghai, and the International Association

113 Cf., for example, the letters dated December 12, 1886, October 6, 1887, January 26, 1888, and October 27, 1895.

114 Letters dated January 7, 1889, February 24, 1891.

115 Letters dated August 13 and November 6, 1887; February 27, 1890, and October 6, 1895.

116 For the introduction of iconic plants collected by Delavay into horticulture, particularly in France and England, cf. Kilpatrick 2014, 113-19.

for Botanical Geography, established by Hector Léveillé, a former MEP missionary in India, in Le Mans in 1892. Through the discovery of new elements classified into families, genera, and species, these partnerships significantly contributed to the enrichment, refinement, and advancement of the universal taxonomic system. While the contributions of these other institutions were less extensive and influential than those of the Muséum, they collectively demonstrated the unwavering commitment of French naturalists, both professional and amateur, from diverse backgrounds, to the progress of botany as a modern science.

In this study, we have highlighted several dimensions of this collaboration, exemplified by the remarkable partnership between Delavay and the Muséum, with Franchet playing a pivotal role. Analysing primary sources, including Delavay's sixty-three letters – unique and invaluable documents – has illuminated the intricate details and processes of their cooperative work. In this collaboration, Delavay and Franchet take center stage as bilateral partners in collection and research, while the Muséum and the MEP provided crucial support in the background, leveraging their respective resources and expertise: the Muséum through scientific and financial aid, and the MEP through its administrative system of procurators. On a deeper level, this collaboration was facilitated by specific political and social contexts in both France and China. In France, the growing enthusiasm for natural sciences fostered such endeavours, while in China, missionaries were granted freedom of movement across the country, enabling their explorations and collections. This collaboration emerged as the product of a complex mechanism, integrating field collectors, laboratory researchers, research institutions, and religious congregations. Like a finely tuned machine, each element was indispensable, and it was through their synergy that this scientific success was realised.

Regarding Delavay, who uniquely combined the roles of missionary and botanical collector, three essential aspects stand out in the coordination of these roles. First, his botanical collections were predominantly conducted within the regions of his evangelical administration and along the routes of his extensive travels related to his mission, irrespective of their primary purpose. These dual vocations became inseparably intertwined, pursued simultaneously and harmoniously throughout his life. Second, his expertise as a botanist is particularly notable. While his meticulous herbaria and specimen labels attest to his skill and precision as an outstanding botanical collector, his letters reveal a true scholar. These correspondences include highly professional descriptions of morphological and bio-geobotanical characteristics of numerous plants, as well as theoretical exchanges with Franchet on topics such as the origin and dissemination of botanical geography. Finally, his personal qualities – modesty, integrity,

generosity, and above all, his selfless dedication to botany – played a decisive role. These traits ensured the exemplary effectiveness of his scientific collaboration with Franchet, which remains a model of cooperative research.

In the broader context of the collaborative discovery of Chinese flora during the late nineteenth century, Delavay was one of the most prominent botanical collectors among many missionaries from various apostolic congregations. These missionaries, not only in China but across Asia and the world, also devoted themselves to this scientific cause. By forming a remarkable 'entity' with the Muséum, this collective effort played a pivotal role in advancing the universal taxonomic system and establishing botany as a modern science. In this regard, the recent emergence of new research into the intrinsic collaboration among missionaries, religious orders, and scientific institutions holds significant interest (cf. Perrus 2016; Gicquel 2023). Rather than focusing solely on the scientific results of their cooperation, this approach aims to shed light on the multilateral mechanisms and processes that led to the production of these outcomes.

Figure 1 Main zones of Delavay's collection in Yunnan (1882-1895). Zone 1: Headquarters of the Yunnan mission. Zone 2: Apostolic district of Dapingzi. Zone 3: Mengzi. Zone 4: Kunming

