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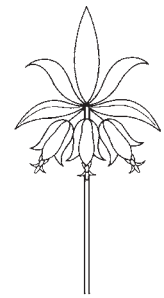

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The history of botany in Moscow and Russia in the 18th and early 19th centuries in the context of the Linnaean Collection at Moscow University (MW)

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Abstract

The Herbarium of Moscow State University, Russia, possesses a relatively small (63 specimens), but historically interesting, collection of herbarium specimens linked with Carl Linnaeus (1707–1778). Some of these originally formed part of Linnaeus' own herbarium while others, although never his property, were nevertheless studied by him and may be original material for the typification of his plant names. This paper discusses the broad historical background to the gathering of these specimens, their study by Linnaeus and their subsequent fate. Specimens linked with Linnaeus have been encountered in each of the four largest historical collections of the Herbarium of Moscow State University, i.e., in the herbaria of J. F. Ehrhart, G. F. Hoffmann, C. B. von Trinius and C. L. Goldbach. Ehrhart's General Herbarium contains 31 sheets, which were more or less certainly collected or studied by Linnaeus. Ehrhart, a pupil of Linnaeus, received some specimens directly from the latter, while others came to him from Linnaeus filius, A. Dahl, and P. J. Bergius. Ehrhart's collections were purchased by G. F. Hoffmann, later the first head of the Department of Botany at Moscow University, who took them to Russia. Hoffmann's General Herbarium contains three specimens that may be connected with Linnaeus. They were received from C. P. Thunberg, J. A. Murray, and an unknown person, respectively. At least five specimens from Trinius' collection, although certainly never seen by Linnaeus, are probable duplicates of material that was studied by him. Some of them are almost certainly iso-lectotypes of Linnaean names. Finally, 24 specimens linked with Linnaeus were found in Goldbach's herbarium. The majority of them were collected in the Lower Volga Region by J. Lerche and during the Second Kamchatka Expedition (Great Northern Expedition) by J. G. Gmelin and G. W. Steller.

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Dedication

We dedicate this work to the memory of the outstanding Russian botanist, leading specialist in the study of historical herbarium collections, and Keeper of the Herbarium of Moscow State University, Mikhail Nikolaevich Karavaev (1903–1992), whose publications were extensively used in our research.

Introduction

The herbarium specimens studied by Carl Linnaeus (1707–1778) (Fig. 1) have considerable historical as well as nomenclatural significance as they are important for the typification of the plant names he described. The Linnaean Plant Name Typification Project (Jarvis 1992) is studying the plant names described by Linnaeus, analysing the specimens and illustrations used by him, and selecting types in collaboration with appropriate taxonomic specialists.

Figure 1. Carl Linnaeus (1707–1778).

During his lifetime, Linnaeus accumulated quite a large herbarium collection. In 1784, after the death of Linnaeus filius (1741–1783), the collections and library were purchased from the widow of Linnaeus senior by James Edward, later Sir James Edward, Smith (1759–1828). At its inception in 1788, Smith became the first president of the Linnean Society of London, and after his death in 1828, the collections were bought by the society. Consequently, the main part of Linnaeus' own herbarium (more than 13,000 sheets) is now preserved at the Linnean Society of London (LINN). However, Linnaeus had also given away many specimens during his lifetime, mostly to colleagues and students, and many of these have subsequently been brought together at the Swedish Museum of Natural History in Stockholm. Several smaller Linnaean collections of this type are preserved in Sweden (GB, SBT, UPS), Finland (H), France (Paris, Institut de France), Switzerland (G), Russia (MW), and apparently in Germany (M). A Linnaean specimen was found recently at the Herbarium of the V. L. Komarov Botanical Institute, St. Petersburg, Russia (LE) (A. N. Sennikov, pers. comm.). Other significant collections were studied by Linnaeus but as they never formed part of his own herbarium are now in other institutions. For example, the large herbarium of George Clifford (1685–1760), linked with Linnaeus' *Hortus Cliffortianus,* and the Sri Lankan collections of Paul Hermann (1646–1695), which form the basis for Linnaeus' *Flora Zeylanica,* are both at The Natural History Museum, London (BM). The North American collections of John Clayton (1686–1773) can also be found there. Similarly, the herbarium of Joachim Burser (1583–1639) is at the University of Uppsala.

The history and structure of the general Linnaean herbaria and other relevant collections have been extensively discussed (e.g., by Trimen 1887; Lindman 1907, 1909; Fries 1935; Juel 1936; Savage 1945; Alston 1957; Kukkonen and Viljamaa 1973; Reveal 1983; Jarvis et al. 1987; Wijnands and Heniger 1991). Information on the relatively small, but historically interesting, collection of Linnaean specimens in the Herbarium of Moscow State University (MW) was, however, much less widely available mainly because it was published in Russian (Karavaev and Gubanov 1981; Karavaev 1981, 1983).

However, a collaboration between botanists from Moscow State University and the Linnaean Plant Name Typification Project based in London has significantly increased our knowledge of the specimens connected with Linnaeus that are kept at MW. We have revised the historical collections at MW as fully as possible in order to identify specimens linked with Linnaeus and to establish their nomenclatural significance. In this, we have been continuing the huge work in this area conducted by M. N. Karavaev (Fig. 2). Although we have made extensive use both of Karavaev's published results and handwritten annotations to herbarium sheets, we have not always reached the

Figure 2. Mikhail Nikolaevich Karavaev (1903–1992), Keeper of the Herbarium of Moscow State University (1954–1963) and a leading specialist in the study of historical herbarium collections in Russia. Many of his publications have been used extensively in our research.

same conclusion as to the probable relationship of a particular sheet with Linnaeus. In total, we consider 63 of the specimens in MW to be linked with Linnaeus. We cannot, of course, be sure that we have located all of the material studied by Linnaeus as it can be extremely difficult to prove whether Linnaeus saw and studied a particular specimen.

As a result of our collaboration, a CD–ROM with high quality digital images of all 63 herbarium specimens linked with Linnaeus from MW (Balandin et al. 2001) and an annotated list of specimens (Sokoloff et al. 2001) are being published. A revised typification of *Astragalus physodes* L., based on material from MW, is also being proposed (Jarvis et al. 2001). The publication of the CD–ROM is part of an ongoing Digital Herbarium project of the Herbarium of Moscow University. The CD–ROM (which is available from The Natural History Museum, London) contains high quality images and customisable navigation resources as well as extensive relevant information, including a historical review and comments regarding the nomenclatural significance of each specimen (prepared by C. E. Jarvis).

The aim of the present paper is to discuss in more detail the historical background to the origin of the collection of plant specimens at MW that are linked with Linnaeus. The Herbarium of Moscow State University (MW) is the second in size and importance in Russia. It contains more than 800,000 specimens, many of which have great value from a scientific, as well as historical and cultural, viewpoint. The specimens linked with Linnaeus and kept at MW do not originate from a single, integrated collection. They were located by M. N. Karavaev and by the present authors within the four largest historical collections at MW, i.e., the herbaria of Jacob Friedrich Ehrhart, Georg Franz Hoffmann, Carl Bernhard von Trinius and Carl Ludwig Goldbach. We demonstrate how these specimens were gathered, how they were acquired for study by Linnaeus and, finally, how they reached their present-day location at Moscow State University. The history varies from specimen to specimen and is often quite complicated. Since it is difficult to separate the history of the specimens from the wider historical background, we discuss episodes of the development of botanical research in Russia in connection with this interesting collection. We have restricted our study to the 18th and early 19th centuries since apparently all the material under discussion was acquired by the university during this period.

Botany in Moscow: First years

Up until the middle of the 18th century, botany in Moscow developed almost exclusively as a part of medicine. In the late 17th and early 18th centuries, four State Apothecary Gardens,

Figure 3. *Sukhareva Bashnya*. A. Savrasov. 1872. Oil on canvas. 74 x 61 cm. State Historical Museum, Moscow. In 1706, the Moscow Apothecary Garden was established "behind Sukhareva Bashnya." The tower was destroyed in the 1930s. This historical site in Moscow is illustrated by the Russian artist Alexey Savrasov (1830–1897).

and more than 50 tsar (royal), monastery and private gardens were in existence in and around Moscow (Kropotova et al. 1980).

The Moscow Apothecary Garden (Moskovskij Aptekarskij ogorod), which was established in 1706 in a northern outlying part of Moscow behind Sukhareva Bashnya (Sukharev's Tower (Fig. 3); now destroyed), is of particular interest because of its contribution to the development of Russian botany and because it still survives on its original site as a branch of the Botanical Garden of Moscow University (Fig. 4). According to tradition, Peter the Great (Fig. 5) was directly involved in the foundation of the Moscow Apothecary Garden and even planted here three trees (*Abies, Larix,* and *Picea* — Shevyrev 1855 — of which one, *Larix sibirica,* still survives). Peter also made a herbarium collection (apparently lost) in Moscow. Many plants were moved to the Apothecary Garden from the tsar's garden in Izmaylovo near Moscow (Kropotova et al. 1980). This branch of the Botanical Garden of Moscow University is currently under reconstruction with the aim of rebuilding the garden in the style of the 18th century.

In the early 18th century, the activity of the garden was directed exclusively to pharmaceutical purposes, and there was no senior scientific position. However, there were people in Moscow interested in botany during that time. Perhaps the most important of these

Figure 4. The branch of the Botanical Garden of Moscow University (formerly the Moscow Apothecary Garden) showing the end of the Subtropical Greenhouse. In the 18th century, greenhouses in the garden were constructed of wood — they have not survived. The Subtropical Greenhouse was consequently rebuilt many times and its foundations now contain part of a greenhouse built in 1820 during the directorship of G. F. Hoffmann (see below). The end of the greenhouse (in the photo) is seemingly from the 1870s. Photo from the 1990s by A. Parshin. By courtesy of the author.

Figure 5. *Portrait of Peter the Great*. Unknown artist. The second half of the 19th century. Oil on canvas. 65 x 37 cm. Khanty-Mansiysk District Gallery. Peter the Great (1672–1725), tsar (from 1682, governed from 1689) and the first emperor (from 1721) of Russia, began the westernisation of Russia, greatly increased Russian power and developed relationships with the rest of the Europe. He won a victory over Sweden in the Great Northern War (1700–1721), added territories along the Baltic coast, and founded St. Petersburg (1703), the capital of Russia between 1712 and 1918. He founded many new institutions, including St. Petersburg Academy of Sciences (1724), Moscow Apothecary Garden (1706), and St. Petersburg Apothecary Garden (1713 or 1714). He initiated the First Kamchatka Expedition (1725). Peter was interested in the development of botany as well as other kinds of natural history in Russia, mainly due to military needs. He made a personal herbarium collection (apparently lost) in Moscow and planted, according to tradition, three trees in the Moscow Apothecary Garden. Peter greatly developed Russian industry and was, in particular, responsible for the colossal fortune of the Demidov family (see below).

was Gottlieb Schober (1670–1739), a graduate of Utrecht University, who lived in Moscow from 1715 until his death. During the last years of his life, he was a physician to the Georgian King in the latter's Moscow residence (Karavaev 1981). Schober was one of the first botanists to study the flora of European Russia. In particular, he prepared an enumeration of plants occurring "circa Metropolin Moscuam." A copy of the manuscript is kept now in London (Karavaev 1981). In 1717–1720, Schober visited the Lower Volga Region as well as the northern and northwestern shores of the Caspian Sea (Bobrov 1970). Linnaeus had in his garden at Uppsala some plants that came from material collected by Schober from the shores of the Caspian Sea. Based on this material, Linnaeus described *Nitraria schoberi* L. Schober is also commemorated in the genus *Schoberia* (Chenopodiaceae), described by C. A. Meyer in 1829. About 20 plants from Schober's collection survive in the collections in MW (Karavaev 1981).

Traugott Gerber

The first scientific head of the Moscow Apothecary Garden was Traugott Gerber (1709–1742 or 1743), a graduate of Leipzig University, who arrived from Germany in 1735 (Karavaev 1971). Gerber greatly developed the collections of the Apothecary Garden, in both open ground plantings and greenhouses, plants and seeds being received from Germany, France, the Netherlands, China, Siberia, southern Russia, St. Petersburg, etc. (Karavaev 1971). He also taught botany and pharmacology to Russian pupils.

Gerber collected herbarium material in the garden and also conducted extensive floristic research in European Russia. Besides field work in the neighbourhood of Moscow (he produced "Flora Mosquensis," a manuscript containing about 200 plants), Gerber conducted in 1739 an expedition around the Volga river basin with the following itinerary: Moscow–Murom–Nizhny Novgorod–Kazan'–Samara–Saratov–Tsaritsyn (now Volgograd)–Voronezh–Tambov–Ryazan'–Moscow (see Figure 6 for a sketch map indicating the location of many of the places mentioned

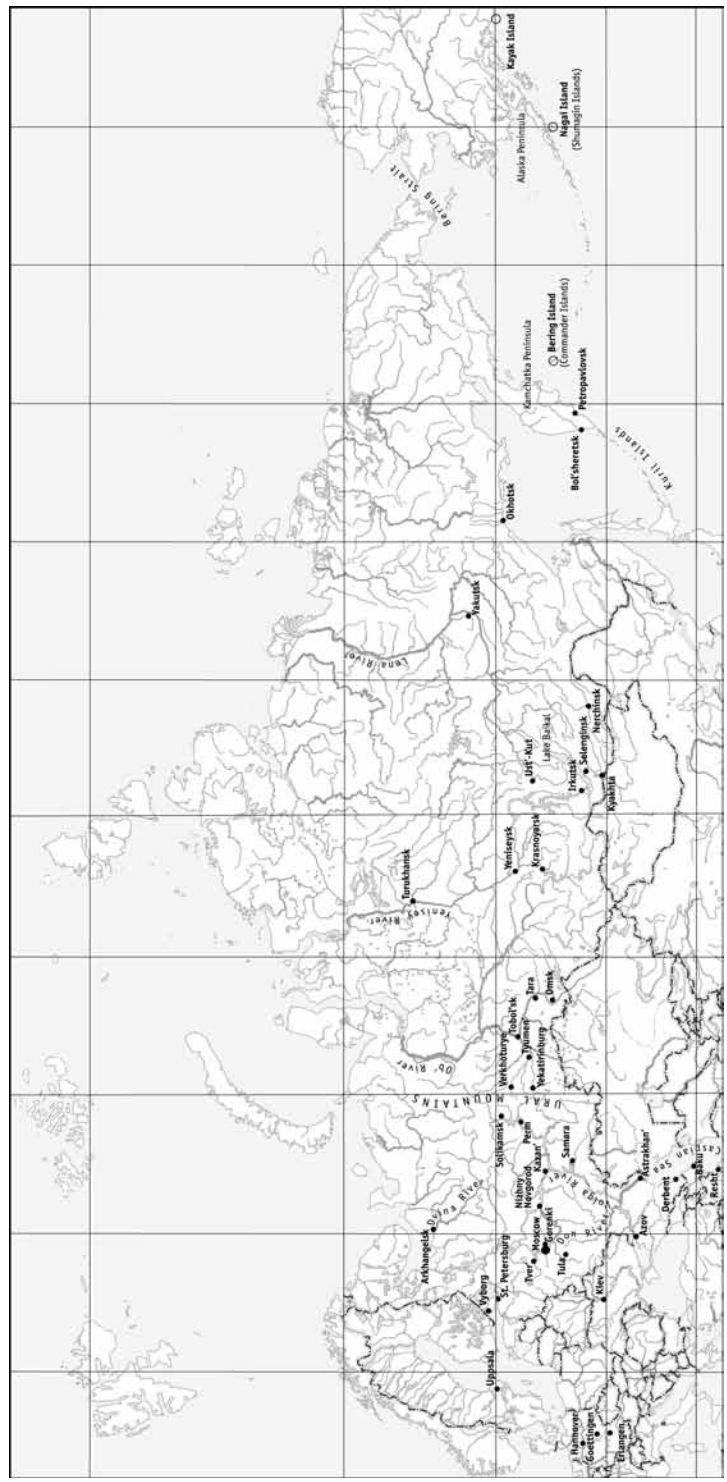


Figure 6. A sketch map containing places often mentioned in the text of the paper. Present-day boundaries of Russia are shown.

in the text). As a result, he compiled a "Flora Wolgensis," which included 225 plant species (Lipschitz 1947; Karavaev 1971, 1972). In 1741, Gerber organised a second expedition in the Don river basin and the Ukraine, and this resulted in his "Flora Tanaicensis," which included 280 species (Lipschitz 1947; Karavaev 1971).

According to Karavaev (1971), Gerber amassed a herbarium of about 2,400 plant taxa through his own collections and by exchange. Several plant species were collected and described (in his manuscripts) for the first time by Gerber. A number of his specimens were received by Linnaeus via G. A. Demidov and used while he was preparing *Species Plantarum* (Linnaeus 1753), and some of them are still in Linnaeus' own herbarium, kept now at the Linnean Society of London (see below). According to Savage (1945), Linnaeus also received Gerber's manuscripts "Flora Wolgensis" and "Flora Tanaicensis" in 1744.

In 1741 (or 1742 according to Amlinsky and Shumakova 1989), Gerber's position in the Moscow Apothecary Garden was abolished, and so he moved to Vyborg where he died some months later (Karavaev 1971). Gerber's large herbarium moved with him to Vyborg (Lerche 1791), but its subsequent fate is unknown. About 60 of Gerber's specimens are kept now in MW (Karavaev 1972), but they have apparently only historical (not nomenclatural) significance. In contrast to specimens collected by Lerche and Steller, there is no clear evidence that any of Gerber's specimens kept at MW were studied by Linnaeus. An example of one of Gerber's herbarium specimens is shown in Figure 7. The genus *Gerbera* (Compositae) was described in honour of Gerber by Linnaeus.

Figure 7. A herbarium specimen collected during the expedition of Traugott Gerber (1709–1742 or 1743) (MW). Gerber was the first scientific head of the Moscow Pharmaceutical Garden. A number of Gerber's specimens were received by Linnaeus via G. A. Demidov and used while he was preparing *Species Plantarum*. Some of them are still in Linnaeus' own herbarium, kept now at the Linnean Society of London.

Between Gerber and Hoffmann: Lerche and Stephan

During the year 1751 (according to Lipschitz 1952), or from 1748 (according to Karavaev 1981), the Moscow Apothecary Garden was under the supervision of J. J. Lerche, who developed the garden and its greenhouses. Johann Jacob (in Russia, Ivan Yakovlevich) Lerche (1703–1780) had obtained the degree of doctor of medicine in Halle (1730) and moved to Russia in 1731 (here and below mainly following Lipschitz 1952). From 1733, Lerche was head physician in the Astrakhan' corps of the Russian Army, which was then in service in Persia. In 1733–1735, Lerche visited various places in the Caucasus (Derbent,

Baku, Shemakha, etc.), taken there by his medical duties. During these journeys, he studied the local natural history. In 1737–1738, Lerche was working as a physician in the Don region, treating an epidemic of plague (Karavaev 1981). In 1745–1747, he participated in the diplomatic mission of Prince M. M. Golitsyn to Persia that had the following itinerary: St. Petersburg–Moscow–Astrakhan'–Baku–Lenkoran'–Resht (returning to Astrakhan' via the Caspian Sea). Lerche had now a special commission from the St. Petersburg Academy of Sciences to study natural history during these travels. Lerche was consequently responsible for introducing some Persian plants into cultivation in Russia. For example, a specimen of *Gossypium* (MW No. 490, Fig. 8) has the following annotation: "Baumwolle, Pflantze, welche ich zu Asow aus dem Samen bis zur Blüte gebracht. 1737." (i.e., A cotton plant, which I have cultivated in Azov from seeds to flowers). According to Karavaev (1981), the annotation is written by Lerche, and the specimen was collected during his stay in the Don region (efforts were apparently being made to establish *Gossypium* in cultivation in order to obtain cotton wool as a dressing material for military purposes). In 1751, after a short spell at the Moscow Apothecary Garden, Lerche was transferred to St. Petersburg where he worked at the Medical Chancellery.

Lerche completed two manuscripts, "Flora Persica in confinibus maris Caspii" (based on his travels in 1733–1735) and "Descriptio plantarum Astrachanensium et Persicorum" (after his second journey). Linnaeus received copies of both of these (Bobrov 1970) and evidently appreciated them for he sent a letter to Lerche with 55 comments on the second manuscript and praised the importance of Lerche's work. Eight of Lerche's works were published, including an account of plants he had found during his travels (Lerche 1773) and a description of the travels themselves (Lerche 1791).

Lerche sent herbarium specimens to both

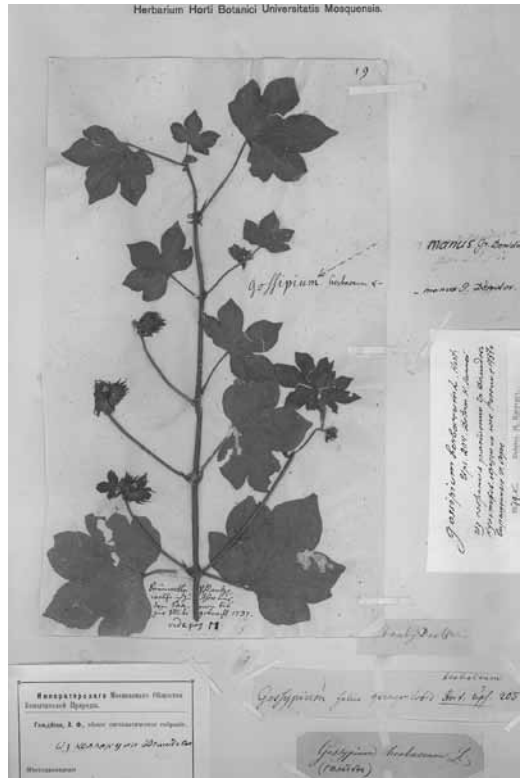


Figure 8. A specimen of a cotton plant (MW No. 490). According to the annotation on the sheet, it was cultivated by J. J. Lerche (1703–1780) in Azov from seeds to flowering. A number of Lerche's specimens were received by Linnaeus via G. A. Demidov before publication of *Species Plantarum*.

J. Amman and J. G. Gmelin, and in 1748 he passed a parcel of specimens to G. A. Demidov (Karavaev 1981). A number of Lerche's specimens were received by Linnaeus via G. A. Demidov before the publication of *Species Plantarum* (Stejneger 1936), and Lerche had also been sending seed direct to Linnaeus (Bobrov 1970). Demidov received back from Linnaeus at least some of Lerche's specimens. A small set of Lerche's specimens is kept now in MW and includes, in particular, the lectotype of *Astragalus physodes* L. (Jarvis et al. 2001), original material for *Glycyrrhiza echinata* L. and three other specimens that may be at least of similar

provenance to material studied by Linnaeus. Apart from this, some of Lerche's specimens at MW have been designated as lectotypes for species described by other botanists (Gubanov 1993). Lerche is commemorated in the genus *Lerchea* (Rubiaceae), described by Linnaeus in 1771, and in the species *Artemisia lercheana* Weber (type in MW).

Only in 1786 was the position of scientific director re-established at the Moscow Apothecary Garden. Christian Friedrich Stephan (1757–1814) was offered the post, along with the position of professor of chemistry and botany in the Moscow Medical-Surgical School (Kropotova et al. 1980). Stephan conducted an extensive floristic study in the Moscow area and compiled the first published Flora of this region (Stephan 1792) containing 860 plant species. In 1796, at Stephan's suggestion (Kropotova et al. 1980), the garden became attached to the Medical-Surgical School (after 1798, the Medical-Surgical Academy).

