

## BOTANICAL HISTORY

## The history of Eduard Lindemann's collection kept in the Herbarium of Botanical Department of St. Petersburg State University (LECB)

Vyacheslav V. Byalt<sup>1</sup>, Valentina A. Bubyreva<sup>2</sup> & Larisa V. Orlova<sup>1</sup>

<sup>1</sup> *Herbarium of Higher Plants (LE), Komarov Botanical Institute of the Russian Academy of Sciences, Prof. Popova St. 2, St. Petersburg, 197376, Russia. byalt66@mail.ru (author for correspondence)*

<sup>2</sup> *Herbarium of St. Petersburg State University, St. Petersburg, University Emb. 7, St. Petersburg, Russia.*

In this article, we present the results of a study of the herbarium collection by E.E. Lindemann kept at the Herbarium of the Botanical Department of St. Petersburg State University (LECB). Biographical data on Lindemann are given. The history of the collection, its contents and current status are discussed. The main part of Lindemann's herbarium (around 200,000 specimens) is kept at LECB. The collection was started by Eduard Lindemann's father, Emanuel Lindemann. It contains unique specimens collected by 844 collectors all over the world and sent to the Lindemanns by some of the most famous botanists of the 19th century in exchange. The most interesting specimens were contributed by C. Bauhin, J. Breyn and A. Clegero (XVII c.), C. Thunberg, P.S. Pallas (XVIII c.), C. Willdenow, F.A. Marschall von Bieberstein, Ch. Steven, E. Boissier, J.D. Hooker (XIX c.) and many others. At present, we have identified approximately 150 type specimens, but their actual number is much greater.

**KEYWORDS:** biography, collectors, E.E. Lindemann, herbarium, history of botanical collections, types

### THE HISTORY OF LINDEMANN'S BOTANICAL COLLECTIONS

Eduard Emanuelovich (Eduard Bogdanovich) Lindemann was born in Mitava (now Elgava, Latvia) on June 13, 1825, and died on July 7 or 9, 1900 (the latter date can be found more frequently) in Kishinev (now Chişinău). In 1847 he graduated from the St. Petersburg Medical Surgery Academy. The head of the Botanical Study (now known as the Botanical Department at the Medical Surgery Academy), at the time was an excellent botanist, P.F. Goryaninov (1796–1865), who taught botany with his own textbook (Lindemann, 1866). Students used the class herbarium for their studies (in 1848 it contained around 10,000 specimens), as well as plants collected on field trips and in the Academy's botanical garden and conservatories (Anonymous, 1898; Borodin, 1898; Zelenetsky, 1901). The ties between botany and medicine were very strong at the time (Ruprecht, 1865). Botany was an important part of the medical students' syllabus and hence many of the Academy's graduates eventually became botanists. Lindemann, having received a medical education, subsequently specialized as a military surgeon, became a famous botanist, taxonomist and an expert on the flora of Russia. Having graduated from the Academy, Lindemann worked as a garrison doctor. He was stationed and, therefore, carried out his botanical research in 29 provinces in the European part of the Russian Empire.

We are not going to give a detailed biography of E. Lindemann as it has already been given by Gobi (1900). Our focus will be his collection. Where ever he was

stationed, Lindemann collected herbarium specimens, identified and studied plants. Lindemann devoted fifty-three years of his life to the study of the Russian flora. He published nineteen research papers, over a half of them impressive floristic reviews (Lindemann & Siering, 1847; Lindemann, 1847, 1850, 1860, 1865b, 1867a, b, 1868a, b, 1872a, b, c, 1875, 1880a, b, 1881–1882). He also published works on the taxonomy and biology of flowering plants (Lindemann, 1859, 1865a, 1901). Lindemann's botanical research was highly appreciated. According to Gobi (1900), Russian natural science societies, as well as many foreign academies and societies appointed him their honorary or acting member. The New Russian University in Odessa celebrated the 40th anniversary of Lindemann's continuous and fruitful research by awarding him the "honoris causa" doctor of botany degree in 1877, while the New Russian Natural Science Society (Odessa) made him their honorary member in 1855 (Markevich, 1890). In 1873, the St. Petersburg Natural Science Society also made Lindemann an acting member (Anonymous, 1893). Eduard E. Lindemann's name was given to *Cytisus lindemannii* V. Krecz. and *Sclerantus lindemannii* Reichenb.

