

Chapter 2

History of Botanical Research in the Czech Republic

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Abstract The history of non-experimental scientific botany, including research on the flora of vascular plants, bryophytes, lichens and plant communities, is reviewed for the territory that is now the Czech Republic. This review is organized chronologically, starting from the Middle Ages. For each period it describes the development of universities, research institutions and scientific societies and outlines the developments in various branches of botany.

2.1 Introduction

There are several literature sources that describe the history of botany in the current territory of the Czech Republic, mainly in Czech or German, starting with the early attempts by d'Elvert (1868) for Moravia and Maiwald (1904) for Bohemia. There is an excellent overview of the history of botany in the context of other life sciences in the monograph *Life Sciences in the Czech Lands 1750–1850* (Janko 1997). The history of field botany for the whole country in Czech, including brief biosketches

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of many botanists, is provided by Klášterský et al. (1982) and a review in English by Krahulec (2012). The history of life sciences within the Czech Academy of Sciences and Arts and then in the Czechoslovak Academy of Sciences was recently outlined by Franc (2015). A description of botany at Prague University up to the 1830s is provided by Krombholz (1837), while the history of botany at Masaryk University in Brno in the twentieth century is described by Vacek and Bureš (2001). The history of the Czech Botanical Society is outlined by Novák (1962) and Hejný et al. (1982). Biographies of important botanists have been regularly published in the journals of the Czech Botanical Society. The history of lichen research in the former Czechoslovakia and the Czech Republic is reviewed by Liška (1992, 2012), while detailed portraits of many lichenologists working in the present territory of the Czech Republic are presented by Halda (2009). An important source of information for the period up to 1952 is the botanical bibliography compiled by Futák and Domin (1960), followed by *Bibliographia botanica čechoslovaca* and for the period 1993–2000 *Bibliographia botanica česká*. A lichenological bibliography up to 1999 was compiled by Vězda and Liška (1999) and a syntaxonomic bibliography up to 1970 (*Bibliographia syntaxonomica čechoslovaca ad annum 1970*) by a team of the Institute of Botany in Průhonice and published in 20 volumes between 1983 and 1992. This chapter is largely based on these sources.

This review is organized chronologically. Description of each period starts with a brief introduction of the political history followed by information on the development of institutions and societies and an outline of the developments in various branches of botany. Up to the establishment of Czechoslovakia in 1918, the developments in Bohemia, Moravia and Silesia are explained separately as there was no formal administrative or political connection between these historical lands apart from being part of the Habsburg Monarchy or Austrian Empire. For completeness, we describe the history up to the present, but we are aware that it is too early to make any serious conclusions about the historical importance of the developments in recent decades.

2.2 The Middle Ages and Renaissance

The present territory of the Czech Republic consists of three historical lands (see Fig. 1.1 in Chap. 1, this book): Kingdom of Bohemia (*Království české* or *Čechy* in Czech, *Böhmen* in German) in the west with Prague (*Praha*, *Prag*) as its capital city, Margraviate of Moravia (*Morava*, *Mähren*) in the east with Olomouc (*Olmütz*) and from the seventeenth century Brno (*Brünn*) as its capital, and Silesia (*Slezsko*, *Schlesien*, *Śląsk* in Polish) in the north-east with the capital in Wrocław (*Breslau*; now in Poland) and later a local administrative centre in Opava (*Troppau*). All these three lands, together with Upper and Lower Lusatia (now in Germany and Poland), constituted the Lands of the Bohemian Crown (Bohemian lands or less precisely Czech lands), a political entity established in the mid-fourteenth century by Holy Roman Emperor Charles IV. At that time, Bohemia and Moravia had a

Czech-speaking majority. However, as early as the late twelfth century Bohemian kings invited German-speaking colonists to settle in peripheral, less populated or previously unsettled parts of their lands and also in towns. In 1347–1349 Charles University (*Universitas Pragensis* or *Carolina*), the first university in Central Europe, was established in Prague following the model of the universities of Paris and Bologna. For more than four centuries this university remained the only scientific institution in the kingdom. However, it lost its international importance in the fifteenth century after becoming the chief doctrinal authority of the Hussite movement.

In 1526, the Bohemian lands became part of the Habsburg Monarchy, i.e. an assemblage of countries and provinces ruled by the junior branch of the House of Habsburg and between 1780 and 1918 by the House of Habsburg-Lorraine. Emperor Ferdinand invited the Jesuits to Prague, who opened their own academy, the Clementinum (in 1562), and another public university in Olomouc, then the capital of Moravia (in 1573). Under Rudolf II (Emperor 1576–1612) Prague replaced Vienna as the capital of the Habsburg Monarchy and the city became an important centre of arts and sciences. The Thirty Years' War started in 1618 with the rebellion of Bohemian non-Catholic estates against King Ferdinand II. It was defeated two years later and non-Catholic nobility, clergy and many educated town dwellers had either to convert to Catholicism or to leave Bohemia and Moravia. German was introduced as the language of administration with equal rights with (but effectively superior to) Czech. In 1654, the Carolinum and Clementinum were merged by an imperial decree to create the Charles-Ferdinand University (*Universitas Carolo-Ferdinandea*).

The Renaissance period witnessed a boom in interest in natural history including botany. The earliest printed herbal in Czech, compiled by Jan Černý, a physician in Litomyšl, was published in Nuremberg in 1517. It contains, among others, a record of *Angelica archangelica* from the Krkonoše Mts. Pietro Andrea Mattioli (1501–1577), born in Siena, arrived in Prague in 1554, where he served as a physician at the Habsburg court. In 1563 he travelled to the Krkonoše Mts, where he discovered *Allium victorialis* and *Geum montanum* (Fig. 2.1a; Matthioli 1565). His famous herbal, *Petri Andreae Matthioli Senensis medici, Commentarii in sex libros Pedacii Dioscoridis Anazarbei de Medica materia*, was translated into Czech and adapted to a Central European flora by the Prague physician Tadeáš Hájek z Hájku. This book, illustrated with numerous woodcuts, was printed in Prague in 1562. An augmented edition followed in 1596.

Herbarium specimens were being produced already in the sixteenth century, which can be documented by the fact that the description of *Cortusa matthioli* in one of the editions of Mattioli's herbal is based on specimens sent to him to Prague from Italy. Probably the earliest herbarium specimens from Bohemia that currently still exist were collected by Joachim Burser (1583–1639), who worked in 1615–1624 as a physician in the town of Annaberg on the Saxon side of the Krušné hory Mts. He made trips to north-western Bohemia and collected plants for instance in the surroundings of Jáchymov, Kadaň, Žatec and Karlovy Vary. His *Hortus siccus*, now at Uppsala University, was often consulted by Linnaeus when working on *Species plantarum* (Speta 2000).

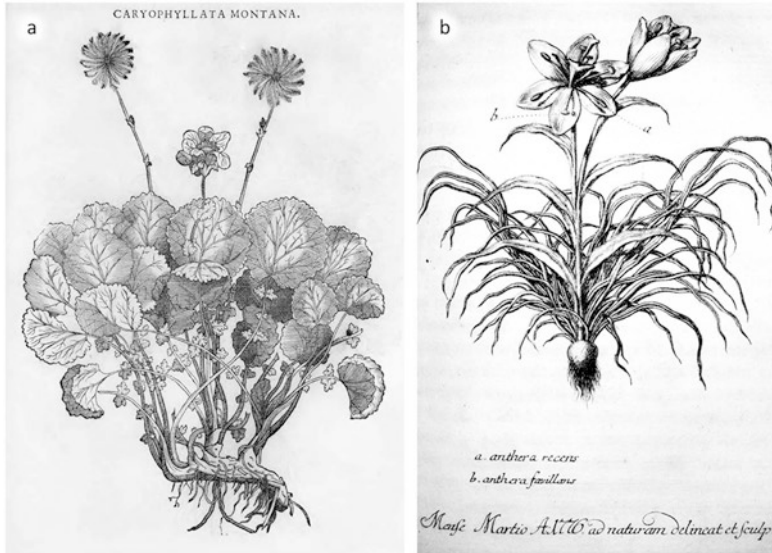


Fig. 2.1 Examples of early botanical illustrations from Bohemia: **(a)** *Geum montanum* (*Caryophyllata montana*) discovered by Pietro A. Mattioli on his trip to the Krkonoše Mts in 1563 (Matthiolus 1565); **(b)** *Gagea bohémica* (*Ornithogalum bohemicum*) as depicted by Johann Z. Zauschner in the protologue (Zauschner 1776)

2.3 The Age of Enlightenment: Second Half of the Eighteenth Century

The reign of Empress Maria Theresa (1740–1780) was affected by the war of the Austrian succession, in which most of the Duchies of Silesia were lost to Prussia in 1742. The empress and her son Joseph II (1780–1790) introduced various administrative and economic reforms, including the abolition of serfdom, religious freedom for non-Catholic Christians, more rights for Jews, compulsory education for children and other improvements in the education system. One of the main goals of university studies in the Habsburg Monarchy became the education of efficient bureaucrats for various positions in the state administration.

2.3.1 Bohemia

Until the mid-eighteenth century newly appointed professors at the Faculty of Medicine of Charles-Ferdinand University started as teachers of theoretical disciplines and advanced to teaching practical subjects with resignations or deaths of their older colleagues. This system required all professors to be polymaths but made any research difficult. By the decision of the government in Vienna this system was

replaced in 1747 by specialized professorships. Two years later Joseph J. Scotti von Compostella (1722–1794) was appointed as the first specialist professor of botany and *materia medica*, but nothing is known about his achievements in botany; he resigned in 1762. He was followed by Johann B. Bohadsch (Jan Boháč; 1724–1768), who gathered a large collection of minerals, plants and other objects when travelling across Bohemia, but his manuscript on the natural history of the kingdom was not published after his untimely death. The professorship in botany was combined with that in chemistry and in 1775 granted to Joseph G. Mikan (1743–1814), a student of Nicolaus J. Jacquin. He initiated the establishment of a botanical garden in Smíchov near Prague (now part of the city). With two specialized professorships in natural history established at the Faculty of Medicine in 1752 and the Faculty of Arts in 1784, Charles-Ferdinand University had three professional natural historians at the end of the eighteenth century. In contrast, the small University in Olomouc remained rather unimportant in natural history research.

The Scholar Society (*Gelehrte Gesellschaft*, *Společnost učená*) was formed in Prague about 1770 as an informal private association of scholars and scientists, supported by high-ranking members of the kingdom's administration. In 1790 Emperor Leopold II granted the society public status as the Royal Bohemian Society of Sciences (*Königliche böhmische Gesellschaft der Wissenschaften*, *Královská česká společnost nauk*). The society published a journal, *Abhandlungen einer Privat-Gesellschaft in Böhmen*, and established a natural history collection and library. Approximately at the same time the Patriotic-economic societies (*Patriotisch-oekonomische Gesellschaft*, *Vlastenecká hospodářská společnost*) were established in the individual crown lands by governmental decisions aiming at an improvement in agricultural production. Despite their applied focus, these societies also improved the knowledge of natural history, especially in Moravia. In Bohemia this society was headed by Count Joseph E. Malabaila von Canal (1745–1826), who established a private park and botanical garden with greenhouses and a lecture hall in Prague. In 1791–1830, lectures in 'philosophical botany' and natural history were regularly given there by, for instance, Franz W. Schmidt (see Schmidt 1790–1792), Johann C. Mikan and Ignaz F. Tausch.

The research into this country's flora by the members of the Scholar Society started in the 1770s. In 1776 Johann B. Zauschner, later a professor of natural history at the Faculty of Arts, published in the society's journal a description of *Ornithogalum bohemicum* (now *Gagea bohemica*; Fig. 2.1b; see also Kirschner et al. 2007). To our knowledge, this is the first description of a species native to Bohemia by a Bohemian botanist. In 1786 the society organized a research expedition to the Krkonoše Mts (Jeník 1986). One of the four expedition members was the botanist Thaddaeus (Tadeáš) P. X. Haenke (1761–1816/1817; Fig. 2.2a). The scientific report published five years later in Dresden (Haenke 1791) includes, among others, the description of *Poa laxa* as a species new to science (Kirschner et al. 2007) and some of the earliest scientific records of bryophytes and lichens from Bohemia. Several records of lichens from Bohemia in the doctoral thesis of the German naturalist Alexander von Humboldt (Humboldt 1793) also belong to this period. Perhaps the first lichen record in a taxonomic study concerns the rare cyanolichen *Polychidium muscicola* collected near Karlovy Vary (Bernhardi 1799).



Fig. 2.2 Remarkable Bohemian botanists from the late eighteenth to the early twentieth century: (a) Thaddaeus P. X. Haenke (1761–1816/1817); (b) Jan S. Presl (1791–1849); (c) Karel B. Presl (1794–1852); (d) Philipp M. Opiz (1787–1858); (e) Josephine Kablik (also Kablíková; 1787–1863); (f) Ladislav J. Čelakovský (1834–1902); (g) Josef Velenovský (1858–1949); (h) Josef Rohlena (1874–1944); (i) Karel Domin (1882–1953). Sources: Viníklář (1931; a–d), Pluskal (1849; e), Polívka (1904; f), Časopis Národního musea (1926; g) and archive of the Czech Botanical Society (h, i)

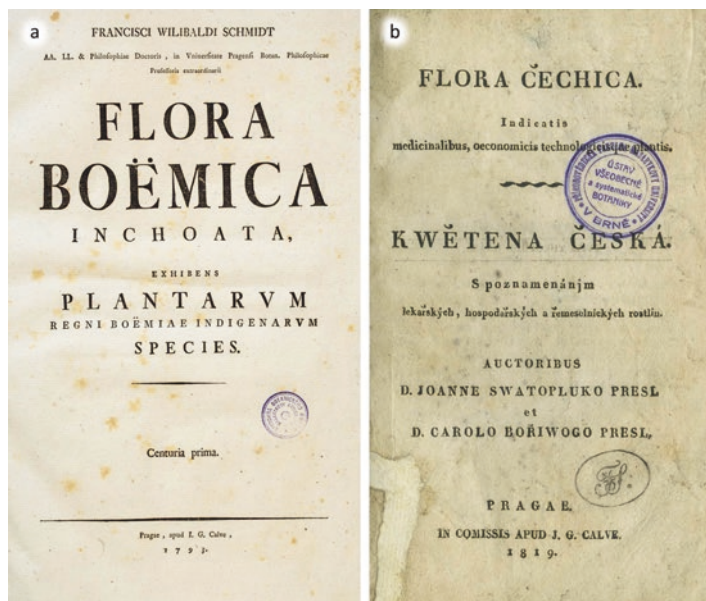


Fig. 2.3 Title pages of early Bohemian floras: (a) The first centuria of *Flora boëmica inchoata* (Schmidt 1793): due to untimely death of its author only four hundred species were described in four volumes published in 1793 and 1794; (b) *Flora Čechica* (Presl and Presl 1819), the first complete flora of Bohemia

Franz W. Schmidt (1764–1796), a botanist and lecturer at Count Canal’s garden, started publishing the first kingdom’s flora in the mid-1790s. Each of the four published volumes of the *Flora Boëmica inchoata, exhibens plantarum regni Boëmiae indigenarum species* (Schmidt 1793, 1794; Fig. 2.3a) contains 100 species regardless of the Linnaean system. Schmidt, born to a family of painters and himself an excellent draughtsman, prepared 244 plates for centuriae 1 and 2, but these were never published. Unfortunately, he died at the age of 32 and Bohemia entered the new century without a complete flora.