At Moscow University, which was founded in 1755, the first lectures in botany had been given by P. D. Veniaminov in 1765 (Nasarov 1926; Pavlov 1978). He also collected herbarium specimens around Moscow. The university's second botanical lecturer was M. A. Afonin (1739–1810), a pupil of Linnaeus. In the 18th century, botanical study was restricted to the Faculty of Medicine of the university as a part of medical education (Pavlov 1978).

Figure 9. Georg Franz Hoffmann (1760–1826), the first head of the Department of Botany and of the Botanical Garden of Moscow University (appointed in 1804), who was responsible for bringing to Moscow several important herbarium collections including his own herbarium with three possible Linnaeus-linked sheets. He also acquired collections of J. F. Ehrhart, J. R. Forster and J. G. Forster and other important materials. The original portrait (in pencil) hung in the laboratory of the Botanical Garden of Moscow University. Unfortunately, it was lost as far back as 1940 (Lipschitz 1940). All further reproductions are derived from a photograph made by a Keeper of the Herbarium of Moscow University, D. P. Syreishchikov (Lipschitz 1940). There is an annotation: "Als Doctor 20 Jahre alt"; thus the portrait was drawn apparently in 1780.

Georg Franz Hoffmann and Ehrhart's collection

In 1804, a separate Department of Botany was created in Moscow University. The Apothecary Garden was bought by the university from the Medical-Surgical Academy to be transformed into the university's new Botanical Garden. (There was a small, existing University Botanical Garden in the centre of Moscow, just near the university. This old garden was completely destroyed in the Moscow fire of 1812 [Nasarov 1926; Kropotova et al. 1980].)

The first head of both the Department of Botany and the Botanical Garden was Georg Franz Hoffmann (1760–1826) (Fig. 9), who was appointed in January 1804 (Lipschitz 1940a, b, 1950; Meyer 1966). Almost simultaneously with Hoffmann, several other German professors were

Figure 10. Johan Andreas Murray (1740–1791), a pupil of Linnaeus and Hoffmann's predecessor at Göttingen University. A specimen of *Hamamelis* from Hoffmann's Herbarium was received from Linnaeus via Murray. Murray had edited a revised version of *Systema Vegetabilium* (Linnaeus 1774) and the botanical portion of the 12th edition of *Systema Naturae* (Linnaeus 1767), incorporating changes from Linnaeus' own annotated copy of that work (Stearn 1957; Goerke 1978). Murray was commemorated in the genus *Murraya* Koen. ex L. (Rutaceae).

invited to Moscow University including, as head of the Department of Zoology, G. Fischer von Waldheim (1771–1853), who was a founder of the Moscow Society of Naturalists, and as head of the Department of Astronomy, F. Goldbach (1763–1811), whose son L. F. Goldbach became a favourite pupil of Hoffmann (Shevyrev 1855).

A graduate of the University of Erlangen (1786) where he was subsequently professor of botany (1787–1792), Hoffmann was head of the Botany Department and director of the Botanical Garden at Göttingen University between 1792 and 1803. Two famous botanists had been his predecessors there — Victor Albrecht von Haller (1708–1777), then Johan Andreas Murray (1740–1791) (Fig. 10).

Hoffmann was by 1804 a famous botanist and an author of publications concerning the taxonomy and uses of lichens and willows *(Salix)* as well as two editions of *Deutschlands Flora* (the manuscript of the third edition was lost in the fire of 1812). In Moscow, Hoffmann published a classical monograph *Genera Plantarum Umbelliferarum* ... (Hoffmann 1814), a description of the Botanical Garden of Moscow University (3528 species) (Hoffmann 1808), and several other important papers (see Lipschitz 1940a, for complete review). Hoffmann was also a well-known lecturer — both Goethe and Humboldt attended his lectures at Göttingen University — as well as a talented plant illustrator, preparing many excellent plant images for his various books (Lipschitz 1940a). Hoffmann is commemorated in the genus *Hoffmannia* Sw. (Rubiaceae).

Hoffmann had accumulated at Göttingen, and taken with him to Moscow, an extensive herbarium collection and library. The herbarium included a small number of specimens that he had collected before moving to Moscow and many important collections made by other botanists. Hoffmann collected very few plants in Russia (Lipschitz 1940a; Pavlov 1978). However, he continued to acquire collections made by other botanists, rearranging his specimens and organising their labelling during his stay in Moscow. The structure of Hoffmann's collection was therefore created in Russia. Unfortunately, he usually replaced original labels of other botanists with abbreviated copies that he made (Lipschitz 1940a; Smirnov 1940). However, in 1825, he published a catalogue (Hoffmann, 1825) of his *personal* collection, which is very important because in many cases it contains more information than was recorded on the labels of the herbarium specimens. According to Smirnov (1940), the catalogue is extremely rare (only three or four copies were known in 1940). A copy of the catalogue is kept in the MW Herbarium.

Specimens linked with Linnaeus

Three specimens from Hoffmann's personal collection may be connected with Linnaeus (Karavaev and Gubanov 1981; Balandin et al. 2000; Sokoloff et al. 2001). The first sheet, labelled as *Cactus grandiflorus,* has an annotation that it was received from Linnaeus at his country estate, Hammarby, near Uppsala. The label is written by an unknown person, and the use of the word "Juny" (not Juni, June, Junio, juin, or Junius) is intriguing. According to M. N. Karavaev (annotation on the sheet, see also Karavaev and Gubanov 1981), the specimen was received from Linnaeus in 1756. However, the year is quite unreadable on the original label. Besides, Linnaeus had purchased Hammarby only in 1758 (Odelberg 1978). The specimen had been received by Hoffmann from C. P. Thunberg (1743–1828). Thunberg was a student of Linnaeus and became professor of botany in Uppsala before Linnaeus filius' death. There is also a very similar specimen labelled as *"Cactus pereskia"* in Demidov's collection (MW). It is reasonable to suppose that the two specimens were duplicates (supported by a comparison of paper and watermark types, by the form of mounting and, finally, by comparison of the plants themselves). Both specimens lack any Linnaean handwriting, but they are quite similar to sheets from Linnaeus' collection.

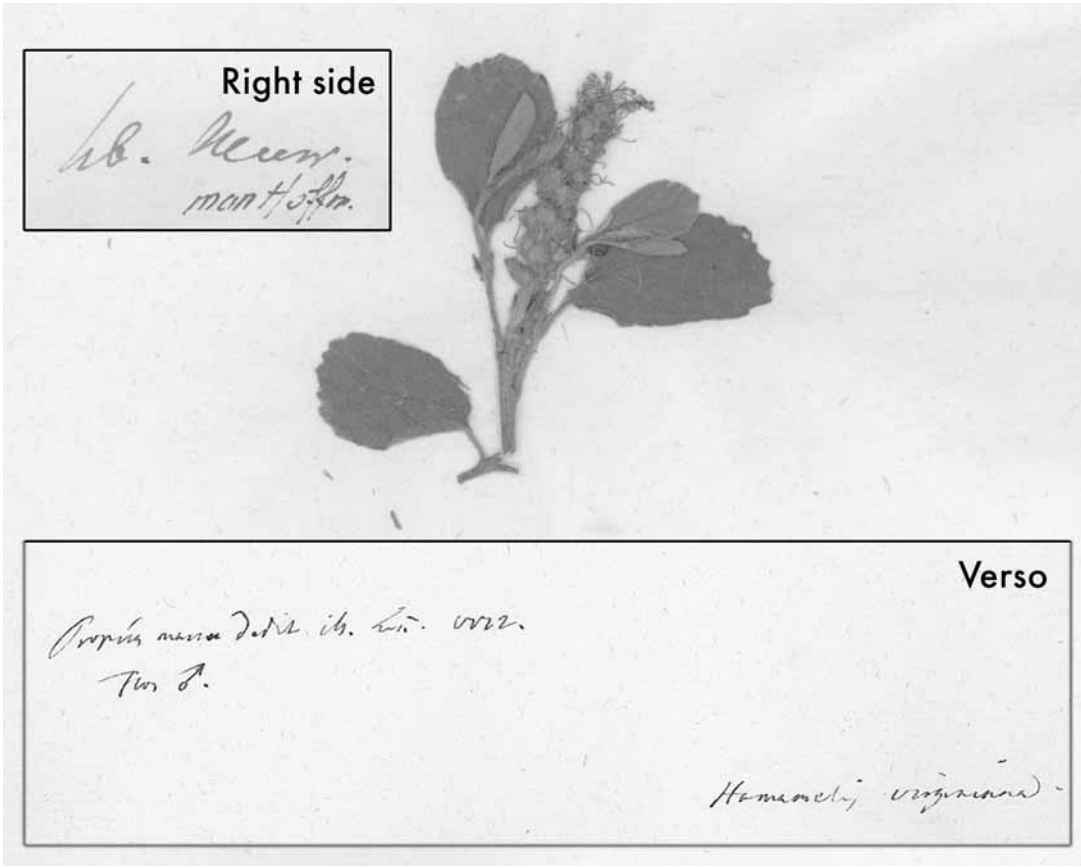


Figure 11. A specimen of *"Hamamelis"* from Hoffmann's herbarium (MW No. 26), which was received from Linnaeus via Murray. According to identification by Alan Weakley, the specimen belongs to *Fothergilla gardenii* Murr. (Hamamelidaceae). *Below:* an annotation from the verso of the specimen.

The second sheet, annotated as *"Hamamelis virginiana"* (Fig. 11), also has an annotation indicating that it had been received from Linnaeus and evidently belonged to Murray. Linnaeus presented the specimen (and some other sheets) to Murray, presumably during Murray's visit to Sweden in 1771. During this visit, Murray also obtained the materials necessary for the publication of *Systema Vegetabilium* (see Fig. 10) (Goerke 1978; see also Karavaev and Gubanov 1981).

Finally, there is a specimen of *Fucus confervoides* with the annotation "Herb. Lin.". It is uncertain whether it has any connection with Linnaeus.

Hoffmann's collection is particularly rich in original material for species of lichens, mosses, and fungi (Smirnov 1940). A study of Hoffmann's collection of lichens was published by Wainio (1888). Apart from his personal collection, Hoffmann also possessed the more or less extensive collections of his predecessors at Göttingen University, Murray and Haller, and also collections of A. J. Hugo (?–1753), J. F. Ehrhart, J. R. Forster and J. G. Forster, J. J. Dickson (1738–1822), D. H. Hoppe (1760–1846), C. P. Thunberg (1743–1828), and J. E. Smith (1759–1828) (Nasarov 1926). These collections were not incorporated into Hoffmann's personal herbarium. A very important collection purchased by Hoffmann was the herbarium of Johann Reinhold Forster (1729–1798) and Johann Georg Adam Forster (1754–1794), collected on Capt. James Cook's second circumnavigation in the *Resolution* (Mitrofanova 1959; Karavaev and Merkis 1960; Karavaev 1961).

Perhaps the most significant collection moved by Hoffmann from Germany was the herbarium of J. F. Ehrhart, which contains several Linnaean specimens (Karavaev and Barsukova 1968; Karavaev and Gubanov 1981). Jacob Friedrich Ehrhart (1742–1795) (Fig. 12) was a pupil and friend of Linnaeus (Hoffmann 1824) and a friend of Carl Linnaeus filius (1741–1783), who was

Figure 12. Jacob Friedrich Ehrhart (1742–1795), a pupil of Linnaeus whose General Herbarium, with several Linnaean sheets, is kept at MW.

the same age as Ehrhart. Ehrhart was born at Holderbank in the canton of Bern (Switzerland), where his father was pastor. His father frequently made botanical excursions with Haller, often accompanied by the young Friedrich who, in this way, acquired a taste for botany (Britten 1922). By 1765 Ehrhart was studying pharmacy in Nürnberg. After some years in Erlangen (Germany), where he began collecting plants for his herbarium, Ehrhart moved to Uppsala University. During three years there (20 April 1773–26 September 1776, Britten 1922), Ehrhart studied botany and collected plants under the guidance of Linnaeus.

Some interesting information concerning Ehrhart's years in Uppsala is given by Fries (cit. after Britten 1922) and Britten (1922). Ehrhart regretted that he had not been a student when

Linnaeus himself took part with his students in their excursions into the country — "he was already," says Ehrhart, "an old man and was expecting his death," which took place in 1778: "When I asked him about cryptogams he answered frankly that thirty years ago he had known these plants, but that now he was obliged to leave them to others." "Few of the students," continued Fries, "could have been so industrious as Ehrhart was. On week-days all hours free from lectures were spent in excursions in the surrounding country; Sundays he spent in the Botanic Garden. In the summer holidays he too excursioned, sometimes accompanied by other Linnean students, from early morning until late at night, seeking plants in the fields, woods, moors, and marshes. He reported his discoveries to Linnaeus, who had conceived great affection and regard for him"; "Each plant," says Ehrhart "was examined on the spot where I found it, with the *Genera Plantarum* and the *Flora Suecica* of Linnaeus, and such as were doubtful I compared with his herbarium. … when I found that my senior [i.e., Linnaeus] had made a mistake, I told him so; for whoever I was I showed that I was a free Swiss! … And when on Sept. 26, 1776, I said good-bye to him at Hammarby, seeing him for the last time, he pressed my hand and said : 'Write to me; from you I will believe everything.'" Ehrhart also clearly indicated that at least some of his specimens he had collected with Linnaeus near Hammarby (Britten 1922). In 1776, Ehrhart returned to Germany and worked in Hannover. He is commemorated in the genus *Ehrharta* Thunb. (Gramineae). Ehrhart was a talented plant taxonomist. During his life, he described several hundred new plant species, and his herbarium seems to have comprised 16,000–20,000 specimens (Stafleu and Cowan 1976).

The Ehrhart collection purchased by Hoffmann consists of two parts, Ehrhart's *exsiccatae* and a General Collection.

Ehrhart was one of the first botanists to publish plant *exsiccatae* (i.e., prepared collections, in several or many sets, of precisely identified and named dried plants with printed labels, to be distributed among various botanists and/or institutions). Starting in 1780, he published seven series of *exsiccatae* (Britten 1922) comprising about 1,620 plant species (Ehrhart 1780–1793). Five of the seven of Ehrhart's series (ser. 1, 2, 4, 5, 7) are kept now in MW (with a few specimens missing) (Fig. 13). The *exsiccatae* contain type material for a number of Ehrhart's names. Many specimens were collected in the vicinity of Uppsala and in the Uppsala Botanic Garden (Karavaev and Barsukova 1968; Gubanov and Balandina 2000)

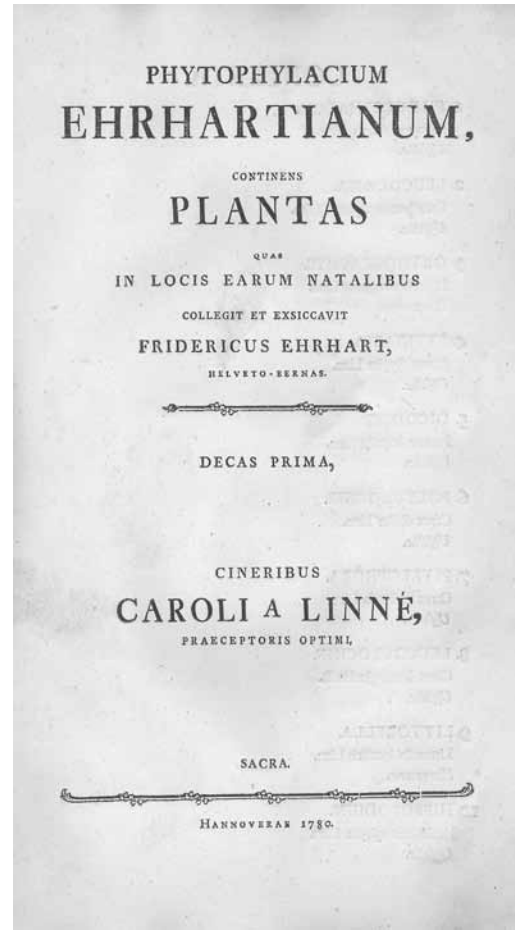

PHYTOPHYLACIUM
EHRHARTIANUM,
CONTINENS
PLANTAS
QUAS
IN LOCIS EARUM NATALIBUS
COLLEGIT ET EXSICCAVIT
FRIDERICUS EHRHART,
HELVETO-BERNAS.
DECAS PRIMA,
CINERIBUS
CAROLI A LINNÉ,
PRAECEPTORIS OPTIMI,
SACRA.
HANNOVERAE 1780.

Figure 13. J. F. Ehrhart's *exsiccatae* in MW.

and perhaps were compared with specimens now in the Linnaean collections or perhaps even examined by Linnaeus himself.

Ehrhart's General Collection ("Hortus siccus") contains material of about 3,300 plant species (Hoffmann 1824) and came from four different sources (Karavaev 1963; Karavaev and Barsukova 1968):

1. Specimens collected by Ehrhart in various places in Germany, the Netherlands, Denmark, and Switzerland.
2. Dried plants from Ehrhart's garden in Hannover.
3. Specimens collected by Ehrhart in the neighbourhoods of Uppsala and in the Uppsala Botanic Garden. It is very likely that Ehrhart collected some of these plants together with Linnaeus and/or Linnaeus filius (Karavaev and Barsukova 1968). The specimens collected in Uppsala Botanic Garden are important because the plant material in the garden would have been identified by Linnaeus. Linnaeus described many plants from the garden in his work *Hortus Upsaliensis* (Linnaeus 1748), and these descriptions were cited extensively in his *Species Plantarum* (Linnaeus 1753). In 1773–1776, many plants described by Linnaeus in 1748 were still surviving in the garden. Therefore, specimens from Uppsala Botanic Garden in Ehrhart's herbarium, although they cannot represent original material for purposes of typification of Linnaean names, are nevertheless an important historical and botanical resource, which can assist in the interpretation of some problematic names (Karavaev and Gubanov 1983). They may be useful also for the purpose of neotypification, if necessary. Linnaeus and his gardener kindly permitted Ehrhart to collect even very rare species in the garden.
4. Specimens received by Ehrhart from other botanists. According to Hoffmann (1824), the collection contains specimens from 67 different botanists, while according to Karavaev and Barsukova (1968) about 80 collectors are represented. In particular, there are several Linnaean specimens in Ehrhart's collection.

Specimens linked with Linnaeus

Thirty-one sheets of Ehrhart's General Collection are undoubtedly or presumably linked with Linnaeus. Eighteen specimens were presented to Ehrhart by Linnaeus himself. These specimens are marked by Ehrhart as "M.L." (= misit Linnaeus). Six specimens had been presented to Ehrhart by A. Dahl (1751–1789). Ehrhart stated on the labels of these sheets "M.Dahl" (= misit Dahl). A number of similar Linnaean specimens from Dahl's collection are preserved now in Helsinki (Kukkonen and Viljamaa 1973). Two of the six MW specimens were received by Dahl directly from Linnaeus (there are Dahl's autographs "a Linné P."), and three from Linnaeus filius ("a Linné f."). One specimen *(Gnaphalium alpinum)* was received by Ehrhart from Dahl and is considered to be Linnaean although no explicit mention of Dahl is present. The sheet definitely bears handwriting by Linnaeus filius and perhaps also by Linnaeus. Besides, there is a specimen (MW No. 15a) that was lying in the same folder as the specimen definitely received by Ehrhart from Linnaeus via Dahl (MW No. 15). We may suppose that both specimens were received from Linnaeus.

Three specimens were annotated by Ehrhart as "Linn. in lit." The connection of these specimens with Linnaeus is doubtful. There are no Linnaean annotations. According to Karavaev and Gubanov (1981), Ehrhart presumably sent to Linnaeus some specimens for identification from Hannover, keeping duplicates for himself. After receiving a reply from Linnaeus, Ehrhart annotated the duplicates in his herbarium according to Linnaeus' identification. A specimen of *Salix glauca* was received by Ehrhart from P. J. Bergius (1730–1790) ("M. Berg."). According

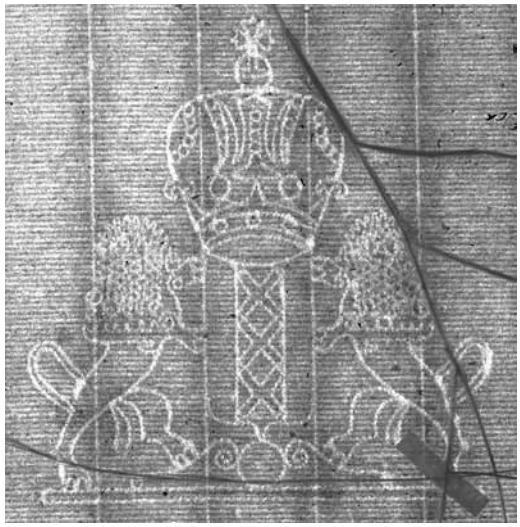


Figure 14. A watermark of the mounting sheet of a Linnaean herbarium specimen from Ehrhart's herbarium (MW No. 5).

to Karavaev and Gubanov (1981), the specimen was collected by Bergius but then annotated by Linnaeus. Finally, two algae specimens in the Ehrhart herbarium have annotations "Herb. Lin.". It is uncertain whether these specimens have any connection with Linnaeus.

The majority of the Linnaean specimens in the Ehrhart herbarium are very similar to those now at the Linnean Society, London (LINN), in the size of the mounting sheets, the type of mounting, type of paper, watermarks (Fig. 14), etc. (cf. Karavaev and Gubanov 1981). A number of specimens have Linnaean annotations very similar to those seen on specimens at LINN. Some sheets that are now at MW were part of Linnaeus' own herbarium, prior to 1753 and the publication of *Species Plantarum,* and still possess the characteristic species numbers (Fig. 15). Such sheets represent original material for Linnaean names (Fig. 16, Fig. 17) and may be available for typification purposes.

Some of the MW sheets were apparently collected by Linnaeus in Sweden, while others came from other botanists. For example, MW No. 2 (original material for *Poa capillaris* L.) was apparently collected by P. Kalm in North America. The specimen of *Osmunda regalis* L. (MW No. 22) is apparently from a very old, pre-Linnaean collection; it is annotated with a Tournefort phrase-name.

Two sheets of *Carex* (MW No. 8 and No. 10) (Fig. 18) belong to Linnaeus' Lapland collections and possess "Flora Lapponica" numbers (Fig. 19). The mounting sheets are much smaller than in subsequent Linnaean collections. Most of the Lapland collections were given away by Linnaeus to J. Burmann, then bound into a book format, and are now to be found in the library of the Institut de France in Paris, where there is a duplicate of MW No. 8.

Ehrhart's general herbarium and *exsiccatae,* purchased by Hoffmann and now preserved in MW, seems to be the largest and most important of Ehrhart's collection now known. Hoffmann (1824) published a catalogue of Ehrhart's General Collection in which he introduced a numbering system following Murray's edition of *Systema Vegetabilium* (Linnaeus 1774). It is important to note that numbers were attributed to species, not to particular herbarium sheets (Karavaev and Barsukova 1968).

Hoffmann's herbarium and his other collections fortunately survived the Moscow Fire in 1812 because they were kept neither in Moscow University nor in Hoffmann's house but in the Moscow Military Medical-Surgical Academy (Nasarov 1926). Hoffmann's library and manuscripts were destroyed by fire in his house. The herbarium was housed at the academy after 1812, too, perhaps because Hoffmann held lectures there and, from 1817, he was a professor of the academy (Smirnov 1940) in addition to his position at the university.

