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Research article

Richard Maack and his contributions to the botany of Siberia

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A brief account of the biography of Richard Maack (1825–1886) is provided, with an emphasis on his botanical travels and research presented in the context of contemporary politics and sciences. The history of three Siberian expeditions of the Imperial Russian Geographical Society is detailed: to the Viluy River in 1853–1855, to the Amur River in 1855–1856 and to the Ussuri River in 1859–1860. Scientific and curatorial treatments of botanical collections of these expeditions are reviewed. The botanical works based on the Amur and Ussuri expeditions are analysed, and more precise dates of their effective publication are traced from contemporary sources. The corrected nomenclature is provided for *Carex wiluica*, *Chloranthus mandshuricus*, *Ligustrina* and *Nymphaea wenzelii*. *Chloranthus japonicus* is re-established as the correct name for *C. mandshuricus* in place of the recently resurrected *C. quadrifolius*. Lectotypes are designated for *Carex wiluica*, *Chloranthus japonicus* and *C. mandshuricus*; the previously designated lectotype of *C. japonicus* is superseded because of being in conflict with the protologue.

Keywords: bibliography, botanical nomenclature, *Carex*, *Chloranthus*, history of botany, lectotypification, *Nymphaea*, Russian Empire, Russian Far East, Russian Geographical Society, Siberia, *Syringa*

Introduction

During the first part of the 19th century, under the treaty of Nerchinsk, which was signed by the Tsardom of Russia and the Qing dynasty of China in 1689, the course of the Amur River, formed by the confluence of the Shilka and Argun, was part of Chinese Manchuria. The treaty had suspended the first Russian conquest and colonisation of northern Manchuria, which was attempted in the mid-17th century (Yakovleva 1958).

In the 19th century, the territory of China had been surveyed by British and French geographers, mostly the English military and the French Jesuits, who compiled overview maps of the country including its remote provinces and dependencies. Although this work was reasonably accurate, it was considered not completely reliable regarding the territories lying north of the Great Wall (Williams 1849).

While exploring the wilderness of Siberia, Russian geographers penetrated neighbouring territories belonging to the Chinese Empire in hope to improve existing maps

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of these remote and poorly known areas. The expedition of Alexander von Middendorff arrived to the Amur River in 1844 and travelled extensively in northern Manchuria, although it failed to reach the desired mouth of the Amur (Tammiksaar and Stone 2007). This expedition resulted in the important observation that the Amur River was not effectively controlled by the Chinese (Venyukov 1877). Moreover, the Chinese and Korean colonisations of this territory had not started at that time (Nesterova 2004). These news gave a strong impulse to the idea of re-gaining the Amur lands for the Russian Empire by the virtue of their silent colonisation and subsequent overtake (Venyukov 1877), since the whole course of the Amur had been pronounced Russian and considered to fall under the Russian rule with the approval of the expansion by the Russian Emperor Nicholas I in 1851 (Alexeev 1974). This political process was accompanied by intense research on the landscape and nature of the then Chinese northern Manchuria by many Russian geographers, topographers, ethnographers and naturalists since the beginning of the 1850s (Ravenstein 1861, Venyukov 1877). The scientific expeditions were organised by the Imperial Academy of Sciences in Saint-Petersburg, Imperial Russian Geographical Society and Imperial Botanical Garden in Saint-Petersburg, whereas the topographic works were undertaken by the military personnel.

One of these scientific explorations, which was commissioned by the Imperial Russian Geographical Society and resulted in, among other things, significant botanical collections and remarkable publications, was the expedition by Richard Maack to the Amur River in 1855–1856. Although it was part of a large botanical enterprise supervised by Franz Josef Ruprecht at the Imperial Academy of Sciences in Saint-Petersburg that culminated in the publication of one of the best Russian botanical monographs of the 19th century, the seminal *Primitiae florae amurensis* (Maximowicz 1859), this expedition had particular scientific significance and its own botanical outputs of considerable importance. It served as a foundation for taxonomic research on the Amur flora, from which many exotic plant species and even genera became known to science, including *Maackia amurensis* Rupr., *Phellodendron amurense* Rupr., *Prunus maackii* Rupr. etc. (Maack 1859).

During the ongoing inventory of type specimens of vascular plants described from Siberia and kept at the Komarov Botanical Institute (Sokolova 2012, 2018), we noticed discrepancies in nomenclatural references for some plants described on the basis of the Amur expedition by Maack. References cited in IPNI (www.ipni.org), Tropicos (www.tropicos.org) and various printed Russian sources indicated the near-simultaneously published Maack (1859), Maximowicz (1859), Ruprecht (1859a, b) or even Regel (1861) as competing places for valid publication of plant names with uncertain priority. These uncertainties made the nomenclature of those plants chaotic and incompatible with the strict requirements of modern databases.

For historical reasons, while plant species names based on specimens collected by Maack and published in academic journals were carefully and precisely indexed in 'Index Kewensis' (now transferred to www.ipni.org), those appearing in books and other standalone publications were either not recorded or incorrectly indexed. The main Russian-language publication on the Amur expedition (Maack 1859) was missing in major international botanical bibliographies (Stafleu and Cowan 1981) and also escaped indexing in 'Index Kewensis'. Another problem was a number of publications with closely similar contents that appeared at short intervals in the same year and therefore obscured the priority. Besides, we noticed that the botanical collections of Maack were not properly known to present-day botanists due to a lack of historical overviews, and consequently these collections were imprecisely cited (Wu et al. 2022).

The primary aim of this study is to elaborate a more precise bibliography of botanical works related to the expeditions of Richard Maack, to trace and analyse the history of his botanical collections, and to clarify the correct nomenclature (places of valid publication, typifications) and taxonomy for some tricky plant names established on the basis of his collections and published outside academic journals. The historical background for this work is provided with a brief account of the biography and scientific activities of Maack, placed in the context of political life and scientific development in the mid-19th century.

Material and methods

Maack's biography was compiled from published sources (Lipschitz 1952, Varep 1975, Jääts 2010, 2021, Laane 2010), whereas relevant details of his work were borrowed from his own publications (Maack 1859, 1862, 1877, 1883), from contemporary reports and minutes of sessions and meetings of the Imperial Russian Geographical Society and its Siberian Department, published in Zapiski Imperatorskago Russkago Geografičeskago Obščestva, Zapiski Sibirskago Otdela Imperatorskago Russkago Geografičeskago Obščestva and Vestnik Imperatorskago Russkago Geografičeskago Obščestva, and also from official documents and announcements of the Ministry of National Education published in Žurnal Ministerstva Narodnago Prosveščenija. More precise dates of individual works and their parts (effective publication) were derived from the author's statements, typographic and publisher's imprints, announcements and advertisements in contemporary academic and public periodicals. Dates are primarily cited according to the Julian calendar then in use, and the corresponding dates according to the Gregorian calendar (conventionally denoted as N.S., New Style) are added in square brackets.

Russian-language references were translated into English in the bibliography except for nomenclaturally important titles, which were also given in transliteration (ISO/R 9) for the purposes of nomenclatural citations. Russian-language titles of non-botanical periodicals were transliterated. Publications of the Imperial Russian Geographical Society and the Ministry of National Education used a complicated structure of separately

paginated divisions or chapters, which were referred to in square brackets according to their numbers or titles.

Protologues were scrutinised and nomenclature was revised according to the Shenzhen Code (Turland et al. 2018).

Herbarium collections were traced from holdings of the Komarov Botanical Institute (LE). Their labels and history of studies were interpreted on the basis of published historical accounts (Ruprecht 1864, Borodin 1908, Litvinov 1909, Lipschitz and Vasilchenko 1968) and our long-term curatorial expertise.

Since herbarium labels of the Amur and especially Viluy expeditions mostly lack date and locality information, these data were inferred from relevant published information (travelogues and taxonomic synopses) and collection numbers. Regarding the Amur expedition, its collection localities were matched with the expedition route map (Maack 1859) and its collection numbers were verified against other collections cited in this work.

Results and discussion

A brief biography of Richard Maack

Richard Otto Maack (Fig. 1), known in Russia as Richard Karlovich Maack (Parmuzin 1959), was born 23 August (N.S. 4 September) 1825 to a family of Baltic Germans in Arensburg (now Kuressaare), Governorate of Livonia, Russian Empire (present-day Estonia) (Varep 1975). His father, Carl Gottlieb Maack, originated from Hamburg, Germany, and was a merchant in Arensburg, also known as a member of the local municipal council and a chief of the local police. His mother, Julie Caroline Maack, née Jordan, belonged to a native family of Baltic Germans (Jääts 2021). Having completed secondary school (Realschule) in Arensburg, Richard Maack was sent to Larin grammar school in Saint-Petersburg; this background allowed him to enter the Imperial Saint-Petersburg University, where he studied (1844–1849) natural sciences and from which he graduated with the degree of Candidate (corresponding to the present-day degree of Master of Sciences with the cum laude classification) (Laane 2010, Jääts 2021).

Maack moved to Irkutsk in June 1852 with recommendations from Ferdinand von Wrangel and Alexander von Middendorff (Laane 2010), both being famous travellers and naturalists of Baltic German origin, who thereby attested a strong scientific profile of the young candidate. He came to serve in the chief administration of the East-Siberian Governorate-General and was appointed to a position as senior teacher of natural sciences at Irkutsk grammar school (Lipschitz 1952). This relocation was apparently inspired by the decision of the Imperial Russian Geographical Society, of which Maack was a member since 1 March 1851, to establish its Siberian Department in December 1851. The department aimed at the scientific exploration of extensive, yet largely unknown and scientifically undescribed Siberian lands, which were considered a treasure for the future economic development of the country. Maack became an associate member (later full member) of the Siberian Department. His academic education allowed him to participate as a lead scientist in the Society's expeditions, which were considered a matter of primary importance for the Society. The expeditions were financed by Stepan F. Soloviev, a wealthy merchant, gold miner and philanthropist, who also explored many other territories in the Urals, Siberia and Central Asia for gold deposits.



