

The Learned Gardeners of the Botanical Gardens of the University of Tartu and Their Activities (1803–1918)

Heldur Sander^{1*}
Toivo Meikar²
Anita Magowska³

¹Estonian Naturalists' Society
Struve 2,
Tartu 51003, Estonia
E-mail: heldsander@gmail.com

²Institute of Forestry and Rural Engineering,
University of Life Sciences
Kreutzwaldi 5,
Tartu 51014, Estonia
E-mail: toivo.meikar@emu.ee

³Chair of the History of Medical Sciences,
Poznań University of Medical Sciences
Przybyszewskiego 37A,
Poznań 60–356, Poland
E-mail: anitamagowska@yahoo.com

Abstract: The paper discusses the individual learned gardeners and assistant learned gardeners of the Botanical Garden of the University of Tartu against the backdrop of the development of botanical research areas at the university and species diversity in the botanical garden in 1803–1918. It also addresses the university's botany professors / garden directors and assistant directors, focusing in more detail on the learned gardeners, who were more notable for their activities prior to commencing work in Tartu or during or after their Tartu period. A total of 22 learned gardeners and 14 assistant learned gardeners have been identified. Among them were persons from Germany, as well as representatives of other nationalities, including Estonians, Poles, Russians and local Germans. The employment duration of the learned gardeners at the botanical garden lasted from a few months to 42 years. The longest serving learned gardener was Wilhelm Eduard Stelling, a local German. Among the learned gardeners, the career and activities of Johann Anton Weinmann, Ludwig Riedel and Jan Muszyński stood out. After leaving Tartu, Weinmann and Muszyński became outstanding researchers in St. Petersburg and Poland,

* Corresponding author.

respectively, and Riedel emerged as a successful plant collector, scientific organiser and developer of park culture in Brazil.

Keywords: 19th century, botanical garden, learned gardeners, their assistants and apprentices, species richness, University of Tartu (Dorpat, Yuriev)

Introduction

Gardeners played a significant role in the development of modern botanical gardens, being essentially the managers and sometimes also the designers and founders of the gardens. Considerable attention has been paid to gardeners in historical studies on botanical gardens, and numerous studies have been published on outstanding gardeners who were simultaneously both gardeners and botanists. They participated in expeditions or organised these themselves to explore new plants, introduce them and collect specimens for herbaria. The history of botanical gardens is closely connected with botany, and the entire field—with European colonisation, mainly by Portugal, Spain, Britain, the Netherlands and Germany. The original medicinal gardens developed into ones for growing not only medicinal but also aromatic and economically important plants. With the development of ornamental gardening, the emphasis gradually moved on to the cultivation of ornamental plants, research into new plants, and promotion and dissemination of plants, which evolved into the educational function of the gardens (Holmes, 1906, pp. 42–61; Hill, 1915, pp. 185–240; Massingham, 1982, pp. 93–102; Monem, 2007, pp. 1–288; Musgrave, 2007, pp. 1–150; Williams, 2011, pp. 147–176).

The 1799 draft statutes of the University of Tartu envisaged the establishment of a professor position at the Faculty of Philosophy for teaching natural history but a botanical garden was not yet mentioned (*Statuten...*, 1802).

The first statutes (1803) of the reopened university envisaged also a botanical garden as a subsidiary base of the university. The garden was to be led and supervised by a professor of botany, while the employing of a gardener and two workers was envisaged for practical work. Maintenance of the latter, and of one horse, was to be provided by the gardener from his salary (*Sbornik...*, 1875, pp. 165, 196). The official titles of the managing gardener of the botanical garden have varied, and different documents thus refer to them by different titles. The initial title was ‘academic gardener’ (Ger. *Akademische Gärtner*). The

minutes of the University Council meeting as of 4 May 1803 state that Professor Gottfried Albrecht Germann had hired an academic gardener, who should be sworn in (EAA, 1803–1814, p. 7). The later titles include ‘botanical gardener’ (Ger. *Botanische Gärtner*), ‘chief gardener’ (Ger. *Obergärtner*), ‘learned gardener’ [Ger. *Gelehrte Gärtner*; Rus. *Uchenyi sadovnik* (Учёный садовник)], or just ‘gardener’. In the university’s staff records of 1855, the former botanical gardener was referred to as chief gardener (EAA, 1828–1862, p. 48). The title of learned gardener was officially adopted in 1914 (EAA, 1908–1917, p. 70). Regardless of the title, the person in this position acted as the immediate manager of practical works in the botanical garden and supervisor of auxiliary staff, often also the compiler of collections, taxonomic identifier of plants, and the person responsible for other works requiring deeper knowledge. The learned gardener was to have knowledge in botany and gardening.

In this paper we refer to them all as ‘learned gardeners’, as the position required the completion of gardener training either at a special school, botanical garden or larger and renowned private garden, or as an apprentice of a distinguished gardener (Meikar, 2002, pp. 62–63).

The gardeners were the actual managers of the botanical garden and had a variety of duties. These were specified in their work instructions, which somewhat differed over time, with the latest one dating from 1855 (EAA, 1803–1855, p. 309). While initially the learned gardeners were relatively independent in their activities, special instructions were introduced under the directorship of Carl Christian Friedrich Ledebour, professor of botany. The first set of instructions (EAA, 1803–1855, pp. 76–77) is dated to 16 May 1813 (the dates correspond to all the sources), the second one (EAA, 1820, pp. 48–49) dates from 1818, and the third one (EAA, 1803–1855, pp. 207–209) dates from 1821. The fourth, the most detailed one, written on the university’s official paper and approved by Friedrich Wilhelm Parrot (rector from 1831 to 1834), is dated to 24 September 1833 (EAA, 1803–1855, pp. 271–273). The instructions drawn up by Ledebour were very detailed—it appears that learned gardeners had almost no freedom of action, they could only act upon the approval of the garden director or the assistant director. The practical responsibilities of the gardener are listed in detail, including, for example, keeping the rooms warm. At the end of each week, the gardener was to submit to the director a work plan for the following week, including a back-up plan in case of poor weather.

Sources

Germann (1804, pp. 333–336, 344–348) was the first to write about the establishing of the botanical garden, while the garden's further development has later been discussed by several others (Germann, 1807, pp. III–X; Weinmann, 1810, pp. IX–XVII; Ewers, 1827, pp. 40–44; Willkomm, 1873, pp. 1–92; Mushinskii, 1911a, pp. 11–15). The university's professors of natural history and botany who were connected with the botanical garden and acted also as directors of the garden, as well as the assistant directors and some gardeners are discussed in more detail in biographical works (Levitskii, 1902, pp. 1–666; Lipskii, 1913–1915, pp. 1–536; Lipshits, 1947, pp. 1–335; 1947, pp. 1–336; 1950, pp. 1–488; 1952, pp. 1–644) and in their obituaries and personal histories. Longer overviews of the botanical garden were written in the final decade of the 19th century (Kuznetsov, 1897, pp. 1–22; 1898, pp. 1–27; 1899, pp. 1–35) and in the first half (Bucholtz, 1921, pp. 3–14) and the second half (Veski, 1953, pp. 255–265; Vaga, 1955, pp. 3–29) of the 20th century, as well as in recent years (Le Lièvre, 1997, pp. 35–55; Sander & Meikar, 2009, pp. 72–85; 2011, pp. 230–256). An original paper on the gardeners of the botanical garden has been published in Estonian (Meikar & Sander, 2000, pp. 197–218; Meikar, 2002, pp. 61–73). Various data on developments in the botanical garden, on the personnel, plant accessions, and many other aspects are included in the archival materials of the Estonian Historical Archives and personal files of the staff of the University of Tartu. An overview of the learned gardeners who were known for their activities other than working at the botanical garden can be obtained from bibliographies, their own research works as well as studies on their works.

Research areas and species richness in the Botanical Garden of the University of Tartu

The activities of learned gardeners cannot be seen apart from the botanical research areas and activities of botany professors of the University of Tartu. Studies on the history of Russian botany distinguish between different schools, two of them being connected with the University of Tartu: 1) the floristic-taxonomic school of Ledebour, or the Dorpat school (after the former name of Tartu), and 2) the phytogeographic and floristic-taxonomic school of Kuznetsov, or the Yuriev school (after the then name of Tartu) (Lipshits, 1947, I, pp. IX–X).

Most of the botany professors of the University of Tartu who worked as directors or assistant directors of the botanical garden (Table 1) were connected with the development of these research areas.

Table 1. Directors, assistant directors and learned gardeners
of the Botanical Garden of the University of Tartu (1803–1918)*

Director	Assistant director	Learned gardener
Gottfried Albrecht Germann (1803–1809)	Ernst Rudolph Trautvetter (1833–1835)	Johann Friedrich Kieser (1803–1804) Johann Peter Buek (1804)
Carl Christian Friedrich von Ledebour (1811–1836)	Carl Rathleff (1835) Carl Herrmann Bluhm (1835–1836) Anton Bärnhoff (1836)	Johann Anton Weinmann (1805–1813) Albert Siegmund Natusch (1813–1814) Carl Neumark (1814–1816)
Alexander Georg von Bunge (1836–1867)	Friedrich Julius Seetzen (1836–1846)	Ludwig Riedel (1818–1820)
Heinrich Moritz Willkomm (1868–1874)	Friedrich Beckmann (1848–1849)**** Friedrich Kupffer (?1848–1850)	Louis Autem (1820–1822) Heinrich Wilhelm Gebhardt (1825–1832)
Edmund August Friedrich Russow (1874–1895)	Karl Johann Maximowicz (1850–1852)	Friedrich Wilhelm Günter (1833–1834) Wilhelm Eduard Stelling (1834–1876)
Nikolai Kuznetsov (1895–1914)**	Carl Friedrich Schmidt (1856–1859) Theophil Bienert (1859–1861)	Carl Ludwig Gustaw Bartelsen (1876–1896)
Mikhail Tswett (Tswet, 1917–1918)	Bernhard Emil Stelling (1862–1863) Leopold Friedrich Gruner (1864–1865) Edmund August Friedrich Russow (1865–1873) Constantin Georg Alexander Winkler (1874–1879) Johann Christoph Klinge (1879–1895) Nikolai Busch (1895–1902) Boleslav Hryniewiecki (1902–1914) Nikolai Petrovich Popov (1914–1918 I sem.)***	Heinrich Siesmayer (Siesmaier, 1896–1897) Ants Murjan (1897–1898) Mikhail Konstantinowitsch Fedossejev (1898–1900) Ants Murjan (1900–1903) Waclaw Zaikowski (1903–1905) Vic(k)tor Jäger (1905–1906) Arthur Michils (1906–1908) Jan Muszyński (1908–1914) Jaan Ranna (1914–1923)

Sources: Beise, 1852, p. 164; Meikar, 2002, p. 65; Leppik, 2006, p. 275.

* The table does not include short-term substitutes in these positions.

** After the resignation of Professor Kuznetsov, the position of chair of the Botany Department and director of the botanical garden remained vacant for three years (Siilivask, 1982, pp. 346–347). In 1916, Vladimir L. Komarov, an outstanding Russian botanist, was elected as professor but he declined the job due to the complicated international situation (Vaga, 1955, p. 23).

*** Popov worked at the botanical garden as assistant director in 1914 and as acting director in 1915–1918 (EAA, 1915–1918, p. 50).

**** Pharmacist Beckmann is mentioned as assistant director of the botanical garden by Theodor Heinrich Beise (1852, pp. 164, 165), while archival data (EAA, 1851–1866) do not support Beckmann's connection with the botanical garden.

Although specific data on cooperation between botany professors and learned gardeners are relatively scarce, gardeners are still known to have assisted botany professors in one way or another in their garden-related activities and research. Gardeners were to keep accession logs on seeds and live plants and organise the sowing and growing of plants. Several of them also participated in compiling the editions of *Index Seminum*, in seed exchange, and in compiling and documenting herbaria.

Thanks to the emphasis on floristic-taxonomic research, the number of taxa grown in the Botanical Garden of the University of Tartu was rather large, particularly in the first half of the 19th century (Table 1).

An overview of species richness in the botanical garden can be obtained from published lists of live plants and manuscript plant lists. A total of 102 manuscript volumes (15,073 pp.) of plant lists have been preserved from the 19th century, mainly from the period of Ledebour's directorship (1811–1836) and Alexander Georg von Bunge's directorship (1836–1867), as signed by the directors or assistant directors of the garden or with no signature (EAA, 1804–1898). The first published plant list of the botanical garden was compiled by director Germann (1807, pp. 11–143) but already the second one was compiled by the learned gardener Johann Anton Weinmann (1810, pp. 1–169). The compilers of manuscript volumes, however, have remained unknown.

The 102 volumes are being preserved in the Estonian Historical Archives (EAA). Twenty-nine of them are alphabetical—that is, plants are listed there by their Latin names in alphabetical order. The remaining ones are topographical—that is, they cover the different sections of the botanical garden. In addition, there are two volumes of lists (569 pp.) that are being preserved in the botanical garden (Sander, 2010, pp. 90–93). In all the lists, plants are arranged according to their species, varieties, subspecies or forms, or recorded at the genus level or as numbers. Unfortunately, the manuscript lists do not always indicate whether the entries concern live plants or seeds or both. The lists also contain insertions and added entries but the time of their insertion is not always clear. Also, these volumes have not been examined in full detail.

Eleven preserved volumes (1823–1902; 1,497 pp.) contain registration logs for seeds and plants sent or brought to the botanical garden. Keeping of these logs was the responsibility of learned gardeners (EAA, 1823–1902). A preliminary overview of the logs has been published for the period 1823–1854 (Sander & Meikar, 2011, pp. 230–256), during which the botanical garden received a total of 48,096 accessions.

Table 2. Numbers of live plant species and varieties in the
botanical garden in different years and sources

Year	No. of taxa /No. of pages in the volumes of plant lists	Source
In the old location (since 1803)		
1804	1,121 / 16	EAA, 1804
1807	2,367 / 131	Germann, 1807, pp. 11–143
In the new, current location (since 1808)		
1810	4,840 / 169	Weinmann, 1810, pp. 1–169
1826	About 11,000 / 330	EAA, 1826
1827	10,449 / –	Ewers, 1827, p. 43
1833	About 16,000 / 467	EAA, 1833
1835	4,289 / –	Willkomm, 1873, p. 15
1837	8,617 / 306	Muszyński, 1911, p. 14; EAA, 1837
1838	About 13,500 / 401	EAA, 1838
1844	6,849 / –	Willkomm, 1873, p. 16
1845	About 14,000 / 414	<i>Enumeratio...</i> , 1845, pp. 1–406; Sander, 2010, pp. 90–93; Sander & Meikar, 2011, p. 239
1848	About 13,500 / 403	EAA, 1848
1849	10,947 / –	Willkomm, 1873, p. 16
1851	13,180 / 301	Sander & Meikar, 2011, p. 240; EAA, 1851
1857	4,600	Kimmel & Trass, 1978, p. 8
1867	11,880*	Willkomm, 1873, p. 16
1873	4,152	Kimmel & Trass, 1978, p. 8
1895	3,940	Kimmel & Trass, 1978, p. 8
1913	10,130	Kimmel & Trass, 1978, p. 8; Siilivask, 1982, p. 346

* Collections of live plants and seeds together

In 1804, Germann wrote:

By October 1803, the garden's territory was ours. At once I planted the greenhouse with the nearly 200 plants that I had grown, had the existing dwelling house set in order, and moved in already in November. I pay rent to the university for this apartment, which I feel justified. The seedlings that I made since April 1804 consist of 2,450 species, of which over 1,500 have germinated and most have also bloomed. Many of those that were seeded late I expect to germinate only next spring. (Germann, 1804, p. 345)

Germann's plant list of 1804 contains 1,121 species from 426 genera. Similar to that of 1804, a plant list was compiled also for 1805, with 1,064 numbered taxa (a taxonomic category, as a species or genus). It contains 1,018 taxa from 463 genera, of which the plant name is absent for 46 taxa. A separate list contains 45 taxa of carnations (EAA, 1804).

The 1810 plant list of the botanical garden, in its present location since 1808, contained 4,586 species from 968 genera. The mode of cultivation was not specified for two of them. Of the remaining 4,584 taxa, 742 were growing in a heated greenhouse, 1,508 in a cold greenhouse, and 2,358 in the open ground. This makes a total of 4,608 taxa, of which 24 occurred in two sites, mostly both in a cold greenhouse and in the open ground (Weinmann, 1810, pp. 1–169; Sander & Meikar, 2009, p. 82).

In 1827, the garden had 10,449 species (Ewers, 1827, p. 43), and no other numerical data are known to have been recorded for that year. Of the 10,449 species 4,477 were growing in greenhouses and 7,627 were growing in the open ground. As we can see, there were more plants growing in the garden in total than recorded on the species list. Thus, altogether 1,655 species were growing both in greenhouses and in the open ground (Sander & Meikar, 2011, p. 239).

In 1835, the botanical garden contained 4,289 species of live plants represented by 9,153 specimens, of which 5,295 were grown in pots and 3,859 in the open ground (one of the latter three figures must be incorrect by one unit). In 1844, the garden contained 6,849 species represented by 10,850 specimens, of which 3,814 were grown in the open ground and 7,036 in pots. In 1849, the collection contained 10,947 species and varieties, with 7,668 of them grown in pots and 3,279 in the open ground, and the number of live plants and seeds together totalled 14,327. In 1867, the garden contained 11,880 species and varieties of live plants and seeds (Willkomm, 1873, pp. 15–16). The garden also had an extensive seed collection—seeds of 4,830 species in 1827; 8,305 species in 1835; 8,617 species in 1837, and 8,256 species in 1849 (Willkomm, 1873, p. 17). It appears from the above that in 1849 the garden possessed 3,380 species and varieties just in the form of seeds, and 4,876 seed species possessed in that year were from the plants grown in the garden.

A calculation derived from the number of taxa and page volume of the plant lists of 1827 and 1845 (307 taxa and 414 pp.) yields that an average page contained 34 plant taxa. The page volumes of the plant lists of the years 1832–1836 (393, 467, 454, 454 and 464 pp.) indicate that the number of plant taxa in the

garden may have been around 16,000 in 1833 and around 13,500 in 1848. This shows the great extent of plant introduction activities in the botanical garden under Ledebour's directorship. However, the preserved plant lists also show that introduction activities did not lag much behind during Bunge's directorship either.