After Hoffmann's death (1826), his extensive herbarium collections were divided and kept in three different places (Lipschitz 1940a): Moscow University, the Botany Museum of St. Petersburg

Figure 15. Annotations from various specimens from Ehrhart's herbarium at MW, which more or less certainly contain Linnaean autographs (in the opinion of C. E. Jarvis). Numbers on the specimens written by Linnaeus usually correspond with species numbers in *Species Plantarum* and are of great importance for nomenclatural attribution of the material. Here and below, species names are always indicated according to the viewpoint of Linnaeus.

MW No. 1 (*Aira spicata* L.): the "37" and the "6" are written by Linnaeus. It is uncertain whether the "7" (the number of *Aira spicata* in *Species Plantarum*) was written by Linnaeus or not.

MW No. 2 (*Poa capillaris* L.): the "11" and the note "ex sem. canadense" on the verso are both written by Linnaeus.

MW No. 3 (*Poa alpina* L.): *"Poa alpina"* is written by Linnaeus.

MW No. 5 (*Poa ciliaris* L.): The symbol is written by Linnaeus and either represents "the East" or a specimen from Hasselquist.

MW No. 9 (*Carex limosa* L.): The "21" appears to be written by Linnaeus.

MW No. 11 (*Juncus trifidus* L.): *"Juncus trifidus Jacquini"* may be written by Linnaeus.

MW No. 15 (*Lepidium petraeum* L.): The "5" might have been written by Linnaeus, but this is very doubtful.

MW No. 16 (*Saxifraga* sp.): "Lappia" is written by either Linnaeus or Solander.

MW No. 17 (*Saxifraga aizoides* L.): "18" is definitely written by Linnaeus.

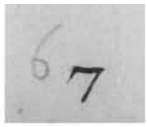
MW No. 19 (*Gnaphalium alpinum* L.): "29" is probably written by Linnaeus.

MW No. 23 (*Osmunda lunaria* L. β.): the "2" could be written by Linnaeus.

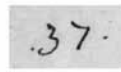
MW No. 24 (*Salix glauca* L.): it is very doubtful that the label "Valde diversia a nostra ex B. qua tantu 2 stigmatis habet, hoc autem 4" was written by Linnaeus as suggested by Enander and Karavaev.

MW No. 27 (*Veronica longifolia* L.): "4 *longifolia*" is written by Linnaeus.

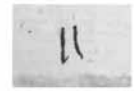
MW No. 32 (*Hypnum filicinum* L., nom. illeg.): *"filicinum"* is probably written by Linnaeus.



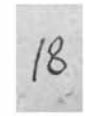
MW No. 1



MW No. 1



MW No. 2

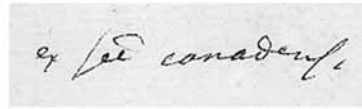


MW No. 17

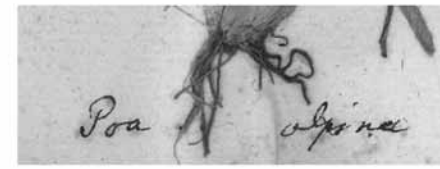
MW No. 19

MW No. 5

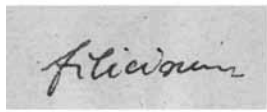
MW No. 9



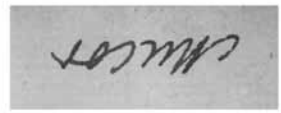
MW No. 2 (verso)



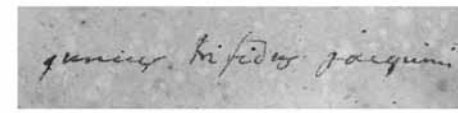
MW No. 3



MW No. 32

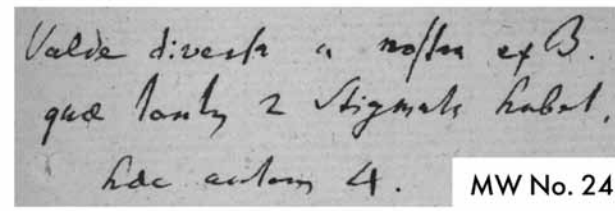


MW No. 32 (cover verso)



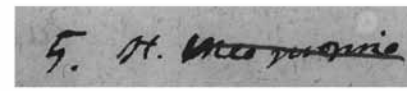
MW No. 11

MW No. 23

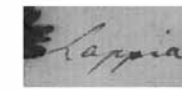


MW No. 24

MW No. 27



MW No. 15



MW No. 16

Figure 16. A Linnaean specimen from Ehrhart's herbarium (MW No. 17). Original material for *Saxifraga aizoides* L.

Figure 17. A Linnaean specimen from Ehrhart's herbarium (MW No. 27). Original material for *Veronica longifolia* L.

Academy of Sciences, and the Moscow Branch of the Military Medical-Surgical Academy. According to Stafleu and Cowan (1979), some specimens from Hoffmann's herbarium are kept now at GOET.

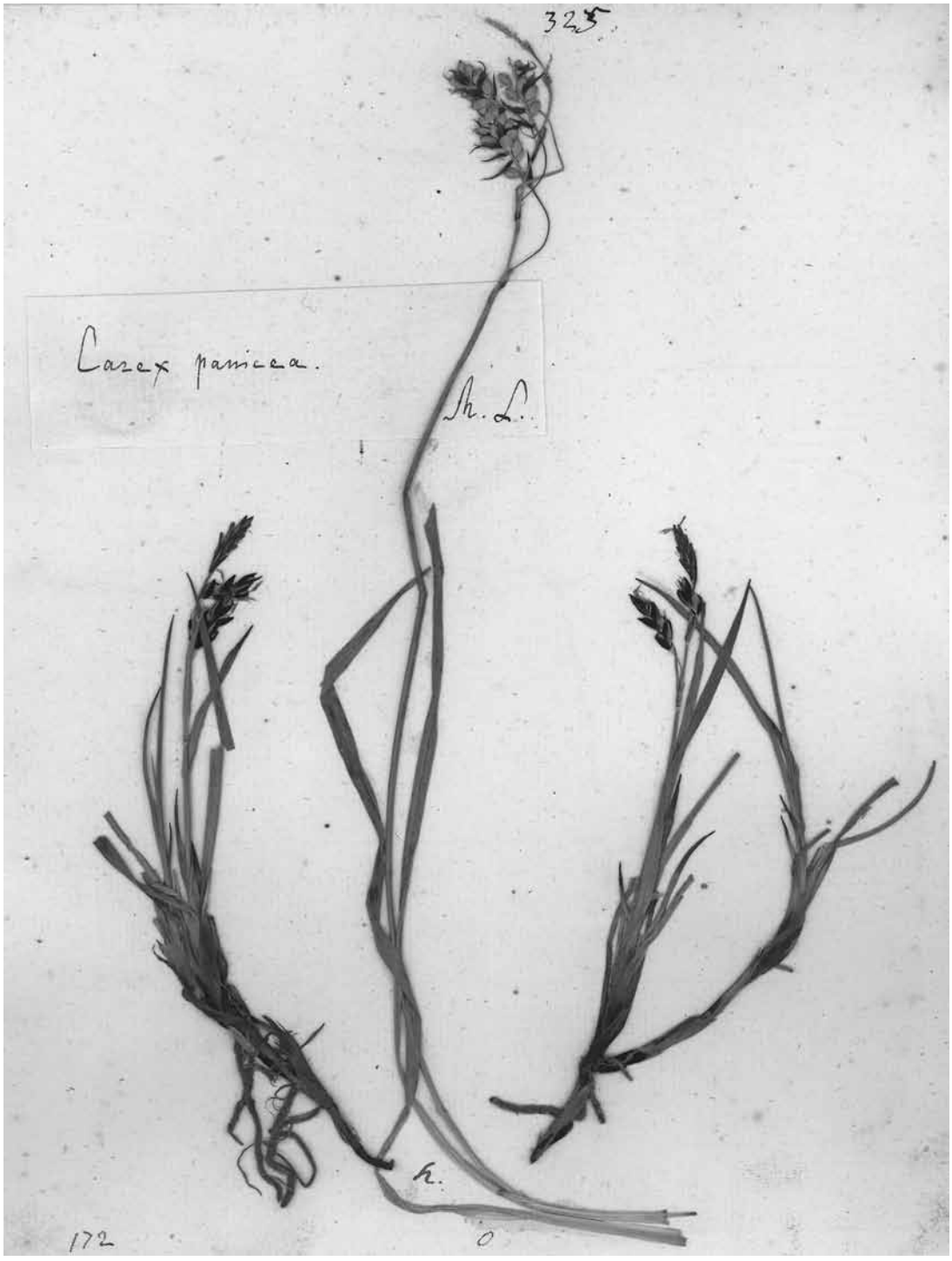
Shortly before his death, Hoffmann himself sold his personal collection (Fig. 20) and the general collection of Ehrhart (Fig. 21) to Moscow University for 7,000 roubles (Lipschitz 1940a). The university therefore purchased at that time only the collections described in Hoffmann's two published catalogues. This represented a third major acquisition by the University Herbarium following the 1812 Moscow Fire that had destroyed almost the whole of its collection. The two earlier accessions were 3,000 specimens from Germany and a collection of 800 specimens from the Moscow region collected by M. A. Maximowicz (1804–1873), who later briefly became (1833–1834) the head of the Botany Department before moving to Kiev University where he studied Ukrainian songs and history (Nasarov 1926; Pavlov 1978).

A part of Hoffmann's collection that included many cryptogamous plants was in 1827 bought from his successors for 3,000 roubles by the Botanical Museum of the St. Petersburg Academy of Sciences (now in Komarov Botanical Institute Herbarium, LE; Lipschitz 1940a, 1950). According to Karavaev and Barsukova (1968), there are in LE about 170 sheets from various series of Ehrhart's *exsiccatae,* and we may suppose that these specimens were acquired in 1827.

The rest of Hoffmann's collections, including Ehrhart's *exsiccatae* (presumably excluding those sheets that had already been moved to St. Petersburg) and the collections of Hugo, Murray, the Forsters ("Herbarium Australe"), Dickson ("Herbarium Britanicum"), Hoppe, Thunberg and Smith ("Herbarium plantarum Capensium et Novae Hollandiae") and Haller ("Herbarium alpinum"), was kept in the Moscow Branch of the Military Medical-Surgical Academy. The academy was closed in Moscow in 1842 (Smirnov 1940) and merged with Moscow University (Lipschitz 1940a). Hoffmann's collections were moved to the Moscow University Herbarium in 1840 (according to Nasarov 1926) or 1843 (according to Shevyrev 1855 and Pavlov 1978), where they are still preserved.

Botany in St. Petersburg in the early 18th century: Siegesbeck and Amman

Like botany in Moscow, the origin of botany in St. Petersburg was linked with Peter the Great. In 1713, or 1714, an Apothecary Garden (Aptekarsky Orogod) was founded in St. Petersburg on Aptekarsky Island (Lipsky 1913; Baranov 1957; Lipshitz and Vassilchenko 1968), the current site of the Komarov Botanical


325
Carex paniculata.
Sh. L.
172

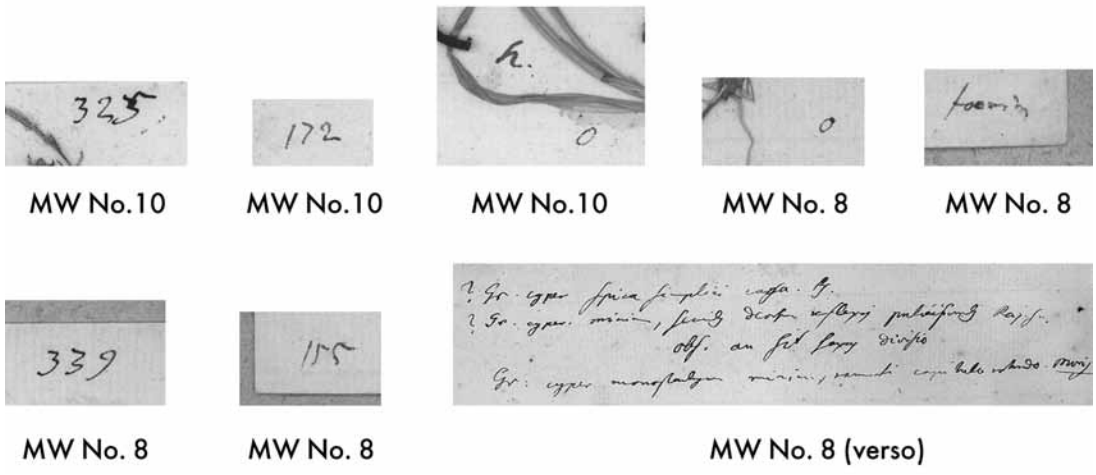


Figure 18. *Left:* Specimens of *Carex* from Linnaeus' Lapland collections (MW No. 10). Most of the Lapland collections were given away by Linnaeus to J. Burmann, then bound in a book format and are now to be found in the library of the Institut de France in Paris. The mounting sheet is much smaller than that in Linnaeus' subsequent collections. Of three shoots mounted on the sheet, the central one belongs to *C. magellanica* Lam. s.l., whereas those to left and right belong to *C. rariflora* (Wahlenb.) Smith. However, the *Flora Lapponica* number at the top of the small sheet appears to have been "323" originally (= *Carex panicea* L.), then changed by Linnaeus to "325" (= *C. limosa* L.).

Figure 19. *Top:* Linnaean annotations on Lapland specimens of sedges from Ehrhart's herbarium. Probably all annotations are by Linnaeus. Numbers 339 and 323 (then changed by Linnaeus to 325) correspond to species numbers in *Flora Lapponica.* Annotations on the verso of the sheet MW No. 8 are: "? *Gr. cyper. spica simplici cassa M.*" (Morison, Pl. Hist. 1699, 3: 244), "? *Gr. cyper. minimum, seminibus deorsum reflexis puliciformis* (Ray Syn. Obs. an sit sexus divisio)", "*Gr: cyper. monostachys minimum, ranunculi capitulo rotundo* Moris." (Morison, op. cit.: 245).

Figure 20. *Right:* Part of G. F. Hoffmann's General Herbarium in MW: present day.

Figure 21. J. F. Ehrhart's General Herbarium in MW: present day.

Institute. The history of the garden before 1735 is poorly known due to the loss of the archives in the fire of 1737. In 1735, a German botanist, Johann Georg Siegesbeck (1686–1755) was appointed director of the garden. Siegesbeck is well known for his strong criticism of the Linnaean sexual system. In spite of the quarrel with Linnaeus, Siegesbeck was apparently a good botanist and an active director of the garden. He developed the collections and published the first catalogue of the garden. In 1742, Siegesbeck became a member (Academician) of the St. Petersburg Academy of Sciences and left his position at the Apothecary Garden (Baranov 1957). For many years, there was no scientific guidance in the garden, and it was only in 1765 that J. P. Falck (1733–1774), a pupil of Linnaeus, was appointed as the next director (Baranov 1957; Shetler 1967).

Another important centre of St. Petersburg botany was the Kunstkammer and the Botanical Garden of the Academy of Sciences. The Kunstkammer (Fig. 22) was the first public museum in Russia. It was founded in 1704 by Peter the Great and became a basis for developing the St. Petersburg Academy of Sciences (created in 1724; now the Russian Academy of Sciences) and its scientific institutions and museums. A silhouette of the Kunstkammer is still used as the official logotype of the Russian Academy of Sciences. One of the first collections purchased by Peter for the Kunstkammer was the herbarium of F. Ruysch (1638–1731). A great contribution towards the development of the botanical collections of the Kunstkammer was made by Johann Amman (1707–1741), who was its assistant director (Baranov 1957).

Amman was born in Switzerland, studied medicine in Leiden University, then was employed by Sir Hans Sloane (1660–1753) (Fig. 23) and finally was professor of botany in St. Petersburg and a member of the St. Petersburg Academy of Sciences (Dandy 1958; Amlinsky and Shumakova 1989). During his work with Sloane's collection, Amman established contacts with many collectors and botanists of that time. In St. Petersburg, he continued herbarium exchange with colleagues. In particular, there is

Figure 22. The Kunstkammer of St. Petersburg Academy of Sciences.

Figure 23. Sir Hans Sloane (1660–1753).

Amman material from Russia in Herb. Sloane 296: 68–70; 316: 49–59 (BM). Amman was a friend of William Houstoun (1695–1733), who collected in the West Indies and Mexico. Houstoun recommended Amman to Sloane (Dandy 1958).

Amman accumulated in St. Petersburg a rather rich herbarium collection of tropical plants from southern Asia, America and Ethiopia. According to Karavaev (1969), Amman's herbarium at the Kunstkammer represented about 4,700 species and included plants from Sloane, Plukenet, Petiver, and Houstoun. A number of these specimens from Amman's herbarium were received by Linnaeus via Gmelin and Bielke (see below). In an undated letter, written probably at the end of 1746, Linnaeus thanked Gmelin for Amman's herbarium in which there were many beautiful American and Asian plants, including almost all of Houstoun's from Vera Cruz (Plieninger 1861; Rowell 1980). This is a good example of the circuitous routes by which collections finally reached Linnaeus (Rowell 1980).

Amman himself was also a correspondent of Linnaeus, sending him at least 37 herbarium specimens (Bobrov 1970). In his letters to Linnaeus, he criticised the sexual system introduced in *Systema Naturae*. Amman, however, did not react so violently to Linnaeus' system as did Siegesbeck. Amman warned Linnaeus that Siegesbeck was preparing a critique of the sexual system (Smith 1821, see also Jonsell 1978; Rowell 1980). Amman published an important work on a number of Russian plants (1739), which was used by Linnaeus and discussed in his letters to Amman.

In 1735, Amman founded a Botanical Garden for the St. Petersburg Academy of Sciences on Vasilyevsky Island and was its first director. After Amman's death (1741), Siegesbeck was appointed director, but in 1747, he was retired mainly as a result of his quarrelsome nature (Baranov 1957). Siegesbeck therefore moved back to Germany where he died in 1755. Siegesbeck was succeeded by J. G. Gmelin (director in 1747) and S. P. Krascheninnikov (1747–1749). This second botanical garden in St. Petersburg was closed after 77 years (in 1812).

The Second Kamchatka Expedition

When analysing the history of botanical research conducted by the St. Petersburg Academy of Sciences during the 18th century, it is easy to conclude that the most important events were the famous expeditions, rather than the establishment of the botanical gardens and the Kunstkammer herbarium in St. Petersburg (cf. Baranov 1957). Among these expeditions, the Second Kamchatka Expedition is important for our study because numerous seeds and herbarium specimens collected during the expedition were studied by Linnaeus. Prior to discussing the Second Expedition, it may be helpful to give some information concerning its predecessor, the First Expedition (Kushnarev 1976; Shumilov 1992).

The First Kamchatka Expedition (1725–1730) was conducted on the orders of Peter the Great (on 6 January 1725) during the last weeks of

his life. The leader of the expedition was Vitus Jonassen Bering (1681–1741). A Dane, Bering had been employed by the Russian Navy since 1704. One of the most important aims of the expedition was to establish whether Siberia and Kamchatka were connected to the East with America. During the expedition, the Bering Strait between Chukotka and Alaska (which in fact was discovered as far back as 1648 by Semen Dezhnev) was reached. Nevertheless, some doubts remained concerning the possible junction between Siberia and America.

The Second Kamchatka Expedition (1733–1743), a huge project, was aimed at mapping and describing the northern and eastern coasts of Russia, from Arkhangel'sk in Europe to the Kuril Islands in the Far East. Besides this, the expedition also reached the Japanese and American coasts. One of the aims, again, was investigating the nature of the discontinuity between Asia and America. Once again, Vitus Bering was the leader of the whole project, which involved almost 600 sailors and 5,000 land-based participants.

The expedition consisted of several detachments, i.e., Dvina-Ob', Ob'-Yenisey, Yenisey-Lena (after the names of the Siberian rivers delimiting areas of the investigation of the North Russian coast), Western-Lena, Eastern-Lena, 1st and 2nd Pacific, and, finally, Academic. The Academic detachment was aimed at the study of natural history and ethnography. Three of the more than 20 participants of the Academic detachment, Gmelin, Steller, and Krascheninnikov, conducted, together with other works, an extensive floristic study. Among other participants, L. de l'Isle de la Croyère (?–1741) as well as historians G. F. Müller (1705–1783) and J. E. Fischer (1697–1771) should be mentioned.

Johann Georg Gmelin

Johann Georg Gmelin (1709–1755) (Fig. 24) was born in Tübingen, the son of a university apothecary. After graduating from Tübingen University, he decided to move to St. Petersburg in 1727, where he began a study of the collections of the Kunstkammer and studied the flora in the area around the town (Bobrov 1970). In 1731 Gmelin became professor of chemistry and natural history at the St. Petersburg Academy of Sciences. In August 1733, he left St. Petersburg together with other members of the Academic detachment to participate in the Second Kamchatka Expedition. Like many other scientists of the expedition, Gmelin never visited Kamchatka himself. However, he travelled extensively around Siberia, with the following itinerary: St. Petersburg–Tver'–Kazan'–Kungur–Yekaterinburg–Tobol'sk (1734)–Omsk–Tomsk–Krasnoyarsk–Irkutsk (1735)–Selenginsk–

Figure 24. Johann Georg Gmelin (1709–1755).

Kyakhta–Chitinsk–Nerchinsk–Irkutsk (1736)–Ust'-Kut–Yakutsk (1737)–Irkutsk–Turukhansk (1739)–Krasnoyarsk–Tomsk (1740)–Tobol'sk–St. Petersburg (1743).

On his return to St. Petersburg, Gmelin started compiling a solid monograph, *Flora Sibirica* (published 1747–1769, in four volumes; a fifth volume treating cryptogamous plants has never been published). *Flora Sibirica* included 1,178 plant species and nearly 300 plates of illustrations. Apart from his own material, Gmelin also used herbarium material collected by Steller and Krascheninnikov, as well as specimens from Gerber, Lerche, and J. G. Heinzelman from the Southern Urals and Lower Volga, and materials of D. G. Messerschmidt, who had also collected in Siberia. Gmelin completed only the first two volumes of the book while he was in St. Petersburg before returning to Germany in 1747. However, in 1755, he sent to St. Petersburg a completed manuscript of the third volume, and the fourth followed, brought from Tübingen by Gmelin's pupil Joseph Gottleib Koelreuter (1733–1806) (for whom the genus *Koelreuteria* is named), who later conducted in St. Petersburg research into floral biology, hybridisation, and plant sex. The third and the fourth volumes of *Flora Sibirica* were published mainly due to the efforts of Koelreuter and J. Gaertner (Bobrov 1970).

The two first volumes of *Flora Sibirica* were published before Linnaeus' *Species Plantarum*. *Flora Sibirica* was therefore, for Linnaeus, a basic reference book concerning Russian plants during the preparation of *Species Plantarum*. However, Linnaeus was familiar with Gmelin's results before the publication of *Flora Sibirica* and even received herbarium specimens from the latter (see the next section).

The main set of Gmelin's collection and other materials used to prepare *Flora Sibirica* were kept after his death in the Kunstkammer at St. Petersburg. However, many authentic specimens for Gmelin's *Flora Sibirica* are now at The Natural History Museum, London (BM). They arrived there following the sale of the herbarium of A. B. Lambert (1761–1842), which contained Pallas' collections (Stafleu and Cowan 1976).

Figure 25. Peter Simon Pallas (1741–1811), a famous German naturalist, traveller, and explorer of the Russian flora, professor of the St. Petersburg Academy of Sciences. Pallas was responsible for the removal of a large part of the herbarium of the Second Kamchatka Expedition to England (now in BM).