2.3.2 Moravia and Silesia

In the 1780s a private natural history society was also established in Brno, involving high-ranking members of the Moravian provincial administration. In 1794 the society was reorganized and renamed *Mährische Gesellschaft der Natur- und Vaterlandskunde*. Its main tasks included research, developing a natural history collection and organizing meetings with lectures by its members.

From 1763 the surgeon Norbert Boccius (1729–1806), member of the Order of Hospitallers, lived in Valtice (*Feldsberg*) in southern Moravia (at that time a part of Lower Austria). Apart from his professional interest in medicinal plants, he initiated the production of fourteen volumes of *Liber regni vegetabilis*, known also as the Codex Liechtenstein (Lack 2000). It contains 2748 plates of around 3100 species of plants, including also many native plants of southern Moravia. The plates were painted by the famous botanical illustrators Franz A. Bauer and Ferdinand Bauer, during their early careers. Boccius also discovered *Crambe tataria* near the village of Kurdějov in southern Moravia and sent it to the author of its scientific description (Sebeók 1779).

Probably the earliest preserved herbarium specimens with standard labels from Moravia are those collected by Heinrich Schott (1759–1819), who worked as a gardener of Count J. B. Mitrovský from about 1786 to 1800. Several dozen specimens, collected mainly near Brno, are now preserved in the herbarium of the Moravian Museum in Brno (acronym BRNM) and in Budapest (herbarium BP; Sutory 1995). However, there was no attempt to produce a flora of the province.

The situation in Silesia was different. The province had a university founded in 1702 in Wrocław as a school of Philosophy and Catholic theology and reorganized in 1811 as a regular university with five faculties. Although Austria had to cede most of the province to Prussia in 1742, the natural history research organized from Wrocław dealt with the whole of Silesia, including the small part that remained in the Habsburg Monarchy. In 1776 the *Flora silesiaca* was published by Count Heinrich G. Mattuschka (1734–1779), followed by an updated version published under a different name three years later (Mattuschka 1776, 1779). Also the four-volume *Flora Silesiae renovata* (Krocker 1787–1823) by the Wrocław physician Anton J. Krocker (1743–1823) was started in this period. Therefore, the smallest province of the Bohemian lands entered the nineteenth century with two complete floras, which was in a marked contrast with the situation in Bohemia and Moravia.

2.4 The First Half of the Nineteenth Century

The first years of the century were marked by the Napoleonic wars, bringing frequent changes not only in government policies, but also in educational and scientific institutions. The ideas of the Enlightenment were gradually replaced by policies of Prince Klemens W. Metternich, from 1809 Foreign Minister and in 1821–1848 State Chancellor of the Austrian Empire (formally established in 1804), aimed at fighting liberalism and nationalist movements. In spite of that, the cultural movement of the Czech National Revival started, followed by a gradual improvement of the economic situation of the Czech-speaking population. Initially this cultural and economic emancipation found some support also among the German-speaking compatriots, which lasted until 1848. The conservative policies also affected the education system: in 1818, for instance, natural history was removed from the curricula of secondary schools as a concession to the Catholic Church.

2.4.1 Bohemia

At Charles-Ferdinand University the system of professorships remained unchanged (see also Svojtka 2016). At the Faculty of Medicine lectures in botany were given by Johann C. Mikan (until 1826), who took part in the Austrian expedition to Brazil, and Vinzenz F. Kosteletzky. Jan S. Presl was appointed as a professor of natural history in 1820. Lectures in natural history at the Faculty of Arts were given by Karel B. Presl. However, the university's importance in terms of its research into the flora of Bohemia remained small.

A discussion about the need for institutional support for natural history research resulted in 1818 in the establishment of the *Museum Regni Bohemiae*, inspired by a similar institution in France and the recently founded *Joanneum* in Graz. The museum was a private institution supported by Bohemian estates including the head of the kingdom's administration, Count Franz A. Kolowrat. The botanist Count Kaspar M. Sternberg (1761–1838), founder of modern palaeobotany (Sternberg 1820), became the first President of the Society of the Patriotic Museum, which also included some other botanists. The museum focused on assembling diverse collections, thus becoming the first biological record centre in the kingdom. The society started publishing a journal in German in 1824 (closed in 1832) and another journal in Czech in 1827, named *Časopis Společnosti Vlastenského museum v Čechách* (Journal of the Patriotic Museum in Bohemia) and nowadays published as the Journal of the National Museum (Prague). The society purchased a part of T. Haenke's collection from America, and K. B. Presl, curator of the natural history collections, participated together with his younger brother J. S. Presl and Count Sternberg in its taxonomic treatment (Presl 1825–1835). Karel B. Presl later turned his attention mainly to the taxonomy of *Lobeliaceae* and pteridophytes with a world-wide scope. Thus, the contribution of the museum to the knowledge of the kingdom's flora was minor during the first decades of its existence.

Another attempt to produce a flora of Bohemia was Johann E. Pohl's *Tentamen florae Bohemiae* (Pohl 1809, 1814). Pohl used the records of his predecessors and information from botanical amateurs working in various parts of this country. The flora is slightly more critical than Schmidt's work but many records are unreliable. In 1817 Pohl left with an Austrian expedition for Brazil and the flora remained unfinished. In 1821 he returned to Vienna, where he worked mainly with the botanical collections from Brazil.

The first complete flora of the kingdom, *Flora Čechica/Květena česká* (Presl and Presl 1819; Fig. 2.3b), was published by the Presl brothers, Jan S. Presl (1791–1849; Fig. 2.2b) and Karel B. Presl (1794–1852; Figs. 2.2c and 2.4a). Written in Latin, it has a parallel title and foreword in Czech and includes also Czech plant names, mainly based on vernacular ones. This book includes accounts of 1498 species of phanerogams, and although being far from perfect, it is definitely more critical than earlier attempts. The authors explicitly say that they consider many records published by earlier writers as erroneous. Specimens of most of the species' records still exist in the Charles University herbarium (PRC). The Presls published a supple-



Fig. 2.4 Herbarium labels and handwritings of some Bohemian botanists: (a) Karel B. Presl (1794–1852); (b) Philipp M. Opiz (1787–1858); (c) Ladislav J. Čelakovský (1834–1902); (d) Antonín Weidmann (1850–1915); (e) Josef Velenovský (1858–1949); (f) Václav Kuřák (1876–1956); (g) Karel Domin (1882–1953); (h) Günther Beck (1856–1931); (i) Karl Preis (1913–1941); (j) Josef Rohlenský (1874–1944); (k) Ivan Klášterský (1901–1979). Credits: Herbaria of Charles University (a, b, e, g, h, i), the Department of Botany of the National Museum in Prague (c, d, j, k) and the Institute of Botany of The Czech Academy of Sciences, Průhonice (f)

ment to their flora three years later, and this was their last contribution to research on the Bohemian flora. Later they turned their attention to their work in the National Museum and on taxonomy. Jan S. Presl also compiled several natural history books in Czech, introducing Czech terminology in biology and chemistry. Some of these books are still important in botanical nomenclature because of the priority principle.

The first identification key for the Bohemian flora, *Clavis analytica in floram Bohemiae phanerogamicam* (Kosteletzky 1824), was written by its author as a doctoral dissertation. However, already at that time Latin was a major obstacle to many potential users. The author later became the first professor of botany at Charles-Ferdinand University.

Another important Bohemian botanist at that time was Ignaz F. Tausch (1793–1848), who worked for a long time as a lecturer in the botanical garden of Count Malabaila (see Tausch 1823, 1825). He travelled to various parts of Bohemia and collected plants, producing several exsiccatae, which he offered for sale, with the largest being the *Herbarium florae bohemicae*. The specimens, marked with handwritten numbers and accompanied by labels written by someone else, are found in many European herbaria. Tausch did not write a flora but published numerous articles in the journal *Flora* (then published in Nuremberg). Tausch's exsiccatae of phanerogams were actually not the earliest in Bohemia, being predated by the collection *Flora bohémica* of Franz X. Sieber distributed in 1814.

In the 1820s Philipp M. Opiz (1787–1858; Figs. 2.2d and 2.4b) became the leading personality doing research on the Bohemian flora. He was neither a university professor or medical doctor or pharmacist as were many of the contemporary botanists, but he served as an official in the administration of state-owned forests in Prague. He travelled to the Krkonoše Mts and some parts of central Bohemia to explore their flora. In 1819 he established a *Pflanzentausch-Anstalt*, a society for the exchange of herbarium specimens, seeds and insects, which continued until his death. This exchange scheme grew to 856 members in 1857, the year before his death. The number of specimens that passed through the exchange society is estimated at more than three million, which gave Opiz an unprecedented knowledge of the Central European flora. In 1823–1828[–1830] Opiz issued a catalogue of specimens offered for exchange, named *Naturalientausch*, which was later modified to a short-lived natural history journal; its 12 volumes are an important source of information on the flora of Bohemia and Central Europe. Numerous taxa were described as new to science in this journal. Opiz's concept of species was very narrow, therefore many taxa described by him are no longer recognized, although some of them were “resurrected” in the twentieth century. Keeping always one specimen for himself, Opiz established a large private herbarium, which is now in the National Museum in Prague (PR). He published only two books, in recent terminology check-lists. The first one, Bohemian phanerogamic and cryptogamic plants (*Böheims phanerogamische und kryptogamische Gewächse*; Opiz 1823) was in German, but with Czech (“provincial”) names. The second, a List of plants of the Bohemian flora (*Seznam rostlin květeny české*; Opiz 1852), was in Czech. The first edition is actually a reprint of the botanical chapter in a “statistical-topographical” description of

the Kingdom of Bohemia published one year earlier (Ponfíkl 1822). Both editions also include lichens and fungi, and were followed by additions published in the journals *Flora* and *Lotos*, respectively. Opiz also contributed many taxonomic parts of the unfinished *Oekonomisch-technische Flora Böhmens* (Berchtold and Seidl 1836–1843). However, his major contribution to the research on the Bohemian flora was the creation of a dense network of collaborators in different parts of the country, including priests, civil servants, lawyers, medical doctors and pharmacists who collected plants in different places, substantially improving the knowledge of the kingdom's flora.

One of the most diligent contributors to Opiz's exchange scheme was the first female Bohemian botanist Josephine Kablík (also Kablíková; 1787–1863; Fig. 2.2e), a wife of a pharmacist in Vrchlabí at the foot of the Krkonoše Mts (Pluskal 1849). She is reported to have collected altogether about 200,000 specimens for Opiz' exchange scheme, mainly in the Krkonoše Mts. She was a member of several societies, including the Society of the Patriotic Museum and the Botanical Society of Regensburg (Ilg 2012).

Opiz, who described several dozen taxa of fungi, lichens and bryophytes as new to science, was not the only botanist working on Bohemian cryptogams in that period. The dissertation of the physician Václav (Wenzel) Mann (1825) is the first book exclusively dealing with the lichens in Bohemia. Exsiccatae of lichens were issued by the Presl brothers in 1812 and by P. M. Opiz as *Flora cryptogamica Boëmiae/Böheims cryptogamische Gewächse* in 1828 and 1829. However, probably the earliest exsiccatae of lichens and bryophytes from Bohemia (and Polish Silesia) were collected already in 1799–1806 in the Krkonoše Mts (*Kryptogamische Gewächse des Riesengebirges*) by Carl Ludwig, a castle gardener in Unięcice (*Meffersdorf*) near Pobiedna in Lower Silesia. The cryptogam flora in the Krkonoše Mts was explored also by the local hobby botanists Karl Mosig and Johann Weigel, both operating from the Silesian side. The earliest validly published lichen name based unequivocally on a specimen from Bohemia (*ad rupes Quartzosas Bohemiae*) is *Lecanora falsaria* (now *Fuscidea cyathoides*), published by E. Acharius in 1810; the specimen was collected by K. Mosig. Several of the type specimens of lichen species that were collected in the Krkonoše Mts are included in the exsiccatae *Lichenen vorzüglich in Schlesien, der Mark und Pommern gesammelt* issued in 1829 by Julius von Flotow, a military officer and amateur lichenologist. A specialized exsiccatae series *Musci bohemici* was issued by A. Poech in 1845. Further records of bryophytes, mainly from the Krkonoše Mts, may be found in the works of Christian G. Nees von Esenbeck. Several dozen species of bryophytes, mostly liverworts, were described and skilfully illustrated by August J. Corda (1809–1849; Corda 1829), from 1835 curator of the zoological collections at the National Museum, otherwise famous as a creator of exquisite mycological illustrations.