In comparison, it can be noted that according to the data of 1850, the Botanical Garden of Vienna (*Hortus Botanicus Vindobonensis*) contained 8,186 species and the Botanical Garden of Berlin contained 10,000 species, which was also the number of plant species known to Linné, and the St. Petersburg Botanical Garden had 12,061 species of live plants (300,000 specimens from 199 families) (Lipskii, 1913–1915, pp. 520–521).

A comparison of the species richness of the botanical gardens at Russian universities in the first half of the 19th century reveals that the Botanical Garden of Tartu (Dorpat) was quite at the forefront in these years (Table 3). In 1848, however, the Imperial Botanical Garden at St. Petersburg takes the leading position with its 44,758 species. A juxtaposition of the data presented in Tables 2 (see p. 59) and 3 discloses divergences in the data of the Botanical Garden of Tartu. The divergences are caused by the fact that in the former table, the figures derive from plant lists, and in the latter, from the official data published by the University of Tartu.

Table 3. Species richness of the botanical gardens at Russian universities in the first half of the 19th century (no. of species)

Year	Moscow	St. Petersburg	Kharkov	Kazan	Kiev	Tartu (Dorpat)
1834	3,750	6,000	13,460	1,766	*	11,535
1836	4,000	15,000	7,650	1,859	5,647	13,055
1838	5,950	7,000	7,350	1,732	5,968	13,699
1840	6,231	8,910	13,000	2,977	5,467	10,094
1842	6,540	10,493	9,200	3,566	2,235	10,912
1844	6,700	15,761	10,220	4,120	3,001	10,850
1846	6,900	*	15,980	4,400	3,126	11,239
1848	6,970	44,758	16,604	4,500	4,307	14,996

Sources: Evans, 1991, p. 187; Lipskii, 1913, pp. 297, 320.

The above shows how extensive and effort-consuming the work of the gardeners at the Botanical Garden of the University of Tartu must have been in ordering seeds and live plants and obtaining them from expeditions, sowing plant seeds, growing plants and documenting them on the relevant lists, and ensuring the correct scientific identification of the plants. Learned gardeners are also thought to have participated in compiling herbaria and seed collections. Both the open ground and the greenhouses of the garden were accessible to the public, the opening times being rather varied over time, and gardeners were also to act as visitor guides (Willkomm, 1873, pp. 28–29).

Learned gardeners

Gardeners during Gottfried Albrecht Germann's directorship

An overview of the learned gardeners of the Botanical Garden of the University of Tartu is provided in Table 1 (see p. 57). The first learned gardener (academic gardener) was **Johann Friedrich Kieser**. He submitted his application for the post on 24 February 1803. On 4 May 1803, Germann informed the University Council of having hired an academic gardener, and the rector approved the application on 20 May the same year. However, Kieser's service as learned gardener remained short: for some reason, he was dismissed from the post as of May 1804 by a decision of the University Government from 2 February 1804, and Professor Germann was charged with finding a new learned gardener by that date (EAA, 1803–1814, p. 7; 1803–1804; Beise, 1852, p. 38; Willkomm, 1873, p. 23; Sander & Meikar, 2009, p. 74). Possessing professional knowledge, Kieser was contracted by the university to plant the first trees on Toomemägi Hill in Tartu in 1803 (Raid, 1990, p. 44).

The subsequent gardener **Johann Peter Buek** (Buck, Bück), brother of the well-known pharmacist and botanist Johann Nicolaus Buek (1779 Hamburg – 1856 Frankfurt), came to Estonia from Germany. Johann Peter Buek was born in 1769 in Hamburg, in the family of gardener and botanist Johann Nicolaus Buek Sr. (1736–1812), and worked as commercial gardener there (Germann, 1804, p. 348; Weinmann, 1810, p. XIV; Willkomm, 1873, p. 23; *Geschichte...*, 2004; Targiel *et al.*, 2000). Germann (1804, p. 348) has written about him: “Academic gardener Mr. Buek is a skilful, active and industrious man who differs from

regular gardeners in being also a good botanist and passionately keen on his subject.” Buek also brought along plant seeds when coming to Tartu (Weinmann, 1810, p. XIV).

After a brief period of working in Tartu, Buek moved on to work in the garden of Yelagin Palace of Count Grigory Orlov in St. Petersburg. He worked there as chief gardener and died in the same place in 1855 (Trautvetter, 1837, pp. 53, 98; Regel, 1866, p. 154). Peter Buek (1827–1886), who studied cameralism and law at the University of Tartu in 1845–1849 and, after graduation, worked as commercial gardener in St. Petersburg (Hasselblatt, Otto, 1889, p. 349), was probably his descendant. And German-Russian philosopher, editor and translator Otto Buek (1873–1966) was born in St. Petersburg as son of German merchant Peter Buek (Gehrke, 2013, pp. 11–16).

Subsequently, the gardener’s position was assumed by **Johann Anton Weinmann**, who referred to himself as botanic gardener, or *Botanische Gärtner* (Weinmann, 1810, p. XVII). He was born on 12 December 1782 in Würzburg as a gardener’s son and obtained his upper secondary and higher education in Germany (Regel, 1859, p. 62; Lipshits, 1947, II, pp. 77–79). Weinmann has been mentioned to have studied at the University of Würzburg (Regel, 1859, pp. 62–63). According to the data of that university, however, he was not in the student registry in 1800–1805 (Holtz & Ehbauer, 2012). Prior to coming to Tartu, Weinmann worked as an assistant to garden architect Konrad Johann Rosenthal in the palace garden of Russian diplomat and ambassador Count Andrey Razumovsky in Vienna. Weinmann regarded himself as a disciple of Andreas Roman Wolff, gardener of Botanical Garden of Würzburg. It appears that it was through David Heinrich Hoppe, botanist and founder of Regensburg Botanical Society, and upon the recommendation of Wolff, that Weinmann was invited to the position of gardener of the Botanical Garden of the University of Tartu from Vienna in the autumn of 1804 (Weinmann, 1810, p. IX; Sander & Meikar, 2009, p. 75).

Some employees of the university appear to have known Weinmann, as he writes:

Before I came here, a person unknown to me from here wrote to me to Vienna: “Do not go to Dorpat before you have been unanimously elected by the council and they have specified your conditions because already two gardeners have left due to disagreements.” I followed this advice and Councillor Mr. Germann answered me: “You have been [...] appointed as academic gardener”—as far as I remember, as of 9 April 1805.

It is unclear when Weinmann arrived in Tartu but he is known to have been an employee of the university from 9 April 1805 to 1 May 1813 or to 20 January 1814. His travel from Vienna to Tartu through Riga cost 228 roubles and took at least 28 days. The travel expenses were reimbursed only in August 1805 and only in the amount of 84 roubles (Beise, 1852, p. 59; EAA, 1805–1828, pp. 1–6, 84).

When Weinmann arrived in Tartu in 1805, the establishment of the botanical garden in its old location had been underway for two years already. However, in the spring of 1806, the university received a new plot as a donation from Anna Maria von Rosenkampf and it was decided to move the botanical garden to this new plot (Sander & Meikar, 2009, pp. 76–77). Before the moving, director Germann (1807, pp. 11–143) published the first plant list of the garden. This contains 2,367 taxa from 669 genera, with some single entries recorded at the genus level or unidentified. In 1807, Weinmann created a master plan for the new botanical garden. The greenhouse of the garden was completed in early September 1808, and transfer of plants and closing of the old garden started in the fall of the same year. The botanical garden had been established in its present location by 1810 (Sander & Meikar, 2009, p. 77), when also the first plant list of the new garden was published (Weinmann, 2010, pp. 1–169). Thus, Weinmann can be regarded as the founder of the botanical garden in the new location. The first longer description of the botanical garden, however, dates from 1814 (Schlippenbach, 1818, pp. 43–45).

Director Germann wrote:

How often it happens that many a plant perishes due to their [garden workers'] laziness, lack of knowledge or good will, or complete incapability of doing some brainwork! Under these circumstances, it is indeed the greatest luck to have an industrious and skilful gardener who really masters his art. We have now got such a man in academic gardener Mr. Weinmann. Both I and the university have reason to be fully satisfied with him, which should be taken into consideration also by those who, failing to understand this, have secretly worked, and will probably continue to work, to sow the seed of indignation and dissatisfaction. (Germann, 1807, pp. VII–VIII)

Apparently, Weinmann was not on the best terms with several people. In 1811, Carl Christian Friedrich von Ledebour entered the service of the University of Tartu, elected as professor of natural history (incl. botany). In the following years, the two men came into conflict because Ledebour wished to subject Weinmann's activities to his own rules and constrained Weinmann's previous

scope of activities (Salupere, 1997, p. 15). Thus, Weinmann's status in the garden had become intolerable for him. He writes:

Over the seven years, I had the honour of being offered an official job twice in Russia and once outside Russia. I thanked and refused. Of the private offers made to me in this country, I would highlight just two: one with a 1500-rouble salary and the other with a 1800-rouble salary, with additional benefits. I thanked also for these and refused because I was devoted to the commenced work with all my body and soul. I would now ask: having done so, can I be called ungrateful? If I now agreed to the changes, I alone would be unable to do a good job under the present circumstances because unskilled workers can no longer be used here; and in the end, debts might force me permanently into conditions that I cannot even think about, let alone tolerate. I am leaving for better conditions, now or never! (EAA, 1805–1828)

Weinmann took the conflict with Ledebour very hard. Even as late as in 1814, he wrote from Gatchina to Maximilian von Klinger, St. Petersburg-based curator of the University of Tartu, and complained about Ledebour's derogatory attitude (Weinmann, 1814, pp. 1–4).

On 14 August 1808, a son Friedrich Wilhelm was born to Johann Anton Weinmann and his wife Antonette Haiderer (Haidener) in Tartu. At his baptism ceremony, Privy Counsellor and Professor Deutsch, Privy Counsellor and Professor Germann, Privy Counsellor and Professor Krause, and Mrs. Secretary Hehn acted as his godparents (EAA, *n.d.,f*). Thus, next to Germann, the godparents were Christian Friedrich von Deutsch, professor of the Medical Department; Johann Wilhelm Krause, the university's architect and artist; and the wife of the university's secretary Eduard Johann von Hehn. The 1811 revision list of Tartu (Dorpat) includes the 32-year-old botanical gardener Johann Anton Weinmann and his 3-year-old son Friedrich Wilhelm (EAA, 1811). Thus, Weinmann must have been born in 1778 or 1879. On 9 June 1812, a daughter Maria Aloysia Katharina was born to Weinmann's family. Her godparents were her grandmother Maria Aloysia Haiderer, her grandfather Joseph Anton Haiderer, Collegiate Councillor Professor Deutsch, Gymnasium Principal Hermann, Franz Pabst, and Johan Hurm (EAA, *n.d.,g*).

Weinmann's letter from 26 March 1813 to the rector of the University of Vienna shows that he applied for a travel passport to Vienna for himself and his family of five. In the letter, Weinmann explained that he would travel with his father-in-law Joseph Haiderer, mother-in-law Catharina Haiderer, wife Antonia, son

Friedrich Wilhelm and daughter Louise Catharina, with the father-in-law and mother-in-law being Austrian subjects (EAA, 1805–1828; Salupere, 1997, p. 15). In 1813, the rector of the University of Vienna was Josephus Mayer (Ilg, 2012). However, Weinmann could not travel to Vienna due to the war because Austria was an ally of Napoleon and thus an enemy of Russia.

Gardeners during Carl Christian Friedrich von Ledebour's directorship

Numerous learned gardeners and substitute learned gardeners worked in the botanical garden during Ledebour's period but could not settle for a longer term. Performing ordinary day-to-day duties, they could not leave any significant imprint on the development of the garden. From the summer of 1813 to the following spring, the learned gardener's position was held by **Albert Siegmund Natusch** from Berlin (EAA, 1814–1828; 1803–1855, p. 73). After his dismissal by the director, someone named **Wagner** worked in the position for barely a month (EAA, *n.d.*,a, p. 73). The successor of this high-handedly removed gardener was **Carl Neumark** from Wörlitz, who resigned of his own accord in spring 1816 (EAA, 1814–1828). Whether or how he was related to well-known gardener Johann Christian Neumark (1741–1811), who worked in Wörlitz and Oranienbaum (Winkelmann, 2013), the authors were unable to ascertain.

The meanwhile vacant position was taken up by **Ludwig** (or Louis, in French) **Riedel** from Berlin (EAA, 1902–1927). On date of archives it has been mentioned that Riedel moved to Tartu in 1816 (Komissarov, 1977a, p. 33) and worked at the University of Tartu in 1816–1819 (Nekrasova & Prussak, 1957, p. 604; Basargina *et al.*, 2012, p. 18). The time of his commencement in Tartu is actually not quite clear. Riedel's employment certificate signed by Ledebour dates from 12 February 1818 (EAA, 1902–1927, p. 1). At the same time, in response to a request of 14 March to the curator of the University of Tartu in St. Petersburg, a permission of the Ministry of Religious Affairs and Public Education (Minister Aleksandr N. Golitsyn) to pay Riedel 50 roubles for travel expenses from Berlin to Tartu was sent out on 28 March 1818 (EAA, 1902–1927, p. 8). Riedel has been mentioned to have worked in Tartu since May 1820 (Leppik, 2013).

Riedel was born on 2 March 1791 in Berlin (Komissarov, 1975, p. 69; 1977a, p. 33; Augel, 1979, pp. 9, 49; de Moraes, 2012, p. 185) and devoted himself to the profession of gardener (Urban, 1894, p. 10). Most modern sources, however,

give 1790 as Riedel's year of birth, probably after Ignaz Urban (1894, p. 10). At about the age of 20, Riedel moved to Germany and acquired the French language. In 1813–1815, he served in the Prussian army against Napoleon as a Chasseur of the Guard. After the defeat of Napoleon's army in 1815, Minister Altenstein [Karl Sigmund Franz Stein] appointed Riedel, a good botanist and eager and scientifically educated gardener, as a member of the committee for returning the assets robbed from Germany by the French. He had also another important duty to fulfil. Upon the invasion of the French, director of the Berlin Botanical Garden Carl Ludwig Willdenow managed to save the garden from major losses. Still, to avoid expropriation, Willdenow had to surrender the more beautiful specimens to the Malmaison (Rueil-Malmaison is now a suburb of Paris) Botanical Garden, which was owned by Joséphine de Beauharnais, the first wife of Napoleon Bonaparte. As these could not be identified later, naturalist Alexander von Humboldt suggested to the managements of the Botanical Garden of Paris (*Le Jardin des Plantes*), Malmaison Botanical Garden and Versailles Gardens that they returned possible doublets to Riedel according to a plant list compiled by the Berlin Botanical Garden's garden inspector Christoph Friedrich Otto, and Riedel would then convey them to Berlin. Riedel was also charged to buy rare plants for 1,500 Marks from local gardening businesses, first of all the garden of von Cels. In addition, he received a grant for a research trip to southern France and Riviera. In the spring of 1816, Riedel travelled to Paris, from where he proceeded to Lyon and further through Torino to Nice and the botanical garden of Marseille, where he stayed at Director M. Gouffé de la Cour's place. During his travels, he collected a great amount of seeds and hundreds of dried plants for the Berlin Botanical Garden. While in France, Riedel applied for a new grant from Berlin. Not receiving the grant, he returned home, from where he travelled to Karlsruhe in the spring of 1817, being abjectly poor (Urban, 1894, pp. 10–11; Augel, 1979, p. 50). He was highly educated, spoke German, French and English and also wrote in these languages (Nekrasova & Prussak, 1957, p. 806).

It is not known how or through whom he ended up in Tartu. He ran into work-related conflict with the garden's director Ledebour, who wrote a long letter of complaint about him. The case went to court and the court of the University of Tartu held Ledebour's complaints to be ungrounded (EAA, 1820; 1902–1927). The judgement of the university court was rendered on 3 May. Riedel left Tartu on 4 May 1820 and arrived at Pavlovsk on 6 May to visit his friend Johann Anton Weinmann (EAA, 1902–1927, p. 7; Augel, 1979, p. 25). On 31 March 1820, it appeared at the University of Tartu that gardener Riedel resigned for health

reasons and a young man from Berlin had been invited to his position on the condition that he serve for at least three years. On 5 June 1820, the Directorate of the University announced that gardener **Louis Autem** from Berlin, who would replace the resigned botanical gardener Riedel, had been sworn in. His actual service probably began on 10 April 1820. His contract envisaged the reimbursement of his travel costs in the amount of 50 roubles, subject to the obligation of staying in service for at least three years and returning the money if leaving earlier. However, Autem was dismissed from service for unknown reasons already after a year or two, probably on 1 March 1822. Thereafter, upon the recommendation of superintendent Schröder from Göttingen, the university offered the position of botanical gardener to Carl Beyrich, who, however, left for Brazil (EAA, 1820–1822; Beise, 1852, p. 164). Heinrich Karl Beyrich (1796–1834) was a well-known German botanist and explorer, who made an expedition to Brazil in 1822–1823 (Jacobs, 1875, p. 605).

Meanwhile, **Georg Friedrich Holst** had written to the university in his letter of 31 March 1820 that Ledebour had promised him the position of botanical gardener but he had heard nothing further and received no confirmation. Holst had participated in procuring exotic plants and seeds for the botanical garden for two years in Riga but now the post had been given to someone from Berlin (EAA, 1817–1820).

In his letter to the University Government in April 1825, Ledebour complained about major difficulties in finding a suitable learned gardener, which had compelled him to work without gardener's support for several years already, using assistant gardeners and apprentices instead. As of 1 July of the same year, **Heinrich Wilhelm Gebhardt**, who came from Riga and had previously worked in seed business, commenced work as gardener apprentice. Having passed a test of botanist-gardener with Professor Ledebour in October, he continued already as learned gardener. He seems to have earned the director's acceptance, yet he suffered from poor health and died on 5 May 1832 (EAA, 1825–1826). Willkomm (1873, p. 23), later director of the botanical garden, regarded Gebhardt as the only notable gardener among the numerous ones working under Ledebour. As Gebhardt's health did not allow him to devote his full energy to work, the director had to use temporary substitutes. In 1830, this function was performed by the son (EAA, 1825–1832) of Anton Rochel (1770–1847), Austro-Hungarian physician, traveller and botanist, curator of Pest Botanical Garden (Ullepitsch, 1884, pp. 363–368). This was probably his elder son **A. Rochel**, who had moved from Tartu to St. Petersburg and was working as an

ornamental and commercial gardener there when Anton Rochel visited the city in 1840, continuing in the same profession in St. Petersburg also later on (Ullepitsch, 1884, pp. 364–365; Regel, 1867, p. 306).