Eduard Lindemann's collection was started by his father Emanuel Lindemann in 1814. By 1845 the herbarium contained 13,500 species (Zelenetsky, 1901), or 13,000 species according to E.E. Lindemann himself (Lindemann, 1884).

Emanuel Lindemann (1795–1845) was both a botanist and an entomologist. In 1814–1819, he studied in Derpt (now Tartu) University. In 1822–1845 he taught ancient

languages and natural history in the Mitava Gymnasium, studying local nature at the same time. In 1839 he published a book on the flora of the Eastern Baltic States together with J.G. Fleischer (Fleischer & Lindemann, 1839). A dipterous insect has been named after him (*Taebina lindemannii* Gimmerthal).

Emanuel Lindemann had three sons, Eduard being the youngest of them. In 1845 he inherited his father's herbarium. It would seem that his brothers were not such keen botanists as Eduard and did not claim its ownership, although we are aware that the herbarium also contains some of their specimens (123 sheets by Gustav and 460 sheets by Julius).

Eduard Lindemann's efforts in collection and his wide exchange contacts doubled the number of specimens. By 1884 the herbarium contained 312 folders with up to 25,640 catalogued species, up to 62,000 numbers and up to 200,000 specimens (Zelenetsky, 1901). According to Gobi (1900), the herbarium was stored in 298 cardboard boxes. In his last report on the herbarium, Lindemann (1884) described the regional distribution of the species: Europe (6,500), Asia (3,874), Africa (1,673), America (1,556), Australia and Polynesia (294). Inside each region, smaller subdivisions were maintained with a different numbering system. The number of species received from various botanical gardens (13 in Russia, 20 in Europe), including those in St. Petersburg, Berlin, Derpt (now Tartu), Mitava (now Elgava), Warsaw, and Breslau, was as high as 8,317. These numbers provide a vivid illustration of how rich and vast Lindemann's herbarium was. His herbarium undoubtedly is of great research and historical interest. Firstly, it contains some very well preserved plants from the 2nd half of the 18th century gathered by J. Breyn and Andrea Clegero. For example, we were able to find a sample of *Stachytarpheta* (Verbenaceae) from South Africa (Cape of Good Hope) sent by Breyn and labeled: "Vermicularia athiopica Breyn, arborescens longifolia floribus in summitatae spicatis, nobis. Ex Promontorio Bonae Spei ubi oritur, accepi Anno 1681 Breyn". Breyn's specimens are of significant value, especially since Linnaeus refers to them in his work (Linnaeus, 1753). We know nothing of Andrea Clegero, but we have grounds to believe that the specimens he gathered in 1688 in Japan were the first brought from the Japanese islands to Europe.

Secondly, Lindemann's herbarium contains a great number of rare, original and authentic specimens gathered by many botanists, taxonomists and floristic botanists. Eight hundred and forty-four botanists and collectors contributed to the collection according to S.Y. Lipschitz (1952), whereas Gobi (1900) mentions 893 contributors. According to Lindemann's published work (Lindemann, 1884) his collection included specimens contributed by 824 botanists and collectors. We do not know what sources were used by C.J. Gobi. Probably, he used a final list of collec-