2.4.2 Moravia and Silesia

A provincial museum was established in Brno in 1816–1818, which was also a private institution of the Moravian Estates, supported by their most prominent members. To honour Emperor Francis, the museum was named *Franzens-Museum* (*Františkovo museum*) and had this name until 1900, when it legally became a possession of the Land of Moravia and was renamed the Moravian Museum (*Moravské zemské museum*, *Mährisches Landesmuseum*). Ten years after its foundation the museum's collections included 7605 herbarium specimens. A small museum affiliated with the local secondary school, *Gymnasialmuseum*, was established in 1814 in Opava, the administrative centre of Austrian Silesia. The current Silesian Museum (*Slezské zemské museum*) in Opava is its direct successor. This museum also had botanical collections from the very beginning.

The Patriotic-economic societies continued to exist, being repeatedly reorganized by the central government. However, only the Moravian *Ackerbaugesellschaft* contributed significantly to the research into the province's flora. Its journal *Mittheilungen der k. k. Mährisch-schlesischen Gesellschaft* was the only journal dealing with natural history in Moravia up until the early 1860s. The most important for the natural history research turned out to be the *Schlesische Gesellschaft für vaterländische Cultur*, established in 1803 in Wrocław, from 1809 known under this name and from 1820 with a section of natural history. Since 1824 the society issued a journal, *Jahresbericht der Schlesischen Gesellschaft für vaterländische Cultur*, in which many botanical reports were published. The society also assembled a large herbarium collection and a library, both now at the University of Wrocław.

Botanical research in Moravia started about two decades later than in Bohemia. Alois Carl (1765–1831), a physician in Brno and Uherské Hradiště, collected plants mainly in south-eastern Moravia from about 1806. However, the undisputable pioneer of Moravian botany was Christian F. Hochstetter (1778–1860; Fig. 2.5a). Born in Stuttgart and educated in theology, he served as a Lutheran minister in Brno from 1817–1824. During this period he visited various places, mainly in the southern half of the province. He produced exsiccatae *Gewächse des Brünnener Kreises*, containing probably 500 species. He also collected some lichens for *Lichenes exsiccati* issued by L. Reichenbach and C. Schubert in 1822–1826. Hochstetter established a herbarium of southern Moravian flora and in 1823 issued a list of the plants of Moravia and Austrian Silesia comprising more than 1200 species (Daníhelka 2008). After returning to Germany, he published the first summary article on the Moravian flora (Hochstetter 1825), which marks the beginning of modern botanical research in this province. It includes also some records of cryptogams.

The first Moravian flora, *Vorarbeiten zu einer Flora des Mährischen Gouvernements* (Rohrer and Mayer 1835; Fig. 2.6a), was compiled by two amateur botanists, Rudolph Rohrer, an owner of a printing office in Brno, and August Mayer, an administrator of an estate in Silesia. It contains 1346 species of seed plants from Moravia and 1172 from Silesia. It is based on records by earlier authors (mainly Hochstetter and Carl) supplemented by Mayer's observations from Silesia and



Fig. 2.5 Herbarium labels and handwritings of some Moravian botanists: (a) Christian F. Hochstetter (1778–1860); (b) Alexander Makowsky (1833–1908); (c) Gustav Niessl von Mayendorf (1839–1919); (d) Václav Spitzner (1852–1907); (e) Adolf Oborny (1840–1924); (f) Franz Petrak (1886–1973); (g) Heinrich Laus (1872–1941); (h) Josef Podpěra (1878–1954); (i) Otto Thenius (dates unknown); (j) Antonín Vězda (1920–2008). Credits: Herbaria of Charles University (a), Masaryk University (b–i) and the Institute of Botany of The Czech Academy of Sciences, Průhonice (j)

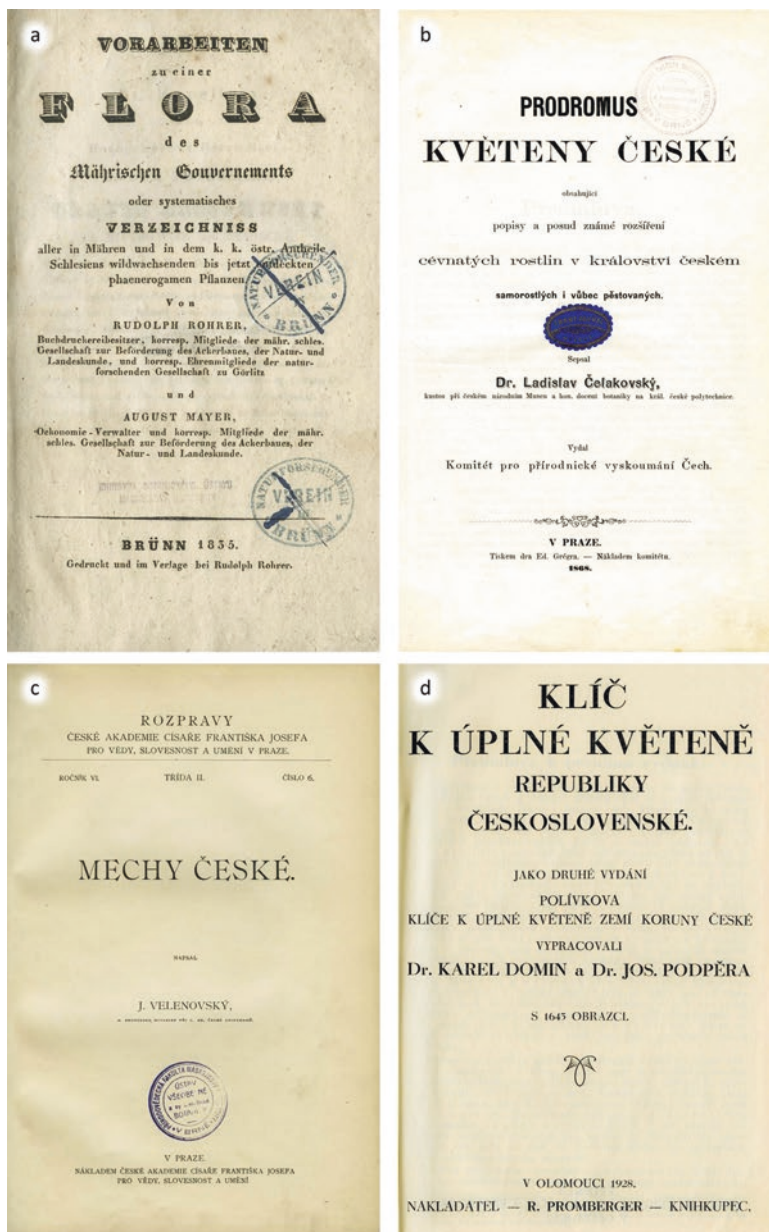


Fig. 2.6 Title pages of the nineteenth and early twentieth century floras: (a) *Vorarbeiten zu einer Flora des Mährischen Gouvernements*, the earliest flora of Moravia and Austrian Silesia (Rohrer and Mayer 1835); (b) Czech edition of the first volume of the *Prodromus of the Bohemian Flora (Prodromus květeny české; Čelakovský 1868)*, published by the Commission for the Exploration of Natural History of Bohemia; (c) *Mosses of Bohemia (Mechy české; Velenovský 1897)*, published by the Emperor Francis Joseph's Czech Academy of Sciences, Literature and Arts; (d) *Key to the Complete Flora of the Czechoslovak Republic (Klíč k úplné květeně Republiky československé; Domin and Podpěra 1928)*

Rohrer's from the surroundings of Brno. Herbarium specimens for most of the records in the flora may still be found in the Charles University herbarium. Numerous records from the mountains of northern Moravia and Silesia, many of them provided by Franz Mückusch, are erroneous. The publication of this flora stimulated new interest in the flora of both provinces and resulted in additions published mainly by Siegfried Reissek, which increased within five years the number of species known in Moravia up to 1471. The first key to the Moravian flora was written by Joseph C. Schlosser (Schlosser 1843), a Moravian-born physician who graduated from the University of Vienna. The book contains many erroneous records, probably due to the lack of experience of its young author. It was issued when Schlosser was already in Croatia and no longer participated in the exploration of the Moravian flora.

The best explored part of the Bohemian lands was once again the small Austrian Silesia. Apart from the floras mentioned above, *Flora Silesiae* in two volumes was published by Wimmer and Grabowski (1827–1829). Christian F. H. Wimmer (1803–1868), a secondary school teacher in Wrocław, studied in detail mainly the genera *Salix* and *Hieracium*, and prepared three editions of another Silesian flora written in German (Wimmer 1840–1857). Heinrich (also Henryk) E. Grabowski, a pharmacist in Opole, later compiled a flora for Upper Silesia and the Hrubý Jeseník Mts (Grabowski 1843). These Silesian floras contain many important records from the Hrubý Jeseník and Krkonoše Mts.

2.5 From the 1848 Revolution to the Foundation of Czechoslovakia in 1918

The revolutionary year 1848 strongly affected the situation in the Austrian Empire. It became clear that the interests of the German- and Czech-speaking communities in Bohemia and Moravia were different. While German-speaking political and intellectual elites wanted a united Germany with a liberal constitution, the newly formed Czech elite preferred social and nationalist demands. The Austro-Hungarian compromise in 1867 created Austria-Hungary, a constitutional union of the Austrian Empire and the Kingdom of Hungary, with two national parliaments and a reduced central government. Although the Bohemian lands did not receive similar autonomy as Hungary, the social-economic and cultural advancement of the Czech community continued, manifested, for instance, by the establishment of numerous secondary schools with Czech as the only language of instruction from the 1860s onwards. After the failed attempt at a Czech-Austrian compromise in 1871 the relationship between Czech and German communities further deteriorated. A strong decrease in the loyalty of Czech community to the imperial dynasty and Austria occurred during WWI. Defections of Czech soldiers were particularly frequent on the Russian front, and Czech and Slovak prisoners of war formed military units that joined the French and Russian armies. The Austrian power in Bohemia and Moravia collapsed on 28 October 1918, when an independent state of Czechoslovakia was proclaimed in Prague.

2.5.1 *Institutions and Societies*

The development of life sciences in the Austrian Empire was supported by reforms of universities and secondary schools shaped by Minister Count Leo Thun-Hohenstein in 1849, which effectively introduced academic freedom. Following these reforms, research became an integral part of the activity not only of university professors, but also of secondary school teachers. In the Faculty of Arts of Charles-Ferdinand University the professorship of natural history was replaced by specialized professorships in mineralogy, botany and zoology. Also the importance of the Prague Polytechnical Institute (now Czech Technical University in Prague), formed in 1806, increased with the introduction of studies specializing in forestry and agriculture, and the establishment of professorships in zoology and botany. Olomouc University was dissolved in 1860 but this loss was partly compensated for by the establishment of a technical college in Brno in 1850, which was transformed into a technical university in 1873. The German-speaking amateur botanists Alexander Makowsky and Gustav Niessl von Mayendorf (Fig. 2.5b, c) were affiliated with the latter. The division of Charles-Ferdinand University in 1882 into two parallel German and Czech institutions was finally supported also by the German-speaking politicians, who felt endangered by the growing influence of the Czech majority. This division considerably supported the development of a scientific infrastructure, suddenly almost doubling the number of professional scientists in Bohemia. However, the gap between the Czech and German intellectual elite grew. For example, the herbarium remained at the German institute and because of mutual animosities, it was not used by Czech botanists.

From 1875 the Royal Bohemian Society of Sciences had exclusively Czech-speaking scholars as presidents. It continued to publish a journal, *Sitzungsberichte der Königlichen böhmischen Gesellschaft der Wissenschaften in Prag*, from 1886 with the main title in Czech as *Věstník Královské české společnosti nauk*, and a series of scientific monographs, *Abhandlungen...* (from 1886 with the main title in Czech as *Rozpravy...*), both of which also included botanical studies. In 1890 the Emperor Francis Joseph's Czech Academy of Sciences, Literature and Arts (*Česká Akademie císaře Františka Josefa pro vědy, slovesnost a umění*) was founded as an institution of the Czech-speaking scholars and scientists, with the formal protection of the Emperor. This institution, whose main task was deciding on research, travel and publication grants, was financially supported by Josef Hlávka (1831–1908), a Czech architect, builder and philanthropist. The first 19 ordinary members appointed by the Emperor included one botanist, Ladislav Čelakovský, while another botanist, Josef Velenovský, was elected an extraordinary member. This society supported the publication of numerous scientific monographs, one of the earliest being *Flora bulgarica* (Velenovský 1891), and published a specialist journal, *Rozpravy České akademie císaře Františka Josefa pro vědy, slovesnost a umění*, which contained many botanical studies. In 1891 a similar society, the Association for Fostering German Science, Arts and Literature in Bohemia (*Gesellschaft zur Förderung deutscher Wissenschaft, Kunst und Literatur in Böhmen*), was founded by German-speaking

scholars and scientists. This society supported, for instance, the publication of a monograph on the genus *Euphrasia* written by R. Wettstein.

The natural history society *Lotos* was established in Prague in 1848; three years later it started a journal, named also *Lotos*, which later became the flagship journal of the Prague German-speaking university professors and scientists. A similar society, *Naturforschender Verein in Brünn*, was founded in Brno in 1861. It immediately established its own herbarium (now incorporated into the herbarium of Masaryk University; BRNU) and started publishing a journal, *Verhandlungen des Naturforschenden Vereines in Brünn*. This society later became famous because of the membership of Gregor J. Mendel (1822–1884), the discoverer of the rules of heredity, which were published in this journal. Both societies later profiled themselves as exclusively German. Czech natural history societies emerged about two decades later, the first being the Natural History Club of Prague (*Klub přírodovědecký v Praze*), founded in 1869 (Viníklář 1931). Roughly in the same period almost ten local museums were formed in various Bohemian and Moravian cities. The Czech Museum Society in Olomouc and its museum were founded in 1883; this society also published a journal. The natural history museum, *Josefo-Ferdinandeum*, was established there in 1896. Other Czech natural history societies in Moravia were established rather late: in 1898 in Prostějov in central Moravia and in 1904 in Brno, then still with a German-speaking majority. Both societies immediately started publishing their annual bulletins, which also contained local botanical studies, while some of the museums became important centres of local research by amateur naturalists. With a growing specialization in different branches of natural history, a need for a specialized botanical society became clear in the years shortly before WWI. The Czech Botanical Society was established in 1912, and Professor Velenovský was elected its first president. Two years later he resigned, being replaced by young and ambitious Karel Domin. In the same year the Society published the first volume of its yearbook *Preslia*, named in honour of the Presl brothers. The Prague natural history journals *Živa*, established by the prominent physiologist Jan E. Purkyně in 1853, and *Vesmír* (Universe), launched about two decades later, both published up to now with interruptions, were important not only because of publishing some botanical notes and studies in Czech, but also as a platform for discussion among scientists, teachers and amateur researchers living in remote parts of this country. An important publication platform became the series of monographs published by the Commission for the Exploration of Natural History in Bohemia (*Komité pro přírodovědné proskoumání Čech*), which was created by the National Museum and the Patriotic Economic Society in 1864. The monographs were usually issued in both languages.