On 1 September 1833, Ledebour announced that he had hired **Friedrich Wilhelm Günther** as botanical gardener and given him the relevant instruction (EAA, 1803–1855, p. 266). However, the service period of this gardener from Göttingen remained brief, too—he was dismissed from service in May 1834 for work-related reasons (EAA, 1833–1834).

Gardeners during the directorship of Alexander Georg von Bunge, Heinrich Moritz Willkomm and Edmund August Friedrich Russow

The learned gardener's position was then taken up by **Wilhelm Eduard Stelling**, who started as a gardener apprentice in 1828 and later worked as assistant learned gardener. Stelling, German by nationality, was born in Valmiera County, Livonia (present Republic of Latvia) to the family of miller Magnus Cornelius and Johanna Frederica (born Austien) on 26 November 1813 and was baptised at the parsonage of Luhte (Lugažu) church on 25 December 1813. He acquired his education at Valmiera county school and Goldner private school but his personal file did not contain the documents certifying this. Ledebour informed the university's management in his letter of 10 January 1828 that he has hired a young man from Valmiera as a gardener apprentice. This is also confirmed by the record of the Directorate of the University of 28 January 1828. Stelling commenced work as gardener apprentice on 1 February 1828. On 15 May 1834, Ledebour suggested to the Directorate that the so far gardener apprentice Stelling be appointed as botanical gardener. It appears that Stelling had been both a gardener apprentice and assistant botanical gardener. As the previous botanical gardener Günther had been released, the Directorate affirmed the appointment on 16 May 1834. As of 15 June 1837, Stelling was assigned a yearly salary of 300 roubles, and on 18 June the university sent him to St. Petersburg Botanical Garden for a three-week in-service training familiarisation with rare plants. On 22 March 1846, Stelling's yearly salary was increased to 457 roubles, with the provision of a free apartment. While lacking adequate general education, he was noted for possessing just the professional knowledge and working skills required for a learned gardener. In 1855, the university even considered sending him to the Karlsruhe Academy of Fine Arts to take the examinations of academic

horticulturist. The prior practical training was planned to be conducted under well-known gardener and dendrologist Johann Hermann Zigra in Riga. Although this plan was not realised, the work of the learned gardener was found highly satisfactory. Stelling also earned several accolades with his work: on 8 June 1851, the curator of the Dorpat Educational District acknowledged him for the excellent order achieved in the botanical garden; on 5 January 1853, he was thanked for participation in organising the university's anniversary events; on 22 November 1856 he was rewarded with 300 roubles for his work in reorganising the botanical garden in 1855–1856; on 11 April 1858, he became a honorary citizen of Tartu (Ger. *Persöhnliche Ehrenbürger*) by a decision of the Council of Ministers of Russia and upon endorsement by Emperor Alexander II; and on 17 January 1862, he was rewarded with 250 roubles. Stelling was married to Catharina Natalia (born Bauch) and they are known to have had six children, including Bernhard Emil (born 1 Dec 1840), Carl Reimund (5 Jan 1843) and Reinhold Eduard (17 Sep 1850) (EAA, 1828–1862; 1882). Stelling, together with assistant gardener Ludwig Jacobsohn, was also listed among the most important persons of the Livonian Governorate as of 1862 (Martuzāns, 1995–2002). Eduard Stelling has published at least one research paper (Stelling, 1876, pp. 186–188), which was also abstracted in French (Erceau, 1876, pp. 182–183). He was also actively involved in compiling the 300 specimens of the University of Tartu's *Flora Eccicata Liv-, Ehst- und Kurlands* (Bunge, 1851, pp. 66–67). He left the university in 1876, already an aged man and suffering from health problems, and died on 5 January 1882 in Riga (EAA, 1828–1862; 1882). It could be added that his first son **Bernhard Emil Stelling** worked even as assistant director of the botanical garden in 1862–1863, after just a few months of prior employment there, although dealing mainly with economic administration (EAA, 1862–1863).

Stelling was succeeded in the position of learned gardener by **Carl Ludwig Gustaf(v) Bartelsen**, born on 17 December 1851 in Tartu as son of Johann Friedrich Bartelsen, gardener of Luunja Manor, and his wife Wilhelmine Juliane Elisabeth (née Thomson). At his baptism ceremony, Raadi landlord Carl von Liphart, Ludwig Loewen, bailiff Gustav Thomson (hence also his forenames), chief gardener's (W. E. Stelling's) wife Natalie Stelling and gardener's daughter Marie Kleekampf(f) were his godparents. Helene Marie Kleekampff, born in Räpina in 1832, was a daughter of then well-known gardener Ludwig Kleekampff and Helene Auguste Kleekampff (née Michelson) (EAA, 1876–1913; 1855–1864).

Carl Bartelsen graduated from the Gymnasium of Dorpat in 1868 (1869) and travelled to Germany for gardening studies. He was admitted as an apprentice in the Royal Gardening and Nursery School (*Königliche Landes-Baumschule*) in Alt-Geltow near Potsdam in the same year. After completing the practical training, he entered gardening studies at the Royal Horticultural School of Sans Souci near Potsdam in 1870. After graduating from there in 1872 as a learned gardener, Bartelsen also familiarised himself with the gardens of several major educational institutions in Germany and returned to Tartu at the end of the year. He then worked as gardener in Raadi Manor and assumed the post of learned gardener in the Botanical Garden of the University of Tartu on 1 October 1876, occasionally working also as an assistant in botany (EAA, 1851–1877; 1876–1913). Carl Bartelsen married Julie Marie Feldmann on 4 November 1876 (EAA, 1851–1877). Their first child, daughter Wanda Emma Margarethe, was born in Tartu on 6 August 1877 (EAA, 1877–1926). Wanda Bartelsen married a well-known Latvian-Russian journalist Oskar Johann Martin Grosberg in 1898 in St. Petersburg (*BBLd*, 2013, p. 262).

Bartelsen is known to have established the garden's *Alpinetum*, the collection of alpine plants. Eight hundred species of plants from Turkestan, the Caucasus and Southern Russia were sent here from St. Petersburg Botanical Garden. Bartelsen also helped to create the conifer collection and was the sole publisher of *Index Seminum* in 1877–1895. After working in the garden until 1 September 1896, Bartelsen proceeded to work in St. Petersburg Botanical Garden as senior gardener and later as learned gardener (EAA, 1876–1913; Lipskii, 1913–1915, pp. 241–243; Kuznetsow, 1897, pp. 380–381; Lipshits, 1947, I, p. 125).

Gardeners during the directorship of Nikolai Kuznetsov and Mikhail Tswett

In 1896–1897, the learned gardener's position in the botanical garden was held by **Heinrich Ernst Joseph Siesmayer** (Siesmaier, 1852–1925), who was born in St. Petersburg and came from there to Tartu. His uncle was the well-known gardener and garden architect Franz Heinrich Siesmayer (1817–1900), who, with his brother Nikolaus Siesmayer (1815–1898) founded a famous gardening enterprise in Germany. Heinrich Siesmayer studied in different schools in Vyborg, St. Petersburg and Frankfurt. From 1867 to 1869 he studied in St. Petersburg, at the private school for boys founded by Karl May. His gardener's career began in 1868 in the greenhouses of the Taurian Palace (in the Crimean

Peninsula) under his father Karl (Carl) Friedrich Siesmayer (1821–1902), who worked there as chief gardener (EAA, 1896–1897; Lipskii, 1913–1915, p. 293; Yatsenko, 2009–2011). In 1873, Heinrich Siesmayer went abroad, working in Belgium, Germany, France and England. While working in London, he married Emily Moore (born in 1852). Returning to Russia in 1895, he became the chief gardener of St. Petersburg Botanical Garden. After working in Tartu, Siesmayer returned to St. Petersburg Botanical Garden and in 1899 reassumed the post of chief gardener of Taurian Palace. In 1902, after his father's death, Siesmayer became the chief gardener of Yelagin Palace.

Although Siesmayer worked in Tartu for a brief period, Nikolai Kuznetsov acknowledged him for his professional knowledge and talent in park architecture, crediting him for the fact that the botanical garden had acquired a new appearance within a short period of time (EAA, 1896–1897; Kuznetsov, 1897, p. 5; Lipskii, 1913–1915, p. 293; Vogt, 1999, pp. 105–113). Bartelsen and Siesmayer also organised tours for students in the surroundings of Tartu (Kuznetsov, 1897, p. 17).

As of 1 April 1897, **Ants Murjan** became the acting learned gardener at the university, having previously worked as junior gardener of Taurian Palace in St. Petersburg and, since November 1896, as junior gardener of the Botanical Garden of the University of Tartu. Although lacking in-depth professional education, he displayed good knowledge. Professor Kuznetsov gave special credit to his work with tropical plants, and to the high-quality seed catalogue compiled under the guidance of assistant director Nikolai Bush. On 15 April 1898, Murjan resigned of his own accord because the university had found a professional for the position of learned gardener. Murjan then took up the position of gardener of Taurian Palace in St. Petersburg (EAA, 1897–1903; Kuznetsov, 1899, p. 3).

In 1898–1900, the learned gardener's position was held by **Mikhail K. Fedosseyev**, born in a military family in 1866 in St. Petersburg. He had taken a course in natural history at the University of Odessa and studied practical gardening in the Gardening School of Nikolayev (probably the present Mykolaiv in Southern Ukraine). Prior to assuming the post of learned gardener, Fedosseyev had been working in Tartu as Professor Kuznetsov's assistant for two years already and had studied plant taxonomy and plant geography under his supervision, and practical gardening on his own. Fedosseyev stood out for systematisation of scientific collections, culturing activities and commercial success in plant sales from the botanical garden. Fedosseyev left the position, among other reasons, because the university could not offer him an acceptable salary (EAA, 1898–1900; Dörfler, 1902, p. 175).

After Fedossejev's resignation, **Ants Murjan** was invited back to Tartu from St. Petersburg, where he had worked as gardener of Taurian Palace for the interim two and a half years. Murjan's second work period at the university commenced on 15 October 1900 and ended on 1 April 1903 (EAA, 1897–1903). After Ants Murjan left in 1903, **Wladislaw Zaikowski** was appointed as the new learned gardener as of 1 April 1903. Zaikowski had studied in a market garden in Warsaw in 1890–1892 and been an apprentice in Warsaw Botanical Garden in 1892–1895 and 1896–1899. Later, he extended his practical knowledge in the gardens of Warsaw and Görlitz and graduated from the Royal Pomological Institute in Prószków (Proskau or Pruszkow). Prior to coming to Tartu, he also worked briefly as senior gardener in Galicia. He left the botanical garden of Tartu at the beginning of 1905 to continue his studies abroad. The character reference letter from the university emphasised his ability to work with all outdoor collections, and he also paid great attention to developing the commercial side of the garden (EAA, 1903–1905).

From 15 January 1905 to 1 October 1906, the learned gardener's post was held by **Wictor Jäger** from Germany (EAA, 1905–1906). His successor **Arthur Michils** (Michels) came from Belgium. After graduating from a gymnasium, he worked as master gardener in the gardens of Belgium and led the orchid section in Berlin Botanical Garden in 1901–1903. In 1903, he took up post at St. Petersburg Botanical Garden, where he worked with tropical plants, heading the orchid section prior to moving to Tartu. He left Tartu at the end of 1908 due to family circumstances in Belgium (EAA, 1906–1908).

As of 19 December 1908, **Jan Kazimir Vladimir Muszyński** commenced work as acting learned gardener at the botanical garden of the university, becoming full learned gardener on 1 January 1909. He was born on 21 June (3 July, according to New Style) 1884 to a family of impoverished gentry from Wólka Nosowska near the town of Biała Podlaska. His father Jan worked as a steward at Korytnica estate. His mother was Anna née Wojtasiewicz. In 1900, Muszyński completed the fifth grade at the Upper Secondary School of Vitebsk but discontinued his studies due to financial problems. In his later curriculum vitae (1916), he still mentions acquiring a secondary education in Warsaw. In 1900–1902, Muszyński was a pharmacist apprentice in Warsaw. In 1902–1905, he worked as assistant pharmacist, completing the exams for assistant pharmacist license at the University of Warsaw in 1903. In this period, Muszyński also developed a greater interest in botany. For example, he repeatedly participated in botanical excursions organised by well-known Polish botanist Professor Ferdinand Karo.

In 1902, Muszyński was awarded a scholarship of the Pharmaceutical Society of Warsaw to compile a herbarium of medicinal plants and describe the family *Solanaceae*. Already as an assistant pharmacist, he worked in his free time at the Botanical Garden of Warsaw and in the laboratory of the Pharmaceutical Society. In the meantime he became an activist of the Polish Socialist Party, which was illegal in Russian Poland. He was arrested and sentenced to long-term imprisonment in 1905. Luckily, he was mistaken for another prisoner and unintentionally released from the Warsaw Citadel. He fled from Warsaw and continued to practice in a rural apothecary in Drobin near Płock. Some time afterwards, he married Irena Baumgarten, the owner's daughter.

In 1907, still wanted by the tsarist secret police, he went to study pharmacy at the University of Dorpat (present-day Tartu), whose high academic level and autonomy attracted many Polish students. On 28 August 1907, Muszyński was admitted as an auditor of pharmacy at the University of Dorpat, where he completed the professional examination for pharmacists on 1 June 1909 and received a diploma on 11 June 1909. In his later career, he therefore presented himself as a university graduate, which enabled him to reach a scientific degree and position.

Being a bright student, he soon caught the attention of Professor Nikolai Kuznetsov, who invited him to become his assistant. During his studies, he completed a course in bacteriology and microscopic techniques at the Institute of Veterinary Studies. After graduation, Muszyński took the post of superintendent of the Medicinal Plants Garden in Tartu, where he studied the standardisation of *Digitalis*. He presented this work at a pharmacists' conference in St. Petersburg in 1913.

When the First World War broke out, Muszyński was conscripted, which caused problems for the university. As he did not submit a proper letter of resignation, he could not be dismissed from the service despite his conscription, and the status of Jaan Ranna, who became the acting learned gardener, remained legally unclear. Although Ranna was officially appointed as learned gardener in 1915, Muszyński, too, remained on the staff of the university. The situation was resolved only on 7 June 1916, when Muszyński filed with the university a written request to be dismissed from the duties of learned gardener, which he had retained after his conscription (EAA, *n.d.*,c; d; 1908–1917; *Archiwum Akt...*; Isakow & Lewandowski, 1999, pp. 109–111; Meikar, 2002, pp. 69–70).

In connection with Muszyński's conscription, **Jaan Ranna** was appointed as acting learned gardener upon Professor Kuznetsov's suggestion. Ranna was born

on 17 September (N.S.) 1881 in Otepää and, after graduating from the local parish school, studied gardening for three years at Pühajärve Manor, thereafter practicing for two years at the nursery of Daugull in Tartu and for one year at the nursery of Heinrich Gögginger in Riga. In 1904–1907, he worked as a gardener at Rekta Manor, Mogilyov Governorate (present-day Gomel Oblast, Republic of Belarus). On 25 February 1908, Ranna commenced work at the botanical garden as assistant to chief gardener Muszyński, becoming the acting learned gardener on 1 September 1914 and also officially the learned gardener on 28 May 1915. On 24 February 1918, German troops seized Tartu in the course of the First World War and the Imperial University of Yuriev was renamed the Provincial University of Tartu (*Landesuniversität zu Dorpat*), with the new statutes taking effect on 11 August 1918. Ranna was dismissed from the service of the university by German occupation authorities on 1 June 1918. In fact, though, he found employment as gardener also at *Landesuniversität zu Dorpat*, being appointed as chief gardener again by the university's curator on 1 December 1918. After the establishment of the University of Tartu of the Republic of Estonia on 1 December 1919, Ranna continued to work in the botanical garden, leaving the position in 1923 (EAA, *n.d.*, e; 1821–1823; Meikar & Sander, 2000).

Assistants of learned gardeners

Learned gardeners were supported in their work by assistant gardeners, who participated in as many practical works as possible and supervised and checked the work of unskilled workers, where necessary. Heinrich Moritz Willkomm (1873, p. 25) expected assistant gardeners to be young men with a solid general education who had studied at some botanical garden or gardening school and possessed botanical knowledge. With their knowledge, they could also have served, in some respects, as assistants to botany professors. In reality, though, just some single gardener assistants working at the Botanical Garden of the University of Tartu met those requirements.

In his letter of 9 April 1806 to the University Council, Germann informed the council that the academic garden needed two assistant gardeners, each with a 300-rouble salary, and 4 to 5 day workers (EAA, 1803–1814, pp. 52–53). All assistant gardeners and apprentices cannot be listed here because all personal files have not been preserved, nor do the existing staff lists of the university provide complete information. Besides, the positions of assistant gardeners were not

always filled, either because suitable persons were not found or assistant gardeners were not always needed. Also, the professional fates of assistant gardeners and gardener apprentices were widely divergent and their turnover was high.

The first assistant gardener was hired already during Germann's directorship. Since 1812, the garden already had two assistant gardener positions, although one of them constantly remained unfilled (Willkomm, 1873, pp. 26–27). However, Weinmann wrote: "For almost three years I worked without adequate help, and saw only trouble with common labourers. Later I hired a young person and in this manner have up until now saved the wages of a skilled hand." (EAA, 1805–1828)

One of the persons known to have worked as assistant botanical gardener during Ledebour's time was **Pado Cap(p)ellino** (supposedly Italian), who worked in the position (Balt./Ger. *Gehülfe im Botanische Gärtner*) in 1819–1820 (EAA, 1819–1820). In connection with the conflict between Riedel and Ledebour, Cappellino was also interrogated at the court session in 1820 (EAA, 1820, p. 41).