tors that used to be attached to Lindemann's herbarium, but has not survived to this day. Here we list just a few of them: P.F. Ascherson (1834–1913), C. Bauhin (1560–1624), E. Boissier (1810–1885), V. Borbas (1844–1905), H. Cuming (1791–1865), A.P. de Candolle (1778–1841), J. Forster (1754–1794), W. Hooker (1785–1865), V. Janka (1837–1890), L. Riedel (1790–1861), G. Schimper (1804–1878), V. Tineo (1791–1856), A. Todaro (1818–1892), R. Visiani (1800–1878), and many others. As for the Russian flora, plant collections were sent to Lindemann by many of the great Russian botanists. The collection contains specimens from W.S.J.G von Besser (1784–1842), A.A. von Bunge (1803–1890), J. Gmelin (1709–1755), P. Hohenacker (1798–1872), G.S. Karelin (1801–1872), I.P. Kirilow (1822–1842), S. Krashennikov (1713–1755), C.F. von Ledebour (1785–1851), P.C. Maak (1825–1886), C.F. Meinshausen (1819–1899), C.A. Meyer (1795–1855), A. von Nordmann (1803–1866), P.S. Pallas (1741–1811), C. von Steven (1781–1863), N.S. Turczaninow (1793–1863), A.G. von Schrenk (1815–1876), and others. The complete list of collectors that had contributed to Lindemann's collection was published in 1884 (Lindemann, 1884). We have to note, however, that the collection kept growing after that (up to 1892), therefore, it contains specimens from other botanists not on the list. For instance, M.J. Akinfiev (1851–1919) was not mentioned in the 1884 list.

It must be noted that Lindemann was well aware of the value of this collection and published four reports on it (Lindemann, 1863, 1871, 1872d, 1884, 1885). Three of them (Lindemann, 1863, 1872d, 1884, 1885) contain a list of botanists who had contributed to the collection at the time.

Besides tracheophytes, Lindemann's collection contains mosses, lichens, algae, and fungi. They are all well labeled and await further expert attention and research.

There is some evidence that in addition to the main large herbarium Lindemann also gathered a special medicinal herbarium of thirty plant species used in popular and scientific medicine (Gobi, 1900). Its location is unknown at the moment, but it is likely that it became part of the main collection.

We would also like to point out a number of incongruities in relation to E.E. Lindemann. The first concerns his biography. A famous bibliographer I.M. Kaufman (1955) combines the biographies of two different persons by the surname of Lindemann: Eduard Emanuilovich, botanist and doctor, and Eduard Eduardovich, astronomer (1842–1897). The second concerns the location of Lindemann's herbarium. The review by Stafleu & Cowan (1981) states that Lindemann's herbarium is mainly stored in the Herbarium of the Botanical Institute of the Russian Academy of Sciences (LE) in St. Petersburg. *Index Herbariorum* (Chaudri & al., 1972) on collectors reports collections of Lindemann to be kept at MW, BR, W, Z(?), LE. The Herbarium of the Botanical Department of St. Petersburg State University (LECB) is not mentioned. We hope that the present article will help

clarify this issue. We sent enquiries to all of the Herbaria mentioned in *Index Herbariorum* (1972) as Lindemann's herbarium locations. The Herbarium MW let us know that their collections include mounted specimens gathered by Lindemann near the town of Korochi (Kursk Province at the time, now part of Belgorod Oblast'). The specimens are dated 1862–1863. It is difficult to name their exact quantity. MW has no data whatsoever on the collections gathered by Lindemann's brothers. As for Lindemann's specimens at LE, we were able to find only one document confirming (Lipsky, 1908) that Lindemann handed over 85 herbarium sheets collected near the town of Elisabethgrad (now Kirovograd, Ukraine) in 1875. The Herbarium Z replied that so far they could not find any trace of Lindemann's herbarium. Some of the materials are preserved at BR. However, they are very few and the archives contain data neither on their origin nor a catalogue of the collection. The Herbarium W did not confirm that they possessed any collections by E.E. Lindemann.

According to Zelenetsky (1901), Lindemann bequeathed some of the duplicates from the herbarium (50 folders containing up to 6,500 species), as well as part of his vast library to the Botanical Laboratory of the New Russian University (now Odessa University). The keeper of the Botanical Study at the time was Nikolai Mikhailovich Zelenetsky (Markevich, 1890). We have sent an enquiry about the future history of this gift to the Odessa University, but have received no reply.