2.5.2 Bohemia

The most important Czech botanist in the second half of the nineteenth century was Ladislav J. Čelakovský (1834–1902; Figs. 2.2f and 2.4c). After the death of his father František L. Čelakovský, a Czech poet and scholar, he was raised by Professor Purkyně's family and in 1860 he replaced Purkyně's eldest son as curator of botanical collections in the National Museum. With Čelakovský's appointment the museum became the centre of research into the flora of Bohemia. His first major work was the Prodrum of the Bohemian flora (*Prodrum der Flora von Böhmen*), a four-volume flora of Bohemia (three basic volumes and one volume with additions; Čelakovský 1867–1881). Each volume of this second complete Bohemian flora was printed first in German and one or two years later in a modified and improved version also in Czech (*Prodrum květeny české*; Čelakovský 1868–1883; Fig. 2.6b). The Prodrum, whose scientific quality equalled that of contemporary Austrian or German floras, was followed by a series of additions (*Resultate der botanischen Durchforschung Böhmens im Jahre...*), first published in 1882 (Čelakovský 1882) and then almost annually until 1894. Čelakovský also served as the Bohemian officer for the Flora of Germany prepared by P. Ascherson and P. Graebner (Čelakovský 1885). He used a broad concept of species in marked contrast to that used previously by Opiz and his contemporaries. He was a good and critical taxonomist, who removed many erroneous records from the Czech botanical literature. A considerable part of the plant records in the Prodrum is based on herbarium specimens that are still stored in the herbarium of the National Museum, in which he established a Bohemian collection, separated from the general collection. As the Prodrum lacked identification keys, Čelakovský prepared an Analytical flora of Bohemia (*Analytická květena česká*; Čelakovský 1879), published in three editions up to 1897. The geographic scope of the second edition (1887) was enlarged to include Moravia and Austrian Silesia. This booklet was the standard work for Czech-speaking botanists for more than three decades. Čelakovský revived interest in the Bohemian flora not only by publishing these standard handbooks but also by recruiting local contributors in various parts of the country, usually amateur botanists, who sent him plant specimens for revision and provided him with plant records. Some of these collaborators later produced valuable local floras.

Čelakovský became associate professor of botany at the Prague Technical University in 1866. Five years later he became extraordinary professor and in 1880 he was appointed as an assistant to Professor H. Moritz Willkomm at Charles-Ferdinand University. In 1882, when this university was divided, he became the first professor of botany in the Faculty of Arts of the Czech University and held this position for the next 20 years. At the university he focused on comparative plant morphology.

Čelakovský had several talented students, the most prominent being Josef Velenovský, Karel Vandas, Bohumil Němec and Edvin Bayer. However, none of them continued Čelakovský's studies on the flora of Bohemia, preferring to study cryptogams, Balkan flora, or even different branches of biology. It is possible that

Čelakovský felt endangered by the professional growth of his former students (Kláštorský et al. 1982; Janko 1997). The rivalry between the professor and his ambitious students became almost a rule in botany in Prague, and the generation change was never smooth. The small size of the scientific community, with only one prestigious professorship and one or two additional second-rank positions at the Technical University, may have been the main reason.

Josef Velenovský (1858–1949; Figs. 2.2g and 2.4e) replaced the deceased Čelakovský as professor of botany in 1902. His research interests included palaeontology, flora of Bulgaria, bryology, mycology and comparative plant morphology, which is also the title of the four-volume monograph published in parallel in German as *Vergleichende Morphologie der Pflanzen* in 1905–1913 and in Czech. He also established a new herbarium at the Czech University.

Botany at the Prague German University had a brilliant head in Richard Wettstein (1863–1931), who was appointed as a professor of botany in 1892 and remained in Prague until 1898 when he replaced his deceased father-in-law, Anton Kerner, as a professor of botany at the University of Vienna. His most significant work written in Prague was the Basics of the Geographical-morphological Method of Plant Systematics (*Grundzüge der geographisch-morphologischen Methode der Pflanzensystematik*), a pioneering work of botanical taxonomy (Wettstein 1898). Using this taxonomic approach and applying the concept of seasonal dimorphism, he wrote a monograph on the genus *Euphrasia* (Wettstein 1896). The next professor of botany at the German University in Prague was Günther Beck (1856–1931; Fig. 2.4h), who remained active until 1921. Already in the 1890s he wrote a detailed and critical flora for Lower Austria (Beck 1890–1893). In Prague he continued his studies on the flora of the western Balkan Peninsula, publishing a monograph on the vegetation in this area and then in three volumes the Flora of Bosnia and Hercegovina and the District of Novi Pazar (*Flora Bosne, Hercegovine i Novopazariskog sandžaka*; Beck 1903–1927). However, the participation of the German University in the research on the flora of Bohemia was very limited.

A good example of the many local floras written under Čelakovský's influence is the flora of the Cidlina and Mrlina river basins, which deals with a large part of eastern-central Bohemia, by the secondary school teacher Eduard Pospíchal (1838–1905). This flora was published both in Czech and German (Pospíchal 1881, 1882), and received an award in a competition organized by the Opiz Foundation.

In the twentieth century the centre of floristic research moved from the museum to the university where it was organized mainly by Karel Domin (1882–1953; Figs. 2.2i and 2.4g), since 1904 assistant to Professor Velenovský. Domin coined a new kind of geobotanical study of various parts of Bohemia, based on the principles of phytogeography introduced by the German botanist Oscar Drude. The most representative of these studies is probably the description of the České středohoří Mts (Domin 1904). The author classified the study area into seven districts with different climates and floras, distinguishing 23 vegetation formations. The second part is a travelogue describing various landscapes in the area and listing records of plants noted during the author's field trips or extracted from the literature. Josef Podpěra,

together with K. Domin the most influential Czech botanist in the first half of the twentieth century, tried to explain the historical development of the flora of the Bohemian lands (Podpěra 1906), based on the latest knowledge about glacial periods and the phytogeographic spectrum of the flora. Although many of his opinions and premises are outdated, it was a reasonable attempt at a phytogeographic analysis.

2.5.3 *Moravia and Silesia*

In Moravia a handful of local floras were published in the 1850s and 1860s. Research was stimulated by the establishment of the Brno Natural History Society, and Makowsky's *Flora des Brünnner Kreises* (Makowsky 1863) was published already in the first volume of its journal. Alexander Makowsky (1833–1908; Fig. 2.5b) was a professor at the technical college in Brno. His flora is a careful and critical synthesis of plant records from the beginning of botanical research in this area. It was soon followed by a pocket field guide with the same geographic scope (Haslinger 1869), which was revised and reissued after a decade.

Makowsky's flora may have served as a model for the *Flora des Znaimer Kreises* (Oborny 1879), dealing mainly with the flora of south-western Moravia. Its author, Adolf Oborny (1840–1924; Fig. 2.5e), a German-speaking secondary school teacher in Znojmo, became the leading Moravian botanist in the late nineteenth century. The two-volume *Flora von Mähren und österr. Schlesien* (Oborny 1883–1886) is a synthesis of crucial importance, being precise and critical, and therefore a respectable counterpart of Čelakovský's *Prodromus* or Fiek's *Flora von Schlesien*. Starting from 1884, Oborny annually summarized records of vascular plants from Moravia and Austrian Silesia (Oborny 1885). Throughout his botanical life he also studied *Hieracium* and wrote a monograph of this difficult genus in both provinces (Oborny 1905, 1906). A less critical two-volume flora of Moravia and Austrian Silesia was written in Czech and appeared soon after Oborny's flora (Formánek 1887–1897). Its author, Eduard Formánek (1845–1900), a secondary school teacher in Brno, also studied the flora of the Balkan Peninsula. His Moravian flora is very similar to Oborny's book, in places resembling a translation, but it contains some additional records. Local floras were published also in Czech: a valuable flora covering two districts in central Moravia was written by Václav Spitzner (1852–1907; Fig. 2.5d), a secondary school teacher in Prostějov (Spitzner 1887). A few studies on the Moravian flora were published by Franz Petrak (1886–1973; Fig. 2.5f), a student of Professor Richard Wettstein at the University of Vienna. He started his first exsiccatae *Flora Bohemiae et Moraviae exsiccata* already as a student in 1907 (Petrak 1910). It includes 1600 numbers of vascular plants collected by the joint efforts of members of the Petrak family and 13 other mainly German-speaking botanists from various parts of Bohemia and Moravia. It also contains specimens of numerous rare plants.

Moravia was the place where the first botanical identification key written in Czech was compiled (Sloboda 1852). The book, covering the flora of the whole Austrian Empire, was written by a Lutheran minister from Rusava in eastern Moravia and published by the Patriotic Museum in Prague. It is a compilation based on the 1840 edition of P. F. Cürrie's pocket flora of central and northern Germany and the *Österreichs Flora* by J. A. Schultes from 1814. Because it was written in Czech it became crucially important in the dissemination of botanical knowledge among Czech-speaking students and local botanists. However, many workers used German floras published by H. G. L. Reichenbach and W. D. J. Koch because of their scientific quality, and later also the handbook published by G. Lorinser, born in Mimoň in northern Bohemia, of which five editions were produced between 1854 and 1883 (e.g. Lorinser 1854).

A pocket flora for Moravia and Austrian Silesia in German was written by Gustav Merker (1910). Its author was a teacher at the Forest Academy in Hranice in northern Moravia, and his book is the last complete provincial flora published in German. In contrast, the importance of the botanical handbooks written by František Polívka (1860–1923), another Moravian secondary school teacher, was also greatly appreciated well beyond the province's borders. His four-volume *Illustrated Flora of the Lands of the Bohemian Crown (Názorná květena zemí koruny české; Polívka 1900–1904)* of 2490 pages with identification keys, species descriptions and 3159 illustrations remained an indispensable identification aid for half a century and his pocket flora with the same geographic scope (Polívka 1912) was used until 1928. Twenty editions of his pocket flora for students containing more than 1000 species and 650 drawings, were printed, the first in 1904 (Polívka 1904) and last in 1976.

Geobotanical studies in the contemporary style were also published in Moravia. Heinrich Laus (1872–1941; Fig. 2.5g), from 1902 a professor at the academy for the education of German-speaking teachers in Olomouc and from 1908 curator of the natural history collection in the Olomouc museum, wrote a monograph on the halophilous vegetation in southern Moravia and another on the Moravian weed and ruderal flora (Laus 1907, 1908a). He also published two editions of a student's flora for the Bohemian lands (Laus 1908b). He was an extremely diligent collector who exchanged plants with many botanists abroad: there are thousands of his specimens in many herbaria all over Europe. Probably the best contemporary local flora is that of Podpěra (1911), which covers central Moravia. This book combines descriptions of vegetation formations, geographical range analyses and traditional list of localities for particular species, even with indications of the collectors and herbarium specimens; it includes also specialized chapters on algae, diatoms, micromycetes, macromycetes, lichens and bryophytes written partly by Podpěra and partly by his friends.

Though the plants of Austrian Silesia were included in Moravian floras, the research into this province's flora continued to be organized mainly from Wrocław. A new critical flora of the whole of Silesia was written by Emil Fiek, assisted by Rudolf Uechtritz (Fiek 1881). During the 1890s Theodor Schube (1860–1934), a secondary school teacher in Wrocław, became the leading personality in Silesian botany. The most prominent among his works is the *Flora of Silesia (Flora von*

Schlesien, preussischen und österreichischen Anteils; Schube 1904), which remained the standard work on Silesian botany for many decades. Starting from 1896, he also compiled annual reports on the progress of the research into Silesian flora (Schube 1897). A geobotanical description of the Silesian flora, accompanied by numerous photographs, was written by Ferdinand Pax, professor of botany at the University of Wrocław (Pax 1915).

2.5.4 Bryology and Lichenology

The bryological exploration of the Bohemian lands was initially done by renowned German-speaking bryologists: the Sudetes Mts were explored by Julius Milde (1824–1871) and Karl G. Limpricht (1834–1902), both secondary school teachers in Wrocław. The most important of the Bohemian German-speaking bryologists was Viktor F. Schiffner (1862–1944), born in Česká Lípa in northern Bohemia. He was an assistant to Professor Willkomm and later Professor at the German University, before leaving for Vienna in 1902, where he focused on the taxonomy of exotic hepatics. Schiffner, assisted by Franz Matouschek, explored mainly the bryoflora in northern Bohemia. The first bryological flora written in Czech, Liverworts of the Bohemian Flora (*Mechy jatrovkovité (Hepaticae) květeny české*), was written by a secondary school teacher, Josef Dědeček. It was published first in Czech and then in German (Dědeček 1883, 1886). Ernst Bauer, a lawyer and public servant, studied bryophytes in central and western Bohemia and curated the *Musci europaei exsiccati*. The Bohemian mosses were comprehensively covered by the primary school teacher Antonín Weidmann (Fig. 2.4d) in his Prodrromus of Bohemian Leafy Mosses (*Prodromus českých mechů listnatých*; Weidmann 1895). Professor Josef Velenovský focused on bryology only for about a decade between 1893 and 1903. He became acquainted with Bohemian bryoflora to such an extent that he was able to produce the floras, Mosses of Bohemia (*Mechy české*; Velenovský 1897; Fig. 2.6c) and Liverworts of Bohemia (*Jatrovky české*; Velenovský 1901–1903). Velenovský's student Karel Kavina, during his short bryological career, wrote monographs on the peat-mosses (1911) and frondose liverworts (1915). Perhaps the only attempt to describe the cryptogamic flora in Moravia in a systematic manner was made by Jakob Kalmus (1834–1870), a physician in Brno. He published a moss flora in 1867 and a liverwort flora posthumously in 1871 (edited by Gustav Niessl), both in the *Verhandlungen des Naturforschenden Vereines in Brünn*.