Peter Jacobsohn Pago (Pägo) worked in the garden until 1821 and was probably Estonian. His successor at the botanical garden in 1821–1823 was **Carl Reinberg**, son of innkeeper Tõnis Reinberg from Uus-Põltsamaa (Ger. Neu-Oberpahlen) Manor. When he came to the assistant gardener's position, he brought a positive recommendation letter from the lord of the manor. After his dismissal, he later worked at the botanical garden as day worker (EAA, 1821–1823). According to the revision list of 1795 (EAA, 1795), 9-year-old Carl Reinberg (born in 1786) was the son of Anton (Tõnno) Reinberg, servant of Uus-Põltsamaa Manor, and his wife Tio. In 1816, Carl Reinberg was 30 years old and had been emancipated from Uus-Põltsamaa Manor in 1815 (EAA, 1816–1833).

Johann **Andreas Möhring** worked as gardener apprentice in 1822–1825. According to Möhring's contract with the director of the botanical garden, concluded on 1 March 1822, his apprenticeship was to last for six years. The apprentice was to obey the orders of his direct teacher—the learned gardener. The botanical garden, in turn, undertook to provide the necessary technical and practical training within the specified time period. The monthly salary was set at 25 roubles for the first three years but could be increased later. In addition, the apprentice was provided with free accommodation and firewood. At least Möhring still resigned prematurely due to low salary (EAA, 1822–1825).

In 1835, **Wilhelm Michelson** (born supposedly in Tartu) was working as assistant gardener but it is not known for how long. On 15 September of the same year, at the age of 32, he married Christina Feilchen (born in 1813) (EAA, 1835). Gardener Michelson died on 8 April 1870 in Tartu (EAA, 1870). In 1843–1844, the positions of assistant gardeners were filled by **Bergmann** and **Brandt**, in 1844–1846 by **Emil Stelling**, in 1846–1848 by **Alexander Ernst Hagen**, and in 1848–1850 also by **Wilhelm Michelson** (Beise, 1852, p. 164). The latter Michelson may have been the same man who worked in the position also before. Emil Stelling also participated as a witness at a court session on 30 June 1845, being 24 years old at the time (EAA, 1845).

The apprenticeship period of learned gardener assistants could sometimes be rather long. For example, **Ludwig Jacobsohn** commenced as an apprentice in 1837 but became assistant learned gardener only in 1851, working in the position until the second semester of 1877 (Willkomm, 1873, p. 27; *Personal...*, 1877, Sem. I, p. 9, Sem. II, p. 9). From the second semester of 1877 to the first semester of 1885, **Peep Parrikas (Parikas)** worked as assistant gardener, and thereafter the position was vacant for the first semester of 1885 (*Personal...*, 1877, Sem. II, p. 9; *Personal...*1884, Sem. II, p. 9, *Personal...*1885, Sem. I, p. 9). In 1885–1886, for three semesters in total, the position was held by **Adolph Linau**, who took up the position in the second semester of 1885 (*Personal...*, 1885, Sem. II, p. 9, *Personal...*, 1886, Sem. II, p. 9; *Personal...*, 1887, Sem. I, p. 9).

In 1913, the position of learned gardener assistant was assumed by **Ants Kingo**, who had previously worked as gardener apprentice in Saadjärv (Ger. Sadjerw) Manor in 1907–1909 and as garden worker in Luunja Manor in 1909–1910. In 1910–1912, he worked in the horticultural businesses of Wagner, and in 1912–1913 in other horticultural businesses in Riga. In the botanical garden, he exhibited great interest and knowledge in botany, possessing a rather solid expertise in plant taxonomy. In 1914, Kingo was conscripted into the First World War (EAA, *n.d.*,b).

Scientific activities of learned gardeners in Tartu

Johann Anton Weinmann

Three learned gardeners of the University of Tartu have stood out with their scientific activities, and two of them successfully continued their scientific career elsewhere. One of them was Johann Weinmann, who, in parallel with his work at the botanical garden, also took interest in the flora of the surroundings of Tartu.

In the course of his floral studies, he recorded our native species and also non-native ones, and made observations on feral non-native plants (Weinmann, 1810, pp. 1–169). For example, he first recorded feral *Ligustrum vulgare* in the vicinity of Tartu (Klinge, 1883, p. 23). In connection with moving the botanical garden to the present location, the plant list of the garden needed to be rearranged and republished, and Weinmann was the one to undertake this work. In his work, he describes the establishment of the garden and procurement of seeds and live plants. It appears that plants were sent by several well-known botanists from across Europe: from Russia and Western Europe (Weinmann, 1810, pp. XIV–XVI). It also appears that Weinmann was responsible for the correspondence and procurement of seeds and live plants.

In the plant list of the botanical garden published by Weinmann, plants are arranged according to the same growth forms as in the earlier work of Germann (1807, pp. 11–143). The list also shows whether the plant was growing in a warm heated greenhouse (*Caldarium*), in a cool greenhouse (*Frigidarium*) or in the open ground (*Sub. div.*), and, for open-ground plants, whether they were covered for the winter. The work also includes species descriptions and comments. According to specified data, Weinmann's list showed the botanical garden as having, according to the then nomenclature, 4,586 taxa of plants from 968 genera, with the place of growth unspecified for two taxa. Of the 4,584 taxa 2,250 were growing in greenhouses and 2,358 in the open ground, with 24 species growing in two places, mostly both in a cool greenhouse and in the open ground (Weinmann, 1810, pp. 1–169). When comparing the number of taxa with that in the old location, we can see that Weinmann's work was highly effective.

During his Tartu period, Weinmann described ten new plant species (*International Plant Names Index*). He also describes how plants were used at the botanical

garden for study and research purposes. Weinmann (1810, pp. XVI–XVII) writes about it as follows:

Every student who wished to create a scientific collection could obtain instructive specimens whenever possible. These were also distributed at the lectures of botany. Acclimatisation experiments were carried out with many plants. This was not always possible, however, especially as the garden often had just one or two specimens of a species. One had to act very carefully because even the healthiest plant could get damaged or perish when the cover was allowed to be taken off from just a few windows for one or two hours a day.

After Germann's death, Weinmann also lectured at the university. His abstract of lectures on horticulture has been preserved. The abstract shows that his lectures touched upon the history of horticulture and dealt with the establishment of gardens, with planting, soils, fertilisers, vegetable and fruit gardening and ornamental gardening (EAA, 1922).

Mikhail Konstantinowitsch Fedosseyev

Another learned gardener involved in scientific activities was Fedosseyev, who studied as an auditor at the university prior to becoming learned gardener. Fedosseyev stood out with his energy, systematisation of scientific collections, and commercial success in plant sales. He also travelled around, collecting a herbarium and bringing new plants to the garden. For example in 1897, Fedosseyev visited the Kherson Governorate and examined the materials from the Altai expedition of Professor Eugenio Schmurlo in the same year (EAA, 1898–1900; Kuznetsov, 1898, p. 15; 1899, pp. 4, 13, 16; Dubyeva, 2004). He also helped to supplement the herbarium. When the assembling of *Herbarium Rossicum* was started, Fedosseyev also supplemented it with materials from his travels (Kuznetsow, 1896, pp. 257–259). In 1898, he examined and labelled the collection of palms according to contemporary scientific nomenclature and correct taxonomic classification. Starting from palms, he catalogued all plants in the greenhouses, setting up three catalogues: 1) by the running numbers within each collection; 2) by families, genera and species, and 3) a card catalogue for all live plants in the botanical garden. Fedosseyev also made a scientific examination of the succulent collection, using the newest taxonomic studies. All succulents

were numbered and documented likewise in three catalogues: a numerical, taxonomic and card catalogue. Fedosseyev also examined and re-identified the collection of orchids. He also focused on open-ground plants, examining the plants of the Caucasian and taxonomic sections and starting to set up a collection of ecological groups of plants, that is, plants of different habitats. He established a seed exchange catalogue and a printed catalogue of duplicate live plants, both greenhouse and open ground ones (Kuznetsov, 1899, pp. 9–16). Fedosseyev was also actively involved in assembling the herbarium, examining in 1898 his herbarium collected in Crimea (Kuznetsov, 1899, p. 31). He also participated in studying the flora of the Caucasus and in analysing the data from the studies (Kuznetsov, 1902, p. 223). In his last year at work, Fedosseyev dealt with the repair of the greenhouse and was rewarded for this with 75 roubles on 29 September 1900 (EAA, 1898–1900, p. 32).

Jan Muszyński

Soon after Jan Muszyński arrived at the University of Tartu, he established good contacts with the botanists of the university, first of all Kuznetsov and assistant director of the botanical garden Boleslav Hryniewiecki (Meikar, 2002, p. 69). Working simultaneously at the botanical garden and the Institute of Pharmacology, Muszyński completed his master's examination on 23 March 1912. When the war broke out, Muszyński was conscripted and sent to a military hospital near Petrograd (present-day St. Petersburg), where he worked as assistant manager of the pharmacy and teacher in the school of military medical assistants. In 1915, he was sent to Sukhumi to organise the collection of medicinal plants. In the same year, while working in a military field hospital, he submitted his master's manuscript to the Medical Faculty of the University of Tartu. The manuscript evoked disagreement in the review committee, which included also Nikolai Popov, the assistant director (then essentially director) of the botanical garden, but was ultimately still approved for publication. Upon the thesis defence on 19 March 1917, Muszyński was awarded a master's degree in pharmacy (diploma of 2 August 1917). Participation in the thesis defence appears to have remained one of his last stays in Tartu. Muszyński's last contact with the University of Tartu took place on 7 September 1932, when he turned to Prof. Theodor Lippmaa, the then director of the botanical garden, asking him to send him copies of the documents proving his service at the university (EAA, *n.d.*, c; d; 1908–1917; Mushinskii, 1916, pp. 1–27; Meikar, 2002, pp. 69–71).

Muszyński authored a guide to the botanical garden and a brief botanical description of the surroundings of Tartu (Mushinskii, 1911a, pp. 7–101; 1911b, pp. 336–338). Nikolai Kuznetsov, professor of botany and director of the botanical garden, writes in his foreword to Muszyński's work on the botanical garden that the learned gardener Muszyński has spent much time and energy on developing the garden's collection of live plants and has established order in the garden (Mushinskii, 1911a, pp. 3–5). The published overview was the first of this form—the previous detailed history and plant list of the garden had been published nearly 40 year before (Willkomm, 1873, pp. 1–179).

Muszyński's work describes the botanical garden by its departments. A brief description of the park and its vegetation is followed by longer overviews of the departments of the Caucasus, Siberia, Amur-Japan, America, medicinal plants, alpine plants, steppe plants, and the taxonomic department. Biological groups of plants and plants in the six greenhouses are characterised separately and, finally, an overview of insectivorous plants is presented. The work is the first to address the medicinal plants growing in the medical department of the botanical garden. The relevant table contains 88 taxa, preparations derived from them, and their healing properties, separately listing several trees and shrubs growing in the department (Mushinskii, 1911a, pp. 17–101).

During his Tartu period, Muszyński studied the possibilities of obtaining opium in the botanical garden and published the results in the *Apotheker Zeitung* magazine and in the proceedings of the Tbilisi Botanical Garden. Already during his Polish period, he published a Polish-language manual on collecting plants for and compiling a herbarium, and several papers in Polish-language nature and pharmaceutical magazines. By the time of obtaining the degree of Candidate of Sciences, Muszyński could present 30 Polish-language research papers and 3 works in German and 19 in Russian pharmaceutical magazines. His most important floristic works were published in the proceedings of the Botanical Garden of the University of Tartu, to which works in Russian publications were added. There is, however, no complete overview of his works published during the Tartu period. His plant anatomical studies are also incorporated into and highlighted in Kuznetsov's research works. Primarily upon Kuznetsov's encouragement, Muszyński's research focused on the Caucasus and the surroundings of the Black Sea, where he had also been collecting medicinal plants during the First World War (EAA, *n.d.*,d; 1908–1917; Meikar, 2002, pp. 69–71).

In 1896–1912, the learned gardeners H. Siesmayer, M. Fedosseyev, A. Murjan, A. Michils, J. Muszyński and W. Zaikowski participated in the compilation of

the editions of *Index Seminum* of the Botanical Garden of the University of Tartu (Lipshits, 1952, p. 70).

The activities of learned gardeners elsewhere after leaving Tartu

Johann Anton Weinmann in St. Petersburg (Russia)

Of the learned gardeners who worked in Tartu, three men—Johann Anton Weinmann, Ludwig Riedel and Jan Muszyński—later became renowned. Also, the activities of Carl Bartelsen in St. Petersburg were notable.

Weinmann moved to St. Petersburg in 1813 and was admitted, probably upon the recommendation of von Klinger (Salupere, 1997), to the service of Empress Maria Feodorovna, widow of Emperor Paul I, as the superintendent of the palace garden of Gatchina. Weinmann also held a correspondence with von Klinger, as evidenced by his three letters to von Klinger (Weinmann, 1809 & 1811; 1814). It has also been mentioned that Empress Maria Feodorovna invited Weinmann from Tartu to Gatchina in 1813 (Regel, 1859, p. 63).

In 1815, he proceeded to the position of superintendent (essentially the manager) of the castle garden of Pavlovsk. Rather little is known about his professional work there but he is thought to have been essentially a researcher-botanist there, managing the establishment of the entire park complex. Weinmann developed the park into a species-rich landscape park and shaped it into a botanical collection (Trautvetter, 1837, p. 54; Regel, 1858, pp. 356–357; 1861, pp. 350–355; Lipshits, 1947, pp. 77–79). He has even been named as the establisher of the park as redesigned in 1823 (RAN, 2012). Thanks to him, the Pavlovsk Park became the park richest in the species in the surroundings of St. Petersburg. Also the herbarium that he collected from the garden has been preserved (Bubyreva & Osinskaia, 2010). Part of Weinmann's herbarium, together with that of gardener Buek, is located in the collection of naturalist Carl Bernhard Trinius in Moscow (*Herbarium C. B. Trinius*, 2012).

Weinmann was on good terms with widowed Empress Maria Feodorovna and maintained the post confided to him by the Empress also under the new owners of the castle and garden—her son Emperor Nikolai I and grandson Emperor Alexander II. Weinmann was also a good speaker, organised guided tours in

Pavlovsk and vividly described the nature values of the garden to visitors (RAN, 2012).

In parallel with his duties in the garden, Weinmann also devoted himself to studying the flora of Russia. The number of his scientific publications is not known but has been stated to amount to 19 (Trautvetter, 1880, pp. 319–323) or 21 (Lipshits, 1947, pp. 77–79). His papers deal with vascular plants, bryophytes, lichens, algae and various fungi. Weinmann's principal and best known works are the following five overviews: plants of Pavlovsk Garden (1824), fungi of Russia (1836), flora of the St. Petersburg area (1837), bryophytes of Russia (1845, 1846), and flora of Perm Oblast (1850) (Lipshits, 1947, pp. 77–79).

In preparing the plant list of the Pavlovsk Garden, Weinmann followed the taxonomy of Carl von Linné, presenting also the synonyms. He listed the species and intraspecific varieties along with author citations, dividing them between 24 families. He recorded about 660 species in the garden, 633 of them belonging to *Phaenogamae*, 2 to *Characeae* and 24 to *Filicoideae*. Also the life form and natural habitat (distribution range) are specified for each taxon (Weinmann, 1824, pp. 1–472; Trautvetter, 1880, pp. 320–321). For this work, Weinmann was elected as a correspondent member of the Imperial Academy of Sciences of St. Petersburg in 1831 (Regel, 1959, p. 63; Lipshits, 1947, pp. 77–79).

When St. Petersburg-based famous botanists von Trinius (1778–1844), August Gustav Heinrich von Bongard (1786–1839) and Friedrich Ernst Ludwig von Fischer (1782–1854) had read Weinmann's manuscript on the fungi of the St. Petersburg area, they proposed that he draw up an overview of the fungi of Russia. He did undertake this work, which resulted in a detailed and highly valued piece of research. Weinmann's work builds on the research of German botanists Kurt Polycarp Joachim Sprengel (1766–1833) and Christian Gottfried Daniel Nees von Esenbeck (1776–1858) and Swedish mycologist Elias Magnus Fries (1794–1878). The monograph on fungi consolidates the materials collected by Weinmann himself and at least eight more botanists. Part of the material collected by Weinmann has been described by Fries. Weinmann's work describes 1,128 fungus species, including their taxonomy, identification features, synonyms, habitats, seasons of occurrence and distribution ranges, also listing all pieces of literature mentioning the respective fungus species. Weinmann's work is based on Fries's taxonomic classification of fungi. It also describes 99 new species and one new special form (Weinmann, 1836, pp. 1–660; Trautvetter, 1880, p. 322; Lipshits, 1947, pp. 77–79; Shcherbakova, 1979, p. 123; *Istoriia*, 2009).

In the overview of the flora of the St. Petersburg area, Weinmann published the results of his 18-year work and materials collected by himself and others. This work earned Weinmann the award of the St. Petersburg Free Economic Society. The work lists 2,427 species of vascular plants, bryophytes, lichens and various fungi, and a number of intraspecific taxa. The taxa are divided into two big groups: *Plantae Phanerogamea* and *Plantae Cryptocamea*, with 665 and 1,762 species, respectively: a total of 1,373 taxa of fungi (*Fungi*), 196 taxa of bryophytes (*Musci*), 114 taxa of lichens (*Lichenes*), 52 taxa of algae (*Algae*), and 27 taxa of pteridophytes (*Filicoideae*) (Trautvetter, 1880, p. 322; Weinmann, 1837a, pp. 1–320, Lipshits, 1947, pp. 77–79).

In his fourth work, Weinmann published an overview of Russia's bryophytes, presenting the identification features, synonyms, habitats and ranges of 252 Bryopsida species collected and identified by himself and others (Trautvetter, 1880, p. 323; Weinmann, 1845, pp. 429–489, 417–503; 1846, pp. 517–538; Lipshits, 1947, pp. 78–79). His fifth work gives an overview of the flora of Perm Oblast, listing 323 species (Trautvetter, 1880, p. 323; Weinmann, 1850, pp. 538–588; Lipshits, 1947, pp. 78–79). In addition to the above, Weinmann examined the herbarium of the flora of Tambov Oblast collected by O. von Thoermer in 1835–1836. On the basis of this analysis, he recorded 153 species, varieties and forms. Eight of the species and also several varieties and forms are new, with Latin descriptions presented for each of them. Weinmann also named a new plant species found by Thoermer in his honour as *Carduus thoermeri* Weinm. (Weinmann, 1837b, pp. 51–74; Trautvetter, 1880, p. 322; Shcherbakova, 1979, p. 90). In the course of his studies, Weinmann described over 200 new vascular plant, bryophyte and fungus species.