Figure 1. Contemporary photograph of Richard Maack, made during his residence in Irkutsk (1865–1879). Collections of Local History Museum of Irkutsk Region, reproduced from Jääts (2021). Public domain artwork.

During his stay in Irkutsk, Maack participated in three large Siberian expeditions of the Society, which (through the governor-general of Eastern Siberia) solicited the Ministry of National Education for his mission and de facto re-employed him as a travelling scientist. The first expedition was proposed by Maack in December 1852 and explored the territory of Viluysk District of Yakut Region (now Yakutian Republic, Russia) in 1853–1855. Most significant botanically, the second expedition, in 1855–1856, was directed to the Amur River, which was formally controlled by the Qing dynasty of China but claimed by the Russian Empire since 1851. After this expedition, Maack was delegated for a year (subsequently extended to another year) to Saint-Petersburg in order to organise the materials obtained by the Viluysk and Amur expeditions and to prepare their accounts, paid from the same funds previously assigned by Soloviev. The third expedition travelled along the Ussuri River in 1859–1860, prior to its formal annexation

from the Qing dynasty of China in 1860. The two latter expeditions followed after the de facto Russian colonisation of the Amur River in 1851–1855, which was authorised by Nicholas I (Alexeev 1974), and contributed to the scientific background for the annexation of these lands (Jääts 2010, 2021).

During 1860–1861, Maack prepared for publication his account of the Ussuri expedition, being paid by the Siberian Department of the Imperial Geographical Society. He remained in Saint-Petersburg until 1865, while he was temporarily employed by the Ministry of Home Affairs as an assistant editor for the Central Committee for Statistics in Saint-Petersburg. At that time, he participated in another ambitious project of the Imperial Geographical Society, i.e. the Geographical-Statistical Dictionary of the Russian Empire edited by Petr P. Semenov (Tian-Shansky), whose draft list of entries was completed by 1860. Although Maack was not included in the editorial committee of the project, he contributed to the three first volumes of this monumental reference book with entries on East Siberia (Anonymous 1863, Lipschitz 1952).

His further carrier was primarily educational. In June 1865, Maack was appointed to the position of Director of Irkutsk grammar school and primary schools of Irkutsk Governorate, to continue as Superintendent of primary schools in East-Siberian Governorate-General since 1868. His service was rewarded with the Imperial Order of Saint Prince Vladimir (third class) (Anonymous 1869) and the civil rank of Active State Councillor, which also granted the rights of hereditary nobility. In 1879, Maack retired from his service and moved back to Saint-Petersburg to be appointed a council member of the Ministry of National Education, where he was granted with the civil rank of Privy Councillor for distinction (Anonymous 1882). He kept this position until his death on 13 November (N.S. 25 November) 1886 (Anonymous 1886, Lipschitz 1952) and was buried in the Volkovo Evangelic Cemetery in Saint-Petersburg.

First expedition to the Viluy River (1853–1855)

The first expedition was directed to Viluysk District of Yakutsk Region in order to explore the system of the Viluy River, the upper course of the Olenek River and the watershed between these rivers and the Nizhnyaya Tunguska. The expedition aimed to make a topographic map of the area, to bring geological, palaeontological, zoological and botanical collections and also meteorological and ethnographical observations. The expedition was primarily inspired by practical considerations because Viluysk District was known to be rich in iron ores, salt, gold deposits and gemstones, at that time mostly topaz and opal (Pavlovsky 1873a, Maack 1877, 1883). Its field work was undertaken with the financial aid of Soloviev, a supporting member of the Siberian Department of the Imperial Russian Geographical Society (Anonymous 1856b).

Alexander K. Sondhagen (1827–1856), ensign of the Corps of Military Topographers of the Russian Imperial Army (Popov 1926), was the first to depart from Irkutsk for reconnaissance and preliminary observations in May 1853. Sondhagen had just completed his courses at the school of topographers and received his first rank of company officers in 1852 (Anonymous 1852). He was aided by an experienced preparator of Estonian origin, Mihkel Fuhrmann (1823–1873), who was originally a servant to the family of Alexander von Middendorff at the Pööravere Manor (now in Pärnu County, Estonia) but later became a versatile scientific collector in the Siberian expedition of Middendorff during 1843–1845, which reached as far as the Amur River (Tiik 1977, Tammiksaar 1999).

Maack was responsible for the scientific part of the expedition. He and Fuhrmann left Irkutsk on 1 March (N.S. 13 March) 1854, first for Yakutsk to make preparations for a long journey around Yakutia, and then in April to the confluence of the Viluy into the Lena to meet Sondhagen. In Yakutsk, Maack was joined by Alexander P. Pavlovsky, a 27-years-old teacher of mathematics, geometry and calligraphy at Yakutsk District School (later a police administrator in Viluy District and then in Yakutsk Region: Kurchatova 2001), who was sent on the mission by the governor of Yakutsk Region (Anonymous 1855). Throughout the summer, the two parties of the expedition, one headed by Maack and the second by Pavlovsky, explored the basin of the Viluy and its tributaries (Markha, Chona, etc.). Pavlovsky studied the Viluy river basin up to Suntar Village, whereas Maack's party reached the northernmost point of their route at 68°15′N in the upper course of the Olenyok River, and, in late September, moved southwest to Lake Suringda. Later on, their party was assailed by hard frosts below −60°C and forced to move through that unpopulated territory largely on foot. Only on 25 December 1854 (N.S. 6 January 1855) did they meet a team of Yakut people waiting for the party at the mouth of the Chona River. They still examined the mouth of the Akhtaranda River before recovering Pavlovsky at Suntar in the beginning of January. In February 1855, Maack and his companions came back to Irkutsk (Maack 1883), having travelled over 8000 km (Parmuzin 1959). Their precise route has been described in Meinshausen (1871) and Maack (1886), and mapped in Maack (1886).

The hard work of the expedition was rewarded with various honours. In April 1856, Sondhagen was awarded with the next rank of Lieutenant Junior, whereas Fuhrmann received the silver medal 'For diligence' on the ribbon of the Order of Saint Anna (Anonymous 1858). Pavlovsky, who had got no honour signs at that time, bitterly complained that the expedition route and tasks were too extensive and its preparation was too impractical; to compensate the shortcomings of the late field season of 1854, he made a complementary excursion to the Viluy together with Gerhard von Maydell in 1865 (Pavlovsky 1873a).

The botanical collections gathered by Maack and Pavlovsky in 1854 were then passed on to the Botanical Museum of the Imperial Academy of Sciences in Saint-Petersburg in 1858 (Maack 1886, Borodin 1908, Litvinov 1909), with duplicates separated for the museum of the Society in Irkutsk (Popov 1926) which was subsequently destroyed by fire in 1879. The 'complementary' collections of Pavlovsky from 1865 were

donated to the Moscow State University through the Moscow Society of Naturalists (Pavlovsky 1873a, Litvinov 1909). Karl Friedrich Meinshausen based his work 'Nachrichten über das Wilui-Gebiet in Ostsibirien' (Meinshausen 1871) mainly on these collections with some additions from gatherings of Yuly I. Stubendorff (from Olyokminsk, Kirensk), a medical doctor, a founding member and the first secretary of the Siberian Department of the Imperial Russian Geographical Society, later a governor of Yakutsk Governorate, and Robert Kruhse (from Yakutsk, Viluysk, Olyokminsk), a medical doctor in Irkutsk. The collection of Maack's expedition comprised 352 species (Borodin 1908), whereas Meinshausen's account of the Viluysk District flora included 470 vascular plant species and 10 species of cryptogams, with two newly described species (Meinshausen 1871). This taxonomic account was supplemented by extracts from Maack's and Pavlovsky's travel diaries with notes on the flora and vegetation, as well as by comparisons of the flora of Viluysk District with some European and Asian floras. It included the whole of the botanical material, without supplements or corrections (Table 1).

The Viluy expedition discovered that the greatest part of the Viluy river basin belongs to the Central Siberian Plateau, and circumscribed the limits of the Central Yakutian Lowlands. The publication of its complete scientific accounts, although planned along the results of the Amur expedition, was severely delayed in favour of the latter, and was so once again by the next expedition to the Ussuri. Pavlovsky (1873a, b) published his separate travel observations aforehand. Maack worked on the manuscripts during his stay in Irkutsk. Printing of the first volume (Maack 1877) started under the auspices of the Imperial Russian Geographical Society in Irkutsk in 1873 (Anonymous 1875), but the volume was not finally published until 1877. It got a limited circulation, mostly among friends and acquaintances of the author, and its remaining stock was eventually burnt in the devastating fire in Irkutsk in 1879, which destroyed the museum and warehouse of the Society (Maack 1883). Maack's request to reprint the stock was declined due to shortage of funds, but the complete work was published later in Saint-Petersburg with the support from the Ministry of National Education (Maack 1883).

The first volume of the works of the Viluy expedition consisted of meteorological observations (Maack 1877, 1883). The second volume (Maack 1886) contained essays on landscapes, animal world, vegetation and flora, geology, minerals and fossils (Schmidt 1886), supplemented by ethnographic vocabularies, maps and topographic indices. The treatment of fossils contained a number of new species, including two named after Maack. The list of plants in this book was the Russian version of Meinshausen (1871), abbreviated and adapted by Maack. The third volume (Maack 1887), which was edited and printed posthumously, included observations on the ethnography and economy of the territory. The book was published without a dedication.

As noted by Maack (1859, 1877, 1883), his field comrades 'fell on the field of honour' by the time of this publication; they lived too short to see the full report of the Viluy expedition. Sondhagen died of a stroke on the day of his planned departure to join the Great Siberian expedition of the Imperial Russian Geographical Society to the Vitim River, on 8 May 1856 (Anonymous 1864), and was buried in the former Jerusalem Cemetery in Irkutsk (Popov 1926). Fuhrmann died in March 1873 at Nokhtuyskaya sledge station (now Nokhtuysk Village in Yakutia) (Anonymous 1875).