In the mid-nineteenth century the Bohemian lands had no lichenologist, but the Sudetes Mts were explored by German-speaking Silesian researchers. The lichenological handbooks published by them (Koerber 1855; Körber 1859–1865; Stein 1879) were also important beyond Central Europe. The popular handbook by Rabenhorst (1870) dealt with lichens in Saxony, Thuringia, Upper Lusatia and northern Bohemia. The lichenofloristic reports from various parts of Moravia published by V. Spitzner in the 1890s were based mainly on records of other workers, including J. Kalmus, G. Niessl and F. Kovář. An identification key to Bohemian

macrolichens and an up-to-date list of all lichens known from Bohemia was compiled by Josef Novák both in Czech and German (Novák 1888, 1893). The most important field lichenologist around the turn of the century was Filip Kovář (1863–1925), a worker in a shoe-making factory and later museum curator. He wrote several reports on the lichen biota in the surroundings of Ždár nad Sázavou and other parts of Moravia, containing many new records for the province. He also produced small monographs on the species of the genera *Peltigera* and *Cladonia* in Moravia (Kovář 1909, 1912). Another excellent field lichenologist, Václav Kuťák (1876–1956; Fig. 2.4f), worked mainly in north-eastern Bohemia. He became well-known because of his wide-scale exchange of herbarium specimens and collections, *Lichenes Bohemiae*, present in many herbaria worldwide. Eugen Eitner (1839–1921), a retired merchant working in Wrocław, also collected lichens in the Sudetes Mts. He described several dozen taxa of lichens, some of them based on collections from the Bohemian side of the Krkonoše Mts. Unfortunately, his herbarium was destroyed in WWII, and only duplicates have survived. Josef Anders (1863–1936), a teacher in Česká Lípa, influenced his contemporaries with his *Shrubby and Leafy Lichens of Northern Bohemia (Die Strauch- und Blattflechten Nordböhmens; Anders 1906)*, later enlarged to include Central Europe (Anders 1928).

2.5.5 World War I

There was a general decline in botanical activity during WWI, although some botanists did not forget their beloved hobby in spite of their direct involvement in the war. Josef Podpěra was mobilized in the summer of 1914; he was one of 119,000 troops that surrendered to Russian forces in March 1915 and spent the rest of the war in Russian captivity, working in the provincial museum of Ufa in south-eastern European Russia and later as botany lecturer at the University of Tomsk. In 1917 he joined the Czechoslovak legion and returned to his homeland via Vladivostok and North America as late as in August 1920. Wherever he was, he probably used every moment to study plants. Albert Latzel, a medical doctor serving in the Austro-Hungarian Navy in Dubrovnik and Boka Kotorska, collected plants and mosses during the war in Dalmatia and Ukraine. Also Heinrich Laus, who was with an Austrian military unit stationed in the Bosnian capital Sarajevo, collected plants until autumn 1918 and was able to transport numerous herbarium specimens to his homeland despite the chaos at the end of the war. However, botanical research in Bohemia and Moravia was greatly restricted during the war years, as is documented by the small number of specimens from this period in herbaria.

2.6 The First Czechoslovak Republic (1918–1939)

The end of WWI brought the ultimate collapse of Austria-Hungary, and the Bohemian lands became part of the newly established Czechoslovak Republic, which included the Bohemian lands in their historical boundaries, Slovakia and Carpathian Ruthenia (or Carpatho-Ukraine, *Podkarpatská Rus*, now the *Zakarpattia Oblast* of Ukraine). Several minorities were included in the population of this new country: almost 31% of the citizens in the Bohemian lands were German-speaking and in Slovakia almost 22% were Hungarians. These minorities, which actually constituted the majority in many towns and villages, were to a large extent hostile to the new republic, as their political elites lost power. Czechoslovakia was a parliamentary democracy, the most liberal and after 1935 the only one in Central Europe. The “Czechoslovak nation”, including Czechs and Slovaks, was the main constituent of the new state, but the German minority had a system of educational and cultural institutions fully equal to the Czechs. However, the Republic failed in granting political autonomy to ethnic minorities, which later proved to be fatal. The Czechoslovak economy quickly recovered from WWI and the country ranked among the most developed in the world, but the economic crisis in the early 1930s most strongly affected the industrial areas with a German majority. The Sudeten German Party, supported by Nazi Germany, became the strongest of all the parties in the country in the mid-1930s. At the Munich Conference in September 1938 Czechoslovakia had to cede the areas with a predominant German population to Germany, and in March 1939 the Bohemian lands were occupied by the Nazis, creating the Protectorate of Bohemia and Moravia as an autonomous Nazi-administered territory, while a puppet state was established in Slovakia and Carpathian Ruthenia annexed by Hungary.

2.6.1 Institutions and Societies

The establishment of Czechoslovakia brought a sudden improvement in the research infrastructure. Masaryk University, established in Brno in January 1919 as the second Czech university in the country, had a Faculty of Science from the very beginning. In 1921 Josef Podpěra (1878–1954; Figs. 2.5h and 2.7a) was appointed as the first professor of botany and head of the botanical institute. The University of Agriculture in Brno was also founded in 1919; from 1922 it included the Institute of Dendrology, much later with a full professorship. At Charles University, which dropped Emperor Ferdinand from its name, the Faculty of Science was separated from the Faculty of Arts, but Professor Velenovský remained the head of the Institute of Botany until 1927. In 1922 Professor Domin created the Institute of Pharmaceutical Botany in order to satisfy his personal ambitions, and fused both institutes after Velenovský's retirement in 1927.



Fig. 2.7 Remarkable Czech botanists of the twentieth century: (a) Josef Podpěra (1878–1954) in his office in Brno in 1941; (b) František A. Novák (1892–1964); (c) Josef Dostál (1903–1999); (d) Antonín Vězda (1920–2008). Photo credits: Archive of the Department of Botany and Zoology, Masaryk University (a), Archive of the Czech Botanical Society (b, c) and H. Michalčová (d)

At the Institute of Botany of the German University in Prague Professor Beck retired in 1921 and Fritz (Friedrich J.) Knoll (1883–1981), specialized in flower biology, was appointed as a new professor. As a prominent member of the Nazi party he was appointed Rector (chancellor) of the University of Vienna in 1938 and was personally responsible for the persecution of professors and students for racial and political reasons. His successor at the German University, Adolf A. Pascher (1881–1945), from 1927 professor and from 1933 head of the institute, was a prominent algologist and served for two decades as the editor of the journal *Beihefte zum Botanischen Centralblatt*. Pascher's achievements made the institute probably the most important centre of algological research in the world. He substantially reshaped the classification of algae, but probably most famous are his monographs published in *Die Süßwasser-Flora Deutschlands, Österreichs und der Schweiz* (e.g. Pascher 1915, 1927), which he founded. He died in May 1945 in Prague or Doksy (northern Bohemia) under circumstances that remain unclear.

Both the Royal Bohemian Society of Sciences and the Czech Academy of Sciences and Arts, which dropped Emperor Francis Joseph from its name, continued their activities, and so did the renamed German Society of Sciences and Arts for the Czechoslovak Republic (*Deutsche Gesellschaft der Wissenschaften und Künste für die Tschechoslowakische Republik*). In 1924 the Moravian Natural History Society (*Moravská přírodovědecká společnost*) was established in Brno. It immediately started a journal, *Práce Moravské přírodovědecké společnosti*, which became the most important publication venue for natural sciences in Moravia. Also other natural history societies, for instance in Třebíč and Moravská Ostrava, published journals. The faculties of science, both in Prague and Brno, launched in the early 1920s their scientific journals *Spisy vydávané přírodovědeckou fakultou...* (with a parallel title in French, *Publications de la Faculté des sciences...*). Valuable taxonomic studies appeared mainly in the Brno series (e.g. Nábělek 1923). Professor Domin (until 1928 together with J. Podpěra) edited the journal *Acta botanica bohemica*, which published plant geographical and taxonomical articles, in the 1930s and 1940s written mainly by the editor. There was a handful of popular journals, e.g. *Věda přírodní* (Natural Science), published in cooperation with the Natural History Club and Czechoslovak Botanical Society, edited also by Domin, and *Příroda* (Nature); both journals also published short research reports, mainly descriptions of flora and vegetation. Among the journals published in German, botany was best represented in *Lotos* and the *Verhandlungen des Naturforschenden Vereines in Brünn*, published in Prag and Brno, respectively. In 1930 they were joined by the journal *Natur und Heimat*, published by the *Deutscher Verband für Heimatforschung und Heimatbildung* in Ústí nad Labem, which focused on flora, fauna and nature conservation.

In 1927 the Czechoslovak state purchased the chateau in Průhonice and the surrounding park of 250 hectares. The park was founded in 1885 by Count Ernst E. Silva-Tarouca (1860–1936), a politician and self-educated dendrologist, who co-authored (together with Camillo Schneider) several editions of a popular dendrological and horticultural handbook. The state established the Research and Breeding Institute for Ornamental Gardening (nowadays the Silva Tarouca Research Institute for Landscape and Ornamental Gardening) in the Průhonice chateau. In 1950 the Botany Department and herbarium of the National Museum were moved to the chateau, where they remained for more than half a century. Since the 1960s this chateau has been the headquarters of the Institute of Botany of the Czechoslovak (now Czech) Academy of Sciences.

In 1934 the National Museum in Prague, until then privately owned by the Society of the Patriotic Museum in Bohemia, became the property of the Land of Bohemia. Together with numerous state subsidies provided to societies, this change documented the growing role of the state in the support of scientific infrastructure. The activities of the museum's botanical department were shaped by Ivan Klášterský (1901–1979; Fig. 2.4k), who was appointed as department head in 1933. He focused on re-identifying, sorting and incorporating the valuable historical collections acquired by the museum, including those of Haenke, Opiz and Kablik.



Fig. 2.8 Participants of the Fifth Phytogeographical Excursion on the serpentinite slopes near Mohelno in south-western Moravia on 13 July 1928. Photo credit: Archive of the Department of Botany and Zoology, Masaryk University

The Czech Botanical Society enlarged its geographic scope to include the whole of the new country, changing its name to Czechoslovak Botanical Society. Its main activities remained excursions, meetings and lectures. In October 1921 the Society organized the first Congress of Czechoslovak botanists. As there was one participant from the Kingdom of Serbs, Croats and Slovenes, Professor Vale Vouk, the event was also declared the 1st Congress of Slavic Botanists. The next congress, both Czechoslovak and Slavic, was held in 1928 to celebrate the 10th anniversary of Czechoslovakia. It hosted numerous representatives from Poland and Yugoslavia, and also a few from Bulgaria and the Soviet Union. The Society also co-organized the 5th International Phytogeographical Excursion to Czechoslovakia and Poland in 1928 (Fig. 2.8). In 1923, after a long break due to the war, the second volume of the Society's journal *Preslia* appeared, followed by further volumes at more regular intervals. As the established journals were firmly in the hands of the older generation and provided only limited publication space for young botanists, about two dozen young botanists formed the Club of Czechoslovak Botanists in 1937 with the only purpose of publishing at their own expense. Their journal, *Studia botanica čechoslovaca*, edited by Alfred Hilitzer, published 12 volumes, before being fused

with *Preslia* in 1951. In parallel, monographic studies were issued in the series *Opera botanica čechica*, in which a valuable modern monograph on the genus *Sesleria* (Deyl 1946) was published.

2.6.2 Studies on Vascular Flora

Both leading personalities in Czech botany at that time, K. Domin and J. Podpěra, concluded an agreement demarcating their spheres of interest within Czechoslovakia: Professor Domin claimed Bohemia, Slovakia and Carpathian Ruthenia for himself and his collaborators, while Moravia was allotted to Professor Podpěra and his assistants. This agreement held until the mid-1930s, when Vladimír Krist, Podpěra's assistant, started research on the halophilous flora in southern Slovakia. Actually, K. Domin was mainly interested in the Carpathians, while Bohemia was left to amateur botanists. Accounts of local species were compiled mainly for natural history monographs for administrative districts in various parts of the country (e.g. Klement 1930). Domin himself returned to local floristics during WWII when he could not travel to Slovakia, producing instead a comprehensive flora of the Kokořín area in central Bohemia (Domin 1942). In the meantime, the research into the flora of the whole of Bohemia was organized by Josef Rohlena (1874–1944; Figs. 2.2h and 2.4j), a primary school teacher and amateur botanist, who from 1895 lived in Prague. He helped L. J. Čelakovský as a voluntary museum assistant in the late 1890s. Later he shifted his attention to the flora of Montenegro, where he spent most of his summer vacations. He returned to the flora of his homeland in the early 1920s, when he published a series of reports on new floristic records for Bohemia (e.g. Rohlena 1922). He organized an informal network of local contributors, who sent him their field records and herbarium specimens for identification. Of the 13 reports published in 1922–1938, the last three were prepared together with Josef Dostál. However, Rohlena's lifework is undoubtedly *Conspectus Florae Montenegrinae*, edited by Dostál and published as a double-volume of *Preslia* (Rohlena 1942).

The newly established Institute of Botany at Masaryk University in Brno became a centre of botanical research in Moravia. Its herbarium was formed by fusing the personal collections of Professor Podpěra with the purchased herbaria of H. Laus, F. Petrak and the *Naturforschender Verein in Brünn*. This Institute also purchased the library of this society. In 1931, i.e. 10 years after its establishment, the institute's herbarium had about 225,000 specimens. Podpěra soon started working on a new flora for Moravia, of which three volumes were finished (Podpěra 1926–1930), including ferns, gymnosperms and graminoids. The title of this flora may be translated into English as *Flora of Moravia in a Systematic and Geobotanical Context*, which reflects its unusual format: for many species the taxonomical and chorological information is supplemented by detailed descriptions of their distributions and habitats, particularly in Eastern Europe and Siberia, based on the author's personal observations and Russian literature. The complicated hierarchy of infraspecific taxa

resembles that of the *Synopsis der mitteleuropäischen Flora* by Ascherson and Graebner, sometimes with two parallel infraspecific classifications within a single species.