On 24 January 1846, Weinmann was elected as correspondent member of the Russian Imperial Academy of Medical Surgery. He was also a regular, ordinary, correspondent or honorary member of seven specialist societies (gardening and pharmacy), including the Naturalists' Society of Moscow. Weinmann died in Pavlovsk, according to the first notice of Eduard August Regel (1858, p. 356) on 17 August 1858 and according to his second notice at 8 p.m. on 5 August 1858 in the presence of his wife and daughter (Regel, 1859, p. 63). Thus, according to the new calendar, Weinmann's birth and death dates should be 23 December 1782 and 17 August 1858, as the date of death in the first notice of Regel (1858, p. 356) was given according to the new calendar.

Ludwig Riedel in Brazil

The arrival of Ludwig (in Brazil, Luis) Riedel in St. Petersburg has been documented by Johann Friedrich Eschscholz, professor of the University of Tartu, in his letter of June 1820 to his friend Adelbert von Chamisso in Berlin. Eschscholz wrote that Riedel had arrived at Weinmann's in St. Petersburg to head off for a 3 to 4-year expedition to South America. It is not known which expedition he referred to (Komissarov, 1977a, p. 33; Augel, 1979, p. 50). Riedel's leaving from Tartu has been associated with his letter to Consul General Georg Heinrich von Langsdorff, who had been appointed in 1812, arrived in Brazil in 1813 and returned to Europe in March 1820. Riedel spent two months at Weinmann's in Pavlovsk, then travelled to St. Petersburg in July and reached Kronstadt on 22 July. He was still there on 20 August to travel to the New World. From Kronstadt, Riedel travelled to Finland, visited Sweden and Norway and arrived in Copenhagen on 7 September. On 18 October 1820, Riedel arrived in Lisbon aboard the Danish ship *Concordia* (Komissarov, 1977b, pp. 15, 27, 29; Augel, 1979, pp. 25–26). Russia's Consul General in Lisbon at the time was Franz (Francois) Borel, later Consul General in Brazil, who arrived in Rio de Janeiro on 13 (25, according to N.S.) November 1829 (Komissarov, 1977b, pp. 56–57). Riedel may have known him. After living in Lisbon for nearly two months, he reached the port town San Salvador in 8 January 1821, capital of the Brazilian state of Bahia (Augel, 1979, pp. 25–26).

Ludwig (later Luiz in Brazil) Riedel has written in his diary about his arrival in Brazil:

I had such strong emotions that, I don't even know how, tears came into my eyes. I saw a land in the distance, saw myself among people so different from Europeans. The food, the climate, the products of this country—everything was new for me. I took a look into the past and thought about the future not without excitement, like a forsaken must have felt, like a reborn, left without parents and dependent on the humanity of others only. (Komissarov, 1977a, pp. 33–34)

In San Salvador, he met German naturalist Adolf Zaueracker (Saueracker), who had been in Brazil since 1819, to join him to travel south, to the port town of Ilhéus in Bahia state, where a big German colony established in 1818 resided at the time. Riedel and Zaueracker reached Ilhéus with difficulty only on 8 February 1821. While living in Ilhéus for a year and a half, Riedel studied the vegetation

of the area of provinces of Bahia and Minas Gerais and took notes on the local Indians and the immigrants there (Augel, 1979, pp. 26–27; Komissarov, 1977a, p. 34; de Moraes, 2012, pp. 185–187).

Riedel tolerated the local climate poorly, he fell ill and ran into financial difficulties. He wrote in his diary on 17 May 1822: “Many a thing is possible, I dry my paper by the fire to save the collected plants. Poverty does not allow me to have more paper and just the suitable paper.” He continued on 5 June:

Rain has been pouring down all day long, all my paper is used up with plants... The tiny place where I live, and also cheese, everything was covered with mould... I kept a fire in my hut all day to dry the paper... How miserable it is to live without the essential amenities that could be obtained easily and without big expenses.... I could work half the night, I can have no sleep, I don't care, but where could I get money for lamp oil... If I had one franc per day, I wouldn't have to sleep hungry as it quite often happens.

He noted in June 1822: “I am getting weaker day by day. My feet are swollen, even a short trip makes me tired and brings suffering...,” and already in July: “But what can I do amid so many plants, I must not get tired.” (Komissarov, 1977a, pp. 34–35). It is not quite clear for whom he collected the plants. Still, it has been said that he was to collect plants and seeds for the St. Petersburg Academy of Sciences (Urban, 1894, p. 11). According to the information sent from St. Petersburg on 15 February 1822, the sum of 20,000 roubles had been allocated to von Langsdorff and 4,000 roubles to Mr. Riedel, formerly a botanical gardener at the University of Tartu, with a view to obtain interesting material from him, as he was not just a plant expert but also an expert in entomology, mineralogy and other fields (*Allgemeinen Deutschen...*, 1822, p. 91). He also had knowledge in ichthyology (*Flora oder Botanische...*, 1822, p. 112). Thus, Riedel's stay in Brazil was known in St. Petersburg. From early February 1821 to early November 1822, Riedel was botanising and touring in southern Bahia. According to his diary, his numbered plant collections from Bahia and Minas Gerais's provinces contained 1,025 species (Urban, 1894, pp. 11–12; de Moraes, 2012, p. 187).

Riedel got saved when Georg Heinrich von Langsdorff, former consul in Brazil, commenced a complex expedition to study the nature and population of Brazil and engaged Riedel in the expedition as a botanist (Urban, 1894, pp. 6–21; Manizer, 1947, pp. 45–148; Barman, 1971, pp. 67–96; Komissarov, 1975, pp. 67–103; 1977a, pp. 5–116; Augel, 1979, pp. 39–48; Basargina *et al.*, 2012, pp. 14–91). On 27 May 1822, Riedel wrote to Langsdorff about his situation

(Komissarov, 1977a, p. 35). Langsdorff had arrived in Rio de Janeiro with his companions, expedition supplies and 85 German colonists (with Langsdorff personally subsidising the travel of 65 of them) on 21 February (5 March, according to N.S.) 1822 aboard the ship *Doris* (Komissarov, 1975, p. 69). Riedel also wrote to Russia's vice consul Francisco Ribeiro Pessoa. Having received 600 francs of financial support from Pessoa upon Langsdorff's approval, Riedel left Ilhéus on 7 or 8 November 1822 and arrived in Rio de Janeiro on 15 November. There, he went to Russia's representation, met Vice Consul Piotr A. Kielchen, Prussian Consul Karl Wilhelm Theremin, the Swedish Consul, and German naturalists Georg Wilhelm Freyreiss and Heinrich Karl Beyrich. Riedel left Rio de Janeiro on 20 January. Arriving at Mandioca Manor (*Fasenda Mandioca*), a place on the River Serra de'Estrela which Langsdorff had bought in 1816 (1817), he met Langsdorff and the other members of the expedition (Urban, 1894, p. 10; Komissarov, 1977a, p. 35; Augel, 1979, p. 30; de Moraes, 2012, p. 187). The expedition financed by Russia and supported also by Czar Alexander I was held in 1821–1829 and was divided into two stages: (1) beginning of the expedition and initial travels 1821–1825, and (2) the years 1825–1829, which formed the main part of the expedition (Manizer, 1948, pp. 45–148; Komissaro, 1975, pp. 73–103; 1977a, pp. 24–103).

After improving his health at Mandioca, and as the start of the expedition was delayed, Riedel studied the nature in the surroundings of Mandioca with zoologist Édouard Ménétries in 1823 and collected an excellent herbarium (Komissarov, 1977a, p. 35). In the spring and summer of 1822, while living at Mandioca with the participants of the expedition, Langsdorff did not embark on long travels. From September to November, he organised a larger expedition to the surroundings of Rio de Janeiro. In 1823, the naturalists, including Riedel, collected on the rivers Inhumerim and Paraíba and in the surroundings of Sumidouru, Samambaia, Barra (Barra da Tijuca) and other settlements. As departure for the larger expedition was delayed, Riedel wrote to the Prussian Minister of Culture on 10 July 1823, asking for financial support. As botanist Friedrich Sellow (Sello) was currently collecting plants in this area at the service of Prussia, the allocation of a grant to Riedel took long. However, thanks to his supporter garden inspector Otto, Riedel received 450 Marks on 4 January 1824 and resigned from Langsdorff's expedition. In 1824–1826, Riedel used the grant to collect live plants, tubers, bulbs, and 506 accessions of seeds for the Botanical Garden of Berlin (Urban, 1894, p. 11; Augel, 1979, p. 51).

Langsdorff spent the beginning of 1824 on preparations for the new expedition. Only on 26 April (8 May, according to N.S.) did the participants leave Mandioca to head north towards Minas Gerais, accompanied by Riedel, Johann Moritz Rugendas, Ménétries and Nester G. Rubtsov. They returned to Mandioca in February (on 1 March) 1825, having covered over 1,000 km in the ten months and gathered a rich collection of various materials, including 25,000 specimens of plants from 1,500 (1,400) species (Urban, 1894, pp. 12–15; Komissarov, 1977a, pp. 37, 47).

The expedition materials were sent to St. Petersburg on the frigate *Kreisser* of Mikhail Lazarev's world circumnavigation (1822–1825) and on the brig *Krotki* of Ferdinand von Wrangel's world circumnavigation (1825–1827) under the accompaniment of gardener apprentice Johann Stewardt. The living plants were intended for the Botanical Garden of St. Petersburg (Nekrasova & Prussak, 1957, p. 806; Komissarov, 1977a, pp. 36, 47–48).

In 1825, it was decided in St. Petersburg to allocate a new grant to the expedition. Langsdorff took off to a new expedition on 22 or 25 August (3 or 6 September, according to N.S.) 1825. Most of the participants boarded a ship in Rio de Janeiro to travel to the port town of Santos, while Riedel and Christian Hasse headed to the province of São Paulo on land with the expedition's caravan (Komissarov, 1975, pp. 81–82; 1977, p. 51). They also stayed in the cities of Santos, São Paulo, Itu and Ipanema, making trips to the surrounding areas. Langsdorff returned to Mandioca on 24 January (5 February, according to N.S.) 1826, appointing Riedel as his substitute. The expedition group headed by Riedel studied the south-western part of the São Paulo Province, staying in the cities of Itapetininga, Castro, and others. (Urban, 1894, p. 15; Komissarov, 1975, pp. 84–86; 1977, p. 52–54)

Langsdorff returned to Porto Feliz, where also the expedition group had arrived in the second half of March, April 1826. From there, the expedition—consisting of 8 (7) boats and nearly 30 (40) people—took off on a new research trip on 10 (22, according to N.S.) June 1826. On 18 (30, according to N.S.) January 1827, they arrived in Cuiabá, the capital of the Matu Grosso state, having covered 4,000 km since Porto Feliz. They covered most of the distance by rivers, also making numerous land journeys in different directions on the way (Urban, 1894, p. 15; Komissarov, 1975, pp. 81, 86–88; 1977a, pp. 55–63).

The following months of 1827 were spent on resting and organising the collections. Cuiaba remained the expedition's main stopover from where longer

journeys were undertaken during six months, with longer stays in the cities of Guimarães and Diamantina. As an outcome of these journeys, Riedel collected and sent to St. Petersburg 800–900 new plant species and a big quantity of seeds of unknown plants (Urban, 1894, pp. 15–16; Nekrasova & Prussak, 1957, p. 805; Komissarov, 1975, pp. 90–94; 1977a, pp. 65–74).

When departing for an expedition again, Langsdorff divided the participants into two groups.

One group consisted of Riedel and Taunay, who took off on 9 (21, according to N.S.) November 1827, moved west to the Guaporé River and were supposed to reach the Amazonas along the Madeira River. Unfortunately, Taunay perished on 5 January 1828 on the Guaporé River, which was a great blow for the entire Langsdorff's expedition. Riedel still continued the expedition as planned and, despite all the difficulties he met, completed the journey and arrived in Belém, the largest city of Pará Province at the mouth of the Amazon, on 29 December 1828 (9 January 1829 – N.S.) in a poor health condition. The other branch of the expedition had arrived there on 4 (16 – N.S.) September. Riedel covered more than 7,500 km since Taunay's death and collected a large botanical collection during the expedition (Nekrasova & Prussak, 1957, p. 805; Komissarov, 1975, pp. 100–101; 1977a, pp. 75, 81–84, 96). On 14 (26 – N.S.) March, the whole expedition arrived in Rio de Janeiro on the ship *Don Pedro I*. Langsdorff's 32 (16) crates with expedition materials were shipped to Hamburg, accompanied by Nester G. Rubtsov. From there, they were sent to Lübeck, from where Russian Consul Karl Schlözer sent them to St. Petersburg (Nekrasova & Prussak, 1957, p. 806; Komissarov, 1975, pp. 101–102; 1977a, p. 97; Basargina *et al.*, 2012, p. 60).

Langsdorff got himself a good botanist in Riedel, which is evidenced by his several positive appraisals. For example, in his letter of 27 March, Langsdorff notes to Nesselrode that Riedel had sent to St. Petersburg 800–900 new plant species and a big quantity of unknown seeds. Riedel has also been described as an energetic and tough traveller (Nekrasova & Prussak, 1957, p. 806; Komissarov, 1977a, pp. 29, 33–35) and as a person who helped to solve various conflicts that arose during the expedition (Baeza, 2012, pp. 8–11).

Riedel wished to receive a new grant from St. Petersburg for further collecting of plants. This, however, was to be decided upon his return to St. Petersburg. Riedel still remained in Rio de Janeiro and married a daughter of a family living in the farmland of Mandioca. He established his home in Praia Vermelha near

Rio de Janeiro. He also continued to collect plants in the surroundings of Rio de Janeiro (from April 1829 to May 1930) (Urban, 1894, pp. 17, 20; Komissarov, 1977a, p. 97).

In 1830, Riedel arrived in Kronstadt (St. Petersburg) aboard the ship *Elena* (*Helena*) of a Russian-American company, which was circumnavigating the world (1828–1831) under the leadership of Vassili S. Khromtchenko (St. Petersburg). He brought along 84 pieces of luggage: a herbarium of 8,000 species (80,000 specimens) and 1,000 live plants. St. Petersburg Botanical Garden bought the collections for 12,000 and 25,000 roubles, respectively (Urban, 1894, p. 17; Nekrasova & Prussak, 1957, pp. 806–807; Komissarov, 1977a, p. 99; Basargina *et al.*, 2012, p. 60).

Here it is appropriate to mention that in 1823 the St. Petersburg Aptekarsky Island of medical plants was restructured and renamed the Imperial Botanical Garden, which became the centre for collecting and research of plants in the whole of Russia, and this also explained the urgent need for new plants in the following years. Thus, in 1824, the Imperial Botanical Garden in St. Petersburg contained 5,682 species and in 1836 nearly 15,000 species (Lipskii, 1913, pp. 318–320). As a result, the number of plant species more than doubled during Riedel's stay in Brazil.

Riedel was contracted for the period of 14 February 1831 to 1 June 1836 to return to Brazil, organise expeditions to different parts of Brazil and collect seeds, a herbarium and live plants for the botanical garden. Riedel returned to Rio de Janeiro on 3 August 1831 with some students from the Academy of Arts and gardener (Nekrasova & Prussak, 1957, pp. 806–807; Komissarov, 1977a, p. 101; Basargina *et al.*, 2012, p. 60). Bernhard Luschnath, who had been hired as gardener of the St. Petersburg Botanical Garden as of 16 July 1831 and travelled to Brazil on board the expedition (1831–1833) ship *America* (*Amerika*) operated by captain V. S. Khromtchenko, was appointed as Riedel's assistant. He arrived in Rio de Janeiro on 3 January 1832. Riedel and Luschnath established a small botanical garden in Rio de Janeiro to gather live ornamental and medicinal plants for sending to St. Petersburg (Trautvetter, 1837, p. 54; Manizer, 1947, pp. 147–148; Nekrasova & Prussak, 1957, p. 807; Komissarov, 1977a, p. 102). Prior to travelling to Brazil, Luschnath (who also had a brother in Russia) worked in Tessel Manor of General Nikolai N. Rayevski jun. (1801–1843) in Crimea. This is mentioned by Friedrich Ernst Ludwig Fischer, director of the St. Petersburg Botanical Garden, in his letter of 12 June 1833 to Rayevski, in which he refers to Luschnath, former gardener of the manor, as Brazilian

(Nekrasova & Prussak, 1957, p. 807). In 1833, Luschnath returned from Brazil to St. Petersburg on board the ship *America* with 2,000 clay pots with live plants worth 100,000 roubles, and 2,000 species (20,000 specimens) of herbarium plants, a big quantity of various fruits, seeds, wood samples, and a zoological collection. The ship *America* arrived in Rio de Janeiro for the second time during the expedition on 7 April 1833, and from there to Kronstadt on 13 September 1833. Luschnath left the service of St. Petersburg Botanical Garden due to illness on 8 October 1833 and proceeded abroad (Ivashintsev, 1872, pp. 118–123, 240–241; Nekrasova & Prussak, 1957, p. 807; Komissarov, 1977a, pp. 101–103). Luschnath, who has also been called “The English Gardener”, became famous for inventing, while en route from Rio de Janeiro to St. Petersburg in 1833, a method of transporting live plants on board a ship so they would not die (*The Nautical Magazine*, 1838, pp. 167–168).

In 1832, Riedel sent to St. Petersburg twelve boxes with live plants, herbarium materials, fruits and seeds (Nekrasova & Prussak, 1957, p. 807). In 1833–1835, Riedel made a long collecting trip together with Peter Wilhelm Lund, a renowned Danish palaeontologist, zoologist and archaeologist, who had settled in Brazil (Urban, 1894, p. 18). In 1835, Riedel sent to St. Petersburg five cases with collections of seeds, herbarium materials and wood samples. One case alone contained a herbarium of 1,000 specimens. Riedel was dismissed from St. Petersburg Botanical Garden by his own accord as of 1 July 1836 and stayed to live in Brazil. He was known as an energetic organiser and renowned botanist, and Langsdorff and Riedel have been said to have left an indelible imprint in the study of Brazil’s flora (Nekrasova & Prussak, 1957, pp. 805–806; Komissarov, 1977a, p. 103).