Second expedition to the Amur River (1855–1856)

At the meeting dated 6 March (N.S. 18 March) 1855 (Anonymous 1857b), the Siberian Department of the

Table 1. More precise dates for botanical publications resulting from the activities of the Viluy, Amur and Ussuri expeditions. Dates are given according to the Julian calendar.

Reference	Effective publication	Source
Maack 1859	26 May–28 September, most likely in September	Anonymous (1859) (date range); Russkoe Slovo 1859(10): 134 (Oct 1859) (more narrow date range inferred)
Maack 1862	15–28 February	Knižnyj Vestnik 3(4): 85 (28 Feb 1862)
Maack and Ruprecht 1857a	15 February	Imprint
Maack and Ruprecht 1857b	5 April	Imprint
Maximowicz 1859	15–28 February (book version), September (journal version)	Bulletin de la Classe Physico-Mathématique de l'Académie Impériale des Sciences de Saint-Pétersbourg 17(27): 432 (28 Feb 1859); journal imprint
Maximowicz and Regel 1857	17 January	Imprint
Maximowicz and Ruprecht 1856	27 November	Imprint
Maximowicz and Ruprecht 1857	17 January	Imprint
Meinshausen 1871	April	Imprint
Regel 1861	December	Imprint
Regel 1862	15–28 February	Knižnyj Vestnik 3(4): 85 (28 Feb 1862)
Ruprecht 1859a	After 19 October	Censor's approval
Ruprecht 1859b	November	Imprint
Ruprecht 1859c	December	Imprint

Imperial Russian Geographical Society considered two important documents: a travel report of Maack on the Viluy expedition and, immediately thereafter, a prospect commissioned by the governor-general of Eastern Siberia, Count Nikolai N. Muraviev (Amursky), on the proposed Amur expedition to be departed during that spring. The expedition was supposed to examine the Bureya River, then to cross the Khingan-Oola Mts, and to proceed along the Amgun River into the Amur. However, its supervisor Muraviev changed the original route to follow the course of the Amur (Anonymous 1856a) 'because of government interests' and due to the difficulty in travelling across very sparsely inhabited lands.

The same brave team, who had just luckily avoided freezing to death at the Viluy, was entrusted with this new and extensive task: Maack (scientific and practical leadership, collecting animals and making meteorological observations), Sondhagen (general topography) and Fuhrmann (collecting minerals, plants and birds). The team was expanded with Georg Nikolai von Gerstfeldt (1827–1862), a Baltic German from Pernau (now Pärnu, Estonia), who had just obtained his Master degree in natural sciences (with a dissertation in entomology) from Dorpat University in 1853 (Gerstfeldt 1853). Gerstfeldt had already travelled along the Amur River up to its mouth with the first military raft and ship expedition headed by Muraviev in 1854 (Permikin 1856), which started the Russian navigation along the Amur and brought the first scientists to describe its bedrocks and to collect geological samples (Semenov 1855); he was given responsibility for botanical, zoological and ethnographical studies in the Amur expedition. The second person added was Titular councillor Kochetov, University Candidate in chemistry, who served for the Financial Department and whose further particulars we have been unable to trace; he was invited to study soils and their suitability for agriculture, and also minerals and ore deposits.

Once again, funds were secured from Stepan Soloviev, a great enthusiast of Siberian exploration, whose interest was not only inspired by exciting scientific discoveries in this terra incognita but also sparkled by the pragmatic opportunity to uncover further profitable ore deposits. Soloviev assigned half a pood (8 kg) of gold to cover the expedition expenses, everything from travel equipment to daily allowance, and the production costs of the scientific account of the expedition. In return, upon the arrival of the expedition, he was rewarded with the gold medal 'For diligence' on the ribbon of the Order of St Andrew (Anonymous 1856a), which was the highest degree of civilian honour among decorations of the Russian Empire.

After a short break of just two months, Maack, Fuhrmann and Sondhagen departed for the Amur River on 6 April (N.S. 18 April) 1855. From Irkutsk to Chita and then to Nerchinsk they travelled overland, taking some topographic survey, wildlife observations and ethnographic notes. On 5 May (N.S. 17 May) they started rafting from Nerchinsk down the Shilka River to reach the place of its confluence with the Argun on 23 May (N.S. 4 June), thereby entering the 'new territories'. Some 200 km below the confluence, where the Amur proper originates, on 27 May (N.S. 8 June) the expedition arrived to the ancient Russian settlement of Albazin (now Albazino Village), which was re-established immediately after the beginning of the new conquest in 1851.

At this point, the scientific expedition was subordinated, for greater security, to the second military expedition of Muraviev, which transported the first group of Russian colonists to settle the new lands along the Amur (Grum-Grzymajło 1894). This safety measure forced the scientific expedition to pass the unexplored territories too quickly, thus handicapping their observations for about three weeks, from 5 June (N.S. 17 June) to 24 June (N.S. 6 July), till the eastern foothills of the Lesser Khingan Range (Maack 1859).

After that, the expedition proceeded independently down the Amur, making topographic surveys, astronomical and geological observations and collecting specimens of flora and fauna. On 8 August (N.S. 20 August) they reached Mariinsky Post (now Mariinskoe Village) at Lake Kizi, established by Captain G.I. Nevelskoi in 1853 as part of a network of new Russian villages and military posts. This lake, situated only 8.5 km away from the river mouth, was the easternmost and lowermost (along the Amur) point of the expedition, at which Kochetov was left to stay by the order of Muraviev and from which Gerstfeldt separated and proceeded back together with Muraviev (Anonymous 1857c).

Preparations for the way back took about a week, and on 14 August (N.S. 26 August) Maack, Fuhrmann and Sondhagen started a long row against the Amur current. As to botanical collections, Maack did his best to gather fruits of the plants he had seen in blossom on the way downstream. Above Aigun Town (Chinese spelling Aihui), the expedition was blocked by frazil ice and suffered from the lack of food, so they had to return to Aigun and observe the town till 12 November (N.S. 24 November), when they received horses and food supply from the Chinese authorities in order to go in sledges to Irkutsk, to which they arrived on 16 January (N.S. 28 January) 1856.

The Amur expedition resulted in the first scientific description of the Amur River and brought rich collections of natural sciences (Semenov and Dostoevsky 1896). As such, it was strictly academic; this feature was received to the dissatisfaction of the general public who expected that the expedition and its reports should have been more practical and concentrated on the suitability of the Amur lands for navigation, exploitation and development, in order to provide more opportunities for the Russian colonists moving from Europe to seek for better fortune (Livensky 1859).

The zoological collections of the Amur expedition were delivered to the Zoological Museum of the Academy of Sciences (Brandt 1865). Two zoological accounts with a number of new species were published in connection with the Amur expedition: flatworms, ringed worms, millipeds and crustaceans (Gerstfeldt 1858) and on terrestrial and freshwater molluscs (Gerstfeldt 1859). Besides these contributions to zoology, Gerstfeldt (1857) also published his detailed, yet unfinished ethnographic observations on

the people residing along the banks of the Amur River. Other zoological treatments, with a number of new species dedicated to Maack, were published separately in academic journals (Brandt 1858, Ménétries 1858).

On 26 March (N.S. 7 April) 1857, Maack received the Imperial Order of Saint Prince Vladimir (fourth class) for his merits during the Viluysk and Amur expeditions because of their extraordinary results, demands and dangers (Anonymous 1857a). This reward was very high for a young scientist and granted him the rights of hereditary nobility. In 1858, on the occasion of the treaty of Aigun that transferred the territories north of the Amur from China to the Russian Empire, Maack, among other participants of the colonisation of the Amur lands, also received the Imperial Order of Saint Stanislaus (second class) (Anonymous 1864, Shinkovoy 2010).

The botanical bibliography of the Amur expedition

Maack gathered extensive botanical collections during his expedition to the Amur River. The specimens, delivered to Saint-Petersburg in spring 1856 (Ruprecht 1864, Parmuzin 1959), were received by the Academy of Sciences in Saint-Petersburg but were split for taxonomic treatment between two authorities: Franz Ruprecht at the Academy of Sciences (formerly also at the Botanical Garden) examined the arboreous plants but passed the herbaceous plants to his pupil, Karl Maximowicz at the Botanical Garden. Maximowicz treated his own specimens collected in the expedition of the Imperial Botanical Garden in the first place, describing a number of new species on their basis (Maximowicz and Ruprecht 1856, 1857). This work of Maximowicz was augmented with his observations on the vegetation of the Amur River and with a criticism on Ruprecht's accounts of arboreous plants by the Director of the Botanical Garden, Eduard Regel (Maximowicz and Regel 1857). Ruprecht prepared his taxonomic treatment during 1856 and presented the manuscript to the Imperial Academy of Sciences on 16 January 1857, to be published later in the same year (Maack and Ruprecht 1857a, b). Maximowicz also added some collections received from Maack to assemble his final publication on the flora of the Amur region (Maximowicz 1859).

These early treatments (Maximowicz and Ruprecht 1856, 1857, Maack and Ruprecht 1857a, b) provided the taxonomy for a synopsis of the arboreous flora of the Amur River area (Maack 1859), which was solely based on the specimens collected by Maack and treated by Ruprecht.

A complete taxonomic treatment of the Amur flora (Maximowicz 1859) was prepared by the end of 1857 and submitted to the Imperial Academy of Sciences in Saint-Petersburg on 29 January 1858. This magnificent work had immediately received the full Demidov Prize (Veselovsky 1859), which was the most prestigious scientific merit in the Russian Empire. As indicated on its last page, the printing was finished in February 1859, but the work was included in an academic journal in September. Meanwhile, a separate was prepared immediately after printing and distributed by booksellers through the vendors in Saint-Petersburg and Leipzig, apparently in order to qualify for the prize; as evident from announcements in Bulletin de la Classe Physico-Mathématique de l'Académie Impériale des Sciences de Saint-Pétersbourg, the book became publicly available and thus was effectively published between 14 and 28 February 1859.