Local floristic studies appeared less frequently in this period. A nice example of a local flora is that for the town of Štramberk in northern Moravia (Otruba 1930), once again a work of an amateur botanist. Roughly at the same time Heinrich Laus described the flora on Mt. Petrovy kameny (Petersteine) in the Hrubý Jeseník Mts (Laus 1927).

Young members of the botanical institutes studied the taxonomy of various genera, including *Dianthus* (e.g. Novák 1924), *Festuca* (e.g. Krajina 1930) and *Centaurea* (Dostál 1938). Particularly valuable are the monographs on *Fabaceae* written by Grigorij Ivanovič Širjaev (1882–1954). He was born in Kharkiv (Ukraine), where he also studied botany. During the Russian civil war, he joined the White Army, in 1920 leaving Crimea for Turkey together with the remnants of General Wrangel's army. In 1923 he started working at Masaryk University as the first herbarium curator. In Brno he published monographs on the genera *Onobrychis* (e.g. Širjaev 1925–1937), *Trigonella* and *Ononis*, as well as taxonomic studies on some species of *Lathyrus* and *Astragalus*.

The interwar period was a golden age of exsiccatae. Professor Domin with his assistant Vladimír Krajina, supported by numerous collaborators, prepared four centuries of *Flora čechoslovenica exsiccata*, issued from 1929 to 1936. The Brno series, *Flora exsiccata Reipublicae bohemicae slovenicae*, was started in 1925 and instalments were issued almost annually until 1938. The series was continued until 1979 under modified names, reaching altogether 17 centuries. Both collections were produced in numerous copies and are present in many herbaria all over the world.

There was a need for a flora of Czechoslovakia as the already outdated floras published before WWI by F. Polívka covered only Bohemia and Moravia, while information about Slovak and Carpatho-Ruthenian floras had to be extracted from Hungarian sources. A pragmatic solution was to update and extend the time-proven Polívka's pocket flora of 1912 (Domin and Podpěra 1928; Fig. 2.6d). A year later a flora of Bohemia, written in German, the *Bestimmungsbuch der Flora von Böhmen* (Tannich 1929) was published by Anton Tannich, a forester and amateur botanist expelled to Austria in 1945. In the early 1930s an attempt of Jaromír Klika to launch a new flora failed at the planning phase: Klika was a vegetation scientist at the Czech Technical University in Prague and failed to obtain the support of taxonomists. Instead, Domin hastily compiled a list of Czechoslovak vascular plants (Domin 1935), which was probably intended as a taxonomic backbone of the future flora edited by him. This publication was followed by a thorough survey of the literature related to the flora of Czechoslovakia, much later published as a comprehensive bibliography (Futák and Domin 1960), and by a systematic extraction of plant occurrence records on card files.

2.6.3 *Bryology and Lichenology*

The most influential Czechoslovak bryologist in the interwar period was Professor Josef Podpěra, a student of Velenovský at the Czech University in Prague and founder of scientific bryology at Masaryk University in Brno. He is best known for his studies and a monograph on the genus *Bryum* (e.g. Podpěra 1942), which were published throughout his career, and for a compilation of a modern and comprehensive index of European mosses, *Conspectus muscorum europaeorum* (Podpěra 1954). He also authored a handful of bryofloristic studies during his early years in Moravia.

The interwar lichenological research in Czechoslovakia was dominated by two scientists. Alfred Hilitzer (1899–1940), associate professor at the Czech Technical University in Prague, was a field botanist specializing in lichenology. His most important work was a book on epiphytic cryptogam communities, *Étude sur la végétation épiphyte de la Bohême* (Hilitzer 1925), inspired by the Scandinavian phytosociological approach. The most productive lichenologist of that time was Jindřich Suza (1890–1951), from 1921 assistant to Podpěra at Masaryk University in Brno and from 1932 professor at Charles University in Prague. He focused on phytogeographic and geobotanical aspects of lichenology, working mainly in Moravia and the Western Carpathians. He published more than 100 papers on lichenology initially focusing mainly on lichenofloristics; later he also included geographical and ecological aspects. This resulted in a synthesis of the Moravian lichen biota (Suza 1925). Josef Anders continued his studies on lichens in northern Bohemia, while Oskar Klement (after 1945 expelled to Bavaria) studied lichens mainly in the Krušné hory Mts.

2.6.4 *Vegetation Studies*

In the 1920s the research interest of young botanists turned towards the emerging field of geobotany or phytosociology. The first attempts to study Czech vegetation using a phytosociological approach were made by Professor František Schustler (1893–1925) at Charles University in Prague. Unfortunately, his untimely death prevented him from continuing his vegetation research in the Krkonoše Mts and Bohemian dry grasslands, which were continued by his student Alois Zlatník (1902–1979; Fig. 2.9a). Professors Domin and Podpěra were also interested in vegetation studies, although their main interests were in phytogeography and plant taxonomy. Domin published a book on phytosociological methods (Domin 1923) and introduced the internationally well-known Domin scale for estimating cover in vegetation-plots. Podpěra published insightful descriptions of vegetation at various sites, especially in Moravia, framed in a broad phytogeographic context.



Fig. 2.9 Botanical events and remarkable botanists of the twentieth century: (a) *from left*: Witold H. Paryski, Jaromír Klika (1888–1957), Alois Zlatník (1902–1979), Vladimir N. Sukachev, Rezső Soó, Mrs. Szafer, Wladyslaw Szafer and Bálint Zólyomi in the High Tatras during the Congress of the Czechoslovak Botanical Society in 1955; (b) Josef Holub (1930–1999; *left*) and Stuart M. Walters in a field trip organized during the Congress of the Czechoslovak Botanical Society in 1962. Photo credits: Archive of the Czech Botanical Society

An important event in the development of vegetation science in Czechoslovakia was the Fifth International Phytogeographical Excursion in Czechoslovakia and Poland in the summer of 1928 (Rübel 1930). This excursion, organized for the Czechoslovak part under the leadership of Karel Domin, Josef Podpěra and Karl Rudolph, was attended by leading vegetation scientists of that time and pioneers of phytosociology, including Josias Braun-Blanquet, Heinrich Brockmann-Jerosch, Helmut Gams, Henry Gleason, Rolf Nordhagen, Eduard Rübel, Arthur Tansley and Heinrich Walter (Fig. 2.8). For this event, Czech botanists prepared pioneering vegetation studies of various excursion sites (e.g. Domin 1928; Firbas and Sigmond 1928; Klika 1928; Podpěra 1928a, b, c; Rudolph 1928; Rudolph et al. 1928; Suza 1928; Zlatník 1928a, b). The establishment of international contacts and research motivated by this excursion had a great influence on further developments of vegetation science in Czechoslovakia.

In the 1930s, vegetation scientists from Prague and Brno continued surveying various parts of this country, though many of them were attracted mainly by the relatively more natural and less explored Carpathian landscapes in Slovakia (e.g. Josef Dostál, Vladimír Krajina, Rudolf Mikyška and Pavel Sillinger) and Carpathian Ruthenia (e.g. Miloš Deyl and Alois Zlatník). A long-term systematic survey of vegetation in various parts of Bohemia, Moravia and Slovakia was undertaken by Jaromír Klika (1888–1957; Fig. 2.9a), professor at the Czech Technical University in Prague and from 1951 professor at Charles University. Klika was in close contact with the international community of vegetation scientists cooperating with Braun-Blanquet's institute SIGMA in Montpellier. Influenced by Braun-Blanquet attempts at creating an international hierarchical classification of plant communities, Klika started preparing a hierarchical overview of the Czechoslovak vegetation types,

which was published in four editions (Klika 1941, 1948, 1955; Klika and Hadač 1944) containing first descriptions of several high-ranking syntaxa, which are still widely accepted internationally. Three of these editions were published in handbooks and textbooks of vegetation science written in Czech and edited by Klika, which contributed to a national standardization of concepts and methods. The 1944 edition of the overview also contained a pioneering attempt by Emil Hadač at creating a syntaxonomic system for communities of bacteria, fungi, algae, lichens and bryophytes.

Modern palaeobotanical research was started at the German University in Prague by Karl Rudolph (1881–1937) already during WWI. In the 1920s he was joined by Franz Firbas (1902–1964) and several students who carried out palynological studies on mires in various areas of Czechoslovakia. Unfortunately, the successful work of this group was discontinued by the expulsion of Germans from Czechoslovakia after WWII. Firbas resumed his research at the University of Göttingen, where he prepared a monograph summarizing the research results of this group (Firbas 1949–1952).

2.7 World War II and Postwar Turbulence (1939–1948)

Although the ultimate goal of the Nazi occupation was the full Germanization of the Bohemian lands, the repressions were initially aimed mainly at the Czech intellectual elite, politicians, former military officers and people classified as Jews. After anti-Nazi demonstrations in autumn 1939, all Czech universities were closed for three years, nine student leaders were executed and more than 1000 students and many professors sent to concentration camps. After the assassination in 1942 of the Deputy Reich Protector Reinhard Heydrich by Czechoslovak soldiers airlifted into the country by the British Airforce, the Nazi terror against the Czech population intensified. The military defeat of Nazi Germany in May 1945 was followed by the expulsion of the German-speaking population to Germany or Austria soon after the end of the war. The political regime in liberated Czechoslovakia was basically democratic, however, the Communist Party won the 1946 elections and seized absolute power in a coup d'état in February 1948.

2.7.1 *Botany in the Occupied Country*

The closure of Czech universities in November 1939 immediately stopped all teaching and most scientific research at these institutions. In Prague, Viktor Czurda, an excellent algologist but also a convinced Nazi, was appointed as the commissioner for the Czech Faculty of Science. Professor Domin barely managed to save his private library. With the expectations of bombing raids by the Allies, the herbarium

was later moved to relative safety in a castle in south-western Bohemia, together with the collection of the German institute. Both collections were partly damaged because of the lack of care and unsuitable conditions. In Brno the situation was somewhat better since Professor Franz Frimmel (1888–1957) was appointed as the commissioner for the Institute of Botany. He was a prominent plant breeder and professor of agriculture at the German Technical University in Brno. Having nothing in common with Nazi ideology, he was also on good terms with Professor Podpěra. The institute was allowed to work as a kind of a research facility until autumn 1941. Then Professor Podpěra retired and only Širjaev remained as the last member in charge of the herbarium of the dissolved institute. In April 1945 Širjaev managed to escape to Bavaria to avoid his arrest by the Soviet secret police, but he was unable to find an adequate job and died nine years later in poverty in New York.

Although the situation in the occupied country was difficult, botanical research did not stop completely. Professor Domin and a handful of his assistants found a refuge in the Commission for Collecting Medicinal Plants, established by the Protectorate Ministry of Health. It was a small institute of botany, and its employees continued compiling literature records for the planned flora of Czechoslovakia. In early 1940 Domin published a call and instructions for research into the country's flora on a regional basis, which was an invitation to amateur botanists (Domin 1940). The research, referred to as the Floristic Action, was supported by the Czech Botanical Society. Already by the end of 1940 there were about 700 participants. This recording scheme enhanced the collecting of plants, which is reflected in a large number of herbarium specimens of that date in the Charles University herbarium. Although meetings and other activities of natural history societies were restricted by the Nazi authorities, the Czech Botanical Society was able to issue three volumes of Preslia, one of them containing Rohlena's *Conspectus Florae Montenegrinae* (Rohlena 1942).

2.7.2 War Victims and Heroes

Some Czech botanists became actively involved in the anti-Nazi resistance movement. Vladimír Krist (1905–1942) joined a local cell of Defending the Nation, a resistance group organized mainly by former officers of the Czechoslovak Army. This group, whose members sometimes met in the former building of the Institute of Botany at Masaryk University in Brno, was disclosed and Krist died in the Mauthausen concentration camp. Further victims of the Nazi regime include Professor August Bayer of the University of Agriculture in Brno and several amateur botanists. There were victims also on the other side: for instance, Karl Preis (*1913; Fig. 2.4i) became a German army soldier and was killed near Leningrad (now Saint Petersburg) in September 1941 (Pohl 1941).

Professor Vladimír Krajina (1905–1993) joined the Czech resistance movement immediately after the Nazi occupation. He was one of the leading members at the Political Headquarters of Homeland Resistance, being in charge of the encrypted

radio messages sent from the Protectorate to the exiled Czechoslovak politicians in London. Krajina was finally captured by the Gestapo in 1943 and after a failed suicide attempt held in prison till May 1945 as a prominent prisoner of the Nazi authorities (Drabek 2012).

2.7.3 *Consequences of the War*

The defeat of Nazi Germany was followed by the expulsion of Germans from the country, sanctioned by the Potsdam Agreement of 1945, which ended the long and sometimes difficult coexistence of Czechs and Germans in the Bohemian lands. Only a small fraction of the German-speaking citizens was allowed to stay in the country, including professional botanists Professors Erich Daumann, a former assistant to Professor Knoll, and Franz Frimmel. The German University in Prague and other German educational institutions were dissolved. Many herbarium specimens collected by the German-speaking compatriots were transferred to public herbaria (e.g. collection of Otto Thenius to the Masaryk University herbarium; Fig. 2.5i) after their owners had to leave the country with a few personal items only.

The first task after the country's liberation in May 1945 was to rebuild the institutions. At Charles University in Prague, Professor František A. Novák (1892–1964; Fig. 2.7b) was appointed as a head of the Institute of Botany in 1945, while Professor Domin was accused of collaboration with the Nazis and could not return to his former job. In 1946 he was imprisoned but a year later he was expunged of all allegations by the National Tribunal. However, this court decision did not help him reverse his exclusion from the faculty, and he was ultimately retired by decision of the first communist Minister of Education in spring 1949. He blamed his former assistants for his situation. It is now clear that the collaboration charges were fabricated. Domin is said to have been an honest person, a Czech nationalist with right-wing political views and strong political ambitions, but with a poor sense of politics. The reasons for his exclusion from scientific life were partly political as left-wing views prevailed in the postwar period and partly may have been personal, reflecting the reluctance of his former students and colleagues to accept the continuation of his dominance and autocratic style. The Institute of Botany at Masaryk University in Brno was ruined in terms of staff as only Professor Podpěra returned, resuming his work as a head of the institute. A new university was (re-)established in Olomouc in 1946 and named Palacký University. Initially it did not have a Faculty of Science, but a small Institute of Botany was established later at the short-lived University of Education, which was merged with Palacký University in the early 1960s.