In 1892 Lindemann sold his main herbarium to the Ministry of the People's Education for 5,000 rubles, and the Ministry handed it over to the Botanical Study of the St. Petersburg University (Gobi, 1900). At the moment, it is kept at the Herbarium of the St. Petersburg State University (LECB). It must be mentioned that for 110 years the herbarium has been preserved as it had been received from Lindemann and has not been studied. We were able to find only handwritten notes on some of the Tamaricaceae specimens made by Robert Regel, the son of Eduard Regel.

## THE LINDEMANN'S COLLECTION CURRENTLY KEPT AT LECB

The plants have not been mounted and are mainly stored between sheets of grayish bulked paper in species and geni sleeves. The families are sorted according to de Candolle's system and stored in green cardboard folders with strings. All folders and sleeves are signed and numbered. In addition, there is a special handwritten alphabetical index (by genus) to the herbarium, which was made by Lindemann himself. It is very easy to find a genus under a known number. There are many amendments and additions to this 1876 handwritten catalogue that were made by Lindemann. The final number of contributors to the collection is 825.

To conclude, we would like to emphasize that at present almost the complete herbarium of E.E. Lindemann is located at the Herbarium of the Botanical Department of St. Petersburg State University (LECB) and is the subject of special pride of the department, together with G.P. Bongard's collection. A preliminary review of Lindemann's collection alone let us identify about 500 type specimens (first of all, syntypes and isotypes) which have been added to the type collection of the Herbarium of the Botanical Department of the St. Petersburg State University (LECB). The most precious specimens are those of the types of taxa described by Lindemann himself, for instance, *Convolvulus quinquelobus* Lindem. (Lindemann, 1850), *Cytisus communis* Lindem. (Lindemann, 1867b), *C. unibracteatus* Lindem. (Lindemann, 1850), *Fragaria neglecta* Lindem. (Lindemann, 1865c), and of many varieties and forms. It must be noted that the greater part of the type specimens of varieties and species described by Lindemann are preserved at the St. Petersburg State University (LECB). Specimens from the other Herbaria mentioned above, should they be found, are to be considered duplicates.

Distanced from the Russian and world research centres by his profession, Lindemann was unable to communicate to other botanists in person. He replaced personal communication by continuous and vast correspondence with outstanding European and Russian taxonomists and floristic botanists. He gathered a rich and vast book collection. His herbarium, due to its size, variety, rare and valuable specimens, can be compared to the largest and most valuable personal herbaria in the world (for instance, the herbarium of N. Turczaninow and W. Besser in Kiev (KW), of C. Willdenow in Berlin (B-Willd.), E. Boissier in Geneva (G-Boiss.), etc.

Lindemann's collection without doubt presents a great historical and scientific interest. Further work with the collection will let us identify type specimens of plants from different groups and to discover new collectors' names (Byalt & Bubyreva, 2005a, b, c).

## ACKNOWLEDGEMENTS

The authors would like to express their sincere gratitude to A.K. Sytin for his review of the draft and his comments. Special thanks are due to Charles Jeffrey and the editors of TAXON for correcting the English translation.

## LITERATURE CITED

- Anonymous.** 1893. *The Review of Activity of St. Petersburg Society of Naturalists for first 25 Years of its Existence 1868–1893*. St. Petersburg. [in Russian]
- Anonymous.** 1898. *The History of the Imper. Military Medical*