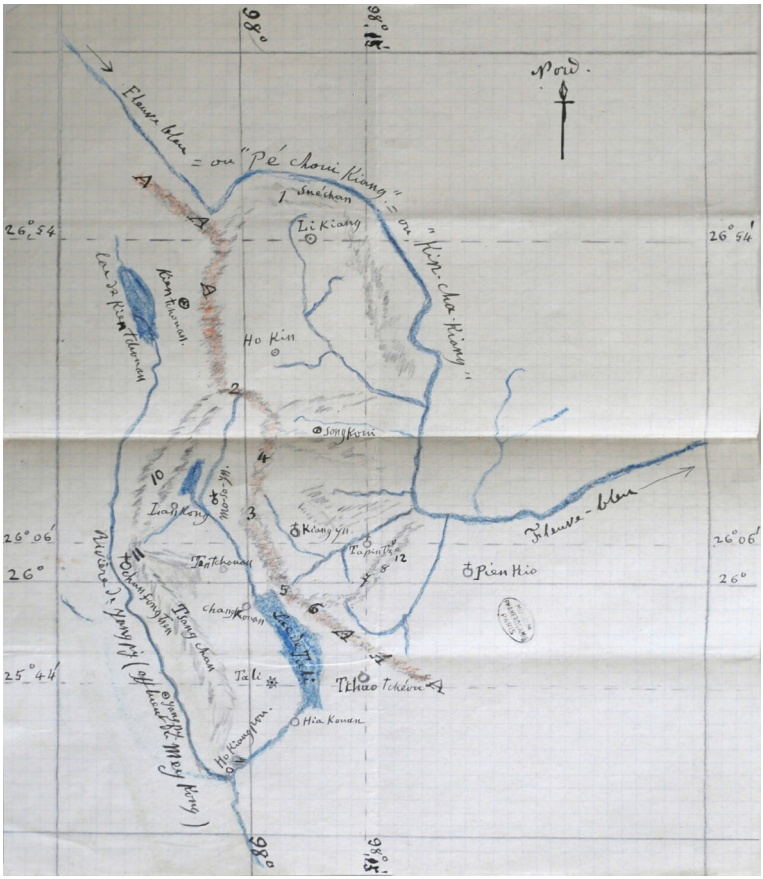

Figure 2 Delavay's collection zone in the apostolic district of Dapingzi and surroundings (July 1882 to mid-1890; area: approximately 100 km × 28 km. Map sketched by Delavay himself, in the letter of August 13, 1887)

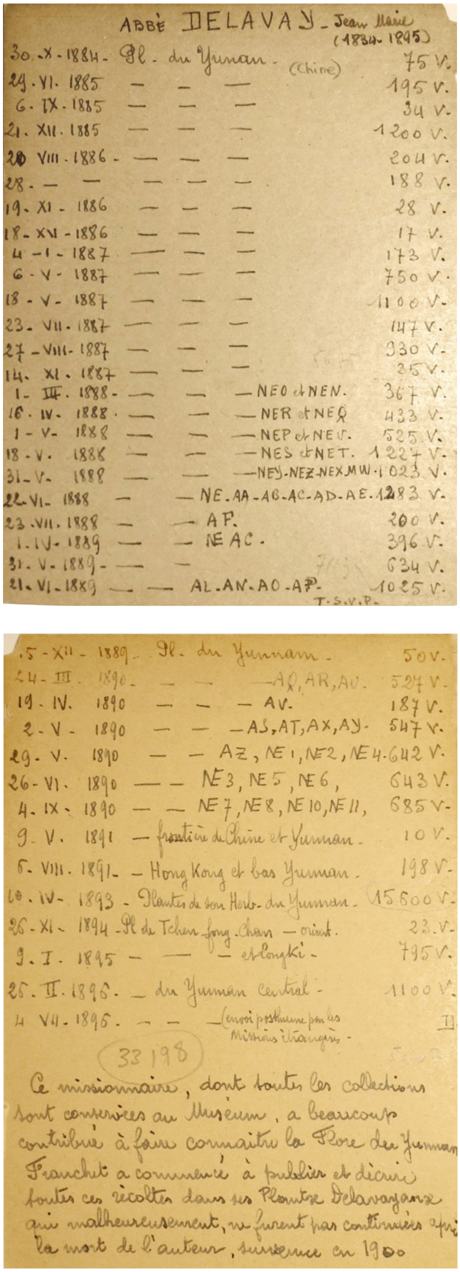

Figure 3 Register of the receptions of herbarium packets sent by Delavay. Archive of the Herbarium Library, Muséum national d'histoire naturelle: CR-GF-124. (Erratum: NE [NE] in the register is an erroneous transcription of ME [Delavay's manuscript for ME: Missions étrangères])

Figure 4 Two herbarium specimens of *Rhododendron* collected by Delavay, preserved at Harvard University Herbaria & Libraries

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Abbreviations

BSBF: Bulletin de la Société Botanique de France.
JB: *Journal de Botanique*

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AMEP (Archives MEP), 0939 J-M Delavay.
AM (Archives du Muséum national d'histoire naturelle), Correspondance Franchet, Per K 123, Delavay (J.-M.) 103-173, 3 Cartes & Documents sur Mong-tsé 174-177.
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