The postwar developments forced Professor Krajina to accept the job of Secretary General of the Czechoslovak National Socialist Party in 1946. In spite of its name it was a democratic party never associated with Nazi ideology, which in the postwar period was the main opponent of the Communists. In February 1948, immediately after the communist coup, Krajina was arrested and released only with the help of President Beneš. He finally managed to flee from the country skiing over the Šumava

Mts. He started a new professional career at the University of British Columbia in Vancouver, where he taught plant ecology for 24 years. There he developed an ecologically-based vegetation classification now widely used as the basis for forest management, and made a major contribution to the establishment of a network of ecological reserves in British Columbia (Drabek 2012).

2.8 The Communist Period (1948–1989)

The Communists introduced a Soviet style one-party political regime and a centrally planned economy. The first years of communist rule were marked by harsh repressions not only against its active opponents but also against any assumed dissenters. Economic difficulties in the early 1960s indicated an urgent need of reforms, which were prepared by liberal economists and intellectuals within the Communist Party. These reforms were accompanied by pressure from Slovak representatives asking for more autonomy, resulting in the federalization instituted in 1968. The conservative Communist Party leadership was removed from office in January 1968, which opened the way for an eight-month period of democratic reforms, usually referred to as the Prague Spring. This short period of liberalization was terminated by the Warsaw Pact invasion, led by the Soviets, in August 1968, followed by the restoration of a conservative communist regime, which was less severe than that of the 1950s, but still oppressive of any opposition movement. In the late 1980s there was a crisis in the country's planned economy, growing domestic opposition, and change in the Soviet policies towards other communist countries, which ultimately resulted in the collapse of the communist regime in the fall of 1989.

2.8.1 *Life and Work of Botanists Under the Communist Regime*

The communist regime had a profound influence on all spheres of Czechoslovak society, including the educational system and research. It immediately suppressed the academic freedoms that had existed since the late 1840s. Officially Soviet science became the only model to follow, including a shift towards applied research. Research was also impeded by international isolation: travelling to western countries and communication with their institutions and workers were severely restricted. Exchange and purchase of literature was also substantially reduced. The other devastating factor were the persecutions of real or assumed political opponents. The Communists almost immediately removed many professors, students and scientists from universities and other institutions. For example, Josef Svoboda, later an Arctic plant ecologist in Canada, was arrested in 1949, when he was a student at Masaryk University, and kept in work camps and prison until 1958 (Svoboda 2011). Even the

Czechoslovak Botanical Society terminated the membership of Professor Domin, its former President, Miroslav Pulchart, who testified in Domin's favour at the National Tribunal, and Vladimír Krajina, a hero of non-Communist anti-Nazi resistance. Another wave of cleansing of "untrustworthy" persons followed in 1958, when numerous scientists had to leave their institutions or were removed from important positions. For instance, Antonín Vězda, later a prominent lichenologist, had to leave the Faculty of Forestry at the University of Agriculture in Brno. Jan Šmarda, a bryologist and vegetation scientist, was expelled from Masaryk University in 1961. Probably the greatest loss of intellectual capacity came after the defeat of the 1968 reform movement. During the early 1970s several people were expelled from universities, such as the vegetation scientists Jan Jeník and Jarmila Kubíková at Charles University, and Jiří Vicherek at Masaryk University (then renamed J. E. Purkyně University), while others were given lowly jobs. Some of them were replaced by Communist Party members or conformists with a lack of expertise in the field. As the state, completely controlled by the Communist Party, was the universal employer, only few of these people were fortunate enough to find adequate employment outside universities. Others left the country in order to escape political oppression or find better working conditions in a democratic society. For instance, Adolf Češka, who left almost immediately after the 1968 Warsaw Pact invasion, worked later as a museum curator and vegetation scientist in British Columbia, Canada. The former political prisoner Josef Svoboda left the country in the same year and later did his PhD in Canada and became a professor at the University of Toronto. The plant ecologist Marcel Rejmánek left the country via Yugoslavia in 1983 and became a professor at the University of California, Davis, in 1993; he made fundamental contributions to the ecology of plant invasions. It is indisputable that this brain drain caused by political oppression had an adverse effect on the quality of research in all fields of science.

The communist system gave the members of the Communist Party in leading positions in scientific institutions extraordinary powers, with the result being dependent on their personal qualities. For example, Slavomil Hejný, the long-serving Director of the Institute of Botany of the Czechoslovak Academy of Sciences in Průhonice, had a balanced personality and dared to support good scientists expelled from universities or otherwise in trouble with the regime as long as it did not endanger his own position. He even employed former political prisoners such as Josef Svoboda and Josef Petr Ondok, which undoubtedly was risky. The Institute of Botany consequently entered the post-communist period in a relatively good condition. In contrast, Radovan Hendrych, the head of botany at Charles University in Prague, made the climate in the department substantially worse than the general political situation required, which had a considerable negative effect on the department's teaching and research (Hrouda 2005).

2.8.2 Institutions

The traditional research infrastructure was profoundly changed by the establishment of the Czechoslovak Academy of Sciences (CAS) in October 1952, following the Soviet example. Formally it succeeded both the Royal Bohemian Society of Sciences and the Czech Academy of Sciences and Arts, but the main difference was that the Academy fulfilled not only the role of a body of the most eminent scientists, but also ran numerous institutes specialized in various fields of basic research. From the very beginning, the research topics were to a large extent prescribed by state authorities as part of a Soviet-type planned economy, nevertheless, it started to have an important role in many fields of research, which it still has.

The Academy of Sciences founded the Geobotanical Laboratories in Průhonice near Prague in 1954 and in Brno in 1955. The Průhonice laboratory was headed by Rudolf Mikyška (1901–1971), assisted by Jaroslav Moravec, while the Brno laboratory was headed by Jan Šmarda (1904–1968). The Institute of Botany came into existence by merging these two laboratories in January 1962. Slavomil Hejný (1924–2001), a plant ecologist who specialized in aquatic botany and ruderal vegetation, became the first director of this institute, keeping this position for 29 years. In 1971, a new Hydrobotanical Department of the Institute of Botany was established in Třeboň in southern Bohemia.

The restoration of the conservative communist order after the 1968 Warsaw Pact invasion adversely affected botany especially in universities. As there was no suitable Communist Party member available for the headship of the Department of Botany at Masaryk University from among staff members, the department was merged in 1971 with the Department of Plant Physiology and its staff gradually reduced. In contrast, the Department of Botany at Charles University was temporarily divided into the Department of Botany of Higher Plants in 1978, led by Radovan Hendrych, and Department of Botany of Lower Plants, headed by Zdeněk Urban, in order to satisfy the personal ambitions of the two influential party members.

As the communist system aimed at absolute control of many human activities, voluntary associations and societies lost their right to publish books and periodicals. Also local museums, in many cases previously backed and owned by voluntary associations, were taken over by the state. Despite many negative effects, gradually professional curators of the collections in various museums were appointed. This is one of the reasons for the existence of numerous public herbaria in the Czech Republic. In February 2017 the Index Herbariorum listed 51 Czech herbaria with an international code, though some of them are actually defunct or very small. Still, apart from the large university and museum herbaria in Prague and Brno, there are further 12 herbaria housing from 47,000 to 209,000 specimens each, some of them perfectly curated. The total number of herbarium specimens in the collections is estimated at about 8 million.

In 1966 the Institute of Botany of the Czechoslovak Academy of Sciences started publishing its own journal, *Folia Geobotanica et Phytotaxonomica Bohemoslovaca*. This journal, now published by Springer as *Folia Geobotanica*, was intended to be

international, and it was published mainly in German and English. In addition to these national and to some extent international journals, there were numerous periodicals, journals and yearbooks issued by local museums, which published natural history papers of local or regional importance, such as *Severočeskou přírodou* (published in Litoměřice), *Sborník Jihočeského muzea v Českých Budějovicích* (České Budějovice) and *Vlastivědný sborník Vysočiny* (Jihlava).

2.8.3 *Czechoslovak Botanical Society*

The activity of the Czechoslovak Botanical Society increased rather slowly, probably because of the workload of the leading personalities during postwar reconstruction, frequent changes in Society's governance and its division in three branches based in Prague, Brno and Bratislava. Professor Domin resigned as President in June 1945 and was replaced by Silvestr Prát (1895–1990), a prominent plant physiologist, who was successively replaced by Josef Podpěra, Jaromír Klika and Alois Zlatník. The situation stabilized only after 1956 with the election of Professor Karel Hrubý (1910–1962), an excellent geneticist, botanist and lepidopterologist, who was, however, in disgrace because of his firm adherence to Mendelian genetics and opposition to politically enforced pseudoscientific Lysenkoism. A law passed in 1951 virtually abolished the freedom of association, and the Society was affiliated by an administrative decision of state authorities with the Biological Section of the Czechoslovak Academy of Sciences. It was reshaped into an “exclusive scientific society”, in which only professional botanists could become members. Consequently, it lost some dedicated amateur members. This was later partially remedied by introducing extraordinary memberships. These unfortunate state interventions were partly compensated by regular subsidies, which enabled the Society to employ an officer and a librarian at its Prague headquarters.

The activities of the Society gradually expanded. Several local branches were established, often informally associated with museums and co-organized by botanists employed in these facilities. The most active were probably those in northern Bohemia (Ústí nad Labem), western Bohemia (Plzeň) and southern Bohemia (České Budějovice). These branches focused mainly on doing research on the local flora, field trips, lectures, plant identification workshops and publication of local botanical bulletins. In parallel, specialized sections were established, including the Algological Section, Dendrological Section, Floristic Section, Section of Plant Physiology, Geobotanical Section and Section of Synanthropic Flora and Vegetation. Some of them were short-lived, some later split off as separate societies, while others remained important parts of the Society. The most popular was the Floristic Section, established in 1956, which carried out field surveys of flora across the country. Its most important activity was the organization of Summer Schools of Field Botany. The first Summer School was held in 1957 in the České středohoří Mts and since 1964 up to now these one-week field meetings have been organized annually. The number of participants grew from about 30 in the mid-1960s to about 150 in the

1980s. These meetings became the Society's flagship activity with a range of purposes, including dissemination of botanical knowledge and research on the flora of less known areas. Plant records collected during these courses are systematically summarized and published. Equally important is their social function as an informal platform for meetings between professional and amateur botanists, secondary school teachers and students. For many former attendants this encounter turned out to be decisive for their professional careers or life-long hobbies.

In the early 1970s the Society launched a series of two-day conferences or workshops on various topics. In the first decade, the topics of the conferences included, for instance, the phytogeographic land division of the country, Czech plant names, taxonomically difficult groups of vascular plants, vegetation classification and biology of selected species. The 1976 workshop, focused on vanishing flora and vegetation, resulted in the preparation of the first Red List of the country's vascular flora (Holub et al. 1979). The number of conference participants sometimes exceeded 200, which clearly indicated the hunger for information of a scientific and expert community prevented from exchanging information with non-communist countries. The conference lectures were usually published as special issues in the *Materiály* series of the Society's bulletin. This series of annual conferences continues until the present.

In the summer of 1958 the Society organized the 12th International Phytogeographical Excursion across Czechoslovakia. Its itinerary, which included the most important sites of botanical interest in the country, was prepared by Josef Dostál, Ján Futák and Alois Zlatník. The excursion lasted for more than a month and was attended by 60 botanists from Czechoslovakia and 58 from abroad.

The Society continued the tradition of congresses. The fourth society's congress, already with international attendance (Fig. 2.9a), took place in July 1955 in the High Tatra Mts in Slovakia. However, the most important congress, organized to celebrate the Society's 50th anniversary, was convened in summer 1962. It was a window to the botanical world, something like a miracle at that time. There were 180 participants from Czechoslovakia and 66 from abroad. The foreigners came not only from the Soviet Union and its satellite countries, but also from Canada, Denmark, Federal Republic of Germany, the UK and the USA. Of key importance was the presence of the British botanists David H. Valentine and Stuart M. Walters (Fig. 2.9b), whose valuable reviews appeared in the *Preslia* double-issue published on the occasion of the Society's anniversary (Valentine 1962; Walters 1962). The atmosphere at the congress and personal encounters with eminent foreign botanists had a marked effect on the future of Czechoslovak plant taxonomy and facilitated the participation of Czechoslovak botanists in the *Flora Europaea* project. A comparison with the next congress organized in 1972 reflects the political climate of the 1970s: this congress, held in České Budějovice, had only 18 participants from abroad, all from the Soviet Union.

The Society's situation stabilized during the 1960s. After Karel Hrubý, who died in 1962, František A. Novák (until 1964) and Zdeněk Černohorský, both highly respected botanists, successively chaired the Society. In 1965 the Society heralded the future federalization of the country by creating the Slovak Botanical Society,

initially with 155 members. The chairman of the Slovak Botanical Society became automatically vice-chairman of the Czechoslovak Botanical Society and vice versa. As in numerous similar cases, the structure remained asymmetric since the maternal society retained its name (Czechoslovak) and a corresponding Czech society was not created. The election of Slavomil Hejný as President of the Czechoslovak Botanical Society in 1976 was a reasonable decision with positive consequences. Hejný was a Director of the Institute of Botany, a Corresponding Member of the Czechoslovak Academy of Sciences and an influential member of the Communist Party, which enabled him to protect the Society from the worst of the arbitrary acts of the state. As he was fully occupied with the management of the Institute of Botany and his memberships in numerous bodies, the Society's Scientific Secretary Josef Holub was virtually given a free hand in shaping the Society's activities.