Peter Simon von Pallas (1741–1811) (Fig. 25) was a German naturalist and traveller. In 1768, Pallas moved to Russia where he became professor of natural history at the St. Petersburg Academy of Sciences. In 1768–1774, Pallas was exploring the Volga river basin, the Urals, and the Asiatic part of Russia eastward up to Lake Baikal and Dahuria, collecting many new plant and animal species. In 1771–1776, he published a solid three-volume monograph based on these travels. Later, Pallas explored southern Russia and the Crimea. During his last years in the Russian Empire (before returning to Germany in 1810), Pallas was living in Crimea. In Crimea, Pallas was visited by English travellers E. D.

Clarke (1769–1822) and J. M. Cripps. Clarke was not only an amateur natural historian but also an enterprising collector, purchasing many objects and collections of cultural, historical and biological significance from various countries. Clarke bought almost all of the collections that Pallas had at that moment, not only his own collection from Siberia, but also many important specimens from the Kunstkammer, including some of Gmelin and Steller. Clarke took all these collections to England where most were subsequently sold to Lambert. Lambert's herbarium (about 50,000 species) was sold by auction after his death in 1842 and dispersed to some 18 institutions in Europe and the United States. The most important part is kept now at BM (see Sytin 1997, for details). Pallas was much criticised for selling collections that were, in fact, the property of the St. Petersburg Academy of Sciences (Litvinov 1909; Lipshitz and Vassilchenko 1968). However, it is true that the Kunstkammer collections, including the herbarium, were then kept in unsuitable conditions and were being destroyed by insects (e.g., Baranov 1957; Sytin 1997).

Of course, a large part of the authentic material for Gmelin's *Flora Sibirica* was still at the Kunstkammer. Some specimens were probably lost while a few were incorporated within the herbarium of Trinius and moved to Moscow (now at MW, see below). Nevertheless, the Herbarium of the Komarov Botanical Institute at St. Petersburg (LE), the present-day owner of the Kunstkammer herbarium, contains an important set of specimens from Gmelin and Steller.

Gmelin was commemorated by Linnaeus in the genus *Gmelina* (Verbenaceae) and in two species *(Hieracium gmelinii ("gmelini")* and *Cortusa gmelinii ("gmelini")).* Numerous species were described in honour of Gmelin by other botanists.

Georg Wilhelm Steller

Georg Wilhelm Steller (1709–1746) was born in Windsheim (Germany). His father was a cantor in a Latin school and a church organist. In 1729, Steller started to study theology in Wittenberg University but moved in 1731 to the University of Halle. Here his great interest in botany and natural history first developed. Steller's financial position was poor at that time, and his efforts to obtain a position in Germany were unsuccessful. On the advice of a physician, Prof. Friedrich Hoffmann, who had close connections with the St. Petersburg Academy of Sciences, Steller moved to Russia, arriving in Kronstadt (a castle on an island near St. Petersburg) in 1734. In Russia, Steller was initially the personal physician to Archbishop Theophan Prokopovich. Dreaming of work in the St. Petersburg Academy, Steller met Amman and started to assist him in the Botanical Garden and collected plants for him in the neighbourhood of St. Petersburg. Steller's great interest in botany was sometimes to the detriment of his main work as a physician. A. K. Stanyukovich (in Steller 1995, pp. 8–9) discusses a humorous Latin poem by Theophan Prokopovich describing how a patient died and was even buried while Steller was still searching for medicinal plants.

In early 1737, with support from Theophan Prokopovich and Friedrich Hoffmann, Steller became an adjunct (i.e., a junior scientific assistant) of the St. Petersburg Academy of Sciences to participate in the Second Kamchatka Expedition. Presumably in late 1737, Steller was married to the widow of the botanist D. G. Messerschmidt, who had conducted one of the first scientific expeditions to Siberia between 1719 and 1727.

As far as we know, the Second Kamchatka Expedition started from St. Petersburg in 1733. Starting in Siberia, Steller had to overtake the participants of the Academic detachment. Steller left St. Petersburg in January 1738 then reached Moscow, Nizhny Novgorod, Kazan', Kungur,

Yekaterinburg, Tobol'sk and Tomsk, where he was ill with fever. On 20 January 1739 he arrived in Yeniseysk and met (for the first time) J. G. Gmelin. In 1739–1740 Steller was based in Irkutsk (near Lake Baikal) for almost a year and collected about 1,150 plant specimens in that region. He even visited a centre of Russian-Chinese trade, Kyakhta, to purchase Chinese paper for drying plant specimens. In December 1739, Steller sent to the Kunstkammer in St. Petersburg six boxes containing herbarium specimens, seeds and other objects of natural history. However, the boxes were impounded in Yeniseysk. Gmelin and Müller unexpectedly rebuked Steller for sending collections without their permission, although Steller explained that there was a need to send the material to the academy as soon as possible before the seeds started to germinate.

After Irkutsk, Steller reached Yakutsk (May 1740) and then (partially on foot) Okhotsk (August 1740) where he met Bering. In September, Steller arrived by the sea in Bol'sheretsk at Kamchatka where he met Krascheninnikov. During the winter (1740/1741), he collected many interesting ethnographical data in various parts of Kamchatka. In early 1741, Steller was invited by Bering to participate in his navigation to the American coast.

On 4 June 1741 two ships, *St. Paul* and *St. Peter,* left Avachinskaya bukhta (a bay on the eastern coast of Kamchatka where in 1740 the present-day centre of the Kamchatka Region, Petropavlovsk, was founded). During the voyage, the two ships lost each other in the fog. The *St. Peter,* with Bering and Steller on board, reached the American coast (present-day Kayak Island) on 20 July (31 July after the modern calendar). Steller had only a few hours in which to study American terrestrial natural history as, unfortunately for Steller and for his study, Bering decided on 21 July to leave the island and to return to Kamchatka. During the return voyage, Steller also had a chance to visit for a few hours present-day Nagai Island (cf. Jäger 2000). The return was extremely difficult due to problems with fresh water, sea storms and scurvy. In early November, the *St. Peter* reached present-day Bering Island (one of the two Commander Islands), which was mistaken for the environs of Avachinskaya bukhta. The ship was destroyed by a storm shortly after arriving at the island, and it took until August 1742 before a new ship was built, using wood from the destroyed *St. Peter,* and the expedition could return to Petropavlovsk.

Vitus Bering died of scurvy shortly after arriving on the island, as did several others during the voyage and during the enforced stay on Bering Island. During this very difficult period, Steller studied the natural history and described, in particular, an interesting marine mammal (Steller's Sea Cow, *Hydrodamalis gigas),* which was completely eliminated by man by 1768. After the voyage with Bering, Steller studied Kamchatka for almost two years and compiled numerous manuscripts concerning botany, zoology, mineralogy, and ethnography.

Steller had a contradictory nature. He was always enthusiastically active in scientific research and was extremely patient and undemanding during all the difficulties of expedition life. But he also tried to help in solving many of the social problems of that time in Kamchatka; he organised, for instance, the first school on the peninsula. Steller also strongly criticised the behaviour of many people, including that of Bering and other officers (during the voyage) and of the Russian Kamchatka administration. For example, Steller sent a letter to the Russian Senate concerning the excessive drinking of the Bol'sheretsk steward (Bol'sheretsk was one of the first Russian settlements in Kamchatka). Such behaviour was a reason for many conflicts between Steller and various people during the whole expedition.

In early 1743, Steller, acting without permission from the administration, discharged 12 prisoners

in Bol'sheretsk. These prisoners were kamchadals (i.e., of indigenous population of Kamchatka) accused of revolt. The administration sent a denunciation to a higher administrative level in Irkutsk, where it was decided that the incident was important, and the denunciation passed to St. Petersburg.

In August 1744, at the end of the Second Kamchatka Expedition, Steller left Bol'sheretsk and went by sea to Okhotsk. In 1745, Steller reached Irkutsk where an instruction from the Senate had already been received. According to the instruction, Steller, if guilty, should be arrested and kept in Irkutsk. Steller, however, explained that there were no people to guard them, and no fish to feed the 12 kamchadals at that time in Bol'sheretsk. Apart from this, some of the 12 were, in Steller's opinion, not guilty of the charges against them. The Irkutsk administration accepted this explanation and gave Steller permission to continue his journey to St. Petersburg. Unfortunately, the letter concerning this fact reached St. Petersburg too late. Prior to the receipt of this letter, the information that Steller had arrived at a subsequent stop in his journey was received in the Russian capital. A special courier, Zakhar Lupandin, was therefore sent from St. Petersburg to arrest Steller and to return him to Irkutsk. The courier caught up with Steller in Solikamsk in the Urals, and the two started to travel back to Irkutsk (see the Demidov family section for details of Steller's stay in Solikamsk). They were almost halfway back to Irkutsk when the correct instruction from St. Petersburg caught up with them in Tara. Once again, Steller obtained permission to continue his journey to St. Petersburg. Arriving in Tobol'sk, however, Steller realised that he was ill with fever, but unwisely decided to continue his journey and died on 12 November 1746 in Tyumen' (Stejneger 1936).

Steller was not only a talented botanist but also a famous plant collector. Although many of Steller's manuscripts remained unpublished for many years, his contribution to botany and natural history is great. In particular, we are indebted to Steller for the first accounts of the vegetation of islands adjacent to present-day Alaska and of Bering Island (Stejneger 1936; Rowell 1973; Jäger 2000). Stejneger (1936) regarded Steller as the pioneer of Alaskan natural history. Steller was commemorated by Linnaeus in the genus *Stellera* L. (Thymelaeaceae) and by other botanists in the names of a number of species. As discussed below, some of Steller's specimens reached Linnaeus via Gmelin while others came via Grigory Demidov. Some of the specimens returned by Linnaeus to Demidov survived the Moscow fire of 1812 and are now at MW (see below).

Stepan Petrovich Krascheninnikov

Stepan Petrovich Krascheninnikov (also Krasheninnikov) (1713–1755) (Fig. 26) was one of the first botanists who was Russian by

Figure 26. Stepan Petrovich Krascheninnikov (1713–1755).

origin. Krascheninnkov was a soldier's son, and in 1732, when he was a student at the Moscow Slavonic-Grecian-Latin Academy, he moved to St. Petersburg to join the Second Kamchatka Expedition. During the expedition, he made several special journeys following Gmelin's instructions. The most important of these was his journey to Kamchatka (1737–1741). Although the studies undertaken by Steller and Krascheninnikov in Kamchatka in 1741 were related to each other, and Krascheninnikov was formally subordinate to Steller, the two naturalists worked there mainly independently. Returning to St. Petersburg, Krascheninnikov worked at the Botanical Garden of the Academy of Sciences and published his famous monograph *Description of the Land of Kamchatka* (1755), which contains important data concerning the natural history and ethnography of the area. Besides his own extensive materials conveyed to Steller, Krascheninnikov also included in his book many of Steller's observations. During his stay in St. Petersburg, Krascheninnikov assisted Gmelin in the preparation of *Flora Sibirica;* he also studied the flora of the St. Petersburg region and prepared a manuscript, *De Plantis Ingricis* (published after his death). After Gmelin's departure for Germany, Krascheninnikov became professor of botany.

Linnaeus sent two letters to Krascheninnikov and received two letters from him (Ryazanskaya 1958). Krascheninnikov's materials, as well as those of Steller and Gmelin, were important sources of information for Linnaeus. Krascheninnikov sent to Linnaeus some seeds and herbarium specimens. Interestingly, he obtained, from the St. Petersburg Academy of Sciences, special permission to send these materials to Linnaeus (Ryazanskaya 1958). Krascheninnikov is commemorated in the genus *Krascheninnikovia* Gueldenst. (Chenopodiaceae).

The most important publications used to compile the section on the Second Kamchatka Expedition are Stejneger (1936, an extremely full and informative biography of Steller), several works by Steller himself (Steller 1988, 1995, 1999), Andreev (1965), Rowell (1973) and "Vitus Bering's last expedition" (Shumilov 1992). Shirina (1983) provides an itinerary of travels by Gmelin, Steller, and Krascheninnikov.

Baron Bielke, Linnaeus, Gmelin, and Siegesbeck: A quadrangle of intrigues

Linnaeus was much interested in receiving plant material collected during the Second Kamchatka Expedition and other specimens from Russia. His interest in Siberian and Far Eastern plants was both theoretical (e.g., an interest in the relationship between the East Asian and North American floras) and practical (von Sydow 1978). In particular, he was interested in introducing useful Siberian plants into Sweden. "The thought of high-yield Siberian buckwheat or Siberian larch (useful for gun stocks) enthused him," wrote von Sydow (1978). Siberian plants seemed particularly appropriate to Linnaeus because Siberia had the same latitude as Sweden.

However, it was not easy for Linnaeus to obtain Russian collections. We should bear in mind the political background (St. Petersburg was founded by Peter the Great during the war with Sweden of 1700–1721, and in 1741–1743 another war between Russia and Sweden took place). The administrative scientific background was as follows. Although the St. Petersburg Academy of Sciences comprised, during its early years, almost exclusively scientists invited from other countries (chiefly Germany), the collections made by the academy expeditions were Russian property and were to be made available to foreigners only with special permission (cf. von Sydow 1978; Rowell 1980). In fact, the research of German botanists, such as Gmelin, Steller and Pallas, had been possible only with Russian money and Russian permission. Besides this, we should remember that thousands of Russian people were

involved in the huge project that was the Second Kamchatka Expedition.

A key figure in the management of the herbarium collections at the St. Petersburg Academy of Sciences was the director of the Academy Botanical Garden. He was responsible for both dried and living collections, as well as for seeds belonging to the academy. During the early years, the position (as well as many others) was occupied by scientists invited from outside Russia. The first director was Amman, who was in close contact with other European botanists, including Linnaeus. After Amman's death (1741), Siegesbeck, a German botanist, was appointed director (Baranov 1957).

Thus when Gmelin returned from Siberia in 1743, Siegesbeck was responsible for the academy collections. This was quite a difficult problem in Linnaeus' attempts to study Siberian collections, because Siegesbeck was Linnaeus' most bitter scientific opponent. In 1737, Siegesbeck had written a malicious and spiteful attack criticising Linnaeus on both scientific and moral grounds (Siegesbeck argued that the theory of fertilisation arouses immoral thoughts in the reader). As a result Linnaeus harboured an almost obsessive dislike for Siegesbeck for the rest of his life (Bobrov 1970; von Sydow 1978; Rowell 1980). Linnaeus decided not to respond personally to Siegesbeck. However, he requested Browallius and Gleditsch to do this on his behalf, which by 1741 had provoked Siegesbeck into producing a new anti-Linnaean polemic (von Sydow 1978). Even 25–30 years after the events, in his autobiography, Linnaeus did not forget Siegesbeck's attack. Linnaeus prepared a special ironic classification of botanists as "Florae officiarii," in which Siegesbeck was alone placed at the lowest rank as a sergeant-major (Bobrov 1970). Interestingly, before the quarrel, Linnaeus was much better disposed to Siegesbeck and commemorated him in the genus *Sigesbeckia* (Compositae). (Some authors have noted that *Sigesbeckia* is an unlovely plant (e.g., Jonsell 1978) and that Linnaeus' choice may not have been accidental.)

A great help to Linnaeus in his efforts to obtain Siberian material was made by Baron Sten Carl Bielke (1709–1753). Bielke, a close friend of Linnaeus, was a government official and founder member of the Swedish Academy of Sciences, a zealous botanist and agrarian (von Sydow 1978; Rowell 1980). Early in 1744 (just after the failure of a Swedish military attempt to reclaim territories lost during the war with Russia of 1700–1721), he arrived in St. Petersburg together with a young student, Pehr Kalm (1716–1779), who later became known for his botanical travels in North America. (Kalm was one of the best of Linnaeus' students; Linnaeus received many of Kalm's specimens from America, of which two are now in MW, see above.) Bielke was in St. Petersburg on a Swedish diplomatic mission (Stearn 1957) and, according to von Sydow (1978), had family business there; Kalm accompanied him as a secretary. According to Jonsell (1978), Bielke travelled to Russia on private business. Arriving in St. Petersburg, Bielke soon met Gmelin; moreover, he subsequently contrived to win the confidence of Siegesbeck (von Sydow 1978).

Bielke established scientific contact between Linnaeus and Gmelin, and subsequently Gmelin was a correspondent of Linnaeus between 1744 and 1751; 16 letters from Linnaeus to Gmelin survive (Plieninger 1861). It is important to stress that Gmelin was not on friendly terms with Siegesbeck and undoubtedly on Linnaeus' side in the latter's quarrel with Siegesbeck, and this is clearly evident from the correspondence. Bielke, in a letter to Linnaeus (17 Feb. 1744, Fries, 1909: 1881), noted a detail that may help to explain why Gmelin was so loyal to the Linnaean theory (Jonsell 1978). During the third year of his travels in Siberia, the field library and almost all of Gmelin's notes were destroyed in a fire. "He asked for new books from the Academy; they gave few apart from yours," wrote Bielke

to Linnaeus, and added with an undertone of flattery: *"Damnum incendii beneficio fuit"* (The fire turned into a benefit) (Jonsell 1978).

Gmelin was just as interested in contacts with Linnaeus as his outstanding colleague was interested in the Siberian collections. Gmelin requested copies of Linnaeus' publications that he did not possess and, of course, discussed numerous taxonomic and other botanical problems, such as plant hybridisation. Gmelin's letters show how closely he worked with Linnaeus in the preparation of *Flora Sibirica* (Bobrov 1970; Rowell 1980). He consulted Linnaeus over the identification of many plants and exchanged packets of seeds and herbarium specimens. In his first letter to Linnaeus, Gmelin sent some seeds and promised more, if the seeds planted in a private garden in the previous year fruited (Plieninger 1861). According to Rowell (1980), Gmelin may have been referring to the private garden of P. A. Demidov in Moscow (see below). The Demidovs' gardens were used more readily as repositories for collections than were the governmental gardens, largely because they received better care. Another important reason, however, was probably that this practice allowed the collectors more freedom in disposing of their plants, there being strict regulations governing the exchange of Russian plant material (Rowell 1980). However, according to Bobrov (1970), Gmelin planted seeds in his small personal garden established in St. Petersburg for Siberian plants.

Later, Gmelin sent to Linnaeus numerous seeds along with duplicates of herbarium specimens (collected both by him and by Steller; Gmelin had those of Steller's specimens collected before Krascheninnikov's departure from Kamchatka in 1741, cf. Stejneger 1936). Linnaeus received "a specimen of every plant" collected during Gmelin's travels in Siberia (Stearn 1957). According to von Sydow (1978), Gmelin was even sending to Linnaeus, and not infrequently, living plants in pots, chests or lumps of earth wrapped in bark. Bielke personally carried Gmelin's plants and seeds back to Sweden (Rowell 1980). Other mediators, according to von Sydow (1978), were Legation Secretary Lagerflycht and Legation Clergyman Baelter, as well as several anonymous ships' captains.

It is evident that Linnaeus received Gmelin's material in a somewhat clandestine manner (Stearn 1957) since the collections of the Second Kamchatka expedition were the property of the academy. However, it is difficult to believe that Siegesbeck (the Keeper of the collections) was completely unaware of these events. Von Sydow (1978) cites, from one of Gmelin's letters to Linnaeus, the description of an argument between Siegesbeck and Gmelin during an academy session. In particular, Gmelin accused Siegesbeck of giving plants to Baron Bielke. According to Stejneger (1936), whose opinion is based on a letter from Linnaeus to Peter Elfwius dated 28 August 1744, and on another from P. Kalm to Linnaeus, from St. Petersburg, dated 18 March 1744, Siegesbeck secretly supplied Bielke with specimens of more than 200 Siberian plant species, probably in exchange for money (cf. Hulth 1922:8-9). Kalm told Linnaeus, in strict confidence, not to divulge to a living soul that Siegesbeck was the person who had contributed the many rare things he had received.

Interestingly, in a clandestine way, and with the help of Bielke, Linnaeus received from St. Petersburg material of *Anandria,* the plant so named by Siegesbeck because he believed that it lacked stamens. In 1745 this plant was the subject of a dissertation under Linnaeus' presidency, in which he triumphantly discovered that the plant does have stamens and belongs to the genus *Tussilago* (Fries 1909; Jonsell 1978).

Linnaeus was very grateful to Bielke for his help in making contacts in Russia, writing to him in a letter: "Thank you for three things. Thank you for the letters, the seeds, and the good Gmelin" (Fries 1909; Rowell 1980). Linnaeus

Figure 27. *Sigesbeckia orientalis* L. A specimen from Trinius' herbarium (MW). The genus name was proposed by Linnaeus in honour of Johann Georg Siegesbeck (1686–1755) in *Hortus Cliffortianus* (1738). After a quarrel with Siegesbeck, Linnaeus sent him seeds of *Sigesbeckia* under the name *"Cuculus ingratus."*

also expressed a profound respect for Gmelin's scientific achievements, writing "You alone have discovered as many new plants as many other botanists together" in a letter to him. In the ironic classification of botanists (see above), Linnaeus placed Gmelin at the relatively high rank of major.

Linnaeus was also interested in the extensive collections that were in the hands of Steller, who was returning to St. Petersburg some years after Gmelin. Bielke and Linnaeus were well informed about the scientific value of these collections. Bielke was considering how to arrange access to these collections by Linnaeus after their arrival in St. Petersburg. The main problem — Siegesbeck — remained, however, and Bielke suggested to Linnaeus a reconciliation with Siegesbeck (Stejneger 1936; Rowell 1980). Instead, Linnaeus only added fuel to the fire by playing a practical joke on Siegesbeck, sending him, among other seeds sent to Bielke for exchange, a packet of seeds labelled *"Cuculus ingratus."* Bielke innocently (?) turned them over to the unsuspecting Siegesbeck, who planted them in the academy garden and with great curiosity and interest watched the growth of

the plant with the queer name. The seeds, when grown, produced the plant that bore Siegesbeck's own name, *Sigesbeckia* (Fig. 27). As a result of this, Siegesbeck resolved to cease all Swedish correspondence and requested that it all be addressed to Gmelin. Bielke remarked that it was very unfortunate that this trouble should occur just when Steller was expected to return and asked Linnaeus to write to "old man Siegesbeck" saying that he was not to blame, that he had not been at home when the seeds were dispatched, and that some gardener must have labelled the packet. But Linnaeus was adamant and wrote to Bielke: "... with Pilate I say 'What I have written, I have written.' If Siegesbeck feels cruelly done by, let him" (see Stejneger 1936; Rowell 1980, for full discussion of the question). In spite of the failure of Bielke's efforts to reconcile Linnaeus with Siegesbeck, Linnaeus nevertheless received a large part of Steller's collections through the assistance of Grigory Demidov.

The Demidov family: An important source of Russian material for Linnaeus

A great contribution to the history of Russian botany and Moscow University was made by several generations of the Demidov (also Demidof, Demidoff, Demidow) family. The Demidovs included the most important Russian businessmen, philanthropists and well-known patrons of various institutions of their time (Demidov 1910; Klyuchevsky 1910; Karavaev and Efimov 1983; Yurkin 1998). They were owners of large factories, especially in the Ural Mountains, and were great amateur enthusiasts of botany and natural history.