On the occasion of the prize, Maximowicz (1859) was thoroughly reviewed by Ruprecht (1859c), who provided further geographical observations and a number of taxonomic corrections. The German version of this review (Ruprecht 1859b), which included lists of plants lacking in the official Russian version, has a slight priority for the purposes of plant nomenclature (Table 1).

Although Maximowicz (1859) used the material collected by Maack in 1855, some important specimens escaped his attention. When his book had been already finalised, Maximowicz became aware of a few new species established but not yet published by Ruprecht and Maack and these were mentioned in the list of additions and corrections with references to the manuscript and plates of Maack (1859), which were ready for print by the end of 1858.

The scientific report of the Amur expedition (Maack 1859) was composed of an extensive travelogue with ethnographical observations and separate accounts of natural history (geology, botany and zoology). The botanical part was limited to the list of shrubs and trees treated earlier by Ruprecht (Maack and Ruprecht 1857a, b), with observations on occurrences and ecology and brief notes on superficial and aesthetic, sometimes also diagnostic characters, but excluding full morphological descriptions. The book, printed on wove paper of excellent quality and decorated with a portrait of the governor-general of Eastern Siberia, Count Muraviev, was accompanied by a deluxe portfolio of numerous illustrations showing selected landscapes, ethnographic drawings, botanical portraits and geological and botanical maps of the Amur. As this book was aimed at the general public, it was written entirely in Russian, including scientific descriptions of the new plants.

The illustrations were not part of the original plan of this work. These were added by the personal wish of Soloviev, who not only financed the preparation and publication of the book, assigning a large sum of 25 000 roubles for this particular purpose (Popov 1926), but also wanted to turn this scientific publication into a luxurious present to the Geographical Society. The illustrations were prepared in the first part of 1858. As these included 10 'most interesting' plants of the Amur River, extra work was undertaken for their presentation. In the first place, Maack selected a beautiful drawing (coloured in some copies) of *Nymphaea* which was determined as a new species and for which Maack supplied a name honouring the Chairman of the Siberian Department of the Imperial Russian Geographical Society, governor of Irkutsk Governorate, Lieutenant general Karl von Wenzel. Another new species of *Chloranthus* was added by Ruprecht, thus making this block of illustrations a supplement of its own scientific value. The new species were described and some others were commented upon by Ruprecht in the legend to

the illustrations, as Ruprecht alone was responsible for the botanical taxonomy and nomenclature in Maack (1859).

Maack had completed this work during his second year in Saint-Petersburg. The Amur book was typeset in the beginning of 1859 and received the censor's approval on 30 January 1859. Its actual publication was, however, slightly delayed, probably because the illustrations were printed in Paris according to Soloviev's wish. The book was published and presented to the Imperial Russian Geographical Society in Saint-Petersburg between 26 May and 28 September 1859, as evident from the Society's report (Anonymous 1859). According to advertisements and reviews in contemporary public periodicals (Bibliografičeskija Zapiski, Otečestvennyja Zapiski, Russkoe Slovo, Voennyj Sbornik), which appeared in October and November of the same year, Maack's book most likely became commercially available in September. Its price, 20 Russian roubles, was a few times higher than the average for a scientific book of the time.

Although the number of printed copies of the complete book was reasonably high (besides other sales and gifts, as many as 400 copies were generously given by Soloviev to the Society for its extra profit), the number of printed copies of the illustrations exceeded that of the printed books and Soloviev offered their separate distribution (Anonymous 1860). An album of landscapes and ethnographic drawings was planned but never realised. The botanical leftovers were collected in a small separate album (Ruprecht 1859a), published for the Academy of Sciences and commercially distributed in Russia and Europe, for which the legend from Maack (1859) was translated into Latin. The album was credited to Ruprecht on the title page, and botanical descriptions and comments in the text were also explicitly ascribed to him. As evident from the censor's approval, signed 19 October 1859, the album post-dated the effective publication of the book.

The dates of botanical publications, which were based on or included the specimens collected by the Amur expedition, with their background information, are collected in Table 1.

Third expedition to the Ussuri River (1859–1860)

The survey of the Ussuri river basin aimed to provide evidence-based grounds for the arrangement of transport communications with China, for the agricultural development of the new territory and for the exploration of its natural resources. The first botanical travellers to the Ussuri River were K. Maximowicz, who ascended its lower course up to the mouth of the Nora in 1855, and Leopold von Schrenck, who collected along the river up to its confluence with the Khor in the same year, whereas the first geographer to make a survey of the whole course of the Ussuri in 1858 was Mikhail I. Venyukov (Semenov and Dostoevsky 1896), whose detailed account (Venyukov 1859) shed light on this previously unknown land.

In December 1858, a demarcation commission was collected by the General Staff officers of the Russian Army, headed by Lieutenant Colonel Konstantin F. Budogossky, then Quartermaster-General of the army staff of Eastern Siberia, in order to study the newly acquired lands and to draw a new borderline with China from the upper reaches of the Ussuri to the border with Korea (Romanov 1859). The expedition of Budogossky included two experienced astronomers, 13 topographers, an artist and a number of assistants. The Siberian Department of the Imperial Russian Geographical Society delegated R. Maack (geography, natural history, meteorology) and A. D. Brylkin (ethnography) to join this expedition according to the directions of its patron, Count Muraviev, who personally supervised the exploration and colonisation of the Amur lands. The party sent by the Geographical Society acted independently from the topographers but explored the same routes.

Maack left Saint-Petersburg for Irkutsk on 16 (N.S. 28) February 1859, where he received his field allowance and equipment. On 26 April (N.S. 8 May), accompanied by Brylkin, with the first open water Maack started his journey from Chita down the Ingoda, Shilka and Amur rivers, to arrive to the destination point at the mouth of the Ussuri on 5 (N.S. 17) June. With a technical assistance team and provision received in Khabarovka post (now Khabarovsk Town), the expedition surveyed the Khekhtsir (German spelling Chöchzier) Range and the course of the Ussuri for ca 300 versts (320 km) upstream. Besides regular collection of natural history objects and meteorological observations, they stayed overnight at native villages in order to learn more about the local languages and life style; at the same time, erection of the very first houses in new Russian settlements was also observed. In late July (N.S. early August), the expedition entered the Songacha (Sungacha) River, a left tributary of the Ussuri, to reach Khanka (Xingkai) Lake on 8 (N.S. 20) August. They explored the lake until 19 (N.S. 31) August and returned to the mouth of the Songacha. Their further journey up the Ussuri was hampered by the late season, so that the expedition was reverted back to the mouth of the Ussuri. On 28 September (N.S. 10 October) Maack sailed from Khabarovka up the Amur. After a long journey, partly on water, partly in sledges, he arrived to Saint-Petersburg with his collections on 16 (N.S. 28) March 1860 (Maack 1862).

The botanical materials of the Ussuri expedition were received by the Imperial Botanical Garden in Saint-Petersburg and examined promptly by its Director, Eduard Regel, who had also treated the collections of Gustav Radde from the same area, which had been received shortly before that. Regel delivered his work to the Academy on 7 June 1861 and published its original (German) version in academic periodicals (Regel 1861). The taxonomic synopsis in this work comprised 618 species of vascular plants and 25 species of mosses and hepatics, including 17 newly described species, of which all were credited to Regel and Maack except those dedicated to Maack himself (4) or originally separated by other authors (1).

In agreement with his contract with the Imperial Geographical Society, Maack produced a full-size, two-volume account of the Ussuri expedition (Maack 1862), which was printed in 500 copies. Its high production costs (over 5700 roubles, including the direct expenses and the allowance

of Maack) were covered by the Siberian Department of the Society and its donors (Anonymous 1865).

This book (Maack 1862) was dedicated to State Secretary, Baron Modest A. von Korff, who at that time served for the State Council and His Imperial Majesty's Own Chancellery as well as Director of the Imperial Public Library. The book was approved for publication in December 1861 but, contrary to the imprint on its title page, was not ready for distribution within the same calendar year because a significant effort was needed to set and bind these two thick volumes of sophisticated layout.

The first volume of the book contained extensive essays on topography and zoology (by Maack) as well as a note on the Nanai language (by Brylkin). The botanical part occupied the second volume and included an annotated checklist with comparisons with neighbouring territories (by Regel) and a general description of the vegetation (by Maack). The parts of Maack and Regel were originally written in German, and their translation to Russian was included in the production costs (Anonymous 1865) because the Society wanted to make the book accessible to the general public.

The botanical account (Regel 1862) was reprinted separately from Maack (1862). The reprint differs by the absence of Maack's preface, by renumbering the other preface pages, and by a separate dedication to His Imperial Highness Nicholas Alexandrovich (1843–1865), then the heir of the Russian Empire, apparently to celebrate his age of majority which he reached in the same month. Although Regel (1862) was technically a reprint, as evident from its later censor's approval, both books became available to the public during the same short period in February 1862 (Table 1).

Once again, the zoological collections of Maack made along the Ussuri River were proven to be abundant and highly valuable. Those were delivered to the Zoological Museum and treated separately in academic periodicals with many new species established, including some named after the collector (Bremer 1861, Morawitz 1862).

Herbarium collections from the Viluy, Amur and Ussuri expeditions

All herbarium specimens collected by Maack and his companions during the Siberian expeditions of the Imperial Russian Geographical Society were transported for treatment to Saint-Petersburg.

The specimens collected by the Viluy expedition were acquired by the Imperial Academy of Sciences. These collections included the specimens collected by Maack and Pavlovsky in 1854 (Fig. 2E) and those collected by Fuhrmann in the summer of 1853 (Fig. 2D). Maack originally labelled the specimens by small field tickets, carrying field numbers with additional minor notes (Fig. 2A–B). In late summer and autumn, seeds were collected and added to the specimens in separate packages (Fig. 2C). During 1869–1870, the collection was treated curatorially and taxonomically by K. Meinshausen, an assistant at the Botanical Museum, who added standard printed labels titled 'Herb. Acad. Petrop.' with the locality written as 'Sibiria orient. ad fl. Wilui 64°' or 'Sibiria orient. inter fl. Wilui 64° et fl. Olenek 68°' and the collection information stated as 'Exped. soc. geogr. leg. R. Maack 1854' (Fig. 2C). Meinshausen wrote plant identifications, collection numbers and collector's names (when different from Maack) to the printed labels but did so very sparsely, so that the overwhelming majority of the curatorial labels remained incomplete or were left totally blank. However, in the latter cases the field tickets were often preserved.