- Academy (Former the Medical Surgery Academy) for 100 Years (1798–1898)*. St. Petersburg. [in Russian]
- Borodin, I.P.** 1898. *The Historical Sketch of the Botanical Department at the Imper. Military Medical Academy (1798–1898)*. St. Petersburg. [in Russian]
- Byalt, V. & Bubyreva, V.** 2005a. Specimina typica in herbario universitatis Petropolitanae (LECB) conservata. Pars 1. Familia Ericaceae. *Novosti Sist. Vyssh. Rast.* 37: 208–220. [in Russian]
- Byalt, V. & Bubyreva, V.** 2005b. Specimina typica in herbario universitatis Petropolitanae (LECB) conservata. Pars 2. Familia Resionaceae. *Novosti Sist. Vyssh. Rast.* 37: 121–227. [in Russian]
- Byalt, V. & Bubyreva, V.** 2005c. Specimina typica in herbario universitatis Petropolitanae (LECB) conservata. Pars 3. Familia Oxalidaceae. *Novosti Sist. Vyssh. Rast.* 37: 228–232. [in Russian]
- Chaudhri, M.N., Vegter, I.H. & de Wal, C.M.** 1972. *Index Herbariorum: A Guide to the Location and Contents of the World's Public Herbaria*, part 2 (3), *Collectors I–L*. Regnum Vegetabile 86. A. Oosthoek, Utrecht.
- Fleischer, J.G. & Lindemann, Em.** 1839. *Flora des deutschen Ostseeprovinzen Esth-, Liv- und Kurland*. G.A. Reher, Mitau und Leipzig.
- Gobi, C.J.** 1900. E.E. Lindemann. Necrologue. *Trudy S.-Peterburgsk. Obshch. Estestvoisp.* 31 (1) Proceedings of meetings, 5: 224–227. [in Russian]
- Kaufman, I.M.** 1955. *Russian Biographic and Bibliographic Dictionaries*. Goskultprovetizdat, Moscow.
- Lindemann, E.E. & Siering.** 1847. Erster Beitrag zur Flora von Kurland. *Correspondenzbl. Naturf.-Vereins. Riga.* 2: 5–7.
- Lindemann, E.E.** 1847. Cryptogamologische Beiträge zur Flora der Ostseeprovinzen. I. Equisetaceae Spc.. *Correspondenzbl. Naturf.-Vereins Riga.* 2: 27–34.
- Lindemann, E.E.** 1850. Prodrumus florarum Tschernigovianae, Mohelevianae, Minskianae, nec non Grodneviae. *Bull. Soc. Imp. Naturalistes Moscou* 4: 446–547.
- Lindemann, E.E.** 1859. Zur Frage: warum die Wurzel in einer dem Stengel entgegengesetzten Richtung wächst. *Bull. Soc. Imp. Naturalistes Moscou* 23: 310–313.
- Lindemann, E.E.** 1860. Index plantarum, quas in variis Rossiae provinciis hucusque invenit et observavit Eduardus a Lindemann. *Bull. Soc. Imp. Naturalistes Moscou* 24: 77–190.
- Lindemann, E.E.** 1863. Kurze Nachrichten über den Bestand meines Herbariums. *Bull. Soc. Imp. Naturalistes Moscou* 27: 233–253.
- Lindemann, E.E.** 1865a. Nova revisio florum kurskianae. *Bull. Soc. Imp. Naturalistes Moscou* 29: 172–206.
- Lindemann, E.E.** 1865b. Addenda ad novam revisionem florum kurskianae. *Bull. Soc. Imp. Naturalistes Moscou* 29: 600–601.
- Lindemann, E.E.** 1865c. Über eine sehr verbreitete und bisher verkaunte Erdbeerart *Fragaria neglecta*. *Bull. Soc. Imp. Naturalistes Moscou* 29: 218–220.
- Lindemann, E.E.** 1866. Nekrolog. Paul Horaninow. *Flora* 24: 205–207.
- Lindemann, E.E.** 1867a. Verzeichniss derjenigen Pflanzenarten, welche durch Abtretung der russischen amerikanischen Landbesitzungen gegenwaertig aus der Flora rossica auszuscheiden sind. *Bull. Soc. Imp. Naturalistes Moscou* 31: 559–561.