The founder of the family was Nikita Demidovich (Demidych) Antuf'yev (1656–1725), who is said to have started as a common blacksmith at Tula (in Middle Russia) and then, with support from Peter the Great, founded there an iron works. Peter the Great made enormous efforts to develop Russian industry, mainly due to military needs. In 1699, he developed iron works in Verkhoturye on the Nevya River, on the Siberian side of the southern Urals. In 1702, Peter made Nikita a present of the iron works and later, in 1720, ennobled him under the name "Demidov." It is difficult to establish how and when Peter first met Nikita, but he greatly supported Nikita's business, which was very important for Peter's military needs. According to Klyuchevsky (1910), whose view may represent legend rather than fact, Peter was familiar with Nikita's guns as far back as 1686 (being 14 years old, he had used Nikita's guns in his *poteshny* regiment formed of boy-soldiers). Nikita was an outstanding businessman. At Peter's death, five of the twenty-one iron and copper works in the Yekaterinburg District (an industrial region of the Urals) were owned by Demidov. Nikita's son Akinfy Nikitich Demidov (1678–1745) vastly expanded the business and acquired gold, silver and copper mines in the Ural and the Altai Mountains. He amassed a colossal fortune and was made a councillor of state (e.g., Klyuchevsky 1910; Stejneger 1936; Karev and Khitrov 1993).

In either 1730 (Yudin 1975) or 1731 (Chagin 1988), Akinfy purchased salt-works near Solikamsk in the Urals (now Perm Province). Solikamsk (originally Sol' Kamskaya, i.e., the salt on the Kama river) was founded in the 15th century in connection with the establishment of a salt-works. In the late 17th and early 18th centuries, Solikamsk (Fig. 28) was one of the most important industrial, trade, and administrative centres in the Urals, a major route connecting European Russia with Siberia and Central Asia passing through it. In the village Krasnoye near Solikamsk, one of the first botanical gardens in Russia was established soon after 1730. The history of the garden is, however, poorly known in places. There is a variety of opinions regarding its date of foundation and whether the garden was established by Akinfy or by his sons (Karavaev 1982; Karavaev and Efimov 1983; Chagin 1988; Yurkin 1998).

Figure 28. A view of Solikamsk with Krestovozdvizhensky Cathedral (left), Cathedral Bell Tower (centre), and Troitsky (Trinity) Cathedral (right). The Bell Tower (1713) is of particular interest. In the two upper floors of the cubic lower part of the tower, the municipal council and other institutions were located. Vitus Bering stayed here in 1725 on his way to Siberia as leader of the Second Kamchatka Expedition, as did another famous traveller, D. G. Messerschmidt in 1719 and 1726. G. F. Müller also visited the tower while returning from the Second Kamchatka Expedition (1742) (Chagin 1988). Reproduced from a postcard from the early 20th century. By courtesy of G. D. Kantorovich (Perm).

Figure 29. *Portrait of Prokofy Akinfievich Demidov* (1710–1786). D. Levitsky (1735–1822). 1773. Oil on canvas. 222 cm and 6 mm x 166 cm. The Tretyakov Gallery, Moscow. An amateur botanist and a man of great wealth, P. A. Demidov created a huge botanical garden in Moscow.

Akinfy had three sons (the elder Prokofy, the middle Grigory and the younger Nikita) and five daughters (Yurkin 1998). The two brothers, Prokofy Akinfievich Demidov (1710–1786) and Grigory Akinfievich Demidov (1715–1761), were involved in the development of the garden, if not its establishment. According to other sources, the garden was founded by Grigory alone (in particular, this is suggested in the first letter from Grigory Demidov to Linnaeus, cf. Stejneger 1936). Karavaev and Efimov (1983) suggested that Prokofy was responsible for the majority of work in establishing the garden. J. G. Gmelin had noted in 1743 that there was a hothouse in the garden, "which for this region certainly deserves to be called royal." According to Abbé Chappe d'Auteroche, who visited the garden in the spring of 1761, it contained a number of greenhouses (Stejneger 1936). The Demidovs' garden was also described by I. I. Lepechin (1737–1802), who visited Solikamsk in the 1770s and published an extensive list of plants cultivated in the garden (Lepechin 1814, pp. 136–189). The last owner of the garden was A. F. Turchaninov. After his departure from Solikamsk in the late 18th century, the garden fell into a state of neglect (Chagin 1988) surviving only until 1810 (Yurkin 1998).

Prokofy Akinfievich Demidov

Prokofy Akinfievich Demidov (Fig. 29) soon left the Solikamsk site and spent some years in Tula where the family still owned large factories. However, in contrast to his father and grandfather, Prokofy had little interest in business. In 1769, he sold all his factories in the Urals (Yurkin 1998). Prokofy was a person of a great wealth, a great philanthropist and a well-known eccentric. Prokofy was not only an amateur botanist, but he was also much interested in apiculture.

Figure 30. *The Alexandriyski Palace* (formerly Demidov's Palace). L. Pitch. 1850s. Oil on canvas. 27 x 36 cm. State Historical Museum, Moscow.

In Tula, Prokofy continued his study of botany and established scientific links and exchanged material with J. Amman in St. Petersburg and with the Moscow Apothecary Garden. In particular, Amman sent *Mimosa* to Prokofy and explained the behaviour of its leaves (Karavaev and Efimov 1983). In 1750, Prokofy moved to Moscow where he established (perhaps in 1756 — Bobrov 1958) quite a large private botanical garden (the site of Demidov's garden is now a public garden, Neskuchny Sad; the palace of Demidov (Fig. 30) belongs now to the Russian Academy of Sciences). Prokofy had about 5,000 plant species cultivated in his garden and was interested not only in medicinal, economic, and ornamental plants but also in various exotic "useless" species, including numerous annuals. There were eight large greenhouses in the garden. Through his contacts with various botanists, he exchanged material and received seeds from P. S. Pallas, I. Lepechin, T. Gerber, N. Jacquin, A. Thouin and other botanists (Karavaev 1972). A. K. Sytin (1997) suggested he may have received some seeds either directly or indirectly from Linnaeus. In 1773 and 1781, P. S. Pallas visited Demidov's garden and in 1781 published a catalogue of its plants in which he commemorated Demidov by establishing a new genus, *Demidovia* Pall. (Aizoaceae). Demidov collected many herbarium specimens in the garden and also purchased collections from other botanists. According to Karavaev (1982), P. A. Demidov had a collection of probably not fewer than 4,000 herbarium sheets.

Prokofy Demidov was an outstanding patron of Moscow University. In particular, he purchased a new building for the university and provided substantial financial support. After the death of P. A. Demidov, his extensive collections were presented to Moscow University by his widow and sons (1789). Unfortunately, they were lost during the Moscow Fire in 1812. However, about 150 of Demidov's specimens had been presented by him to P. S. Pallas. They survived the Moscow Fire in the collection of C. L. Goldbach (see below) and are now kept in the Moscow University Herbarium (Nasarov 1926; Karavaev 1982; Karavaev and Efimov 1983). In particular, the original material of *Demidovia tetragonoides* Pall. survives at MW.

Grigory Akinfievich Demidov

Grigory Akinfievich Demidov (Fig. 31) continued his study of botany at Solikamsk Botanical Garden (in the village of Krasnoye) after the departure of his brother (see above). Like him, Grigory was an amateur botanist, having had no special education in it. Grigory prepared herbarium specimens and established scientific links with T. Gerber in Moscow and J. G. Gmelin in St. Petersburg. Gerber and Gmelin exchanged material with G. A. Demidov and helped him to identify his collections (Karavaev 1981).

J. G. Gmelin, during his return journey from Siberia, visited Demidov at Solikamsk in early 1743 and was entertained and treated with great kindness (Stejneger 1936). Similarly, in 1746, G. W. Steller, who was returning from the Second Kamchatka Expedition and had with him quite a large herbarium collection made in Siberia and

Figure 31. Grigory Akinfievich Demidov (1715–1761). Linnaeus received from G. A. Demidov important herbarium collections from Russia. Some of the specimens returned by Linnaeus to Demidov are kept now at MW. Reproduced from *Russkiye Portrety…* (Romanov 1909).

the Russian Far East, also arrived in Solikamsk. Since Demidov was interested in botany, he was very glad of Steller's visit. Demidov was very anxious to prepare a floristic account for the part of the Urals around Solikamsk and, no doubt, tried to persuade Steller to spend some time with him. However, Steller soon continued the return journey to St. Petersburg and left Solikamsk on 16 May 1746, together with all his luggage, for Moscow (Stejneger 1936). For reasons that are unclear, Steller quickly changed his own plans and returned to Solikamsk. However, his luggage (with his collections) continued to Moscow and then to St. Petersburg (Stejneger 1936). Steller, with infinite care and great trouble, had carried with him a living collection of about 80 species of shrubs and herbs from such distant localities as the Lena river, Lake Baikal and Irkutsk. Returning to Solikamsk, Steller planted this living material in Demidov's garden wanting to give it a temporary home there before moving it to St. Petersburg.

Steller was a guest of Grigory Demidov during the summer of 1746. Grigory had already collected a fair representation of the flora of the Middle Urals and was very glad to discuss the collection with such a knowledgeable botanist as Steller, and the two men agreed to prepare a "Flora Permiae." Steller subsequently explored the area around Solikamsk, often accompanied by Grigory Demidov, collecting and describing the plants (Stejneger 1936).

In August 1746, when the courier from the Governing Senate in St. Petersburg, Zakhar Lupandin, arrived in Solikamsk to take him back to Irkutsk, Steller had already sent nearly all his baggage ahead and had retained only the most necessary things. Of botanical materials, he had with him only his collections from the summer's excursions, the living plants in Demidov's garden, and some manuscripts he was preparing (Stejneger 1936). In his last formal report to the academy, made just before his departure for Siberia, Steller stated that he had left in Demidov's hands, until his return from Siberia, living plants in the garden and dried plants collected in Perm [region] without labels or classification (Stejneger 1936). In his "Promemoria" (18 August 1746), Steller asked Professor J. E. Fischer (another participant in the expedition who was also at that moment in Solikamsk) to urge the academy not to let his plants, which he had replanted in the Demidovs' garden, be dug up by anybody but himself. Steller also stressed that he has not intended to deprive the academy of the plants; on the contrary, Mr. Demidov intended to serve the academy by acceding to his request. Besides, Steller informed the academy that he carried with him a journal with label information for the herbarium left with Demidov (Stejneger 1936).

When the academy was informed of Steller's death, letters were written not only to Demidov in Solikamsk but also to the Chancellory there. Demidov was requested to send to the academy Steller's effects, including his plant collections; the latter was told not to delay their transmission. After receiving a reply from Demidov on 28 May 1747, the academy requested him to send Steller's boxes and other effects but to keep the plants in his garden until further notice (Stejneger 1936). Stejneger has stressed that he has found no record of any herbarium specimens having been received by the academy in response to this request. According to Karavaev (1981), Demidov sent Steller's collection to St. Petersburg but retained a number of Steller's specimens for his personal collection.

Grigory Demidov spent most of 1748 in St. Petersburg. During the previous year, first Siegesbeck then, after a short time, Gmelin both left St. Petersburg to return to Germany. Demidov now started corresponding with Linnaeus, partly because of his great interest in botany and the study of Ural plants and perhaps partly because of the absence of other botanists (with the exception of Krascheninnikov) in St. Petersburg. His letters to Linnaeus are kept at the Linnean Society of London (Stejneger 1936). In the first letter, Demidov writes that he can send to Linnaeus, in exchange for other European plants, the seeds of 62 species growing in his Solikamsk garden, which have either been transplanted by Steller and him from various localities in the Urals or brought by Steller from Siberia. Linnaeus was highly pleased and sent in exchange seeds of 30 species of Indian plants (half of which were sent by Demidov to his gardener in Solikamsk). On 24 June 1748, Demidov wrote to Linnaeus announcing that he was sending a box containing a collection of 320 plants, some gathered himself, but others of which had been brought by Steller from Kamchatka. On 28 October 1748, Demidov wrote to Linnaeus of another shipment he was sending that included some seeds from Steller's plants in Demidov's garden that had ripened during the summer (Stejneger 1936).

Another important parcel of herbarium specimens was sent by Demidov to Linnaeus in 1750 from Moscow (Stejneger 1936). He also sent certain Siberian seeds early in the same year. Stejneger (1936) cites a "specification," or invoice, in Demidov's own handwriting, as follows:

4 Exemplaria marinorum fungor. et conchar.
47 Exempl. herbarum marinarum ..... } in Kamchatka

300 Exempl. herb.
338 ditto ..... } collectae in Kamchatka et Sibiria

101 Exempl. e diversis regionibus collect.
12 Exempl. Ghilanica
23 Exempl. Astrachanensium
19 Exempl. Astrachanica ad Moscoviam.

———
844

It is clear from the invoice that the parcel included not only plants collected by Steller and Demidov. Grigory Demidov also sent to Linnaeus specimens collected by T. Gerber (from Volga and Don), J. G. Gmelin (from Siberia), and J. Lerche (from Astrachan' and Ghilan, Persia). We have already mentioned that, according to Karavaev (1981), Lerche was working in 1748 in the Moscow Apothecary Garden. If so, Demidov may have been able, during his visit to Moscow, to obtain Lerche's specimens. Gerber was already dead in 1748. It is evident, however, from Grigory Demidov's letter to Gerber in 1740, that Demidov received from Gerber, in exchange, many herbarium specimens (Karavaev 1972). It is difficult to establish how Demidov obtained so many specimens collected during the Second Kamchatka Expedition in Siberia and Kamchatka (Stejneger 1936). According to all of Steller's last documents, he left none of his dried plants from Siberia and Kamchatka in Solikamsk. However, in his letters to Linnaeus, Demidov states that Steller presented him with

the Siberian material. Stejneger has suggested, based on a note by Linnaeus, that the collection was sold to Demidov (? after Steller's death).

Linnaeus was extremely happy to receive the plants from Demidov. He was especially impressed by the fact that many plants from Kamchatka are the same as in Canada (e.g., Linnaeus 1751; Fries 1910:129). According to Stearn (1957), since he received Russian specimens for his herbarium via both Bielke and Demidov against a background of prohibition by the St. Petersburg Academy, Linnaeus apparently thought it desirable to conceal the origin of this material, and he therefore marked it with cryptic signs. As suggested by Jackson (1912, 1922), the symbol ∈ was connected with Gerber's collection, ∋ with Gmelin, and ∈ with Steller. However, it may also be possible that Linnaeus used these signs for other reasons. He frequently used various signs as abbreviations for various purposes, in particular to indicate the origin of herbarium specimens. Several other types of signs are known in the Linnaean herbarium, not connected with Russia. And if he thought it desirable to conceal the origin of these specimens, why did Linnaeus mention the names of Gmelin, Steller, Lerche and Demidov in his publications?

A pupil of Linnaeus, J. P. Halenius defended on 22 December 1750 a thesis, *Plantae Rariores Camschatcenses,* with descriptions of 26 species based on the material received from Demidov (Linnaeus 1750). (As was usual at this time, the thesis would have been Linnaeus' work, the student paying for its translation (where appropriate) into Latin and for its publication. The student would study the text carefully before defending the thesis publically.) Interestingly, some species collected on the shores of Caspian Sea, near Astrakhan' by Lerche (e.g., *Astragalus acaulis, leguminibus inflatis subglobosis* = *Astragalus physodes* L.) were included in the thesis. This is not surprising since Lerche's material was received, together with material from Kamchatka, from Demidov. Linnaeus cited in *Species Plantarum* a reprint of the thesis (Linnaeus 1751).

Rowell (1980) discussed interesting differences between the original text of *Plantae Rariores Camschatcenses* (1750) and its reprint in *Amoenitates Academicae* (Linnaeus 1751). In 1750, Linnaeus stated that Demidov had sent him plants collected by Lerche in Kamchatka, Asia, and America, but Steller's name is omitted. This seems strange because Linnaeus was well informed about Steller and his contribution in collecting plant material from Kamchatka (evident from his correspondence with Bielke). In 1751, Linnaeus stated that the majority of plants had been collected by Steller in Kamchatka, while others had been collected by Lerche in Astrachan' in 1745–1747. Jonsell (1978) noted that only through correspondence with Krascheninnikov in the early 1750s did Linnaeus realise that only he and Steller had visited Kamchatka and that Lerche had never done so. In his first letter to Krascheninnikov (dated 24 October 1750; Ryazanskaya 1958: 237), Linnaeus asked, in particular, where Mr. Lerche might be found. Krascheninnikov replied (7 December 1750; op. cit.: 241, 242) that Lerche was now in Moscow and mentioned elsewhere in the letter that he (Krascheninnikov) and Steller were collecting material in Kamchatka. In a letter of 24 January 1751 (by which time Halenius had already defended the thesis), Linnaeus asked whether Lerche had visited Kamchatka in 1749 (op. cit.: 245). Krascheninnikov, in an undated letter of 1751, replied that Lerche had visited Astrakhan', and not Kamchatka; "Kamchatka was visited by Steller and me only, about which the respected Demidov already wrote to you in my presence" (op. cit.: 249–250). Ryazanskaya (1958) suggested that Krascheninnikov meant Prokofy Demidov. It is evident, however, that he meant in fact Grigory. Indeed, this letter from Grigory to Linnaeus on 13 September 1751 survived (Stejneger 1936). The correspondence clearly indicates a close relationship between

Grigory Demidov and Krascheninnikov.

Interestingly, a specimen of *Astragalus physodes* L. in MW, which was collected by Lerche near Astrachan', bears a Linnaean annotation "Pl. Camtschat.". The annotation could be explained by the fact that the species was first described by Linnaeus in *Plantae Rariores Camschatcenses*. The cover of the same specimen also bears the annotations "23 exemplar", "1748. Herbarium vivum Plantarum Astrachanensium.", "Collecta D.D. Lerhii" (Fig. 32), which corresponds closely with the entry "23 Exempl. Astrachanensium" in Demidov's invoice sent to Linnaeus (see above). Together with a study of the cover paper itself (according to M. N. Karavaev, the paper is Russian, manufactured by V. E. Evreinov in the 1730s), this apparently indicates that it is the original cover in which Lerche's material was received by Linnaeus in 1750.

If Linnaeus knew that some specimens were collected in Astrakhan', and others (as indicated in the invoice) in Ghilan (Persia), then should we postulate that he thought in 1750 these places to be located in Kamchatka? On 5 October 1750, Linnaeus confirmed receipt of Demidov's invoice (Stejneger 1936). On 29 October 1750, he wrote to Gmelin (who was already in Germany): "Accepi plurimas plantas ad Kamchatka lectas praecedente anno." He added a species list, which includes *Astragalus acaulis, leguminibus inflatis subglobosis*. These data prove that Linnaeus indeed thought that Astrakhan' and Ghilan are located in Kamchatka. It was, in any case, probably difficult for him to imagine quite how distant Kamchatka really is from Europe. Indeed, Linnaeus clearly thought it possible for material to reach Uppsala from Kamchatka within a year.

Interestingly, even in the 20th century, V. L. Komarov (1927), while discussing *Plantae Rariores Camschatcenses* as the first work on the flora of Kamchatka, stated that this work was based on Lerche's collections and did not link the thesis with the Second Kamchatka Expedition. According to Hultén (1927), the plants described by Linnaeus in the thesis were probably collected in Siberia or Russian America, rather than Kamchatka, but he allows that they were probably based on Steller's or Krascheninnikov's collections (cf. Rowell 1973).

G. A. Demidov did not sell the specimens to

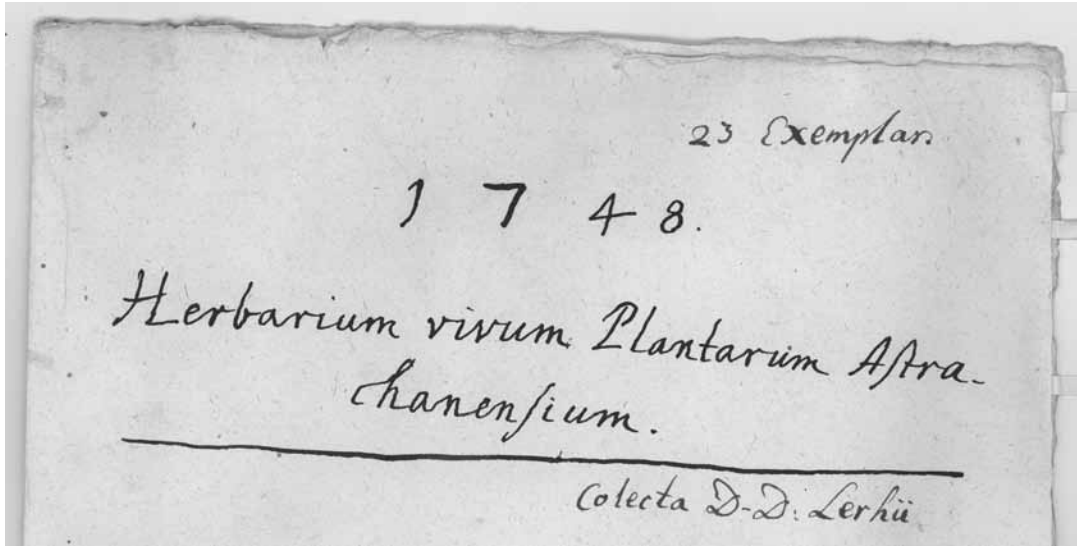


Figure 32. Annotation to the top part of the cover of the specimen of *Astragalus physodes* L. (MW No. 463).

Linnaeus, nor did he present the *whole* collection to him. Demidov asked Linnaeus to identify the specimens and then to return them, allowing Linnaeus, however, to keep the duplicates. These duplicates are kept now in the Linnean Society of London (LINN). It is necessary to stress, however, that any two sheets belonging to the same species were treated during the Linnaean period as duplicates, whereas now we would treat duplicates as sheets of the same taxon collected in the same place at the same time (cf. Stearn 1957).

According to Bobrov (1957a, 1970), Demidov sent only duplicates to Linnaeus and requested Linnaeus to send him a list of identifications. However, Grigory, in a letter on 13 September 1751 from St. Petersburg, acknowledged receipt of the rest of the collection (Stejneger 1936). Besides, Bobrov's opinion contradicts the history of Demidov's collection as described in a dissertation of Karamyschew (Linnaeus 1766). Alexander Karamyschew was one of the first Russian students in Uppsala. It is stated in the dissertation that "Thesaurus ipsius naturalis [i.e., Steller's collections] pervenit, ut fertur, in manus Nobilissimi Domini Gregorii Demidow, qui communicavit illum cum Gener. D:no Praeside meo, ut nomina inscriberet, idque ea lege, ut vir Illustris omnia illa retineret, quae dupla inveniebantur, unde & plura in Praesidis herbario vidi curiosa; sed & his forsan plurima nova erant, quae remisit ille possessori suo, & quae ignota jacent. Dolendum certe, quod non omnia illa in manus Nobilissimi D:ni Praesidis pervenerint!". Therefore, there is another direct indication that Linnaeus returned at least some specimens to Demidov. The dissertation by Karamyschew is an important source of information because Karamyschew was a student of Linnaeus and Linnaeus possibly wrote the text.

According to Karavaev (1972, 1981), Linnaeus did not annotate the specimens returned to G. A. Demidov. However, he did make lists of the plant species he had identified in the parcels received from Demidov. These lists are kept now at the Linnean Society of London (Karavaev 1981). The lists were definitely prepared before completing *Species Plantarum* because they lack *nomina trivialia*. Linnaeus used as a rule names published in his earlier works, especially *Hortus Cliffortianus* (Linnaeus 1737) and *Hortus Upsaliensis* (Linnaeus 1748). It is reasonable to suppose that Linnaeus returned to Demidov the specimens together with copies of lists, the information then being copied from the list on to the herbarium sheets (Karavaev 1981). As far as revealed by Karavaev (1981), the information was copied first by the son of G. A. Demidov, Pavel Grigor'jevich Demidov (1738–1821). Karavaev assumed that Pavel was working with the herbarium in 1751–1752 just as he was finishing his general education. However, Pavel's knowledge of Latin was still too poor, and the father therefore requested an unknown person to continue copying from the Linnaean manuscript (Karavaev 1981).