The precise routes (collection places and dates) of Maack and Pavlovsky were published by Meinshausen (1871) on the basis of their field diaries. These field notes contain short lists

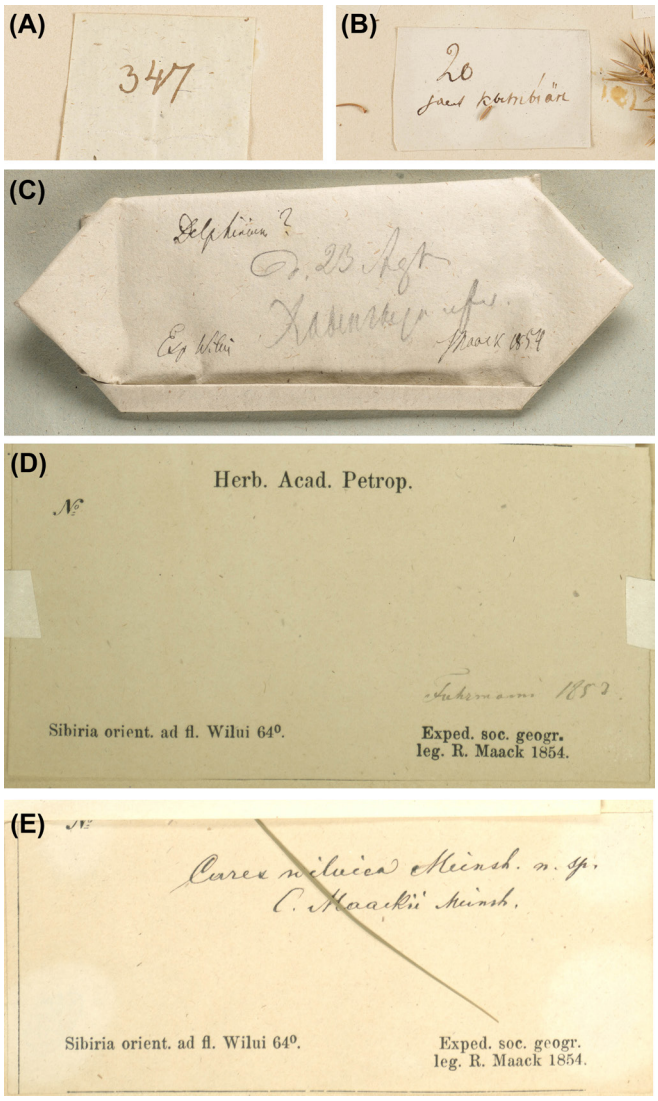


Figure 2. Herbarium labels of the Viluy expedition. (A) Field ticket of R. Maack, collection number (LE 01192569, *Pinus sylvestris*); (B) field ticket of R. Maack, collection number and local vernacular name (LE 01191524, *Juniperus communis*); (C) seed package of R. Maack, collection date and locality (LE); (D) curatorial form, a specimen of M. Fuhrmann collected in 1853 (LE 01019825, *Polygonum bistorta*); (E) curatorial form, a specimen of R. Maack collected in 1854 (LE 01007083, *Carex wiluica*).

of plants noted in certain localities, which may also be helpful in establishing the history of these collections. The collection localities may be matched with the current situation through detailed maps of the expedition area (Maack 1886), which provided all local toponyms.

The specimens collected in the Amur expedition were also sent for treatment to the Academy in 1856. The specimens were partly treated by F. Ruprecht already in the same year, and partly passed for treatment to C. J. Maximowicz. The specimens were originally labelled with field tickets, indicating collection numbers or date (in cases of unnumbered specimens). Standard printed labels were added curatorially, similarly titled 'Herb. Acad. Petrop.' with the locality 'Mandshuria, ad fl. Amur' and the collection information 'Exped. soc. geogr. leg. R. Maack 1855' (Fig. 3). Information from the field tickets was transferred to the labels by the persons who treated the specimens, i.e. Ruprecht (Fig. 3A) or Maximowicz (Fig. 3B), but the original tickets were not preserved (so far, none has been traced by the present authors). Sometimes, collection dates and locality information were curatorially added to the labels. Some labels were subsequently copied by K. Meinshausen (who assisted Ruprecht) for distribution (Fig. 3C). The labels were written either during the time of treatment (by Ruprecht and Maximowicz) or after the publication of Maack (1859) and Maximowicz (1859) (by Ruprecht and Meinshausen); in the latter cases, references to species numbers in these works were added on the labels.

The route of the expedition, with collection dates and descriptions of collection localities, were published in Maack (1859), who also provided a detailed map with local place names used by the expedition. Further information, with some important details (e.g. on the side of the Amur River, either present-day Russian or Chinese), remained in the unpublished diaries of the expedition which were extensively used for the protologues and species accounts (Maximowicz and Ruprecht 1856, 1857, Maack and Ruprecht 1857a, b, Maack 1859, Maximowicz 1859). These published data complement the herbarium labels and can be linked to the specimens through the collection numbers of dates. However, the whereabouts of the original diaries are currently unknown.

The specimens collected by the Ussuri expedition were received by the Imperial Botanical Garden in Saint-Petersburg and treated by E. Regel in 1860–1861. Unlike in the Viluy and Amur expeditions, these specimens lacked numbering and were originally labelled with pieces of paper on which Maack laconically wrote a collection locality in German (Fig. 4). In those times, the Garden did not use printed curatorial labels (printed labels of Maack's collections distributed from the Garden were copied later), and further information was written straight on the original papers. Regel identified and curatorially annotated the main bulk of these specimens, typically with his statement 'teste Rgl'. Vladimir L. Komarov, then assistant curator at the Botanical Garden, annotated the specimens curatorially after 1900 by adding a Russian text explaining the collection localities, collection year and collector's name.

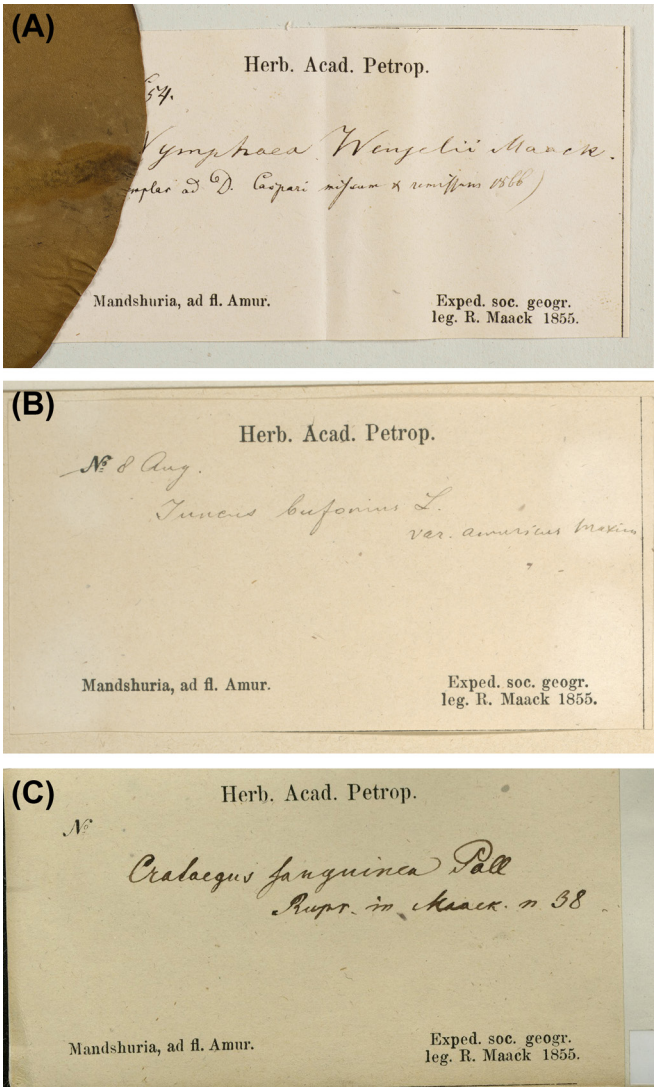


Figure 3. Herbarium labels of the Amur expedition. (A) Curatorial form transcribed and annotated by F. Ruprecht, species name written by R. Maack (LE 01042213, *Nymphaea wenzelii* = *N. tetragona*); (B) curatorial form transcribed and annotated by C.J. Maximowicz (LE 01010513, *Juncus bufonius* var. *amuricus* = *J. amuricus*); (C) curatorial form transcribed by K. Meinshausen (GH 00273523, *Crataegus sanguinea*).

The route of the Ussuri expedition can be traced and matched with present-day maps with the aid of the excellent topographic map and the detailed travelogue published in Maack (1862).