- Lindemann, E.E.** 1867b. Florula Elisabethgradensis. *Bull. Soc. Imp. Naturalistes Moscou* 31(2): 448–544; 31(6): 297–379.
- Lindemann, E.E.** 1868a. Some new data on flora of environs of Elisavetgrad. *Elisavetgradsky calendar for 1868*: 29–33. [in Russian]
- Lindemann, E.E.** 1868b. Supplementum ad florulam Elisabethgradensem. *Bull. Soc. Imp. Naturalistes Moscou* 32: 114–137.
- Lindemann, E.E.** 1871. Kurzer Bericht über den gegenwärtigen Bestand meines Herbariums. *Nouv. Mém. Soc. Imp. Naturalistes Moscou* 35: 1–6.
- Lindemann, E.E.** 1872a. Supplementum II ad florulam Elisabethgradensem. *Bull. Soc. Imp. Naturalistes Moscou* 36: 265–334.
- Lindemann, E.E.** 1872b. Prodrumus florum Chersonensis. *Zap. Novorossiisk. Obshch. Estestvoisp.* 1 (Suppl. 1): i–lxii, 1–229, i–xxvi.
- Lindemann, E.E.** 1872c. Index plantarum usualium florum Chersonensis. *Zap. Novorossiisk. Obshch. Estestvoisp.* 1 (Suppl. 2): 1–8, 1–39.
- Lindemann, E.E.** 1872d. Zweiter Bericht über den Bestand meines Herbariums. *Bull. Soc. Imp. Naturalistes Moscou* 36: 56–101.
- Lindemann, E.E.** 1875. Supplementum III ad florulam Elisabethgradensem. *Bull. Soc. Imp. Naturalistes Moscou* 39: 62–109.
- Lindemann, E.E.** 1880a. Übersicht der bisher in Bessarabien aufgefundenen Spermatophyten. *Bull. Soc. Imp. Naturalistes Moscou* 44: 288–317.
- Lindemann, E.E.** 1880b. Zusatz zu den Spermatophyten Bessarabiens. *Bull. Soc. Imp. Naturalistes Moscou* 44: 181–182.
- Lindemann, E.E.** 1881–1882. Flora Chersonensis. *Zap. Novorossiisk. Obshch. Estestvoisp.* 4 (Suppl. 1): i–lviii, 1–394, i–x; 4 (Suppl. 2): 1–330, i–lxvi, i–iii.
- Lindemann, E.E.** 1884. Dritter Bericht über den Bestand meines Herbariums. *Bull. Soc. Imp. Naturalistes Moscou* 48: 265–308.
- Lindemann, E.E.** 1885. Dritter Bericht über den Bestand meines Herbariums (Schluss). *Bull. Soc. Imp. Naturalistes Moscou* 51: 42–43.
- Lindemann, E.E.** 1901. *Beschreibung einer Campanula persicifolia monstrosa mit einem kurzen Rückblick auf die Geschichte der Pflanzen-Monstrositäten*. (Cit. on: Eduard Emmanuilovich Lindemann, as botanist-systematist and floristic botanist.) *Zap. Novorossiisk. Obshch. Estestvoisp.* 24: 3.
- Linnaeus, C.** 1753. *Species plantarum*. L. Salvii, Holmiae.
- Lipschitz, S.Y.** 1952. *Russian Botanists*. Societatis Naturae Curiosorum Mosquensis, Moscow. [in Russian]
- Lipsky, V.I.** 1908. *Herbarium of the St. Petersburg Botanical Garden (1823–1908)*, 2nd ed. K. Mattisen, Yurjev [now Tartu]. [in Russian]
- Markevich, A.I.** 1890. *25th Anniversary of the Imper. Novorossiiskiy University*. Economic typography, Odessa. [in Russian]
- Ruprecht, A.K.** 1865. The materials for history of Imperial Academy of sciences in botany part. *Zap. Imp. Akad. Nauk, St. Petersburg* 7 (Suppl.): 1–35. [in Russian]
- Staffeu, F.A. & Cowan, R.S.** 1981. *Taxonomic Literature*, vol. 3. Bohn, Scheltema & Holkema, Utrecht.
- Zelenetsky, N.** 1901. Eduard Emmanuilovich Lindemann, as botanist-systematist and floristic botanist. *Zap. Novorossiisk. Obshch. Estestvoisp.* 24: 1–12.