Having left the service of Russia, Riedel ran into financial difficulties. He still continued to collect plants. In 1838–1839, he collected them together with the French botanist Jean Baptiste Antoine Guillemin; the herbarium is located in Paris (Urban, 1894, p. 18; *JSTOR Plant Science*, 2012). In 1838, Riedel left Rio de Janeiro for Europe and arrived back in Brazil through Hamburg on 19 February 1839 (Augel, 1979, p. 52).

In the states of Brazil, Riedel collected

- 1) in 1821–1822 in Bahia – plants of 1,000 (1,025) species;
- 2) from November 1822 to April 1824 in Rio de Janeiro – plants of an unclear number of species;

- 3) from April 1824 to February 1825 in Minas Gerais – 1,500 species;
- 4) from September 1825 to February 1829 in São Paulo, Mato Grosso, Alto Amazonas and Pará – 1,600 species;
- 5) from April 1829 to May 1830 in Rio de Janeiro – an unclear small amount of species;
- 6) from October 1831 to January 1836 in Rio de Janeiro, São Paulo, Goiás and Minas Gerais – 3,000 species. (Urban, 1894, p. 20)

It is written that Riedel “has brought from Rio de Janeiro for the [St. Petersburg] botanical garden a collection of more than a thousand living Brazilian plants, beautiful and rare, among which are many that have not before been found in any botanical garden in Europe” (*AJSA*, 1831, p. 175). The herbarium collected by Langsdorff and Riedel contains about 100,000 specimens of herbarium plants, fruits and seeds of 10,000 (12,000) species and has a high scientific value. The herbarium specimens collected have been mentioned to include 15 per cent of the immense flora of Brazil. They were examined by many well-known botanists of Russia and other countries. Several plant genera and nearly 30 species were named in honour of Langsdorff and one genus with six species was named in honour of Riedel (Komissarov, 1977a, p. 110).

It is known that the herbarium of St. Petersburg Botanical Garden comprised 20,000 specimens from 2,000 species and had been collected by Riedel in conjunction with Luschnath in 1831–1836. In addition, four packs of dried herbs, referred to as “the Brazilian collection”, were obtained from Luschnath. In 1835, 1837 and 1839, he sold part of his herbarium accumulated in the state of Bahia to St. Petersburg Academy of Sciences for 400, 20 and 70 roubles (Nekrasova & Prussak, 1957, p. 812). Luschnath returned to Brazil, as he has been stated to have collected the plants until 1837 (Manizer, 1947, p. 147; *JSTOR Global Plants*, 2013). Guido Pabst and Fritz Dungs (1977, p. 55) wrote: “Luschnath collected around Rio de Janeiro in 1831, 1833 and 1834 and in Bahia in 1835 and 1837. His plants were sent to the Herbarium in Rio de Janeiro, Bahia, Kiel, Brussels, Berlin and St. Petersburg”.

In January 1842, Riedel wrote: “I am in a critical situation. My enormous trade in plants and seeds does not provide sufficient means for maintenance and for the education of my seven children.” (Komissarov, 1977a, pp. 105–106) On 11 February 1842, Riedel got a job at the National Museum (then Imperial Museum) of Brazil, where he was the first person to head the Department

of Botany, Agriculture and Handicraft; Riedel worked there until 1861 (de Sampaio, 1922, pp. 39–41, 44; Komissarov, 1977a, p. 106). Since 1942, Riedel was also the manager of the gardens of the residence of Brazilian emperor Pedro II and worked for years as director of the parks and gardens of Rio de Janeiro. In Brazil, Riedel maintained contacts with Russian researchers. Naturalist Ilya G. Voz(s)nessenski, who visited him in 1839, wrote that Riedel's house and garden were always open to him. Carl Johann Maximowicz, too, stayed at Riedel's place in 1853 when he visited Rio de Janeiro on the frigate *Diana*. Riedel had also a good sense of language—he compiled a bilingual dictionary of the language of a local Indian tribe and Portuguese, which, however, remained a manuscript (*Materialy...*, 1973, p. 59). French botanist and landscape architect Auguste François Marie Glaziou, who became director of the parks and gardens of Rio de Janeiro in Riedel's place in 1858, has written about Riedel's last years. It appears that Riedel was ill for a long time and died in 1861 in Rio de Janeiro (Urban, 1894, p. 19; Nekrasova & Prussak, 1957, p. 808; Augel, 1979, pp. 53, 56; FBN, 2003).

Carl Bartelsen in St. Petersburg

While working in St. Petersburg Botanical Garden, Bartelsen made frequent visits abroad. He visited the Hamburg Horticultural Exhibition and big greenhouses in 1898, participated with exhibits in Paris World Fair in 1900, participated in the horticultural exhibition in Riga in 1901, visited the Gagra Plant Exhibition in Paris in 1903, participated in the International Horticultural Exhibition in London, and visited Kew Gardens and several horticultural institutions in Britain in 1912. In 1905, 1907 and 1909, he visited the Caucasus and Crimea to collect seeds, wood samples and live plants. He introduced *Osmunda regalis* to the botanical garden from Adler and cultured *Hicoria pecan* (*Carya illinoensis*) from the Caucasian Black Sea coast. In 1899 and 1912, he designed new layouts for the botanical garden (Lipskii, 1913–1915, pp. 241–243).

Jan Muszyński in Poland

After the outbreak of the First World War, Muszyński was conscripted into the Russian army as assistant manager of the field hospital's pharmacy of the

Horse Guard Regiment in St. Petersburg and as the superintendent of the local botanical garden. A year later, he became the manager of a government-owned plantation of medicinal plants and its factory in Sukhumi, providing the army with morphine. Only in 1917 did he manage to complete his master's thesis (Mushinskii, 1916, pp. 1–27) and receive a diploma in pharmacy. In Russia, this diploma was equivalent to the doctoral degrees awarded in the Austro-Hungarian Monarchy.

Jan Muszyński returned to his free homeland only in 1921. From Sukhumi, he brought floristic collections, which he donated to the University of Warsaw. He found his first job in Planta, a Warsaw-based herbal products company. His unique qualifications attracted the attention of the Ministry of Public Health and he soon became an officer of its Medicinal Plants Section. For a short period he also worked as superintendent of the university's medicinal plants garden in Warsaw (Magowska, 2001, pp. 63–64).

In the fall of 1921, he was seconded to work in Wilno (now Vilnius) as a deputy professor responsible for organising pharmaceutical studies and establishing the Chair of Pharmacognosy and Medicinal Plant Cultures and the Medicinal Plants Garden. It was a pioneering mission, not just because Poles had not had any scientific or organisational achievements in pharmacognosy. Muszyński organised the garden without any subsidies, fully relying on his own resourcefulness and hard work. Together with his assistant Waław Strażewicz, he took trips to local meadows and woods, collecting plant seeds from their native habitats and later exchanging them for seeds and seedlings with renowned botanical gardens in Europe and the USA (Magowska, 2001, p. 32).

In the absence of academic staff, Muszyński periodically taught not only pharmacognosy but also growing of medicinal plants, microscopic analysis of therapeutic materials, toxicology, applied pharmacy and history of pharmacy. In 1923, he was appointed as manager of the Pharmaceutical Department of Wilno University, while continuing to head the Chair of Pharmacognosy and Medicinal Plant Cultures. In 1928, he took a study tour across Europe to investigate modern methods of growing medicinal plants (Muszyński, 1929, pp. 403–406). In the interwar period, his medicinal plants garden was the most important centre promoting such methods in Poland, exporting seedlings to England, among others. His achievements earned him the title of professor in 1937 (Magowska, 2001, pp. 88–89, 119, 204).

The outbreak of the Second World War interrupted his promising scientific

career. Muszyński took up work in the laboratory of Rodowicz's drugstore, and later in the laboratory of a Wilno-based chemical and pharmaceutical factory by the name of Eska. In the fall of 1942, he managed to flee to Warsaw, where he took the position of scientific advisor of the factory E. Gobiec i Ska and manager of a local plantation of medicinal plants. Soon he became an activist of the clandestine Warsaw University, teaching various courses to pharmacy students. When the Warsaw Uprising broke out in August 1944, he volunteered for medical corps. When the uprising failed, he moved to the nearby town of Radom, where he stayed until the end of the war.

In 1945, the borders of Poland were changed and Muszyński was unable to return to Wilno. The state authorities entrusted him with the challenging task of organising the Pharmaceutical Faculty at the newly established University of Łódź, a city without remarkable academic traditions. The task also involved organising the Chair of Pharmacognosy and founding a Medicinal Plants Garden. He became the first dean of the faculty and held that function until 1951. He continued to head the Chair of Pharmacognosy and manage the Medicinal Plants Garden until his death on 28 April 1957. He was buried in Łódź.

Muszyński's scientific achievements include 524 publications in phytochemistry, pharmacognosy, plant cultures, ethnography and the history of pharmacy. His major successes were the first Polish atlas of pharmacognosy (1923); research into the acclimatisation of a number of plants, including medicinal (e.g., *Mentha piperita*, *Solidago canadensis*) and domesticated (e.g. *Lycopodium selago*); monographs on plant materials for the Polish pharmacopeia (published in 1937 and modelled on the American pharmacopeia of 1926) (Muszyński, 1927, p. 7; Magowska, 2001, pp. 88–89, 94, 163).

Jan Muszyński was not only a versatile scholar and humanist but also an avid social activist. In 1905, he joined the International Esperanto Association and actively promoted the Esperanto language until the end of his life. In Tartu, he was a member of the Academic Association of Pharmacists Lechicja, a self-help and research organisation of Polish students. In recognition of his contribution, Muszyński was awarded honorary membership in 1910.

He reactivated the group in Wilno, changing its name to the Academic Pharmaceutical Society Lechia. He co-founded the Society for the Promotion of Medicinal Plants, modelled on Munich-based *Hortus-Gesellschaft*. He was also an activist of the Polish Herbal Products Association (*Kronika*, 1928, pp. 11–15). In Wilno, he was actively involved in organising anti-gas defence training by giving

lectures on chemical warfare. He was elected the president of the Anti-Aircraft Defence Society, which won him the Golden Cross of Merit in 1933.

In Łódź, he reactivated the Lechia Society and, despite being more than busy with work, was always ready to offer advice and initiate numerous projects. Lechia was dissolved for political reasons in 1948. Since 1947, Muszyński was the president of the newly formed Polish Pharmaceutical Society. Some time later he established its local branch in Łódź and was awarded honorary membership for his lifetime achievements. His students and colleagues remembered him as a friend and supporter of young people, a talented lecturer and amateur poet, who was always glad to recite his own poems on special occasions (Kaszczuk-Grodzicka, 1994, pp. 8–11).

Summary

The development of horticulture in the Estonian and Livonian provinces (the present-day territories of the Republic of Estonia and the northern part of the Republic of Latvia) of the time started in the medieval period, when the first gardeners arrived in the region from Germany. The process largely coincided with the development of Riga, Tallinn, Pärnu, Haapsalu and other larger cities and towns and the growing interest in establishing gardens here. In the 18th and 19th centuries, the number of gardeners arriving from Germany, Sweden and Denmark started to grow, as nearly every manor had employed its own gardener. While there were Estonians and local second- or third-generation Germans and Russians living in Estonia among them, most of the gardeners were foreigners. It is unfortunate that until now the gardeners and their role in the development of horticulture in Estonia have not been the focus of research, and also that no comprehensive overview has been published so far, even though single gardeners have been passingly discussed in monographs and articles on the said towns' citizenry, manor servants and parks.

When the University of Tartu was reopened in 1802, it was also envisaged that a botanical garden would be established. Its establishment started in 1803, about 1.2 kilometres southeast of its present location. In 1808, the garden was moved to its present location on the bank of the River Emajõgi. In 1802–1918, seven men worked as directors of the botanical garden and botany professors at the university, six of them being outstanding researchers of their time and known also

beyond the borders of Russia. Of the seven men, Alexander Georg von Bunge served longest (1836–1867) and Mikhail Tswett served shortest (1917–1918).

The position of assistant director of the botanical garden was established in 1833 and held by 18 men, with Johann Klinge serving longest (1879–1895) and Rathleff and Bärnoff for a brief period in 1835 and 1836, respectively. Eleven persons served in the position for less than two years and thus could not leave a significant imprint on the development of the garden.

Over the period of 1803–1918, the number of persons who worked as learned gardeners at the botanical garden was 22. Two of them, Stelling and Bartelsen, served in the position for a longer period (1834–1876 and 1876–1896, respectively), while Buek, Wagner and Rochel served for a short time. Fifteen of the learned gardeners held the position for less than two years, with Murjan holding it twice and his second term lasting for four years. The remaining learned gardeners held the position for less than ten years. One can thus conclude also for the learned gardeners that most of them could not make a significant contribution to the garden's development because much of their time worked in the garden was spent on settling in. Thus, the turnover of both assistant directors and learned gardeners was high. This was due to several reasons, which would need to be discussed separately.

Learned gardeners were expected to possess a good general education and, naturally, also professional knowledge and practical skills. Until the beginning of the 20th century, persons who had studied in gardening schools and had acquired practical experience in well-known botanical gardens seem to have been preferred. As there were no such educational institutions in Russia that would have satisfied the university, the university tried to use foreigners when possible. The first seven learned gardeners came from Germany. Of them, Johann Anton Weinmann emerged as the most significant person. He would probably have stayed in Tartu unless there was the conflict with Ledebour.

Hiring learned gardeners from abroad would, however, have presupposed a higher salary at the university, which probably became an obstacle for many potential learned gardeners. For example, in 1846 and 1860, the yearly salary of learned gardener was 457 roubles, while that of the assistant director of the botanical garden was 280 roubles. In 1864, learned gardener's salary was 600 roubles, at the end of the 19th century—nearly 1,000 roubles, and before the First World War—1,200 roubles, which, however, lagged behind average salaries in other botanical gardens of Europe. The yearly salary of foreign learned gardeners in

the Imperial Botanical Garden in St. Petersburg (now the Botanical Garden of the Komarov Botanical Institute), the Botanical Garden of Moscow University, and the Botanical Garden of Voronezh (known as the pomological garden or arboretum) at the end of the 19th century was 1,200, 1,500 and 1,000 roubles, respectively (EAA, 1897–1903, pp. 14–15; 1828–1862, pp. 76–78; Meikar, 2002, p. 63; Leppik, 2006, p. 281).

In addition to learned gardeners, the botanical garden also employed their assistants, with 14 of them having been identified. Of the known assistant gardeners, Ludwig Jacobsohn served longest, while the rest served for less than three years. Thus, two men who worked together longest were Stelling (who worked in the garden in 1828–1876, as learned gardener in 1834–1876) and Jacobsohn (1837–1877, assistant learned gardener in 1851–1877) during the time of botany professors and garden directors Bunge and Willkomm. However, there was dissatisfaction with learned gardeners also inside the university. For example, the university's syndic Theodor Heinrich Beise wrote a long and interesting letter on 6 September 1855, in which he analysed the legal status of the botanical gardener, requirements for the position, etc. He finds that learned gardener Stelling is not suitable for the position because the position would presuppose special training or higher education, while the person in question has no documents certifying this. Also, the university's revised statutes of 1820 stipulated that the professor of natural history be assisted by a botanical gardener (this had been stipulated all along) and two workers. By an ordinance of 25 May 1833, the learned gardener even became an assistant to the professor of natural history (botany), which would certainly have presupposed a relevant education (EAA, 1828–1862, pp. 48–51).

The Botanical Garden of the University of Tartu also attempted to raise competent gardeners itself by hiring gardener apprentices but without any significant success.

During the period under observation, a total of 35 gardeners are known to have worked in the botanical garden, including those who worked in the garden for a brief period or temporarily. Most of them came from Germany and relatively few came from elsewhere—for example, four persons came from Russia, three from St. Petersburg. It should be noted here that ties between the botanical gardens of Tartu and St. Petersburg were rather tight. Four persons, on the other hand, proceeded from Tartu to various positions in St. Petersburg, while Riedel travelled from there to Brazil through Portugal. Six gardeners came from elsewhere than Germany, from six countries in total: learned gardener Louis

Autem came from France through Berlin, Arthur Michils came from Belgium, temporary gardener A. Rochel from Hungary, Jan Muszyński and Władisław Zaikowski from Poland, and gardener apprentice Pado Capellino from Italy. Among the learned gardeners and gardener assistants there were also Estonians and local Germans born in the then Livonian Governorate. Still, the role of the Botanical Garden of the University of Tartu in raising Estonian gardeners was relatively small. Of the learned gardeners, Ants Murjan and Jaan Ranna were Estonians, as were gardener assistants Carl Reinberg, Peep Parrikas and Ants Kingo and probably also Peter Jacobsohn Pago. The above allows us to generalise that, probably due to low salary and other reasons, the number of persons working as gardeners was relatively high, they did not stay in the position for long and, when an opportunity came up, proceeded elsewhere or returned to their homeland.

The scope of activities of learned gardeners was rather broad. Although they had to follow the established guidelines, these were not strictly adhered to. The gardeners were responsible for supervising the works in the garden, while also participating in compiling plant lists of the garden, collecting herbarium material and preparing the herbarium, verifying taxonomic identifications, preparing plant labels, guiding visitors in the garden, and participating in the compilation of editions of *Index Seminum* and other works.

The founding of the Botanical Garden of the University of Tartu offered new opportunities for local gardeners. However, owing to the high requirements of academic work and skills imposed on the gardeners, the university largely preferred to employ foreigners who already possessed the necessary work experience and relevant education. A decisive factor in the development of horticulture in Tartu was the city's close vicinity to St. Petersburg with its remarkable horticulture and park architecture and considerably wider opportunities. This is why the relatively small Botanical Garden of the University of Tartu had problems in employing the specialists they needed. This resulted in a high turnover of gardeners and their highly varied level of specialisation, and the need to use locals with less experience in the work.

Three of the learned gardeners—Johann Anton Weinmann, Ludwig Riedel and Jan Muszyński—became renowned and productive researchers in their later life after leaving Tartu. They became outstanding botanists, Weinmann in St. Petersburg in Russia, Riedel in Brazil and Muszyński in Poland.

Acknowledgements

The authors thank Ludmila Dubyeva, Lea Leppik and Mati Laane from Estonia for their help in solving several questions that arose, and Pedro Luís Rodrigues de Moraes from Brazil and Barbara Vogt and Wolfgang Ilg from Germany for their help in obtaining the information necessary for drawing up the article.