The present study revealed, in contrast to Karavaev's opinion, that some specimens from the Demidovs' collection have annotations written by Linnaeus (see the section concerning Goldbach's herbarium for details). Such a possibility was mentioned by Nasarov (1926). Regarding duplicates of specimens from Demidov's parcels, many of the Russian specimens in LINN have annotations equivalent to descriptions in Gerber's manuscripts (see above), and some were written by Gerber himself, but the majority were written by Linnaeus (Karavaev 1972). Karavaev supposed that if there were two of Gerber's autographs, Linnaeus kept one and returned the second, but when there was only a single autograph, he probably copied the text himself. Linnaeus described several species based on material sent by G. A. Demidov. According to Karavaev (1972), Linnaeus undoubtedly cited in several places of *Species Plantarum* the information from Gerber's herbarium specimens (Gerber's specimens were extraordinarily fully annotated for the 18th century).

Pavel Grigor'jevich Demidov

Pavel Grigor'jevich Demidov, like his father and uncle, was an enthusiastic amateur natural historian, and a famous patron and sponsor of various institutions. P. G. Demidov continued his father's contacts with Linnaeus and even visited Uppsala to study natural history (in 1760, together with two brothers). Later, P. G. Demidov was attending lectures in Göttingen University and Freiberg Academy of Mines. Demidov was also acquainted with G. L. L. Buffon (Bobrov 1958, 1970). P. G. Demidov presented to Moscow University in 1802 an extensive natural history collection, which included the herbarium of his father, G. A. Demidov, a library, and huge financial support (100,000 roubles) (Nasarov 1926; Lipschitz 1940a, b; Pavlov 1978).

According to G. Fischer (1806–1807, after Nasarov 1926), the herbarium of P. G. Demidov was divided into three general parts:

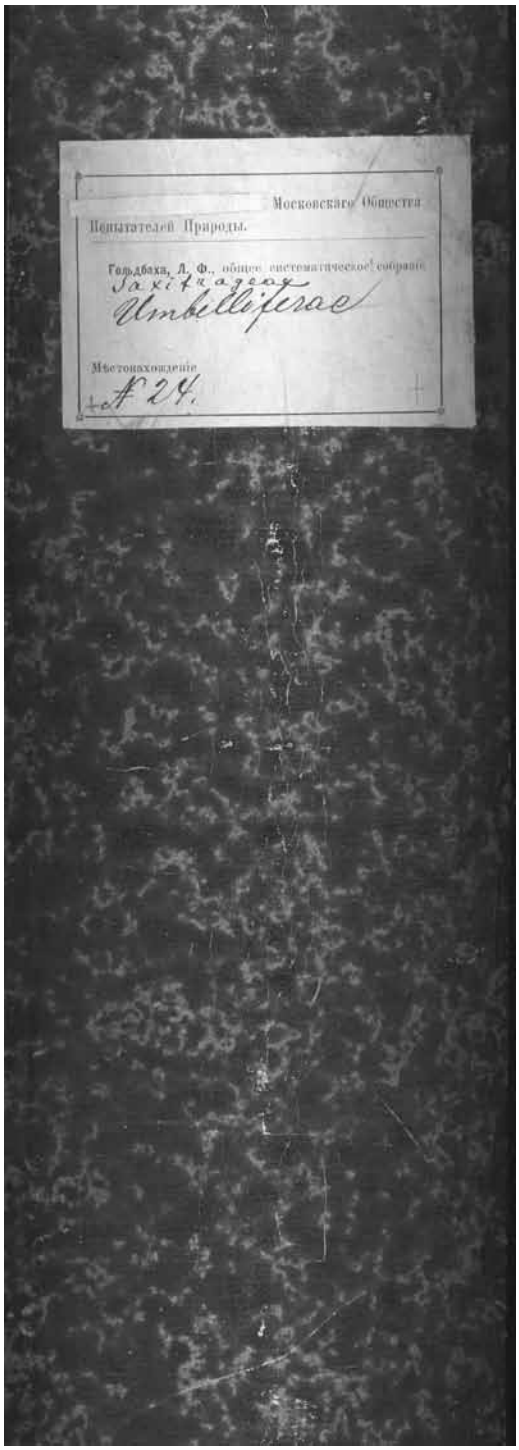
1. A general collection of 65 volumes in folio, including a herbarium of Hermann Boerhaave (1668–1738). Boerhaave was a professor at Leiden University and a friend of Linnaeus. Linnaeus frequently cited Boerhaave's works. A nephew of Boerhaave, Abraham Kaav Boerhaave, moved to Russia in 1746 where he became professor of physiology and a member of St. Petersburg Academy of Sciences. Demidov bought the herbarium from Boerhaave's nephew.
2. The herbarium collected by P. G. Demidov under the guidance of Linnaeus in Sweden (10 fascicles).
3. The herbarium from Siberia and Kamchatka studied by Linnaeus. It is evident that the herbarium was rich in Steller's specimens. However, G. Fischer did not mention Steller's name, perhaps because G. A. Demidov had not sent these specimens to the academy (see above).

Carl Ludwig Goldbach and the herbarium returned by Linnaeus to Demidov

Unfortunately, the herbaria of Boerhaave, Steller and Gmelin, and the personal collections of G. A., P. A. and P. G. Demidov were kept in Moscow University during Napoleon's 1812 invasion. The building of the university (in contrast to the building of the Medical-Surgical Academy) was very severely damaged by the fire. Almost the whole of the University Herbarium was lost. However, a small portion of the collection survived, mainly because of Goldbach.

Carl Ludwig (in Russia, Lev Fedorovich) Goldbach (1793–1824) was a favourite pupil of G. F. Hoffmann. Goldbach moved to Russia from Germany, together with his father who became professor of astronomy in Moscow University (Lipschitz 1940a) in 1804. Goldbach was an outstanding plant taxonomist. Goldbach was commemorated by de Candolle in the genus *Goldbachia* (Cruciferae). He was, however, a very modest person and published only a few articles (besides, he died very young). Nevertheless, Goldbach collected plants and accumulated an extensive herbarium. After the Moscow fire in 1812, Goldbach purchased a number of the surviving sheets, including more or less scorched specimens from D. Gruneberg and perhaps others from other sources.

Goldbach's herbarium, about 10,000 specimens, was bought after his death by the sons of the merchant S. Alexeev and presented to the Herbarium of the Moscow Society of Naturalists (Shevyrev 1855), which was later merged with the herbarium of Moscow University (Smirnov 1940). Many interesting and important specimens have been extracted from Goldbach's collection during the 20th century. The rest of it, which contains numerous poorly labelled specimens, is preserved in separate boxes (Fig. 33).



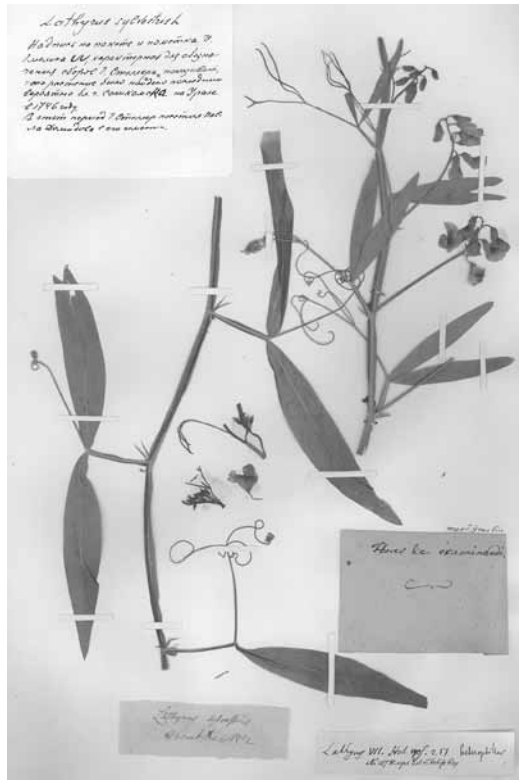
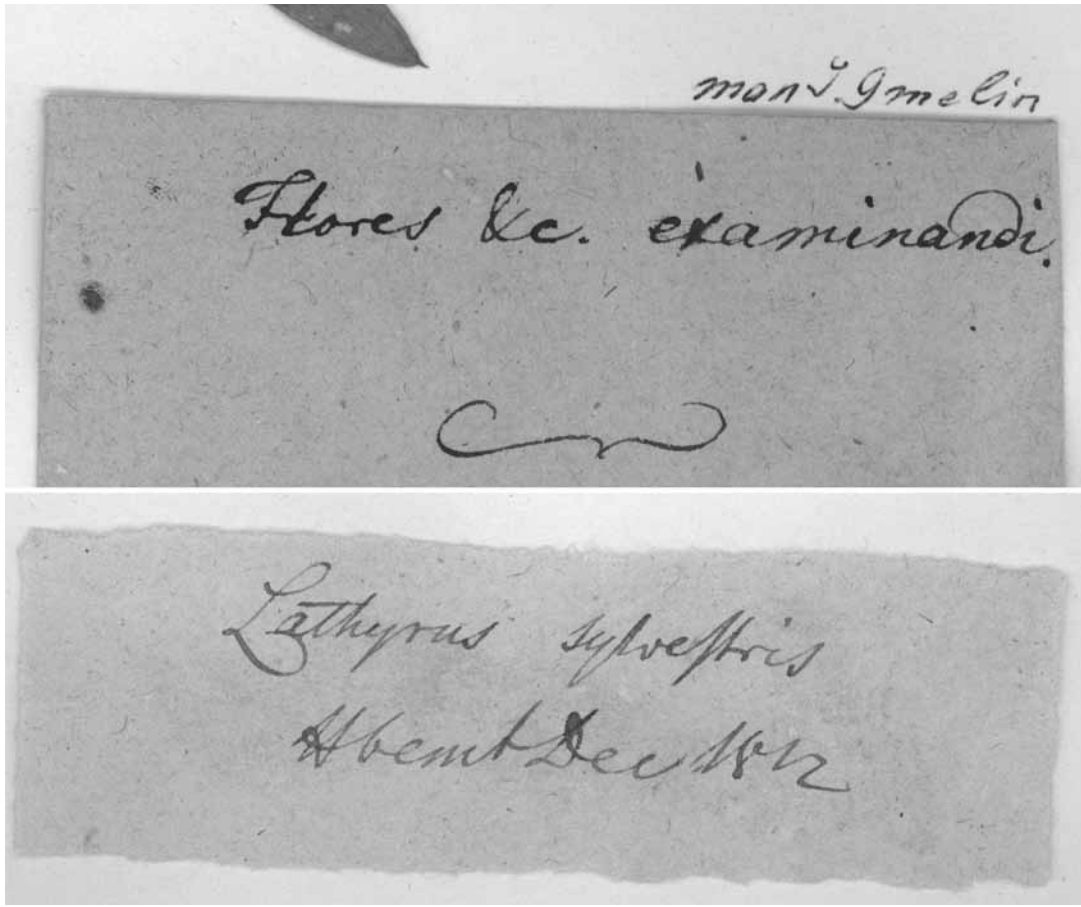


Figure 33. *Left:* L. Goldbach's herbarium in MW: present day. Like other MW historical collections, the herbarium is kept in cardboard boxes superficially simulating books. The image shows the "spine" of a particular box.

Figure 34. *Above:* A specimen of *Lathyrus latifolius* L. from Goldbach's herbarium (MW No. 444). The specimen was collected during the Second Kamchatka expedition and possibly annotated by Linnaeus.

Figure 35. *Right:* Details of annotations on the sheet of *Lathyrus latifolius* L. from Goldbach's herbarium (MW No. 444). *Above:* annotations on the envelope. According to M. N. Karavaev (unpublished data), the text on the envelope and J. Gmelin's symbol, which is characteristic for G. Steller's gatherings, demonstrate that the plant was found by the latter, presumably near Solikamsk in the Urals in 1746. During this period, Steller was visiting Grigory Demidov at his estate. *Below:* an annotation, possibly by L. Goldbach, indicating that the specimen survived the Moscow fire of 1812 during Napoleon's invasion of Russia.



Specimens linked with Linnaeus

Twenty-four specimens from Goldbach's Herbarium are more or less certainly linked with Linnaeus. A specimen of *Sisymbrium supinum* L. belonged originally to the collection of A. J. Hugo. The specimen is linked very closely with Isnard's account in Mem. Acad. Roy. Sci. 1724: 295–306, t. 18, a reference also cited by Linnaeus in his protologue of *Sisymbrium supinum*. However, it is doubtful if Linnaeus saw this sheet.

The remaining 23 specimens belonged originally to the herbarium of Grigory and Pavel Demidov. These specimens were collected by Steller and Gmelin in Siberia, Kamchatka and (presumably) in the Ural Mountains during the Second Kamchatka Expedition [e.g., *Phlox sibirica, Lathyrus latifolius* (Fig. 34, Fig. 35), *Scutellaria lupulina*], by Lerche in the southern part of European Russia [e.g., *Astragalus physodes, Glycyrrhiza echinata* (Fig. 36)], and also by Grigory Demidov in his garden (presumably two species of *Antirrhinum* and other sheets). The material is poorly labelled, and although many specimens were collected by Steller, none possess Steller's original annotations. Therefore, it is difficult to establish who collected some of these sheets. Sometimes Gmelin's *Flora Sibirica* can help to solve this problem. Interestingly, none of Gerber's specimens from Goldbach's collection show direct evidence of having been

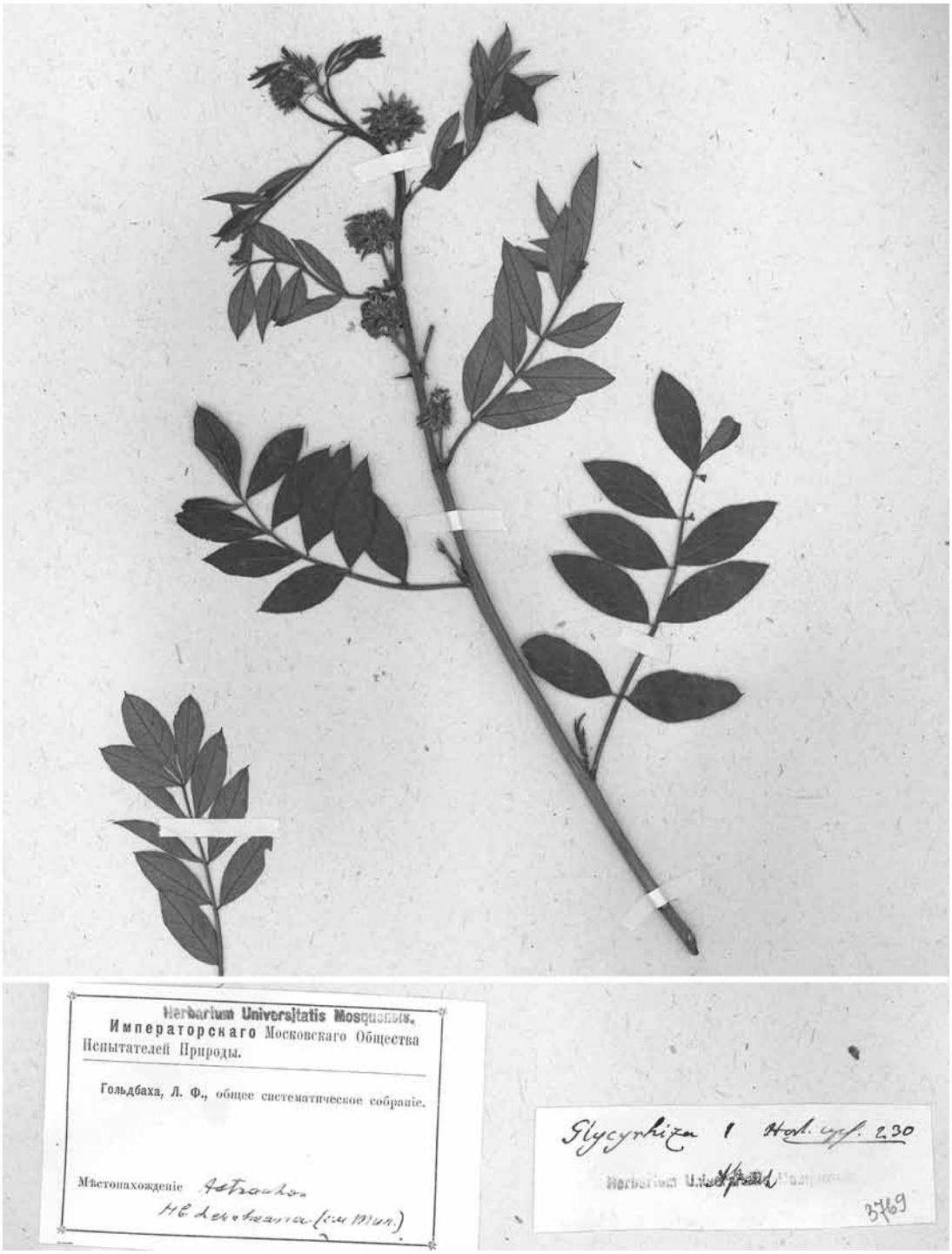


Figure 36. A specimen of *Glycyrrhiza echinata* L. from Goldbach's herbarium (MW No. 451). The specimen was collected by J. J. Lerche and bears Linnaean annotations. Apparently original material.

studied by Linnaeus (although Linnaeus received many of Gerber's specimens via Demidov). Some of the 23 Demidov specimens under discussion were sent by Grigory Demidov to Linnaeus for identification, and then returned to Russia, while others presumably are duplicates of specimens he had examined. Again, it is very difficult to separate these two groups from each other.

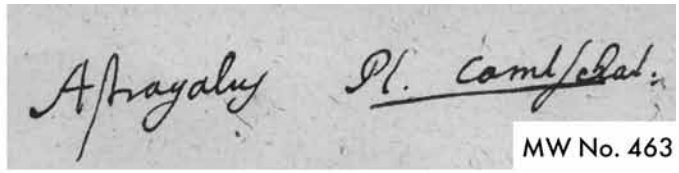
According to the present study, eight of the 23 specimens more or less certainly have Linnaean annotations (Fig. 37). Of these eight sheets, five have Linnaean annotations written on labels, which might have been sent separately or cut out from a list received from Linnaeus. Some labels apparently have "earlier Linnaean handwriting" while others apparently possess "later handwriting." We may suppose that they were written partially just after receiving parcels from Grigory Demidov and thus before publication of *Species Plantarum* and partially during the visit of Pavel Demidov in Uppsala.

Three specimens *(Astragalus, Trigonella,* and *Erysimum)* have Linnaean annotations written directly on the cover. The cover paper is Russian, 18th century (apparently made before 1749, Karavaev, unpubl. data). The first specimen is original material for *Astragalus physodes* (interestingly, there is no material of this species in any of the other Linnaean herbaria, and the MW sheet is therefore being designated as lectotype, see Jarvis et al. 2001). *Trigonella* and *Erysimum* are problematic, because they also possess names of quite different plants written much later by an unknown person on the reverse side of the cover, upside-down (*Helianthemum salicifolium* (L.) Mill. and *Pelargonium cynosbatifolium* Willd., respectively). These annotations clearly indicate that the covers were used in the 19th century for plants other than those studied by Linnaeus.

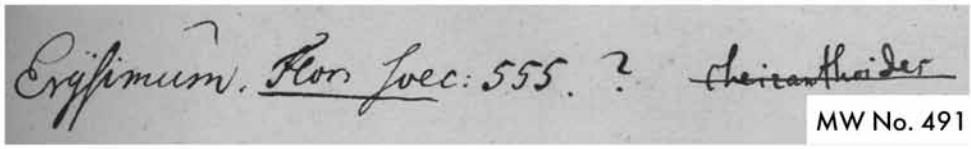
The specimen of *Trigonella* (which is annotated by Linnaeus as *Trigonella foenum-graecum* L. but belongs in fact to *Trigonella gladiata* Stev. ex Bieb.) is quite unusual (Fig. 38). There was initially a plant of *Trigonella* mounted on the cover, subsequently removed, either intentionally or accidentally. The cover was then used for quite a different plant species (apart from the annotation "*Helianthemum salicifolium* (L.)" on the verso, there is a plant imprint on the cover that does not match *Trigonella*). The cover was then used again for *Trigonella*. The *Trigonella* is mounted now on a small sheet of old paper (probably 18th century). This smaller sheet is glued to the cover discussed above, in the same place as the first *Trigonella*. Interestingly, the remains of the first *Trigonella* can be seen between the cover and the attached smaller sheet (several trifoliolate leaves are clearly visible in transmitted light). The remains of the first *Trigonella* are seemingly conspecific with, or at least very similar to, the present-day specimen. We can perhaps imagine that the first and the subsequent specimens of *Trigonella* are of the same provenance. The smaller mounting sheet of the present-day specimen is of special interest. First, there was undoubtedly an annotation at the top of the sheet, which was later cut out, and the mounting technique is unique for the MW Linnaean collection. There are double cuts in certain places of the mounting sheet to allow plant material to be attached. Apart from this, plants are also mounted using thread and special strips of paper. Interestingly, the branched habit of the plant, which is not common in *T. gladiata,* is distorted through mounting. Intriguingly, both MW No. 463 *(Astragalus physodes)* and MW No. 446 *(Trigonella)* bear unusual symbols at the base of the cover sheets on the right hand side (Fig. 39).