Valid publication and the correct nomenclature of *Ligustrina* and *Ligustrina amurensis*

Ruprecht described a new species of *Syringa* from the Amur River, which he named *S. amurensis* Rupr. (Maack and Ruprecht 1857b). This species and the simultaneously described *S. pekinensis*, its closest relative from the mountains of North-Eastern China, were placed in a separate

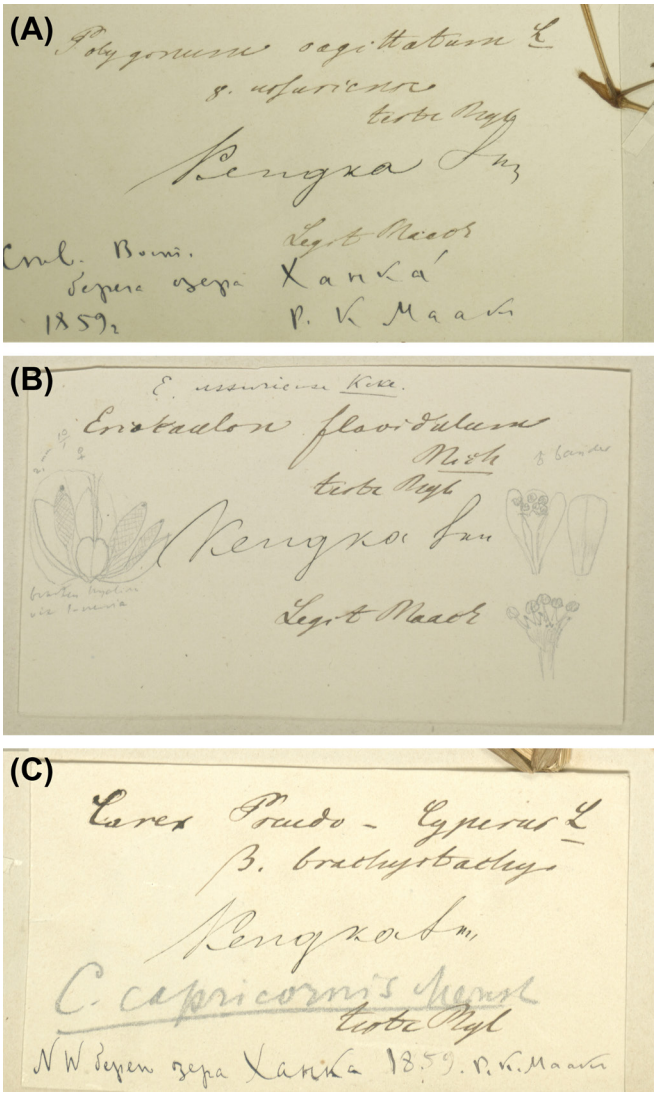


Figure 4. Herbarium labels of the Ussuri expedition ('Kengka See' = Lake Khanka or Xingkai), locality name in the centre written by R. Maack. (A) Identification by E. Regel, Russian annotation by V.L. Komarov (LE 01019913, *Polygonum sagittatum* var. *ussuriense*); (B) first identification by E. Regel, second identification (above) and analytical drawings by C. J. Maximowicz (LE 01012460, *Eriocaulon ussuriense*); (C) first identification by E. Regel, second identification (below) by K. Meinshausen, Russian annotation by V. L. Komarov (LE 01006727, *Carex capricornis*).

section, *S.* sect. *Ligustrina* Rupr., which was distinguished within the genus by the shortest tube of the corolla. At that time, Ruprecht was not aware that both his species represent infraspecific variants of *S. reticulata* (Blume) H.Hara, which was shortly beforehand described from cultivation in Japan, and may be reduced to its varieties or subspecies (Green and Chang 1995).

The taxonomy established by Maack and Ruprecht (1857b) became the basis for the checklist in Maack (1859). However, Ruprecht (1859a, b, c) quickly changed his mind and revised the significance of the short tube in *S. amurensis*, which he now considered to distinguish a separate genus, *Ligustrina* (Rupr.) Rupr. This generic name with the accompanying diagnosis was effectively published in explanations to botanical plates in Maack (1859), which were prepared by Ruprecht during 1858. Because of the heterochronous nature of Maack (1859), in which the synopsis was prepared by Maack in 1857 but the plates and their text were produced by Ruprecht in 1858, both *S.* sect. *Ligustrina* and *Ligustrina* were accepted in the same work and therefore both the generic name and the specific combination in this genus were validly published there by Ruprecht. Although the valid publication of *Ligustrina* is often cited from Ruprecht (1859a) or Ruprecht (1859b), Maack (1859) clearly predates the other competing publications and should be accepted as the protologue.

The most appropriate rank of *Ligustrina* seems to be sectional (Chen 2008, Li et al. 2012), which is followed here. The appropriate rank of *S. amurensis* may be variety (Pringle 1982) or subspecies (Green and Chang 1995, Chen 2008), of which subspecies is preferred due to consistent morphological differences and the territorial isolation.

The original material of *Syringa amurensis* includes two gatherings of the Amur expedition cited in the protologue (Maack and Ruprecht 1857b), which are syntypes. The plants used for the description were collected in full blossom on 20 June 1855 'in Chingan-Gebirge an der rechten Thalwand' (Lesser Khingan Range, right side of the Amur Gorge) and with immature and aborted fruits on 26 July 1855 'an der rechten Thalwand Sargu beim Flusse Girri' (Sarku Village of Nanai people on the right side of Amur River, situated at 49°41'24"N, 136°54'36"E, roughly corresponding to present-day Innokentievka Village, Nanai District, Khabarovsk Region).

Besides the syntypes, there are some other collections loosely associated with the protologue through the mention of a scattered occurrence on 'the middle Amur, near and downstream the mouth of the Ussuri River, reaching as far as Ongme in the east' (Maack and Ruprecht 1857b). In his travel diary, on the way back, Maack (1859) particularly mentioned one more occurrence of the species, on 29 August 1855, at 'Uksemi' (near present-day Sarapulskoe Village, approximately at 48°51'18"N, 135°56'42"E), which thus represents uncited original material. The drawing in Maack (1859) and Ruprecht (1859a) was produced after the protologue had been published.

In the collections at LE, five herbarium sheets of the presumed original material (specimens collected by Maack and annotated by Ruprecht) have been found by us. Maack's field collection number 344 (3 sheets) corresponds to the gathering in flower collected on 20 June, both according to the protologue and the other collection numbers used by Maack. This field number was correctly recorded by Ruprecht on curatorial labels and includes a flowering branch used for the species drawing (Maack 1859, Ruprecht 1859a). Maack's field collection number 626 corresponds to the gathering in immature fruit collected on 26 July, which is also quite certain. However, Ruprecht's annotation on that specimen label,

stating that the fruiting gathering 626 was used for the species drawing, is apparently wrong because the fruits portrayed in the drawing are mature and abundant rather than immature and partly aborted. This mature fruiting branch apparently corresponds to the last collection date on 29 August and is not part of Maack 626; it was appended to that specimen by Ruprecht in the course of curatorial handling. There is one more specimen labelled as Maack 525, whose number corresponds to the specimens collected at the Khekhtsir Range on 13 July 1855. These plants, being in buds, are supposed to be gathered three weeks after the plants were collected in full blossom, which does not make sense; we suspect some curatorial error in this case, which cannot be clarified because Maack made no mention of plants in buds in his diary.

Chen (2008), who revised the taxonomy of *Syringa*, designated Maack 626 at LE as lectotype of the species name without further particulars and comments. This designation, as published by Chen, corresponds to the single branch with immature fruits because the branch with mature fruits on the same sheet is not part of that gathering. However, prior to that, Nedoluzhko (1991) indicated that the 'type' of *S. amurensis* is a specimen of Maack collected in the Khingan Range on 20 June 1855 and kept at LE. This statement formally satisfies the conditions of lectotype designation and has priority over the choice of Chen (2008). Krestovskaya (Krestovskaya and Sokolova 2022) identified this gathering at LE and designated a single sheet of this gathering as a second-step lectotype. Contrary to the common belief (Nedoluzhko 1991), the lectotype locality is situated in present-day China, on the right (Chinese) side of the Amur (Maack and Ruprecht 1857b).

Syringa sect. *Ligustrina* Rupr. (Maack and Ruprecht 1857b, p. 371). *Ligustrina* (Rupr.) Rupr. (Maack 1859, p. vii). *Syringa* subgen. *Ligustrina* (Rupr.) K.Koch (Koch 1872, p. 271). – Type: *Syringa amurensis* Rupr. (lectotype designated by Regel (1863, p. 115)).

Syringa reticulata subsp. *amurensis* (Rupr.) P.S.Green & M.C.Chang (Green and Chang 1995, p. 329). *Syringa amurensis* Rupr. (Maack and Ruprecht 1857b, p. 371). *Ligustrina amurensis* (Rupr.) Rupr. (Maack 1859, p. vii). *Syringa reticulata* var. *amurensis* (Rupr.) J.S.Pringle (Pringle 1982, p. 286).

Type: China, Heilongjiang Province, Daxing'anling Prefecture: 'Mandshuria, ad fl. Amur' (= Lesser Khingan Range, right side of the Amur Gorge, 20.06.1855), R. Maack 344 (lectotype LE 01057213, first-step designated by Nedoluzhko (1991: 253), second-step designated by Krestovskaya in Krestovskaya and Sokolova (2022: 80)).

The correct name and nomenclature for *Chloranthus mandshuricus*

The name *Chloranthus mandshuricus* Rupr. was established for the first species of Chloranthaceae R.Br. ex Sims found in the Russian Empire (Maack 1859). Ruprecht (1859a) described it as differing from *C. serratus* (Thunb.) Roem. and Schult. by its spikes single (versus paired), thus unambiguously indicating its identity with *C. japonicus* Sieb., which has a broad distribution in China, Korea and Japan (Kharkevich 1985, Xia and Jérémie 1999). This synonymy was recognised already by Solms-Laubach (1869).

Ohba and Akiyama (2014) challenged the suitability of Siebold's name for the species. They examined the collections of Siebold at L, which were originally annotated as *C. japonicus*, and noted, in agreement with Miquel (1867), that the majority of these specimens belong to *C. serratus* (Thunb.) Roem. and Schult. The lectotype of *C. japonicus* designated by Akiyama et al. (2014) also belongs to *C. serratus*. For this reason, the species called *C. japonicus* by Xia and Jérémie (1999) was renamed *C. quadrifolius* (A.Gray) H.Ohba & S.Akiyama (Ohba and Akiyama 2014), and this nomenclatural change has been accepted in some major databases like PoWO (2022).