References

- AJSA* (1831), 'Petersburg Botanic Garden,' *The Americal Journal of Science and Arts*, vol. 20, no. 1, pp. 175–176.
- Allgemeinen Teutschen...* (1822), 'Aus einem Schreiben von St. Petersburg vom 15. Februar 1822,' *Allgemeinen Teutschen Garten-Magazins*, vol. 6, no. 2, p. 91.
- Augel, M. P.** (1979), *Ludwig Riedel viajante alemã no Brasil*, Salvador: Fundação Cultural do Estado da Bahia.
- Baeza, R. S.** (2012), 'Science and Passion in America,' *Culture & History. Digital Journal*, vol. 1, no. 2, pp. 1–19. Retrieved from <http://cultureandhistory.revistas.csic.es/index.php/cultureandhistory/article/view/13/58> [accessed Jan 2013]
- Barman, R. J.** (1971), 'The Forgotten Journey: Georg Heinrich Langsdorff and the Russian Imperial Scientific Expedition to Brazil, 1821–1829,' *Terrae Incognitae*, vol. 3, pp. 67–96.
<http://dx.doi.org/10.1179/tin.1971.3.1.67>
<http://dx.doi.org/10.1179/008228871792171647>
- BBLd* (2013), 'Grosberg, Oskar,' *Baltisches Biographisches Lexikon digital*, Baltische Historische Kommission (BHK), p. 262. Retrieved from <http://www.bbl-digital.de/seite/262> [accessed Jan 2013]
- Basargina, E. Iu.; Gruzdeva, E. N.; Shchedrova, I. M.; Iodko, O. V. & Ponikarovskaia, M. V.** (2012), *Ekspeditsiia akademika G. I. Langsdorfa v Braziliuu (1821–1829 gg.) po fondam SPB filiala Arkhiva RAN*. Retrieved from <http://www.ras.ru/langsdorff/about.aspx> [accessed Jan 2013]
- Beise, T. H.** (1852), *Die Kaiserliche Universität Dorpat während der ersten fünfzig Jahre ihres Bestehens und Wirkens. Denkschrift zum Jubelfeste am 12ten und 13ten December 1852*, Dorpat: J. C. Schünmann's Wittve und C. Mattiesen.
- Bubyreva, V. A., Osinskaia, D. V.** (2010), 'Istoriia s geografiei v tsvetakh i travakh,' *Zhurnal Sankt-Peterburgskii Universitet*, vol. 3817, no. 4 (7 aprelia). Retrieved from <http://journal.spbu.ru/?p=1398> [accessed Mar 2013]
- Bucholtz, F.** (1921), 'Der gegenwärtige Zustand des Botanischen Gartens zu Dorpat und Richtlinien für die Zukunft,' *Acta et Commentationes Universitatis Dorpatensis*.

- A I. Mics, 3–14. Retrieved from <http://dspace.utlib.ee/dspace/handle/10062/18869> [accessed Jan 2013]
- Bunge, A. G. von** (1851), 'Flora eccicata Liv-, Esth- und Kurlands,' *Das Inland*, vol. 16, no. 5, pp. 66–67.
- de Moraes, P. L. R.** (2012), 'The Lauraceae. Collected in Brazil by Ludwig Riedel,' *Harvard Papers in Botany*, vol. 17, no. 1, pp. 185–216.
<http://dx.doi.org/10.3100/025.017.0121>
- de Sampaio, A. J.** (1922), 'A secção de Botanica no primeiro seculo de existencia do Museo Nacional. *Archivos do Museu Nacional*, vol. 22, pp. 39–47. Retrieved from <http://www.biodiversitylibrary.org/bibliography/6524#/summary> [accessed May 2013]
- Dörfler, I.** (1902), *Botaniker-Adressbuch /Botanist's Directory...*, *Zweite, neu bearbeitete und vermehrte Auflage...*, Vien: I. Dörfler, p. 175. Retrieved from <http://bibdigital.rjb.csic.es/ing/Libro.php?Libro=6269> [accessed Feb 2013]
- Dubyeva, L. V.** (2004), 'Evgenii Francevich Shmurlo – professor Tartuskogo (Derptskogo/ Yurievskogo) universiteta v 1891–1903 gg,' in *Rossiiskie universitety v XVIII–XX vekah*, Vyp. 7, Voronezh, pp. 105–134.
- EAA (*n.d.*, a), *Bagenski, Anton*, EAA f 402, n 1, s 1201, Estonian Historical Archives, Tartu.
- (*n.d.*, b), *Kingo, Ants*, EAA f 2100, n 2, s 1717, Estonian Historical Archives, Tartu.
- (*n.d.*, c), *Koch, Ernest (Ernst) Oskar Alexander*, EAA f 402, n 1, s 13381, Estonian Historical Archives, Tartu.
- (*n.d.*, d), *Mušinski Jan*, EAA f 402, n 1, s 18380, Estonian Historical Archives, Tartu.
- (*n.d.*, e), *Ranna, Jaan*, EAA f 2100, n 2, s 2243, Estonian Historical Archives, Tartu.
- (*n.d.*, f), *Sünni-, abielu-, surmameetrika ja andmed koguduse tegevuse kohta*, EAA f 1253, n 3, s 4, k 119/l 124, Estonian Historical Archives, Tartu.
- (*n.d.*, g), *Sünni-, abielu-, surmameetrika ja andmed koguduse tegevuse kohta*, EAA f 1253, n 3, s 4, k 155/l 160, Estonian Historical Archives, Tartu.
- (1795), *Uue-Põltsamaa (Oberpahlen, Neu-) mõis: revisjonilehed*, EAA f 1865, n 3, s 236/1, k 3/l 3, Estonian Historical Archives, Tartu.
- (1803–1804), *Kieser Johann Friedrich*, EAA f 402, n 3, s 770, Estonian Historical Archives, Tartu.
- (1803–1814), *Kontrakte, Protokolleextrakte und Briefwechsel mit den Beamten des botanischen Gartens, dem Kurator des Dorpater Lehrbezirks u.a. über die Errichtung und Versetzung des Gartens, den Verkauf des alten Gartens u.a.*, EAA f 402, n 5, s 52, Estonian Historical Archives, Tartu.
- (1803–1855), *Instruktionen für den Gärtner, Protokolleextrakte und Briefwechsel mit den Direktoren des botanischen Gartens, dem Kurator des Dorpater Lehrbezirks u.a.*

- über Errichtung, Benutzung und Ausgaben des Gartens, Anstellung des Personals u.a.*, EAA f 402, n 4, s 89, Estonian Historical Archives, Tartu.
- (1804), *Taimede alfabeetiline nimestik*, EAA f 2100, n 12, s 25, Estonian Historical Archives, Tartu.
- (1804–1898), *Taimede alfabeetiline nimestik*. Elustaimede nimestik, EAA f 2100, n 12, s 25–126, Estonian Historical Archives, Tartu.
- (1805–1828), *Veinmann, Johann Anton*, EAA f 402, n 3, s 276, Estonian Historical Archives, Tartu.
- (1811), *Tartu (Dorpat) linn: revisjonilehed*, EAA f 1865, n 2, s 98/2, k 288–289/l 283–284, Estonian Historical Archives, Tartu.
- (1814–1828), *Neumark Karl*, EAA f 402, n 3, s 1210, Estonian Historical Archives, Tartu.
- (1816–1833), *Uue-Põltsamaa (Oberpahlen, Neu-) mõis: revisjonilehed ja ümberkirjutuslehed*, EAA f 1865, n 3, s 238/1, k 6/l 8, Estonian Historical Archives, Tartu.
- (1817–1820), *Holst, Friedrich; Gärtner der Dorpater Universität*, EAA f 384, n 1, s 3174, Estonian Historical Archives, Tartu.
- (1819–1820), *Capellino Paolo*, EAA f 402, n 3, s 716, Estonian Historical Archives, Tartu.
- (1820), *Akte in Klagesachen des Direktors des botanischen Gartens Professor Dr. Ledebour wider den Gärtner Ludwig Riedel wegen Dienstvernachlässigung*, EAA f 402, n 8, s 1383, Estonian Historical Archives, Tartu.
- (1820–1822), *Autem, Louis; Gärtner der Dorpater Universität*, EAA f 384, n. 1, s 3095, l 1–6, Estonian Historical Archives, Tartu.
- (1821–1823), *Reinberg Karl*, EAA f 402, n 3, s 1431, Estonian Historical Archives, Tartu.
- (1822–1825), *Möhring Johan*, EAA f 402, n 3, s 1113, Estonian Historical Archives, Tartu.
- (1823–1902), *Juurdetulnud taimede ja seemnete nimestik*, EAA f 2100, n 12, s 127–137, Estonian Historical Archives, Tartu.
- (1825–1826), *Gebhard, Heinrich; Gärtner der Dorpater Universität*, EAA f 384, n 1, s 3156, Estonian Historical Archives, Tartu.
- (1825–1832), *Gebhardt Heinrich Wilhelm*, EAA f 402, n 3, s 401, Estonian Historical Archives, Tartu.
- (1826), *Taimede alfabeetiline nimestik*, EAA f 2100, n 12, s 34, Estonian Historical Archives, Tartu.
- (1828–1862), *Stelling Vilhelm Eduard*, EAA f 402, n 3, s 1941, Estonian Historical Archives, Tartu.
- (1833), *Taimede alfabeetiline nimestik*, EAA f 2100, n 12, s 41, Estonian Historical Archives, Tartu.

- (1833–1834), *Günter Friedrich Vilhelm*, EAA f 402, n 3, s 556, Estonian Historical Archives, Tartu.
- (1835), *Kirchenbuch der Geborenen, Getauften, Getrauten und Verstorbenen*, EAA f 1253, n 1, s 39, k 22/l 52–53, Estonian Historical Archives, Tartu.
- (1837), *Taimede alfabeetiline nimestik*, EAA f 2100, n 12, s 45, Estonian Historical Archives, Tartu.
- (1838), *Taimede alfabeetiline nimestik*, EAA f 2100, n 12, s 46, Estonian Historical Archives, Tartu.
- (1845), *Akte betreffend die Werbung des Buchhalters auf dem Gute Ratshof und Gemeinbeschreiber Eduard Johann Schuhmann einer Stelle als Buchhalter auf dem Gute Karolen. Darin: Vernehmung des im botanischen Garten in Dorpat als Gärtner angestellten Emil Stelling*, EAA f 928, n 1, s 1099, Estonian Historical Archives, Tartu.
- (1848), *Taimede alfabeetiline nimestik*, EAA f 2100, n 12, s 52, Estonian Historical Archives, Tartu.
- (1851), *Taimede alfabeetiline nimestik*, EAA f 2100, n 12, s 53, Estonian Historical Archives, Tartu.
- (1851–1866), *Beckmann, Friedrich; gelehrter Apotheker der Dorpater Universität*, EAA f 384, n 1, s 3102, Estonian Historical Archives, Tartu.
- (1851–1877), *Verzeichnisse der Aufgebotenen und Getrauten*, EAA f 1253, n 1, s 595, k 233/l 53, Estonian Historical Archives, Tartu.
- (1855–1864), *Personalbuch*, EAA f 1253, n 1, s 598, k 202/l 169, Estonian Historical Archives, Tartu.
- (1862–1863), *Stelling Bernhard*, EAA f 402, n 3, s 1940, Estonian Historical Archives, Tartu.
- (1870), *Kirchenbuch der Geborenen, Getauften, Getrauten und Verstorbenen*, EAA f 1253, n 1, s 69, k 12/l 12p–13, Estonian Historical Archives, Tartu.
- (1876–1913), *Bartelsen Karl*, EAA f 402, n 3, s 59, Estonian Historical Archives, Tartu.
- (1877–1926), *Sündinute ja ristitute nimekirjad*, EAA f 1253, n 1, s 600, k 8/l 11, Estonian Historical Archives, Tartu.
- (1882), *Kirchenbuch der Geborenen, Getauften, Getrauten und Verstorbenen*, EAA f 1253, n 1, s 539, k 13/l 19, Estonian Historical Archives, Tartu.
- (1896–1897), *Siesmayer Heinrich*, EAA f 402, n 3, s 673, Estonian Historical Archives, Tartu.
- (1897–1903), *Murjan Ants*, EAA f 402, n 3, s 1178, Estonian Historical Archives, Tartu.
- (1898–1900), *Fedosejev Mihhail Konstantin*, EAA f 402, n 3, s 1742, Estonian Historical Archives, Tartu.

- (1902–1927), *Miššenko Pavel Ivan*, EAA f 402, n 3, s 1449, Estonian Historical Archives, Tartu.
- (1903–1905), *Zaikovski Vatslav Aleksander*, EAA f 402, n 3, s 630, Estonian Historical Archives, Tartu.
- (1905–1906), *Jäger Viktor*, EAA f 402, n 3, s 617, Estonian Historical Archives, Tartu.
- (1906–1908), *Michels Arthur Konstantin*, EAA f 402, n 3, s 1141, Estonian Historical Archives, Tartu.
- (1908–1917), *Mušinski Jaan*, EAA f 402, n 3, s 1179, Estonian Historical Archives, Tartu.
- (1915–1918), *Popov Nikolai Pjotr*, EAA f 402, n 3, s 1351, Estonian Historical Archives, Tartu.
- (1922), *Hauaplatside kviitungiraamat*, EAA f 1265, n 1, s 332, Estonian Historical Archives, Tartu.
- Enumeratio...* (1845), *Enumeratio plantarum horti botanici Dorpatensis*, Manuscript, Tartu: Botanical Garden of Tartu University.
- Erceau, P.** (1876), 'Les semis de conifers,' *L'illustration horticole. Revue mensuelle des serres et des Jardins*, vol. 23, pp. 182–183.
- Evans, C. T.** (1991), *Count Sergei Stroganov and the Development of Moscow University, 1835–1847*, Ph.D dissertation, University of Virginia. Retrieved from <http://novaonline.nvcc.edu/eli/evans/his241/Documents/Dissertation/Chapter8.pdf> [accessed Feb 2014]
- Ewers, J. P. G.,** ed. (1827), *Die Kaiserliche Universität zu Dorpat. Fünfundzwanzig Jahre nach ihrer Gründung*, Dorpat: J. Ch. Schünmann.
- FBN (2003), 'Oficia nomeando o botânico Ludwig Riedel....,' *Catálogo de Manuscritos* (166991), 40/75, Pedro II imperador, Fundação Biblioteca Nacional / The National Library Foundation of Brazil.
- Flora oder Botanische...* (1822), 'Beförderungen und Belohnungen,' *Flora oder Botanische Zeitung*, no. 7, p. 112.
- Gehrke, C.** (2013). 'Traces of the Life of a Georgian Intellectual: Georg von Charasoff in Heidelberg, Zurich, and Lausanne,' Paper prepared for the Conference 'The Pioneers of Linear Models of Production', 17–18 January 2013, at the University of Paris-Ouest, Nanterre, pp. 1–48. Retrieved from http://economix.fr/pdf/workshops/2012_pioneers/gerhke.pdf [accessed Jan 2013]
- Germann, G. A.** (1804), 'Schreiben über seine botanische Reise nach dem russ. Finland, und über den Botanische Garten zu Dorpat,' *Bot. Zeit.*, vol. 3, no. 21, pp. 328–336; no. 22, pp. 344–348.
- (1807), *Verzeichniss der Pflanzen des botanischen Gartens der kaiserlichen Universität zu Dorpat im Jahr 1807*, Dorpat: M. G. Grenzius.

- Geschichte...* (2004), *Gedenkkalender* (I), Geschichte Akademie gemeinnütziger Wissenschaften zu Erfurt. Retrieved from <http://www.akademie-erfurt.de/pages/geschichte.php> [accessed Oct 2012]
- Hasselblatt, A. & Otto, G.** (1889), *Album Academicum der Kaiserlichen Universität Dorpat*, Dorpat: C. Mattiesen.
- Herbarium C. B. Trinius* (2012), *Herbarium C.B. Trinius, Moscow (1778–1844)*, The Herbarium of the Moscow State University, Moscow: Brill. Retrieved from <http://www.brill.com/herbarium-cb-trinius-moscow-1778-1844> [accessed Mar 2013]
- Hill, A. W.** (1915), 'The history and functions of botanic gardens,' *Annals of the Missouri Botanical Garden*, vol. 2, pp. 185–240. <http://dx.doi.org/10.2307/2990033>
- Holmes, E. M.** (1906), 'Horticulture in Relation to Medicine,' *Journal of the Royal Horticultural Society*, vol. 31, pp. 42–61. Retrieved from <http://archive.org/stream/journalroyalhor09britgoog#page/n54/mode/2up> [accessed Feb 2013]
- Holtz, M. & Ehbauer, T.** (2012), E-mail correspondence with Heldur Sander, 29 October 2012.
- Ilg, W.** (2012), Personal communication with Wolfgang Ilg, 2012.
- Isakow, S. G. & Lewandowski, J.**, eds. (1999), *Uniwersytet w Tartu a Polacy*, Lublin: Wydawnictwo UMCS.
- Istoriia* (2009), *Laboratoriia sistematiki i geografii gribov, Istoriia*, St Peterburg: Sankt-Peterburgskaia Akademia Nauk. Retrieved from http://www.binran.ru/LabSite2009_AK/Hist_rus.htm [accessed Oct 2012]
- Ivashintsev, N.** (1872), *Russkie krugosvetnye puteshestviia s 1803 po 1849 gg*, Spb: Tipografiia Morskogo ministerstva.
- Jacobs, E.** (1875), 'Beyrich, Heinrich Karl,' in *Allgemeine deutsche Biographie* (ADB), Band 2, Leipzig: Duncker & Humblot, p. 605.
- JSTOR Global Plants* (2013), Retrieved from <http://plants.jstor.org/person/bm000015559> [accessed Oct 2013]
- JSTOR Plant Science* (2012), 'Riedel, Ludwig (1790–1861),' *JSTOR Plant Science*. Retrieved from <http://plants.jstor.org/person/bm000007011> [accessed Nov 2012]
- Kaszczyk-Grodzicka, D.** (1994), *Profesor dr Jan Kazimierz Muszyński w 110-lecie urodzin* [The 110th Anniversary of Jan Kazimierz Muszyński], Łódź: Sekcja Wydawnicza AM w Łodzi, pp. 8–11.
- Kimmel, H. O. & Trass, H. H.** (1978), 'Botanicheskii Sad Tartuskogo Gosudartsvennogo Universiteta i introduktsiia rastenii,' in *Botanicheskie Sady kak tsentry introduktsii rastenii*, Tartu: Tartuskii Gosudartsvennyi Universitet, pp. 7–9.
- Klinge, J.** (1883), *Die Holzgewächse von Est-, Liv- und Curland*, Dorpat: C. Mattiesen.
- Komissarov, B. N.** (1975), *Grigorii Ivanovich Langsdorf. 1774–1852*, Leningrad: Nauka.
- (1977a), *Pervaia russkaia ekspeditsiia v Braziliuu*, Leningrad: Nauka.
- (1977b), *Russkie istochniki po istorii Braziliu pervoi treti XIX veka*, Leningrad: Leningradskogo gosudarstvennogo universiteta.