Twelve of the 23 specimens (Fig. 40) have characteristic references to pre-1753 Linnaean publications, *Hortus Cliffortianus* (Linnaeus 1738), the first edition of *Flora Suecica* (Linnaeus 1745) and *Hortus Upsaliensis* (Linnaeus 1748) without citation of the name of Linnaeus. Keeping in mind the historical information, we can suppose that these labels may have been copied by various persons from original Linnaean labels or his letter(s). It is necessary to stress that some labels

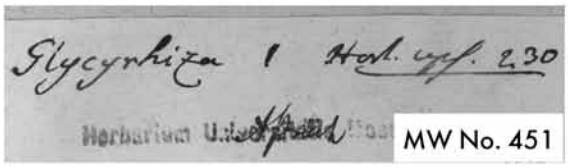
MW No. 491 (cover)



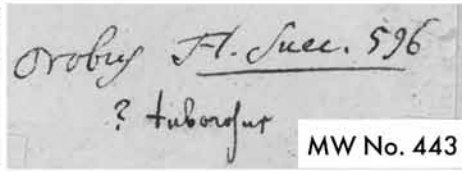
MW No. 463



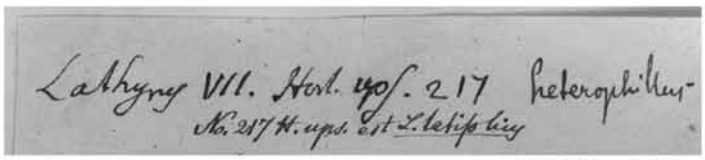
MW No. 491



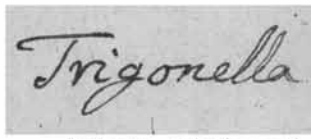
MW No. 451



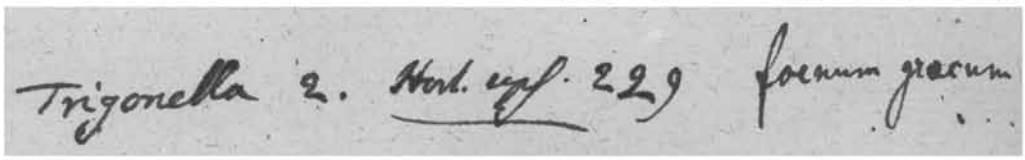
MW No. 443



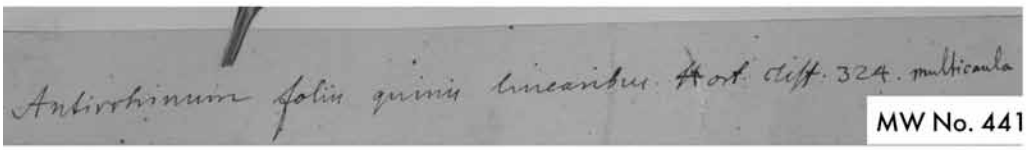
MW No. 444



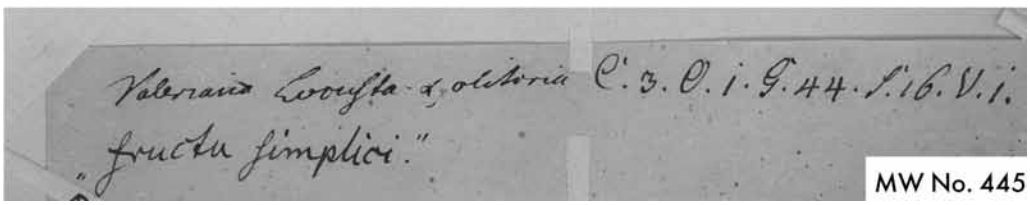
MW No. 446 (cover)



MW No. 446



MW No. 441



MW No. 445

Figure 37. Annotations from various specimens of Goldbach's herbarium at MW, which more or less certainly carry Linnaean autographs.

MW No. 441 (*Antirrhinum multicaule* L.): "Hort. Cliff. 324" and *"multicaula"* might be written by Linnaeus.
MW No. 443 (*Orobus tuberosus* L.): "*Orobus* Fl. Suec. 596" is almost certainly written by Linnaeus.
MW No. 444 (*Lathyrus latifolius* L.): "*Lathyrus* VII. Hort. ups. 217" might have been written by Linnaeus.
MW No. 445 (*Valeriana locusta* var. *olitoria* L.): it is perhaps possible that *"Valeriana locusta* α *olitoria"* is written by Linnaeus (if so, in a later style of his handwriting).
MW No. 446 (*Trigonella foenum-graecum* L.): "*Trigonella* 2. Hort. ups. 229" is almost certainly written by Linnaeus.
MW No. 451 (*Glycyrrhiza echinata* L.): "*Glycyrhiza* 1 Hort. ups. 230" is seemingly written by Linnaeus.
MW No. 463 (*Astragalus physodes* L.): "Pl. Camtschat." is seemingly written by Linnaeus (and perhaps *"Astragalus,"* too).
MW No. 491 (*Erysimum cheiranthoides* L.): At least *"Erysimum"* on the cover is seemingly written by Linnaeus.

might have been copied after the 1812 fire. Two specimens of *Glycyrrhiza echinata* may provide an example of copied labels. Indeed, the specimen No. 451 was seemingly annotated by Linnaeus while the specimen No. 453 has the same (but abbreviated) identification "*Gl.* 1. H. Ups. 230" written by another person (cf. Fig. 37 and Fig. 40).

Three specimens from the Second Kamchatka Expedition *(Phlox, Cortusa,* and *Scutellaria lupulina)* have no Linnaean annotations and no evidence of copied labels. However, there are reasons to suppose that they are at least of the same provenance as the material studied by Linnaeus. The *Phlox* specimen is of particular interest because it appears to be a duplicate of a specimen LINN No. 217.13 (which is annotated by "Demid." on the verso and evidently came from Demidov). Since the species was first described in *Plantae Rariores Camschatcenses,* it is highly likely that the description was based on one or other of the specimens. The specimen in LINN was selected as a lectotype (Wherry 1955), and the specimen in MW is believed to be an iso-lectotype (Jarvis et al. 2001).

It is interesting to compare the list of the Demidovs' specimens at MW linked with Linnaeus (cf. Appendix) with the list of species included in the dissertation defended by Halenius, *Plantae Rariores Camschatcenses* (Linnaeus 1750, 1751). Only three species of those 26 described by Linnaeus have relevant specimens now at MW *(Astragalus, Cortusa,* and *Phlox),* and we failed to find the other 23 specimens in Moscow. This could indicate how many significant specimens were lost in Moscow during the 1812 fire.

Of the 26 species included in *Plantae Rariores Camschatcenses,* 17 have specimens in Linnaeus' own herbarium (LINN) closely linked (e.g., through symbols) to the thesis, five have no material in LINN, and most of the remainder are represented by material that shows no explicit link to the thesis. The five names from the thesis without Russian specimens in LINN are as follows: *Lilium camschatcensis, Sedum verticillatum, Actaea cimicifuga, Astragalus physodes* and *Dracontium camtschatcensis.*

It would also be interesting to compare the specimens collected presumably in the Solikamsk botanical garden in the 1740s with the description of the garden completed in the 1770s (Lepechin 1814). A number of plants from the MW Demidovs' collection are not recorded in Lepechin's list, for example, the two species of *Antirrhinum.*

Trinius' collection

Carl Bernhard von Trinius (1778–1844) (Fig. 41) was a member (Academician) of the St. Petersburg Academy of Sciences, a founder and the first director of the Botanical Museum of the Academy in St. Petersburg. The herbarium of this museum was later merged, along with

Figure 38. A specimen of *Trigonella* from Goldbach's herbarium (MW No. 446) annotated by Linnaeus. *Top:* annotation on the verso.

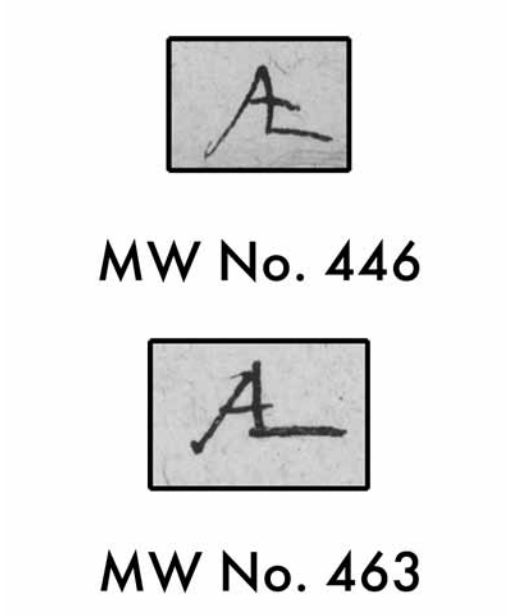


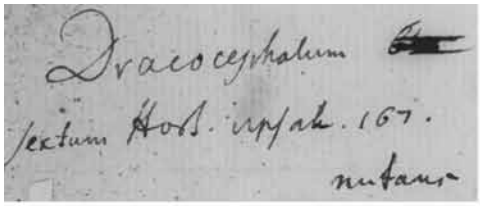
Figure 39. Unusual symbols at the base of the cover sheets of two specimens from Goldbach's herbarium, which bear Linnaean annotations. *Bottom:* MW No. 463 *(Astragalus physodes)*; *top:* MW No. 446 *(Trigonella).* The symbol might be an "AL" ligature (perhaps to be explained as "Astrachan Lerche"?).

the herbarium of the St. Petersburg Botanical Garden, into the herbarium of the present-day Komarov Botanical Institute, LE. Trinius was a specialist in the taxonomy of grasses and described numerous species of Gramineae. In 1841, he presented all his specimens of grasses to the St. Petersburg Academy of Sciences. Trinius' grass herbarium is preserved now in LE. In the collection there are a total of 3,281 folders and about 10,700 sheets. A catalogue and a microfiche edition of Trinius' grass herbarium has been published recently (Soreng et al. 1994). Trinius is commemorated in the genus *Trinia* Hoffm. (Umbelliferae).

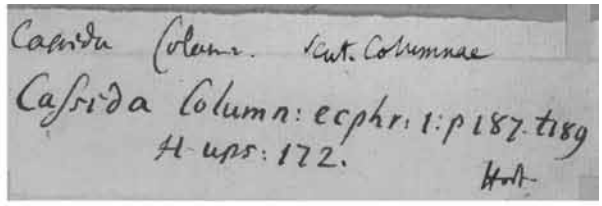
Some Trinius sheets are reported in B, W and H, but the main set of Trinius' specimens (about 60% of the whole collection in 172 boxes, according to Karavaev 1976) was acquired by Moscow University via the Military Medical-Surgical Academy and is kept now in MW (Fig. 42). Together with Hoffmann's collections, it was another important accession from the academy in the Herbarium of Moscow University (Shevyrev 1855). A study of Moscow University's Trinius collections was conducted by an outstanding Russian botanist and a founder of the Moscow school of plant morphology, I. N. Goroshankin, who was guiding the Herbarium of Moscow University in 1876–1904. He published a catalogue of the collection (Goroshankin 1885). Together with collections of Ehrhart and Hoffmann, the Trinius herbarium is one of the most important and extensive historical collections of the MW herbarium.

Trinius described few species of plants other than grasses, and the MW collection is therefore poor in his type material. However, Trinius purchased (in addition to his own specimens) much important and type-rich material from various private collections. According to the extensive study of Karavaev (1976), the MW Trinius collection includes specimens from about 210 collectors and institutions. There are many important specimens collected in Russia, e.g., more than 220 specimens of C. Steven (1781–1863), about 150 specimens (including many types) of Marschall von Bieberstein (1768–1826), about 100 of P. S. von Pallas, about 40 of S. G. Gmelin (died 1774), about 30 of J. M. F. Adams (1780–1838), about 20 of J. G. Georgi (1729–1802) and about 20 of E. L. M. Patrin (1742–1815), etc.

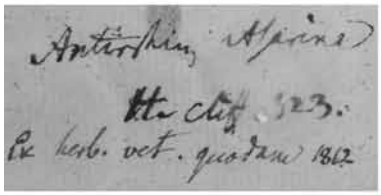
In 1814, Trinius bought the extensive herbarium of Karl Asmund Rudolphi (1771–1832), which is now kept within Trinius' collection (Karavaev 1975). Rudolphi was a scientist who studied various branches of biology and medicine. He described only a few new plant species but collected many himself and also purchased specimens from many famous botanists, amassing quite a large herbarium collection. Born in Stockholm, Rudolphi later moved to Stralsund and finally to Greifswald where he became a pupil of C. E. Weigel (1748–1831). In 1810, Rudolphi became professor of



MW No. 452



MW No. 448



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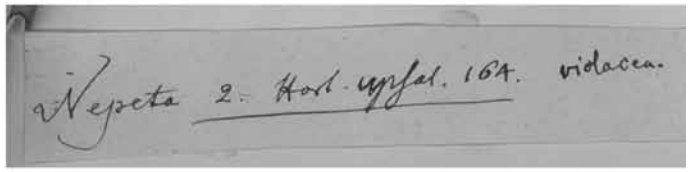

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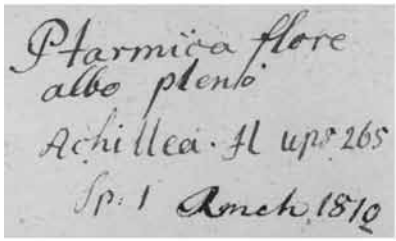

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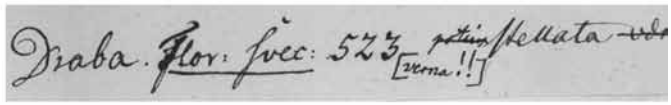
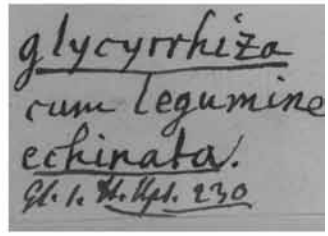
MW No. 436

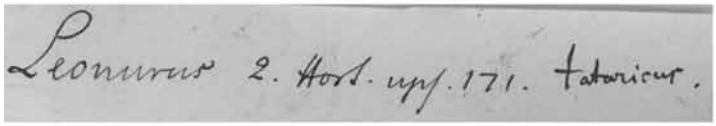


MW No. 439

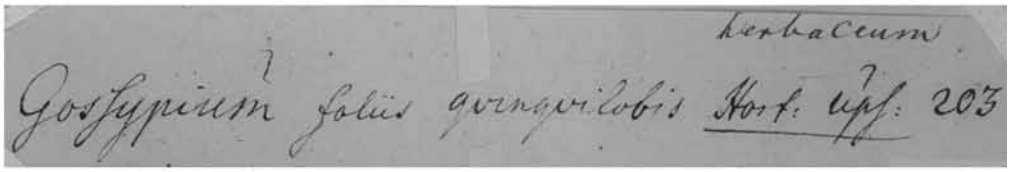
MW No. 437



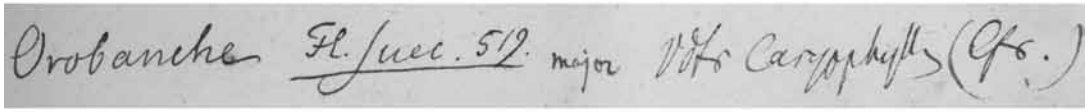
MW No. 453



MW No. 442



MW No. 490

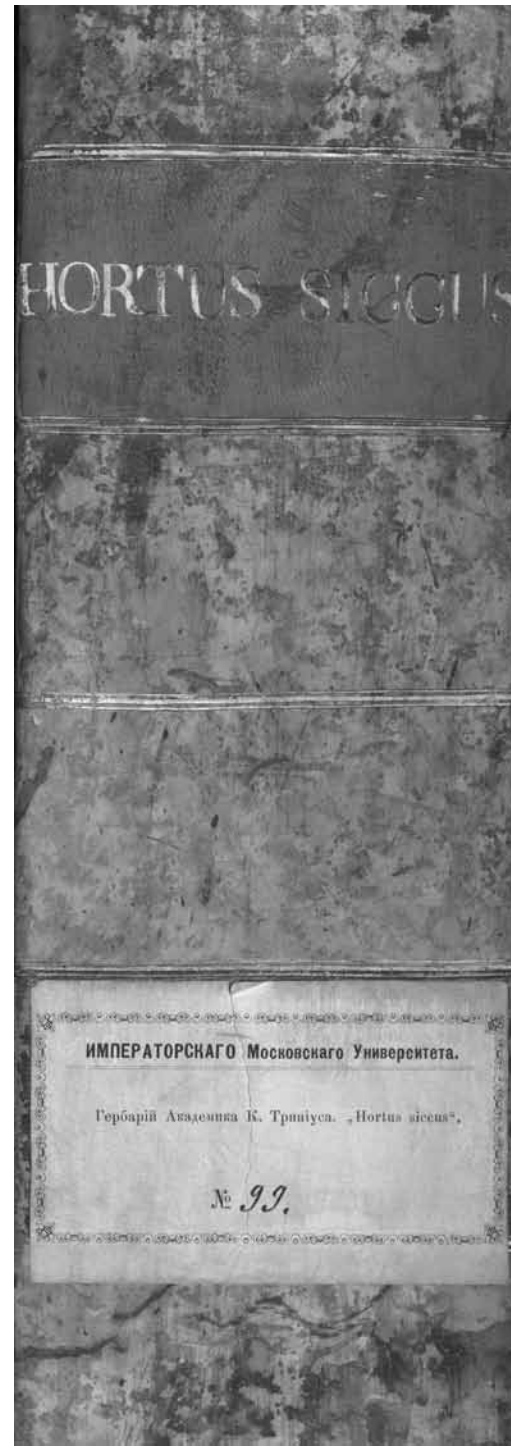


MW No. 440

Figure 40. *Left:* Annotations from various specimens of Goldbach's herbarium at MW with characteristic references to pre-1753 Linnaean publications, *Hortus Cliffortianus* (Linnaeus, 1738), *Flora Suecica* (Linnaeus, 1745) and *Hortus Upsaliensis* (Linnaeus, 1748) without citation of the name of Linnaeus. None of the annotations presented here belongs to Linnaeus. However, bearing in mind the history of the specimens, these labels may have been copied by various people from original Linnaean labels or his letter(s). MW No. 436 (*Pedicularis flammea* L.); MW No. 437 (*Pedicularis comosa* L.); MW No. 438 (*Nepeta violacea* L.); MW No. 439 (*Draba verna* L.); MW No. 440 (*Orobanche major* L.); MW No. 442 (*Leonurus tataricus* L.); MW No. 447 (*Achillea ptarmica* L.); MW No. 448 (*Scutellaria* sp.); MW No. 449 (*Antirrhinum asarina* L.); MW No. 452 (*Dracocephalum nutans* L.); MW No. 453 (*Glycyrrhiza echinata* L.); MW No. 490 (*Gossypium herbaceum* L.).

Figure 41. *Below:* Carl Bernhard von Trinius (1778–1844).

Figure 42. *Right:* C. B. von Trinius' herbarium in MW: present day. Like other MW historical collections, the herbarium is kept in cardboard boxes superficially simulating books. The image demonstrates a "spine" of a particular box.



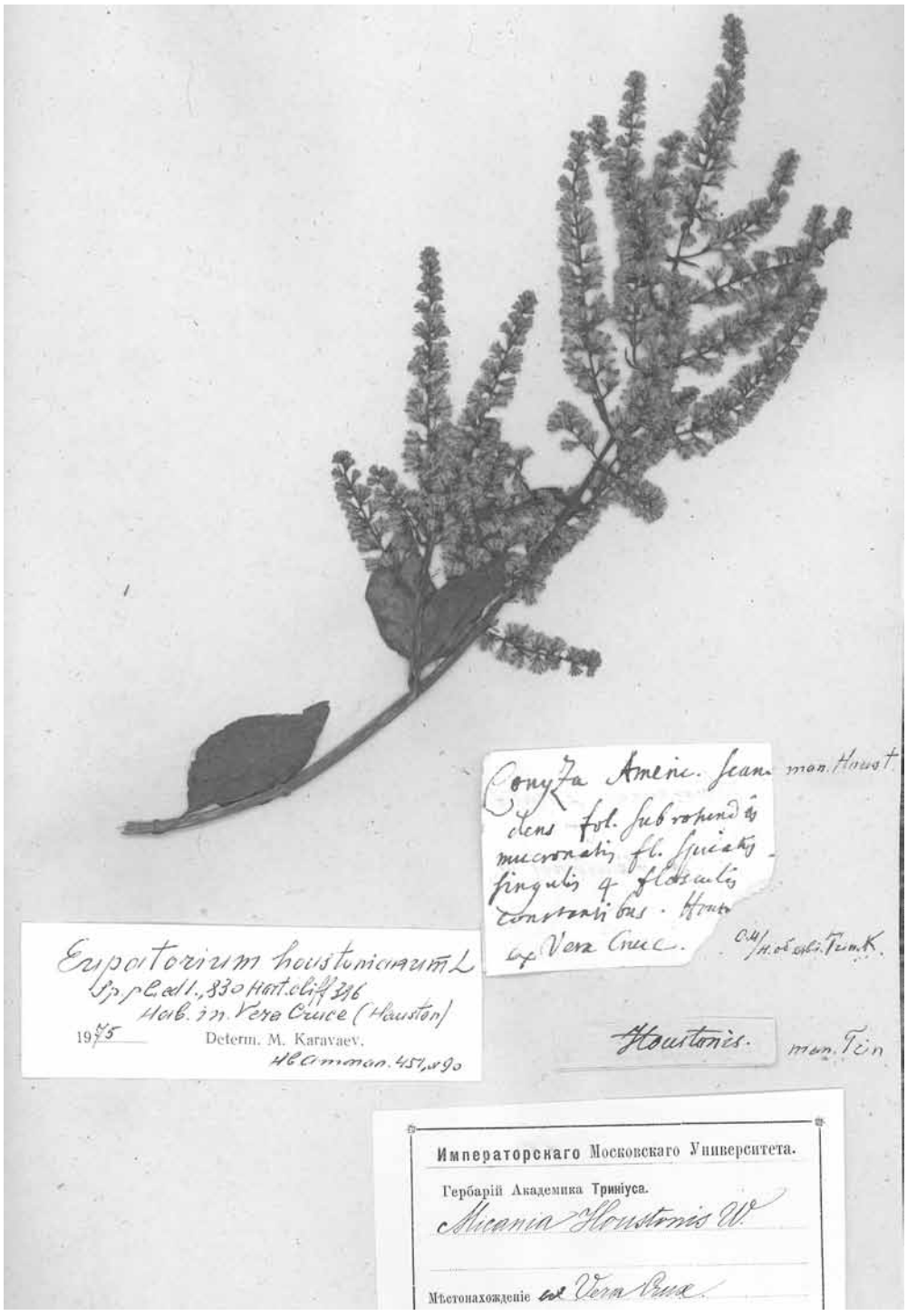


Figure 43. An iso-lectotype of *Eupatorium houstounianum* L. from Trinius' herbarium (MW No. 489). The specimen was collected by W. Houstoun in Vera Cruz.

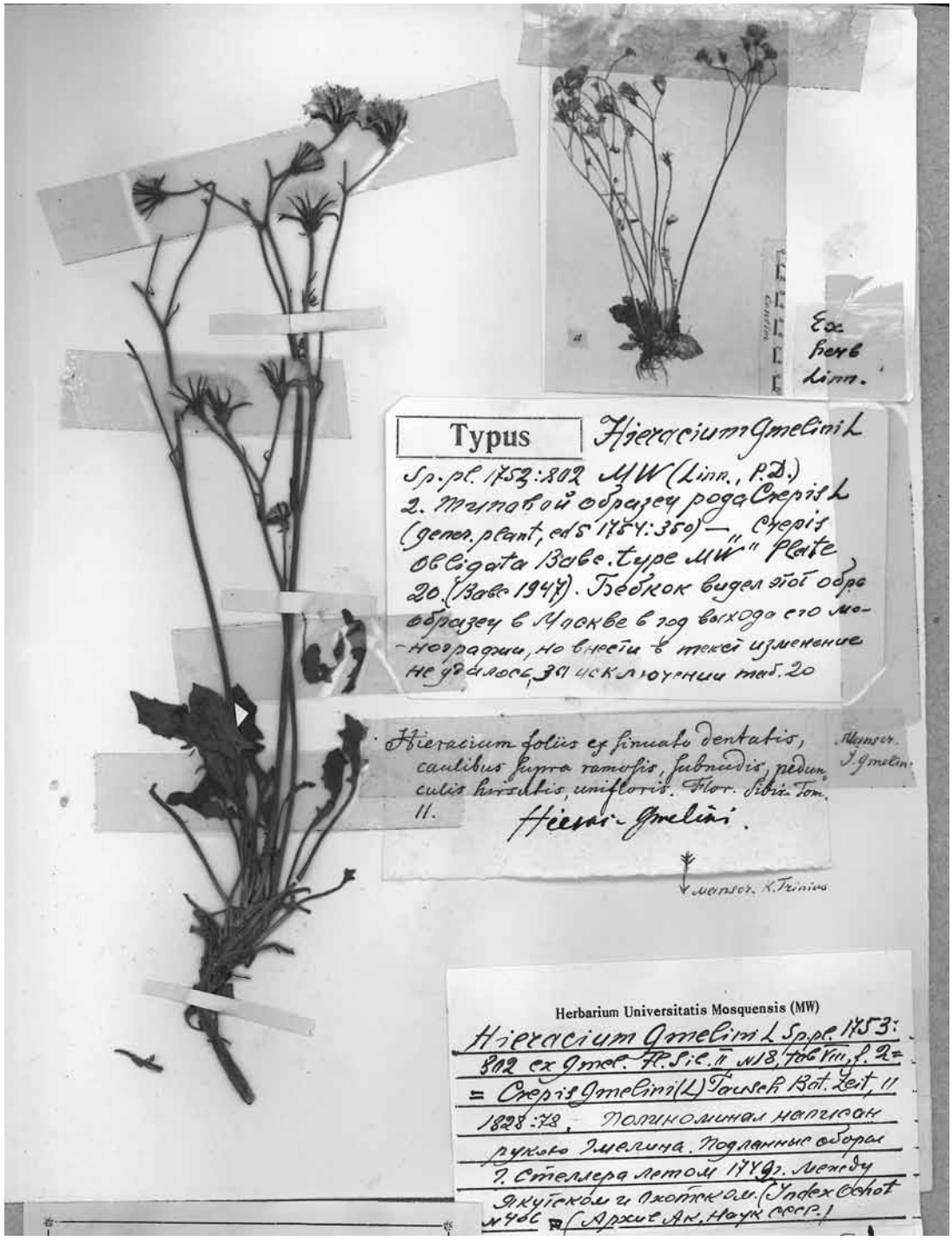


Figure 44. An iso-lectotype of *Hieracium gmelinii* L. from Trinius' herbarium (MW No. 473). The specimen was collected by G. W. Steller during the Second Kamchatka Expedition.

anatomy and physiology at Berlin University. His herbarium contains specimens collected by 106 botanists in various countries (Karavaev 1976). Karavaev (1976) published a list of botanists who collected specimens outside Russia that are now kept in the MW Trinius herbarium. The majority of them came via the Rudolphi collection.