According to the protologue of *C. japonicus* (Siebold 1828), this species is characterised by constantly two 'anthers' ('mein *Chloranthus japonicus* constant zwei Antheren trägt') on the trilobed 'petal'. As evident from his comparisons with L'Héritier (1789), Siebold (1828) applied the term 'anther' to a single theca, whereas his 'petal' corresponded to the lobed androecium of *Chloranthus*. According to the current understanding of *C. serratus* (Xia and Jérémie 1999, Ohba and Akiyama 2014), this species is characterised by three anthers with four thecae (corresponding to the formula 1 + 2 + 1), whereas the central anther is lacking thecae (1 + 0 + 1) in *C. japonicus*.

Siebold's statement about 'two anthers' clearly excludes *C. serratus* but matches *C. japonicus*. No specimens (syntypes) were cited in the protologue of the latter species name; such specimens, if designated as lectotype, cannot be superseded without conservation because specimen citations are part of the protologue and cannot be in any conflict with it. On the opposite side, any uncited element of the original material of *C. japonicus*, which was designated as lectotype, can be superseded if found to be in serious conflict with the protologue. The lectotype designated by Akiyama et al. (2014) is indeed in serious conflict with the protologue because its anthers have four thecae rather than constantly two thecae as stated in the original description. This lectotype should be superseded by another element of the original material, which is not in conflict with the protologue (Art. 9.19; Turland et al. 2018), i.e. with a specimen having anthers with two thecae. The only suitable specimen of the original material that agrees with the protologue of *C. japonicus* and corresponds to the species of Xia and Jérémie (1999) is L0421136 (lower plant) (Akiyama et al. 2014, Ohba and Akiyama 2014), which should be designated as a correct lectotype.

Although Siebold had a mixture of specimens representing *C. japonicus* and *C. serratus* in his collection under the single name *C. japonicus*, his protologue was based solely on the *C. japonicus* element. In that sense the name *C. japonicus* had been used consistently until the erroneous typification by Akiyama et al. (2014), and this use should be resumed with a new lectotype as designated here.

Maack collected his *C. mandshuricus* in a single place along the Amur River at ca 10 versts (10.5 km) above the mouth of the Ussuri River, at the 'Horroko' Mts downstream 'Nunggä' (Nongjiang) Village, on 9 July 1855 (Maack 1859). Its draft

label specifies that the plant was collected on the Chinese side of the river, and the locality that can be inferred at approx. 48°21'36" N, 134°20'06" E. The curatorial annotation stated that there were three plants in the original material, of which two remain on the sheet and constitute a single specimen preserved to date. This specimen is designated as lectotype here. Another remaining element of the original material is the illustration published in the protologue (Maack 1859).

Chloranthus japonicus Siebold (Siebold 1828, p. 681). – Type: Japan. P.F. von Siebold s.n. (lectotype L0421136, lower plant, designated here).

Taxonomic synonyms: *Tricercandra quadrifolia* A.Gray (Gray 1856, p. 318). *Chloranthus quadrifolius* (A.Gray) H.Ohba & S.Akiyama (Ohba and Akiyama 2014, p. 239). – Type: Japan, Hakodadi, 1855, J. Small s.n. (lectotype GH, designated by Koyama (1996, p. 40)).

Chloranthus mandshuricus Rupr. (Maack 1859, p. v). – Type: China, Heilongjiang Province, Jiamusi Prefecture: 'Mandshuria, ad fl. Amur' (= right side of Amur in Fuyuan county-level city, 09.07.1855), R. Maack 516 (LE 01082942, lectotype designated here; Fig. 5).

The nomenclature of *Nymphaea wenzelii*

Plants of *Nymphaea* were discovered by Maack (1859) in a single place along the Amur River, which had not been noticed by Maximowicz (1859). The singularity of this record and the beauty of the plant seem to have inspired



Figure 5. The lectotype of *Chloranthus mandshuricus* Rupr. (LE 01082942).



Figure 6. The lectotype of *Carex wiluica* Meinsh. (LE 01007083).

Maack to the idea of a new species, which was supported by Ruprecht, who compared the plant with its apparent close relative, *N. pygmaea* (Salisb.) W.T.Aiton (now a synonym of *N. tetragona* Georgi), and distinguished it from the latter by minor deviations in dimensions and flower structure (Maack 1859, Ruprecht 1859a). The protologue of *N. wenzelii* was placed by Ruprecht in the legend to the botanical illustrations in Maack (1859), which has nomenclatural priority over its Latin translation in Ruprecht (1859a).

Although the new species was compared with the relatives and described by Ruprecht, its name was suggested by Maack to honour his patron at the Imperial Russian Geographical Society, Karl von Wenzel, and the authorship of the species name should therefore be cited as *N. wenzelii* Maack ex Rupr.

The taxonomic validity of this new species was doubted immediately after its publication (Regel 1861), and it was later downgraded to a variety and placed into the synonymy of *N. tetragona* Georgi (Czerepanov 1995).

Nymphaea tetragona Georgi (Georgi 1775, p. 220). – Type: Russia, Buryatia: 'in Angara sup. cop.', 07.1772, I. Georgi s.n. (lectotype LE, designated by Byalt and Krupkina (2017, p. 185)).

Taxonomic synonym: *Nymphaea wenzelii* Maack ex Rupr. (Maack 1859, p. v). *Nymphaea tetragona* var. *wenzelii* (Maack ex Rupr.) F.Henkel et al. (Henkel et al. 1907, p. 84). – Type: Russia, Khabarovsk Region: 'Mandshuria, ad fl. Amur' (= island opposite to former Pahale Village on Amur River, 50°05'34"N, 136°52'37"E, 3 Aug 1855), R. Maack 654 (lectotype LE 01041173, designated by Byalt (2018, p. 174); isolectotype LE 01042213).

The correct nomenclature of *Carex wiluica*

Meinshausen (1871) established a new species of *Carex*, closely related to *C. nigra* (L.) Reichard, which he intended to name after Maack as *C. maackii* Meinsh. Oddly enough, Meinshausen seems not to have consulted in due time the work of Maximowicz (1859) who described another species of *Carex* in honour of Maack, but he corrected his oversight at the last moment on the errata leaf inserted under the journal's title page. This correction cancelled the species name printed in the main text, and the errata leaf is the place for valid publication of *C. wiluica* Meinsh.

For some reason, this correction escaped attention not only of the first compiler of 'Index Kewensis' (Jackson 1893) but also of contemporary bibliographers (Litvinov 1909) and the recent monographer of the Russian *Carex* (Egorova 1999), who believed that *C. wiluica* was validly published in Maack (1886).

We accept the taxonomy of *C. wiluica* after Egorova (1972), as summarised below. Although Egorova referred to Maack (1886) instead of Meinshausen (1871) while making a new combination based on *C. wiluica*, her new combination was validly published under Art. 41.8 because Maack (1886) misleadingly flagged this species name as new and provided its validating description but no reference, even cryptic, to the actual place of its valid publication.

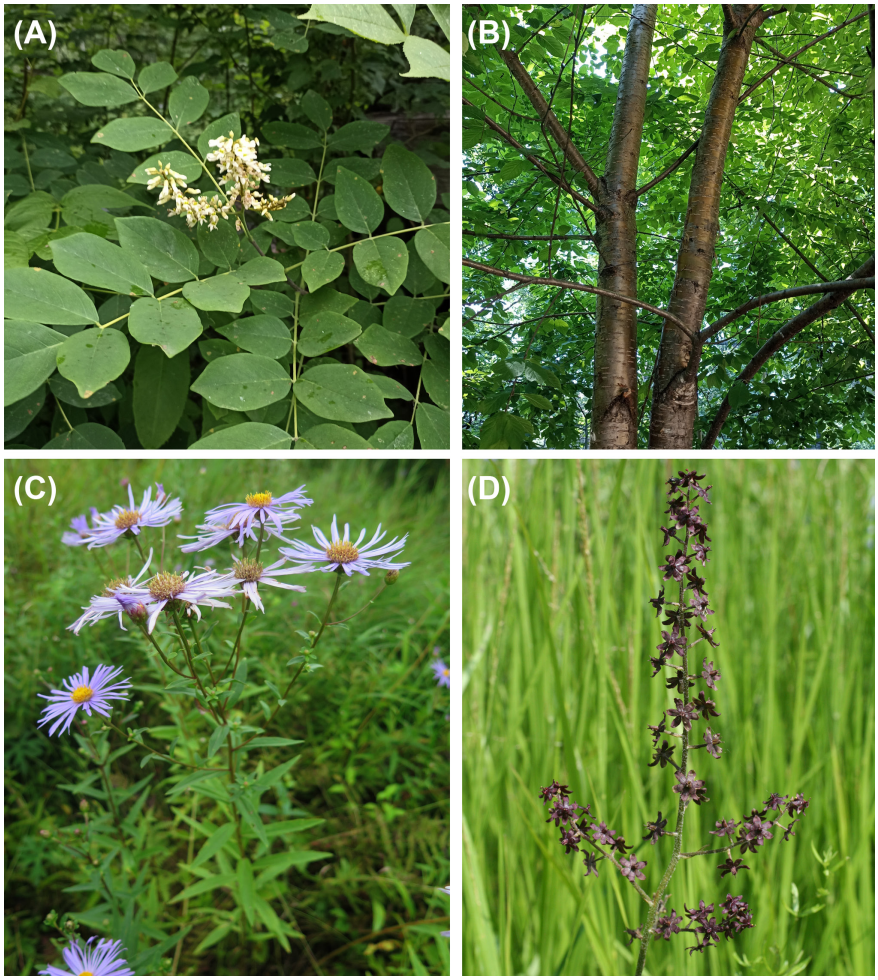


Figure 7. Selected plants named after Richard Maack. (A) *Maackia amurensis* Rupr., Fabaceae (www.gbif.org/occurrence/3873774999); (B) *Prunus maackii* Rupr., Rosaceae (www.gbif.org/occurrence/3859932728); (C) *Aster maackii* Regel, Asteraceae (www.gbif.org/occurrence/2860154932); (D) *Veratrum maackii* Regel, Melanthiaceae (www.gbif.org/occurrence/2963756801). All photographs are distributed under CC-BY-NC licence.