- Kronika* (1928), 'Rośliny Lecznicze i Przemysłowe' [Medicinal and Industrial Plants], *Kronika*, pp. 11–15.
- Kuznetsow, N. J.** (1896), 'Der Botanische Garten der Kaiserlichen Universität zu Jurjew (Dorpat). I. Das Herbarium,' *Botanische Centralblatt*, vol. 17, no. 68, pp. 257–259.
- Kuznetsov, N. I.** (1897), 'Obzor detelnosti Botanicheskago Sada Imperatorskago Iurievskago Universiteta za 1897 god,' *Uchenye zapiski Imperatorskogo Iurievskogo Universiteta*, no. 2, pp. 1–22.
- (1898), 'Obzor deiatelnosti Botanicheskago Sada Imperatorskago Iurievskago Universiteta za 1897 god,' *Uchenye zapiski Imperatorskogo Iurievskogo Universiteta*, no. 1, pp. 1–28.
- (1899), 'Obzor deiatelnosti Botanicheskago Sada Imperatorskago Iurievskago Universiteta za 1898 god,' *Uchenye zapiski Imperatorskogo Iurievskogo Universiteta*, no. 4, pp. 1–35.
- (1902), 'O botaniko-geograficheskikh issledovnniakh Kavkaza, sovershennykh po porucheniiu Imperatorskogo Russkogo Geograficheskogo Obshchestva,' *Izvestiia Imperatorskogo Russkogo Geograficheskogo Obshchestva*, vol. 2, no. 38, pp. 206–227.
- Le Lièvre, A.** (1997), 'Nineteenth-century Dorpat and its botanical influence,' *Curtis's Botanical Magazine*, vol. 14, no. 1, pp. 35–55.
<http://dx.doi.org/10.1111/j.1467-8748.1997.00062.x>
- Leppik, L.** (2006), *Tartu ülikooli teenistujate sotsiaalne mobiilsus 1802–1819* [Social mobility of employees of the University of Tartu], *Dissertationes historiae Universitatis Tartuensis* 11, Tartu: Tartu Ülikooli Kirjastus.
- (2013), Personal communication with Lea Leppik, 27 April 2013.
- Levitskii, G. V.**, ed. (1902), *Biograficheskii slovar professorov i prepodavatelei Imperatorskago Iurievskago, byvshego Derptskago, Universiteta za sto let sushchestvovaniia, 1802–1902*, vol. 1, Yuriev: Tipografiia K. Mattisena.
- Lipshits, S. I.**, ed. (1947–1952), *Russkiiie botaniki. Biograficheskobibliograficheskii slovar*, Moskva: Izdatelstvo Moskovskogo obshchestva ispytatelei prirody, vols. 1–IV.
- Lipskii, V. I.**, ed. (1913), 'Istoricheskii ocherk Imperatorskago S.-Peterburgskago Botanicheskago Sada (1713–1918),' in A. A. Fisher von Valdgeim (ed.) *Imperatorskii S.-Peterburgskii Botanicheskii Sad za 200 let sushchestvovaniia (1713–1918)*, Part 1, S.-Peterburg. Retrieved from <http://leb.nlr.ru/edoc/277505/> [accessed Mar 2014]
- , ed. (1913–1915), 'Biografii i literaturnaia deiatelnost botanikov i lits soprikasavshikhhsia s Imperatorskim Botanicheskim Sadom,' in A. A. Fisher von Valdgeim (ed.) *Imperatorskii S.-Peterburgskii Botanicheskii Sad za 200 let sushchestvovaniia (1713–1918)*, Part 3, Petrograd.
- Magowska, A.** (2001), *Badania leków roślinnych w II Rzeczypospolitej. Geneza, determinanty, problematyka i praktyka eksperymentalna* [Research of medicinal plants in the 2nd Republic of Poland. Genesis, determinants, issues and experimental practice], Poznań: Wydawnictwo Kontekst, pp. 63–64.

- Manizer, G. G.** (1948), *Ekspeditsiia akademiika G. I. Langsdorfa v Braziliiu (1821–1828)*, Akademiia nauk SSSR, Moskva: Ogiz.
- Martuzāns, B.** (1995–2002), *Die höchsten und hohen Autoritäten des Livländ. Gouvernements*. Retrieved from <http://www.roots-saknes.lv/Occupations/Livland.htm#Dorpat> [accessed May 2013]
- Massingham, B.** (1982), 'Some nineteenth-century English gardeners,' *Huntia*, vol. 4, no. 2, pp. 93–102.
- Materialy...* (1973), *Materialy ekspeditsii akademika Grigoriia Ivanovicha Langsdorfa v Braziliiu v 1821–1829 gg. Nauchnoe opisanie*. Akademiia nauk SSSR, Arkhiv. Izdanie podgotovil D. E. Bertel's, B. N. Komissarov, T. I. Lysenko. Pod redaktsii L. A. Shura. Leningrad: Nauka.
- Meikar, T.** (2002), 'Tartu ülikooli õpetatud aednikud (1803–1918),' in *Dendroloogilised uurimused III*, Tallinn: EMPÜ Metsanduslik Uurimisinstituut, pp. 61–73.
- Meikar, T. & Sander, H.** (2000), 'Tartu Ülikooli Botaanikaõppe õpetatud aednikud (1919–1944),' in *Dendroloogilised uurimused III*, Tallinn: EMPÜ Metsanduslik Uurimisinstituut, pp. 197–218.
- Monem, N. K.**, ed. (2007), *Botanic Gardens: A Living History*, London: Black Dog.
- Musgrave, T.** (2007), *The Head Gardeners: Forgotten Heroes of Horticulture*, London: Aurum Press.
- Mushinskii, I. I.** (1911a), *Putevoditel po Botanicheskomu Sadu Imperatorskago Iurievskago universiteta*, Yuriev: Tipografia K. Mattisena.
- (1911b), 'Ekskursiia v okrestnostiakh Iurieva,' *Acta Horti Botanici Universitatis Imperialis Jurjevnsis*, vol. 12, no. 4, pp. 336–338.
- (1916), *Abrus precatorius i khekviripodobnye semena s anatomicheskoi kharakteristikoi sem. Leguminosae*, Yuriev: K. Mattisena.
- Muszyński, J.** (1927), *O metodach badania naporstnicy i o potrzebie wprowadzenia państwowej kontroli używanych w aptekach Folia Digitalis* [On the methods of research of *Digitalis* and the need to implement state supervision over *Folia Digitalis* used in pharmacies], *Wiadomości Farmaceutyczne*, pp. 98–99.
- (1929), 'Oddział Farmaceutyczny' [Department of Pharmaceutics], in *Księga Pamiątkowa ku uczczeniu CCCL rocznicy założenia i wskrzeszenia Uniwersytetu Wileńskiego* [Memorial book commemorating the 350th anniversary of the foundation and reactivation of the University of Wilno], vol. 2, Wilno, pp. 403–406.
- Nekrasova V. L. & Prussak A. V.** (1957), 'K istorii Brazilskogo filiala S.-Peterburgskogo Botanicheskogo sada (1831–1836 gg.) i brazylskikh kollektzii Langsdorfa i Ridelia,' *Botanicheskii zhurnal*, vol. 42, no. 5, pp. 804–813.
- Pabst, G. F. J. & Dungs, F.** (1977), *Orchidaceae Brasiliensis*, Erste Auflage, Band II, Hildersheim: Brücke-Verlag Kurt Schmiersow.
- Personal der Kaiserlichen Universität zu Dorpat, nebst Beilage* (1877), Sem. I–II, Dorpat: Schnakenburg.

- (1884), Sem. I–II, Dorpat: Schnakenburg.
- (1885), Sem. I–II, Dorpat: Schnakenburg.
- (1886), Sem. I–II, Dorpat: Schnakenburg.
- (1887), Sem. I, Dorpat: Schnakenburg.
- Raid, N.** (1990), ‘Tartu ajaloolised haljasalad’ [Historical green areas of Tartu], in *Tartu ja kultuur*, Tallinn: Eesti Teaduste Akadeemia, pp. 42–58.
- RAN (2012), *Rossiiskaia akademiia nauk, No. 2007 ot 01.01.2007*. Retrieved from http://www.ras.ru/members/chronology.aspx?ID=da59205b-9aae-4eeb-812d-6354aa4adead&_Language=en&print=1 [accessed May 2013]
- Regel, E.** (1858), ‘Weinmann. Nekrolog,’ *Gartenflora*, vol. 7, pp. 356–357.
- (1859), ‘Nachträgliches über Weinmann,’ *Gartenflora*, vol. 8, pp. 62–63.
- (1861), ‘3) Die Gärten in St. Peterburg und der Umgebung im Herbst 1860, (Fortsetzung)’ *Gartenflora*, vol. 10, pp. 350–355.
- (1866), ‘Personalnotizen und neuestes etc.,’ *Gartenflora*, vol. 15, pp. 154–156.
- (1867), ‘Neue Scarlet-Pelargonium, gezogen von E. Regel. II. Neue oder empfehlenswerthe Zierpflanzen,’ *Gartenflora*, vol. 16, pp. 304–307.
- Salupere, M.** (1997), ‘Tartu kahest botaanikaaiast. Esimesed ülikooli botaanikaia rajajad’ [On two botanical gardens in Tartu: Founders of the Botanical Garden of the University of Tartu], *Postimees*, 6 Sep 1997.
- Sander, H.** (2010), ‘Kaks haruldast käsikirja Tartu ülikooli botaanikaaiast’ [Two rare manuscripts from the Botanical Garden of the University of Tartu], in T. Meikar (ed.) *Metsaalmanahh 2010*, Tartu: Eesti Metsaselts, pp. 90–93.
- Sander, H. & Meikar, T.** (2009), ‘Tartu ülikooli botaanikaia algaastad ja esimesed taimekogud’ [The early years of the Botanical Garden of the University of Tartu and the first plant collections], in T. Tammet (ed.) *Eesti parkide almanahh 2*, Tallinn: Keskkonnaministeerium, Muinsuskaitseamet, pp. 72–85.
- (2011), ‘Botanical garden of the University of Tartu (Dorpat) and the botanical network in the first half of the 19th century,’ *Baltic Journal of European Studies*, vol. 1, no. 1(9), pp. 230–256.
- Sbornik...* (1875), *Sbornik postanovlenii po Ministerstvu Narodnago Prosveshcheniia*, vol. 1, no. 2, Sankt Peterburg.
- Schlippenbach, U. von** (1818), *Erinnerungen von einer Reise nach St. Petersburg im Jahre 1814. Theil II. Briefe aus Dorpat und Riga*, Hamburg: Perthes und Besser.
- Siilivask K.**, ed. (1982), *Tartu Ülikooli ajalugu 1798–1918*, vol. 2, Tallinn: Eesti Raamat.
- Statuten...* (1802), *Statuten der Kaiserlichen Universität zu Dorpat*, Dorpat: Kaiserlichen Universität zu Dorpat.
- Stelling, E.** (1876), ‘Ein Wort über Aussaat der Nadelhölzer,’ *Gartenflora*, vol. 25, pp. 186–188.

- Shcherbakova, A. A.** (1979), *Istoriia botaniki v Rossii do 60-kh gg. XIX v*, Novorosibirsk: Nauka, Sibirskoe otdelenie.
- Targiel, R.-R.; Wegner, H.; Wegner, A. & Hollenbach, I.** (2000), *Löwen-Aphoteke Frankfurt mit dem Stadtarchiv Frankfurt (Oder)*. Retrieved from <http://www.loewenapotheke-ffo.de/LoewenApothekeV.pdf> [accessed May 2013]
- The Nautical Magazine...* (1838), 'Instructions for preserving specimens of plants', *The Nautical Magazine and Naval Chronicle*, vol. 7, no. 3, pp. 164–170.
- Trautvetter, E. R. von** (1837), *Grundriss to einer Geschichte der Botanik in Bezug auf Russland*, St. Petersburg: Der Keiserl. Akademie der. Wissenschaften.
- (1880), 'Florae rossicae fonts,' *Acta Horti Petropolitani*, vol. 7, Fasc. I, pp. 1–342.
- Ullepitszh, J.** (1884), 'Anton Rochel,' *Österreichische botanische Zeitschrift*, vol. 34, no. 10, pp. 363–368. <http://dx.doi.org/10.1007/BF01643356>
- Urban, I.** (1894), 'Biographische Skizzen II. 2. Georg Heinrich von Langsdorff (1774–1852) und 3. Ludwig Riedel (1790–1861),' *Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie*. Band 18: Beiblatt zu den *Botanischen Jahrbüchern*, no. 44 (Heft 3), pp. 6–21. Retrieved from <http://www.biodiversitylibrary.org/item/676> [accessed May 2013]
- Vaga, A.** (1955), 'Botanichesie issledovaniia i ekspeditsii v Tartuskom universitete,' *Uchen. zap. Tartus. Gos. Un-ta*, vol. 37, pp. 3–29.
- Veski, V.** (1953), 'Tartu Riikliku Ülikooli botaanikaaed 150 aastane' [The Botanical Garden of the University of Tartu turns 150], *Loodusuuriate seltsi juubelikoguteos 1853–1953*, Tallinn: Eesti Riiklik Kirjastus, pp. 255–265.
- Vogt, B.** (1999), 'Franz Heinrich Siesmayer (1817–1900): Biographien europäischer Gartenkünstler,' *Stadt und Grün*, no. 2, pp. 105–113.
- Weinmann, J. A.** (1809 & 1811), Kirjad Fr. M. von Klingerile 6. septembril 1809 ja 29. jaanuaril 1811 [Letters to Fr. M. von Klinger on 6 September 1809 and 29 January 1811], pp. 3, 7. Retrieved from <http://dspace.utlib.ee/dspace/handle/10062/27849?show=full> [accessed May 2013]
- (1810), *Botanische Garten der Kaiserl. Universität zu Dorpat im Jahre 1810*, Dorpat: M. G. Grenzius.
- (1814), Kiri Gatschinast Fr. M. von Klingerile 18. juulil 1814 [Letter from Gatschina to Fr. M. von Klinger on 18 July 1814], p. 4. Retrieved from <http://dspace.utlib.ee/dspace/handle/10062/27850> [accessed May 2013]
- (1824), *Elenchus plantarum Horti Imperialis Pawlowskiensis et agri Petropolitani*, Petropoli: Ex Typographia Orphanotrophii.
- (1836), *Hymeno- et Gasetro-mycetes hucusque in Imperio Rossico observatas recensuit. Pars Prodromi Florae Rossicae*, Petropoli: Impensis Academiae Imperialis Scientiarum.
- (1837a), *Enumeratio stirpium in agro Petropolitano sponte crescentium: secundum systema sexuale Linneanum composita. Opusculum a Societate Imperiali Libera Oeconomica. Petropolitana Praemio Aureo Ornatum*, Petropolitano: Ex Typographia Orphanotrophii.

- (1837b), 'Observationes quaedam botanicae ad floram rossicam sperctantes,' *Bull. Soc. Natur. Moscou*, vol. 10, pp. 51–74.
- (1845), 'Syllabus Muscorum frondosorum hucusque in Imperio Rossica collectorum,' *Bull. Soc. Natur. Moscou*, vol. 18, no. 2, pp. 429–489; no. 4, pp. 417–503.
- (1846), 'Supplementum I. Syllabus Muscorum frondosorum hucusque in Imperio Rossica collectorum,' *Bull. Soc. Natur. Moscou*, vol. 19, no. 2, pp. 517–538.
- (1850), 'Nomina et descriptiones nonnularum plantarum in gubernio Permensi collectarum,' *Bull. Soc. Natur. Moscou*, vol. 23, no. 1, pp. 538–588.
- (2011), 'On the establishment of the principal gardens of botany: A bibliographical essay by Jean-Phillipe-Francois Deleuze,' *Huntia*, vol. 14, no. 2, pp. 147–176.
- Willkomm, M.** (1873), *Der botanische Garten der Kaiserlichen Universität Dorpat*, Dorpat: Verlag von C. Mattiesen.
- Winkelmann, U.** (2013), 'Fürsten, Aufklärer, Visonäre,' *Das Gartenreich Dessau-Wörlitz*. Retrieved from <http://www.gartenreich.com/de/gartenreich/Personen/gaertner/index.html> [accessed May 2013]
- Yatselenko, A.** (2009–2011), *Persony (1856–1918 gg.). Tablitsa utchenikov shkoly Karla Maja*. Retrieved from <http://kmay.ru/allpers.phtml?f=1918&s=1856&start=12> [accessed Oct 2013]

Heldur Sander obtained his MSc in geocology from the Tallinn University in 1998. He was a scientific researcher at the Institute of Forestry and Rural Engineering, Estonian University of Life Sciences in 1998–2010. His current research interests lie in dendrology, urban forestry and the history of science. He has studied urban and rural parks and botanical gardens, interlinking the above fields of research.

Toivo Meikar obtained his PhD in history at the Institute of History (Tallinn), Estonian Academy of Sciences, in 1981. He was senior researcher at the Institute of Forestry and Rural Engineering, Estonian University of Life Sciences in 1998–2013. His current research interest is the history of forestry and science. He has compiled forestry bibliographies and proceedings of the Estonian Academic Forestry Society.

Anita Magowska received her MPharm from the Poznań University of Medical Sciences in Poznań (Poland), PhD in history from the Institute of Literary Research of the Polish Academy of Sciences in Warsaw, and habilitation in history of pharmacy from the Poznań University of Medical Sciences. Since 2009, she is associate professor and head of the Chair of the History of Medical Sciences, the Poznań University of Medical Sciences. Her research interests are history of medicine (especially in the nineteenth century) and pharmacy (especially plant medicines).