The MW Trinius herbarium contains a small but important set of specimens from the Kunstkammer of St. Petersburg Academy of Sciences (Karavaev 1976, 1983). The origin of these specimens in Trinius' herbarium is rather clear. The Botanical Museum of St. Petersburg Academy was initially formed from the botanical collections of the Kunstkammer. As the first director of the museum, Trinius had of course full access to herbarium specimens preserved at the Kunstkammer and was able to move some sheets in his own collection, as did Pallas in the 18th century (see above).

Specimens linked with Linnaeus

Two groups of specimens from the Kunstkammer can be recognised in Trinius' MW herbarium (Karavaev 1976). The first group contains about 30 sheets of tropical plants that came to the Kunstkammer though Amman. Among them are specimens from the herbaria of W. Houstoun, H. Sloane, L. Plukenet (1642–1706), P. Hermann (1646–1695), J. Petiver (1658–1718), etc. (Karavaev 1983). At least three of these sheets could represent duplicates of material studied by Linnaeus. One of them (collected by Houston in Vera Cruz) should be regarded as an iso-lectotype of a species described by Linnaeus (*Eupatorium houstonianum* L. = *Mikania houstoniana* (L.) B.L. Robinson) (Fig. 43). The second group consists of 13 sheets (Karavaev 1983) collected by Steller and Gmelin during the Second Kamchatka Expedition. The Kunstkammer material was used by J. G. Gmelin during the preparation of his *Flora Sibirica*. Since Linnaeus received many duplicates

Figure 45. Count Alexey Kirillovich Razumovsky (1748–1822).

from Gmelin, the Kunstkammer material of the Second Kamchatka Expedition was likely to have been rich in duplicates of specimens studied by Linnaeus. Two such specimens (both collected by Steller), *Artemisia palustris* L. and *Hieracium gmelinii* L. (Fig. 44), apparently represent duplicates of original material (and the latter is seemingly an iso-lectotype of the Linnaean species).

Razumovsky's garden in Gorenki

Count Alexey Kirillovich Razumovsky (Fig. 45) (also Razoumowski, Razoumofsky, Razoumoffsky 1748–1822) was known in particular as a guardian of Moscow University, the first president of the Moscow Society of Naturalists (founded in 1804) and later as a minister of National Education. An amateur botanist and a man of great wealth, Razumovsky created a huge botanical garden at his estate,

Gorenki, near Moscow. Razumovsky developed in Gorenki a kind of scientific institute. The genus *Razoumofskya* Hoffm. (= *Arceuthobium* Bieb.) (Loranthaceae) was described in his honour.

There were 40 greenhouses containing 8,000–9,000 plant species as well as an extensive open ground collection in Gorenki. The library and the herbarium were also very rich. In particular, the herbarium contained many specimens (exotic for that time) from Russian America. Several collectors conducted travels in various regions on behalf of the garden and several famous botanists also worked there. G. F. Hoffmann often visited to study the collections and library, and he wrote his *Genera Plantarum Umbelliferarum* (Hoffmann 1814) there. Hoffmann's pupil Goldbach also wrote his doctoral thesis concerning the taxonomy and uses of *Crocus* at Gorenki. The first director (1798–1803) of the Gorenki Garden was Christian Friedrich Stephan (1757–1814), who did much to develop the garden as a scientific centre (Nasarov 1926; Bobrov 1957b). The second director (1803–1805) was I. I. Redowsky (Redoffsky) (1774–1807), and the third (1806–1822) was Friedrich Ernst Ludwig (in Russia, Fedor Bogdanovich) von Fischer (1782–1854) (Fig. 46), who had moved to Russia from Germany. Fischer published catalogues of the Gorenki Garden (1805, 1808, 1812). The garden in Gorenki was, in the early 19th century, the most important centre of botany in Russia.

After the death of Razumovsky in 1822, the garden was closed as a scientific centre. The herbarium and collections were moved to St. Petersburg (partially to the Botanical Museum, and partially to the Botanical Garden; both parts are now united in LE). F. E. L. Fischer also moved to St. Petersburg where he became director of the Botanical Garden. A present-day view of the garden in Gorenki is presented in Figure 47. During his long stay in Russia, Fischer contributed a great deal to the development of Russian botany. Both alone and together with Carl Anton von Meyer (1795–1855), he described numerous species from Russia and adjacent regions. The genera *Fischera* Spreng. (Umbelliferae) and *Fischeria* DC. (Asclepiadaceae) were described in his honour.

Figure 46. Friedrich Ernst Ludwig (Fedor Bogdanovich) von Fischer (1782–1854), director of Razumovsky's garden in Gorenki (1806–1822) and of the St. Petersburg Imperial Botanical Garden (1823–1850).

Only a small part of the collections from Gorenki reached Moscow University. Some (but not many) plants were moved to the Botanic Garden of Moscow University. Several plants from Razumovsky's garden in Gorenki (*Cycas* and palm-trees) have fortunately survived to the present in the greenhouse of the Branch of the Botanical Garden of Moscow University (former Moscow Apothecary Garden). A number of herbarium specimens from Gorenki found their way to the Herbarium of Moscow University via Goldbach's and Hoffmann's collections.

Figure 47. Former Gorenki Botanical Garden, near Moscow: present day. Photograph from May 2000 by N. E. Zaretskaya. By courtesy of the author.

Figure 48. Much simplified scheme illustrating how materials studied by Linnaeus and their duplicates were received by the Herbarium of Moscow University. Supposed, but unsupported, links are omitted. Links not related to the present-day collections of the Herbarium of Moscow University are also omitted. For example, Gerber is excluded from the scheme because at the moment there is no strong evidence that Linnaeus studied any of Gerber's specimens, kept now at MW, or their duplicates. Large arrows indicate gatherings of herbarium specimens. The following abbreviations are used: 1: Linnaeus' own gatherings in Lapland and other parts of Sweden; 2: gatherings in North America; 3: gatherings in Vera Cruz; 4: gatherings around the Caspian Sea; 5: gatherings in Solikamsk botanical garden and in the Urals, some made with Steller; 6: gatherings in the Far East, in Siberia, and in the Urals during the Second Kamchatka Expedition; 7: gatherings in Siberia during the Second Kamchatka Expedition.

Conclusion

As a result of this survey, we can conclude that Russian botanists were deeply involved in international herbarium exchange during the Linnaean period (Fig. 48). Many specimens collected in Russia were sent in various ways to other countries and in this way, type specimens of many plant species described from Russia are kept now in various institutions in Western Europe. Similarly, many foreign collections reached Russia and can now be found there, mainly in St. Petersburg (LE) and Moscow (MW). Although this paper is aimed mainly at the Linnaean specimens in the herbarium of Moscow University, we should stress that Russian herbaria possess many other collections of foreign botanists, often rich in type material, for example the herbaria of A. von Chamisso (which contains numerous types of Californian species) at LE, and that of Forster at MW.

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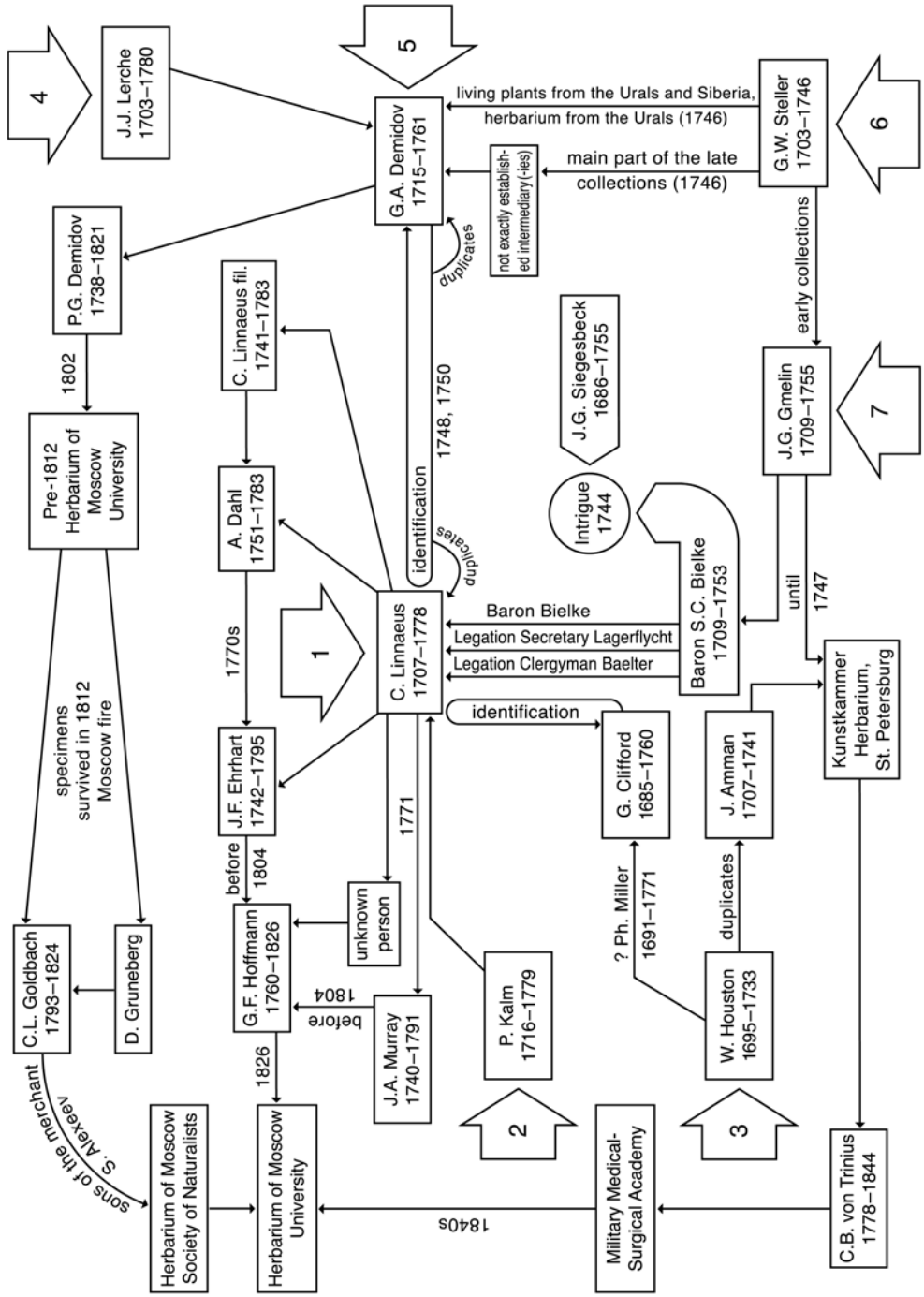
4
J.J. Lerche 1703–1780
5
living plants from the Urals and Siberia, herbarium from the Urals (1746)
G.A. Demidov 1715–1761
G.W. Steller 1703–1746
6
main part of the late collections (1746)
not exactly established intermediary(-ies)
duplicates
P.G. Demidov 1738–1821
early collections
C. Linnaeus fil. 1741–1783
J.G. Siegesbeck 1686–1755
J.G. Gmelin 1709–1755
7
1802
identification
1748, 1750
Intrigue 1744
Pre-1812 Herbarium of Moscow University
A. Dahl 1751–1783
duplicates
Baron Bielke
Legation Secretary Lagerflycht
Legation Clergyman Baelter
Baron S.C. Bielke 1709–1753
until 1747
1770s
1
C. Linnaeus 1707–1778
identification
Kunstkammer Herbarium, St. Petersburg
specimens survived in 1812 Moscow fire
J.F. Ehrhart 1742–1795
G. Clifford 1685–1760
J. Amman 1707–1741
before 1804
1771
unknown person
G.F. Hoffmann 1760–1826
? Ph. Miller 1691–1771
duplicates
C.L. Goldbach 1793–1824
D. Gruneberg
before 1804
J.A. Murray 1740–1791
P. Kalm 1716–1779
W. Houston 1695–1733
1826
2
3
sons of the merchant S. Alexeyev
Herbarium of Moscow Society of Naturalists
Herbarium of Moscow University
1840s
Military Medical-Surgical Academy
C.B. von Trinius 1778–1844

Appendix. A list of specimens connected with Linnaeus that are kept at the Herbarium of Moscow University.

Species names are listed as used by Linnaeus. The collection from which the specimen was obtained by the Herbarium of Moscow University is indicated. Additionally, specimens that came originally from the Demidovs are marked with an asterisk (*). Numbers indicated follow those of the published catalogues of the Ehrhart, Hoffmann, and Trinius herbaria (Hoffmann, 1824, 1825; Goroschankin, 1885), as well as that of the numbering system of the Herbarium of Moscow University. Collections apparently or certainly made during the Second Kamchatka Expedition are annotated by letters "SKE". Where appropriate, cross-references are provided to pages and figure numbers where these collections are discussed further.

Fucus confervoides L. Herb. Hoffmann No. 8666 (MW No. 29). Not original material. P. 140.

Fucus foeniculaceus L. Herb. Ehrhart No. 8065 (MW No. 30). Not original material.

Fucus rubens L. Herb. Ehrhart No. 8089 (MW No. 28). Not original material.

Bryum simplex L., nom. illeg. Herb. Ehrhart No. 7820 (MW No. 31).

Hypnum filicinum L., nom. illeg. Herb. Ehrhart No. 7837 (MW No. 32). Annotated by Linnaeus. Fig. 15.

Jungermannia tamarisci L. Herb. Ehrhart No. 7885 (MW No. 33). Not original material.

Osmunda lunaria L. β. Herb. Ehrhart No. 7512 = Herb. Hoffmann No. 7972 (MW No. 23). Possibly annotated by Linnaeus. Not original material. Fig. 15.

Osmunda regalis L. Herb. Ehrhart No. 7525 (MW No. 22). Not original material. P. 143.

Aira spicata L. Herb. Ehrhart No. 542 (MW No. 1). Annotated by Linnaeus. Possibly original material for *Aira spicata* L. or *Aira aquatica* L. Fig. 15.

Cynosurus aureus L. Herb. Ehrhart No. 602 (MW No. 7). Not original material.

Poa alpina L. Herb. Ehrhart No. 557 (MW No. 3). Annotated by Linnaeus. Not original material. Fig. 15.

Poa capillaris L. Herb. Ehrhart No. 564 (MW No. 2). Annotated by Linnaeus. Original material. P. 143; Fig. 15.

Poa ciliaris L. Herb. Ehrhart No. 579 (MW No. 5). Annotated by Linnaeus. Not original material. Figs. 14, 15.

Poa palustris L. Herb. Ehrhart No. 564 (MW No. 6). Not original material.

Poa sp. Herb. Ehrhart No. 557 (MW No. 4). Not original material.

Carex spp. Herb. Ehrhart No. 6832 (MW No. 8). Annotated by Linnaeus. Original material for *C. pulicaris* L. P. 143; Fig. 19.

Carex spp. Herb. Ehrhart No. 6863 (MW No. 10). Annotated by Linnaeus. Possibly original material for *Carex panicea* L. and *C. limosa* L. P. 143; Figs. 18, 19.

Carex limosa L. Herb. Ehrhart No. 6860 (MW No. 9). Apparently annotated by Linnaeus and original material. Fig. 15.

Juncus pilosus L. β. Herb. Ehrhart No. 2481 (MW No. 12). Not original material.

Juncus trifidus L. Herb. Ehrhart No. 2471 (MW No. 11). Possibly annotated by Linnaeus. Not original material. Fig. 15.

Salix glauca L. Herb. Ehrhart No. 7146 (MW No. 24). Might be annotated by Linnaeus. Not original material. P. 142; Fig. 15.

Thesium alpinum L. Herb. Ehrhart No. 1638 (MW No. 13). Not original material.

Cerastium strictum L. Herb. Ehrhart No. 3273 (MW No. 14). Not original material.

Draba verna L. Herb. Goldbach * (MW No. 439). Not original material. (SKE). Fig. 40.

Erysimum cheiranthoides L. Herb. Goldbach (MW No. 491). Annotated by Linnaeus. Not original material. (SKE). P. 173; Fig. 37.

Lepidium petraeum L. Herb. Ehrhart No. 4520 (two sheets: MW No. 15 and No. 15a). Mw No. 15 might be annotated by Linnaeus. Apparently not original material. P. 142; Fig. 15.

Sisymbrium supinum L. Herb. Goldbach (MW No. 472). Apparently not original material. P. 171.

Saxifraga sp. Herb. Ehrhart No. 3046 (MW No. 16). Annotated by either Linnaeus or Solander. Not original material. Fig. 15.

Saxifraga aizoides L. Herb. Ehrhart No. 3035 (MW No. 17). Annotated by Linnaeus. Original material. Figs. 15, 16.

Hamamelis virginiana L. Herb. Hoffmann No. 1182 (MW No. 26). Not original material for *Hamamelis virginiana* L. However, the specimen might be of similar provenance as original material for *Fothergilla gardenii* Murr. P. 140; Fig. 11.

Astragalus physodes L. Herb. Goldbach * (MW No. 463). Annotated by Linnaeus. Lectotype (Jarvis et al. 2001). Pp. 131, 136, 166, 171, 173; Figs. 32, 37, 39.

Glycyrrhiza echinata L. Two sheets. 1). Herb. Goldbach * (MW No. 451). Annotated by Linnaeus. Original material. 2). Herb. Goldbach * (MW No. 453).

Presumably a duplicate of original material. Pp. 136, 171, 175; Fig. 36, 37, 40.

Lathyrus latifolius L. Herb. Goldbach ⋆ (MW No. 444). Possibly annotated by Linnaeus. Not original material. (SKE). P. 171; Figs. 34, 35, 37.

Orobus tuberosus L. Herb. Goldbach ⋆ (MW No. 443). Annotated by Linnaeus. Apparently not original material. (Might be from SKE). Fig. 37.

Trigonella foenum-graecum L. Herb. Goldbach ⋆ (MW No. 446). Annotated by Linnaeus. Nomenclatural status unclear. P. 173; Figs. 37, 38, 39.

Gossypium herbaceum L. Herb. Goldbach ⋆ (MW No. 490). Not original material. P. 136; Figs. 8, 40.

Cactus grandiflorus L. Herb. Hoffmann No. 3650 (MW No. 25). Not original material. P. 139.

Cortusa gmelinii L. Herb. Goldbach ⋆ (MW No. 474). Might be a duplicate of original material. (SKE). Pp. 154, 175.

Gentiana nivalis L. Herb. Ehrhart No. 1820 (MW No. 18). Not original material.

Convolvulus repens L. Herb. Trinius (MW No. 469). Not original material.

Phlox sibirica L. Herb. Goldbach ⋆ (MW No. 466). Iso-lectotype (Jarvis et al. 2001). (SKE). Pp. 171, 175.

Dracocephalum nutans L. Herb. Goldbach ⋆ (MW No. 452). Possibly of the same origin as the lectotype. (SKE). Fig. 40.

Leonurus tataricus L. Herb. Goldbach ⋆ (MW No. 442). Nomenclatural status unclear. (SKE). Fig. 40.

Nepeta violacea L. Herb. Goldbach ⋆ (MW No. 438). Nomenclatural status unclear; apparently not original material. Fig. 40.

Scutellaria sp. Herb. Goldbach ⋆ (MW No. 448). Apparently not original material. (Might be from SKE). Fig. 40.

Scutellaria lupulina L. Herb. Goldbach ⋆ (MW No. 465). Might be of the same origin as original material. (SKE). Pp. 171, 175.

Antirrhinum asarina L. Herb. Goldbach ⋆ (MW No. 449). Apparently not original material. Fig. 40.

Antirrhinum multicaule L. Herb. Goldbach ⋆ (MW No. 441). Apparently annotated by Linnaeus. Nomenclatural status unclear. Pp. 171, 175; Fig. 37.

Pedicularis flammea L. Herb. Goldbach ⋆ (MW No. 436). Nomenclatural status unclear. (SKE). Fig. 40.

Pedicularis comosa L. Herb. Goldbach ⋆ (MW No. 437). Nomenclatural status unclear. (SKE). Fig. 40.

Veronica longifolia L. Herb. Ehrhart No. 68 (MW No. 27). Annotated by Linnaeus. Original material. Figs. 15, 17.

Orobanche major L. Herb. Goldbach ⋆ (MW No. 440). Nomenclatural status unclear. (SKE). Fig. 40.

Valeriana locusta L. var. *olitoria* L. Herb. Goldbach ⋆ (MW No. 445). Possibly annotated by Linnaeus. Not original material. Fig. 37.

Bryonia laciniosa L. Herb. Trinius (MW No. 468). Not original material.

Achillea ptarmica L. Herb. Goldbach ⋆ (MW No. 447). Might be of the same origin as original material. Fig. 40.

Aster tenellus L. Herb. Ehrhart No. 6119 (MW No. 21). Not original material.

Artemisia palustris L. Herb. Trinius No. 4622 (MW No. 467). Apparently of the same origin as original material. (SKE). P. 182.

Chrysanthemum millefoliatum L. Herb. Ehrhart No. 6249 (MW No. 20). Apparently not original material.

Eupatorium houstonianum L. Herb. Trinius No. 3988 (MW No. 489). Iso-lectotype. P. 182; Fig. 43.

Gnaphalium alpinum L. Herb. Ehrhart No. 5994 (MW No. 19). Apparently annotated by Linnaeus and original material. P. 142; Fig. 15.

Hieracium gmelinii L. Herb. Trinius No. 5139 (MW No. 473). Apparently iso-lectotype. (SKE). Pp. 154, 182; Fig. 44.

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