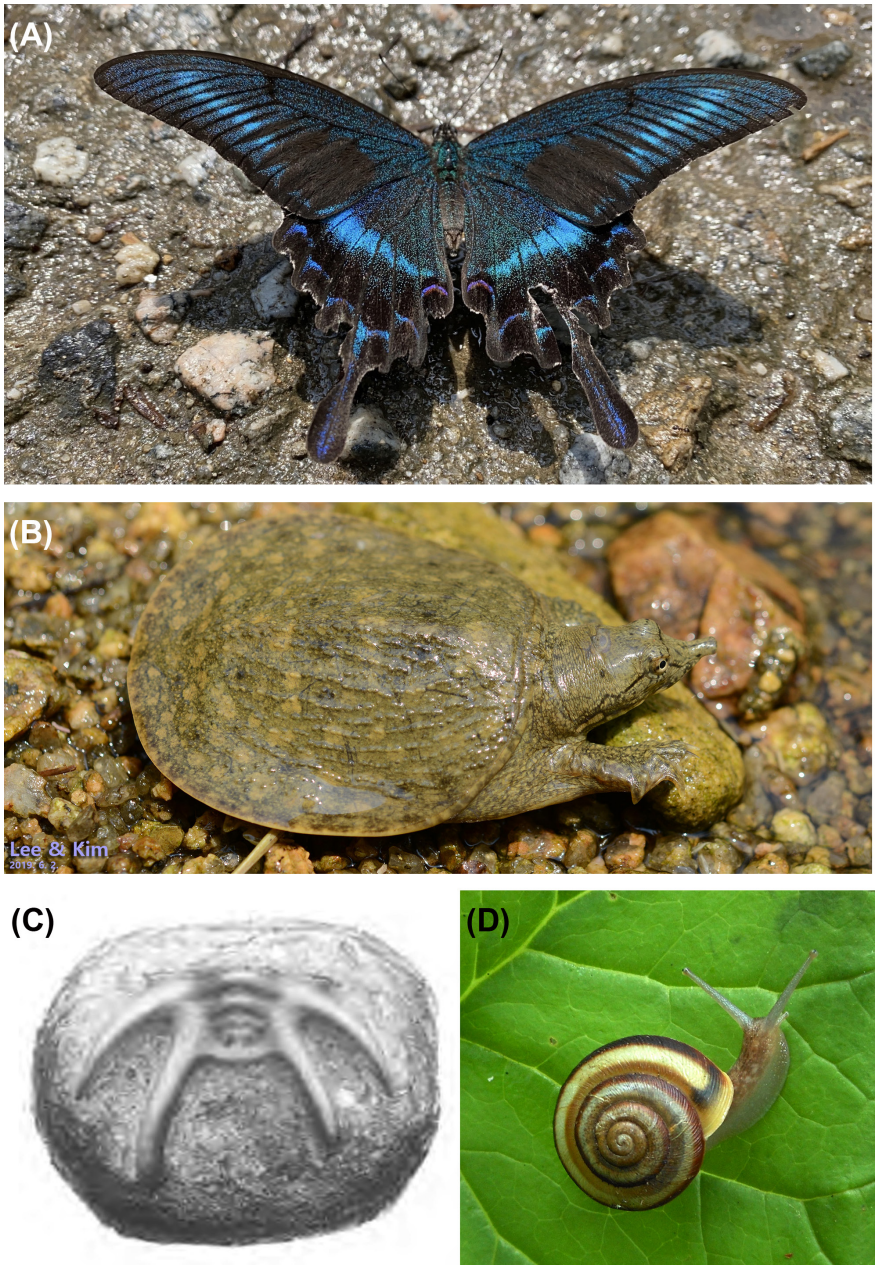


Figure 8. Selected animals named after Richard Maack. (A) *Papilio maackii* Ménétries, 1859, Lepidoptera (www.gbif.org/occurrence/3355479965); (B) *Pelodiscus maackii* (Brandt, 1858), Testudines (www.gbif.org/occurrence/2252013522); (C) *Cheirurus maackii* F.Schmidt, 1886, Trilobita (Schmidt 1886: Fig. 3(4)); D. *Karaftohelix maackii* (Gerstfeldt, 1859), Gastropoda (www.gbif.org/occurrence/2429191485). All photographs are distributed under CC-BY-NC licence.

Mikhailova (2012) stated that the holotype and three isotypes of *C. wiluica* are kept at LE. This species was described on the basis of a single gathering collected by Maack on 15 June 1854 (Meinshausen 1871). No holotype was designated in the protologue. Moreover, the four specimens traced at LE are not fully homogeneous. According to the field tickets of Maack, the collections examined by Meinshausen belong to two field numbers, 306 and 307a. The collection 306 is in young fruit as stated in the protologue but its plants lack basal parts; probably for this reason they were finally excluded by the species author, as evident from his draft identification label. The other specimens are identically in flower and may belong to the same gathering, although only one of them is labelled as Maack 307a. The specimen bearing the correct species name annotated by Meinshausen and accepted as the holotype by Kreczetovicz (1935) and Mikhailova (2012) is designated as lectotype here.

Carex juncella subsp. *wiluica* (Meinsh.) T.V.Egorova (Egorova 1972, p. 92). *Carex wiluica* Meinsh. (Meinshausen 1871, p. (2), Maack 1886, p. 308). *Carex maackii* Meinsh.

(Meinshausen 1871, p. 226), nom. inval. (Art. 36.1). – Type: Russia, Yakutian Republic: 'Siberia orient. ad fl. Wilui' (80 versts from the mouth of Viluy River, moist meadows on the left river side, 15 Jun 1854), R. Maack 307a (lectotype LE 01007083, designated here (Fig. 6); isolectotypes LE 01007084, 01007085).

Conclusions

The botanical works on the Amur River expeditions, which were published during 1859, can be dated rather precisely and organised in the following chronological sequence: book edition of 'Primitiae florae Amurensis' (Maximowicz 1859), 'Travel to the Amur River' (Maack 1859), 'Decas plantarum amurensium' (Ruprecht 1859a), German version of the review of 'Primitiae florae Amurensis' (Ruprecht 1859b), Russian version of the review of 'Primitiae florae Amurensis' (Ruprecht 1859c). For the purposes of nomenclatural priority, names of the new species and genus established by Ruprecht in 1859 were validly published in Maack (1859). The botanical results of the Ussuri expedition were published originally in Regel (1861), whereas the Russian version of this work (Maack 1862, Regel 1862) was printed and distributed later. The plants of the Viluy expedition were completely treated in Meinshausen (1871), and this information was only recapitulated in Maack (1886).

The botanical specimens collected by Maack were acquired by the Imperial Academy of Sciences (Viluy and Amur expeditions) and the Imperial Botanical Garden (Ussuri expedition) in Saint-Petersburg, whereas their duplicates formerly kept in Irkutsk were destroyed by fire in 1879. Nowadays the main sets of these collections are kept at the Komarov Botanical Institute in Saint-Petersburg (LE), whereas many duplicates were distributed to other botanical institutions (e.g. GH, K, L, P, U). These collections are tricky because of their incomplete label data and long history of studies and curatorial handling, and should be treated with utmost caution in order to achieve their correct interpretation.

Although Maack collected many plant species and was able to distinguish between them in the field, he deliberately refrained from any detailed research in natural sciences including taxonomic treatments of his own collections (Maack 1859). He made very little taxonomic contributions to botany, limited to his suggestion of the name to *Nymphaea wenzelii*, which was rather a matter of courtesy than of science, and his cooperation with E. Regel, in which 12 new plant species names were also credited to him. New plants collected by Maack were described by K. Maximowicz, K. Meinshausen, E. Regel and F. J. Ruprecht, with a new genus and several new species named in his honour.

Maack was among the very first naturalists who entered northern Manchuria to collect objects of natural science and who published extensive accounts of its flora and fauna. His collections, rich and accurate, provided a good insight into the plant and animal world of this special territory, which was subsequently recognised as Manchuria Province in botanical classifications (Takhtajan 1986). Many plants and animals, often highly distinct and extraordinary, were described on the basis of his collections. Several plants were named after Maack, including the genus *Maackia* Rupr., a distinct member of Sophoreae in Fabaceae (Cardoso et al. 2013) (Fig. 7A), *Prunus maackii* Rupr., an iconic arboreous species in ornamental cultivation (Fig. 7B), *Aster maackii* Regel, an East Asian member of *A.* sect. *Aster* (Chen et al. 2011, Jafari et al. 2015) that is similar to *A. tataricus* L.f. (Fig. 7C), and *Veratrum maackii* Regel, which is also confined to East Asia (Fig. 7D). The animals named after Maack include *Papilio maackii* Ménétries, 1859, a very large and highly spectacular butterfly of East Asia (Fig. 8A), *Pelodiscus maackii* (Brandt 1858), a turtle (Fig. 8B) of the lower course of the Amur and Ussuri rivers, Korea and southern Japan (Farkas et al. 2019), *Cheirurus maackii* F.Schmidt, 1886, a trilobite of the Upper Silurian period (Fig. 8C), which may constitute a genus of its own (Kobayashi and Hamada 1974), and *Karaftohelix maackii* (Gerstfeldt, 1859), a small terrestrial gastropod mollusc of East Asia (Fig. 8D).

Whatever were the political reasons for decision-makers of the time, many young scientists were driven to Siberia in the mid-19th century solely by the 'charming influence' of the attraction to completely unexplored fields (Venyukov 1877). As part of this romantic movement, Richard Maack, a Baltic German working in the Russian Empire, achieved a prominent place in the history of natural sciences.

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Author contributions

Alexander N. Sennikov: Conceptualization (lead); Data curation (lead); Formal analysis (lead); Investigation (lead); Resources (lead); Writing – original draft (lead); Writing – review and editing (lead). **Irina V. Sokolova**: Conceptualization (supporting); Data curation (supporting); Formal analysis (supporting); Investigation (supporting); Resources (supporting); Writing – original draft (supporting); Writing – review and editing (supporting).

Data availability statement

There are no additioanl data for this paper.

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