The Society resumed publishing *Preslia* as a yearbook in 1948. In 1951 the journal was taken over by a state-owned publishing house and published quarterly, which has continued up to now. A new journal, *Zprávy Československé botanické společnosti* (Bulletin of the Czechoslovak Botanical Society), was launched in 1966. It contained mainly flora surveys, phytogeographic and taxonomic studies and botanical news. Its two parallel series, *Prílohy* (Supplements) and *Materiály* (Materials), published mainly plant records from Summer Schools and proceedings of the Society's conferences, respectively. The youngest Society's journal, *Bryonora*, was launched in 1988 as a bulletin of the very active Bryological-Lichenological Section.

2.8.4 Towards a New Flora

A new illustrated flora of Czechoslovakia was published in two volumes soon after WWII (Dostál 1948–1950). This handbook was edited by Josef Dostál (1903–1999; Fig. 2.7c), who invited almost 30 botanists of different ages as collaborators (e.g. Slavomil Hejný, Radovan Hendrych, Josef Holub, Václav Jirásek, Jaroslav Moravec and František A. Novák). As the distribution records compiled by Professor Domin and his collaborators were not available to them, information about the distributions of the species was based on information in the more important earlier floras and specimens collected during WWII or shortly afterwards during the Floristic Action. An abridged version of this flora was issued as a one-volume field guide *Klíč k úplné květeně ČSR* (Key to the Complete Flora of the Czechoslovak Republic) in two editions (Dostál 1954, 1958). The flora and both editions of the key were criticised for outdated taxonomy, numerous mistakes and inconsistencies, and the option of publishing a third edition was explicitly rejected at a public meeting (e.g. Holub 1959). However, altogether about 35,000 copies of the three books were quickly sold out and they remained standard reference handbooks for more than three decades, but were unavailable to botanical beginners in the 1970s and 1980s. As they were becoming rare and outdated, many botanists also used Rothmaler's pocket floras for Germany as an identification aid. For Moravia and Silesia, a

nomenclatural update with keys to difficult and newly recognized taxa was published as a handbook for students by Miroslav Smejkal (Smejkal 1980), a taxonomist at Masaryk University. However, it was again Professor Dostál, already in his eighties, who tried to meet the demand for a new flora. His two-volume handbook *Nová květena ČSSR* (New Flora of Czechoslovakia; Dostál 1989) is partly based on earlier floras, while some keys resemble those in *Flora Europaea*. A dominant feature of the flora is a narrow generic concept, roughly the same as the one used in the Check-list of the Czechoslovak Flora published earlier (Dostál 1982). Taxonomic splitting was reflected also in Czech taxon names, which was quite confusing for the users of this flora.

A new multi-volume flora of Czechoslovakia was a recurrent topic within the Czech Botanical Society. An editorial committee was formed in 1954 and some preparatory work was done, of which probably the most important was the complete bibliography of the Czechoslovak botanical literature up to 1952 (Futák and Domin 1960). However, the work was discontinued for various reasons, and only two mycological volumes and the treatment of *Sphagnaceae* (Pilous 1971) were published. The publication of the nine-volume *Květena České republiky* (Flora of the Czech Republic), of which the first volume appeared in 1988 (Hejný et al. 1988), is an undisputable great achievement of Hejný, who championed the idea in various committees of the Czechoslovak Academy of Sciences and achieved its inclusion into the state plan of basic research. The Institute of Botany automatically took over the leadership of this task, and the necessary preparations started around 1975. The editorial work, from the beginning, was organized mainly by Bohumil Slavík (1935–2004) and backed by Hejný, who also co-authored treatments of some genera. Although the flora was edited at the Institute of Botany, many chapters were contributed by taxonomists at Charles University, Masaryk University and elsewhere. The Institute of Botany in 1967 also joined the international project Floristic Mapping of Central Europe. Slavík started working on a distribution atlas of the Czech flora in 1969 and the first volume of the Phytocartographical Syntheses of the Czech Socialist Republic (*Fytokartografické syntézy ČSR*) appeared 17 years later (Slavík 1986). It contained grid maps with a resolution of 6×10 min for 316 species. This mapping project was discontinued as the editor died, and the fourth volume was finished much later by Jitka Štěpánková. The four volumes of this atlas include about a half of the Czech flora.

2.8.5 Taxonomic and Floristic Research on Vascular Plants

The Czech plant taxonomy was in a difficult position after WWII. Most of the pre-war leading taxonomists adopted a morphological or morphological-geographical approach, the weak points of which are obvious for example in the monographs of Karel Domin. New trends, indicated in the studies by Miloš Deyl and Alois Zlatník, were discontinued due to political developments. The recovery of the Czechoslovak

taxonomy was encouraged by the 1962 congress of the Czechoslovak Botanical Society, which was attended by leading taxonomists from abroad.

The postwar taxonomic studies may be roughly divided in two groups based on the methods used (Hejný et al. 1978). The first group includes classical studies based mainly on herbarium specimens and field observations, including for instance the studies by Jindřich Chrtěk sen., either alone (*Polygonum aviculare* agg.) or together with Václav Jirásek (*Corynephorus* and *Poa*), by Radovan Hendrych (*Thesium* and *Trifolium*), Josef Holub (*Avenula* s.l.), Anna Skalická (*Corothamnus*, i.e. *Cytisus*), Vladimír Skalický (*Agrimonia*) and Miroslav Smejkal (*Camelina*, *Euphrasia* and *Scleranthus*). The taxonomic studies of Jan O. Martinovský, a retired secondary school teacher, substantially improved the level of knowledge on European species of the genus *Stipa*. Jindřich Chmelař, based at the University of Agriculture in Brno, became one of the few worldwide specialists in the genus *Salix*; his best-known achievement is a brief monograph on European willows aimed at a broader public (Chmelař and Meusel 1976). The second group of taxonomic studies employed biosystematic approaches, most frequently chromosome counting, but also experimental crossing and studies of breeding systems. These include the studies by Ivan Klášterský and Irena Novotná (*Arabis hirsuta* agg.), Irena Klášterská (*Rosa*), Anna Chrtková (née Žertová; *Lotus corniculatus* agg. and *Vicia cracca* agg.), Miloslav Kovanda (*Campanula rotundifolia* agg.), Jiří Soják (*Potentilla*), Pavel Tomšovic (*Rorippa*), Václav Zelený (*Leucanthemum*) and later also by Jan Kirschner (*Luzula*). Some of these authors contributed taxonomic treatments to large international projects such as Flora Europaea, Flora Iranica and Flora of Turkey. From the mid-1970s most of the experts were involved in preparing the Flora of the Czech Republic, which limited the number of biosystematic studies.

Several Czech plant taxonomists were interested in apomictic groups. Numerous microspecies in *Alchemilla* were described by Alexander Plocek during the 1980s and early 1990s. Miloslav Kovanda described the first apomictic species of *Sorbus* (*S. bohémica*) in 1961 and continued studies on this genus until the 1990s; however, some of his conclusions were recently refuted. While the studies of J. Holub on *Rubus* were primarily descriptive, based on field observations and detailed morphological comparisons, the studies on *Taraxacum* by Jan Kirschner and Jan Štěpánek, started in the early 1980s, soon adopted a range of biosystematic methods. Both researchers have become leading worldwide specialists in this genus.

The four postwar decades also brought some local floristic reports and floras, published as books or in journals. Examples are the flora of the Pardubice District by Jan Hadač and Emil Hadač, written during WWII, flora of the Plzeň District by Emil Hadač and collaborators, flora of the Mladá Boleslav District by Čeněk Novotný, flora of the surroundings of Horažďovice in south-western Bohemia by Josef Vaněček and ruderal flora of Brno by František Grüll. Probably the last systematic contribution of a German-speaking botanist to research on the Bohemian flora was the flora of the surroundings of Šluknov in northern Bohemia written by the amateur botanist Hans Marschner (1912–1989). He was allowed to remain in the country after WWII and continued exploring the local flora before moving to Bavaria in 1969. His manuscript was translated into Czech by his friends and pub-

lished when he was already abroad. A very valuable flora was written by Josef Šourek, a former officer in the Czechoslovak Army who moved to the Krkonoše Mts after his retirement in 1947 and spent the last 20 years of his life studying the local flora (Šourek 1969).

2.8.6 Bryology and Lichenology

Bryology in postwar Czechoslovakia was shaped by two students of Professor Podpěra. Jan Šmarda, who succeeded Podpěra at Masaryk University in 1952, studied especially bryophyte communities in the Slovak Carpathians and published a bryoflora of the Hrubý Jeseník Mts (Šmarda 1952). Josef Duda (1925–2012) spent his professional career in the Silesian Museum in Opava, where he studied the taxonomy of liverworts. He also initiated and carried out a detailed mapping of the distribution of liverworts in Czechoslovakia, which he co-authored with Jiří Váňa. The most notable amateur bryologist in this period was Zdeněk Pilous (1912–2000), a primary and later secondary school teacher and local museum worker, who is perhaps best known in the Czech Republic for compiling the last two complete bryofloras. The first one included only mosses (Pilous 1948), and the second, written together with J. Duda, comprised all bryophytes (Pilous and Duda 1960). Professor Jiří Váňa at Charles University in Prague is most renowned for his taxonomic studies on the liverwort family *Jungermanniaceae* and many other groups. He also participated in the compilation of the *Index Hepaticarum*, the World checklist of liverworts.

The leading personality in Czech academic lichenology was Zdeněk Černohorský (1910–2001), who was a Professor at Charles University in 1959–1977 and the first lichenologist to recognize the importance of UV fluorescence in lichen taxonomy (Černohorský 1950). He was the main editor of the only comprehensive key to the macrolichens of former Czechoslovakia (Černohorský et al. 1956). The two co-authors of this book, Miroslav Servít (1886–1959) and Josef Nádvorník (1906–1977), were lichen taxonomists. The most important of their taxonomic studies are those on *Verrucariaceae* (e.g. Servít 1954) and *Physciaceae* (e.g. Nádvorník 1940, 1947), but both of them also made local lichenofloristic surveys. The most influential Czech lichenologist was Antonín Vězda (1920–2008; Figs. 2.5j and 2.7d), who published more than 300 scientific papers. He published numerous taxonomic papers and monographic studies mainly on gyalectoid lichens (e.g. Vězda 1958), taxonomic-chorological papers related to the former Czechoslovakia (e.g. Vězda 1970, 1978) and co-authored two supplements to the identification key for European lichens (Poelt and Vězda 1977, 1981). His lichen exsiccatae, *Lichenes Bohemoslovakiae exsiccati*, *Lichenes rariores exsiccati* and *Lichenes selecti exsiccati*, became renowned; the latter, issued in 1960–1991, reached 2500 in number. In the late 1970s Vězda turned his attention to tropical foliicolous lichens. Ten genera described by Vězda, sometimes with co-authors, are accepted in the latest Czech

lichen checklist (Liška et al. 2008). From the 1970s onwards attention was also paid to lichens as bioindicators of air pollution in the studies by Jiří Liška and collaborators.

2.8.7 *Vegetation Studies*

Several members of the postwar generation of botanists engaged in vegetation research, which was supported by newly established institutions. The main aim of the Geobotanical Laboratories of the Czechoslovak Academy of Sciences, established in the 1950s, was the preparation of a vegetation map for this country, a project led by an experienced field ecologist, Rudolf Mikyška, and involving several young researchers such as Miroslava Husová, Jaroslav Moravec, Robert Neuhäusl and Zdenka Neuhäuslová. The final product was published as a map of reconstructed natural vegetation (conceptually similar to potential natural vegetation of Tüxen 1956) at a scale of 1: 200,000 (Mikyška et al. 1968–1972). The extensive field work done during the preparation of this map yielded hundreds of vegetation-plot records, many of them with detailed soil analyses, and resulted in the consolidation of knowledge on vegetation diversity of Czech forests and other vegetation types. Results were systematically published in journals, especially *Preslia* and *Folia Geobotanica et Phytotaxonomica*, and in the book series *Vegetace ČSSR*, of which 15 volumes were published from 1965 to 1986. This accumulated knowledge was summarized in a new overview of vegetation classes, orders and alliances in Czechoslovakia, prepared by a team at the Institute of Botany in Průhonice (Holub et al. 1967).

Parallel research on forest vegetation was done by foresters of the Forest Management Institute, where the leading personalities were Alois Mezera, Karel Mráz and Věroslav Samek. The experience of extensive field sampling by forest site researchers conducted in the 1950s–1960s was summarized in the national classification system of forest site types. Another system of forest site types, reflecting mainly forest diversity in the Carpathians, was created by Alois Zlatník at the University of Agriculture in Brno (now Mendel University). Both systems were united by Karel Plíva and Eduard Průša in 1971 and the resulting system was used for forest site type mapping in the whole country at a scale 1: 10,000. Eduard Průša also carried out a very detailed survey of old-growth forests (Průša 1985). Forest history was studied especially by Josef Nožička (Nožička 1957).

Department of Botany at Charles University also contributed significantly to vegetation research in the 1950s–1980s. Jan Jeník, the successor of Jaromír Klika at the Department of Botany of Charles University, conducted studies on the diversity and ecology of alpine and subalpine vegetation in the Sudetes (Jeník 1961) and together with Jarmila Kubíková, Jiřina Slavíková and other colleagues also focused on dry grassland vegetation in Bohemia. Besides traditional phytosociological studies aimed at classifying vegetation, plant ecologists at this department were

pioneering, at a national scale, a new approach to vegetation research that applied methods of quantitative ecology, involving detailed measurements of the characteristics of vegetation and environmental factors, which were analysed statistically. The most influential proponents of this new approach were young scientists such as Marcel Rejmánek in the 1970s and Jan Lepš and Karel Prach in the 1980s. Results of the studies conducted by several staff members and students are mainly summarized in a monograph on vegetation-environment relationships at Oblík hill in the forest-steppe region of northern Bohemia (Slavíková et al. 1983) and in a monograph on succession in abandoned fields in the Bohemian Karst (Osbornová et al. 1990). Unfortunately, the leading personalities were forced to leave Charles University due to political repressions after the 1968 Warsaw Pact invasion: J. Jeník and J. Kubíková left in 1971 and M. Rejmánek in 1977. Jan Jeník obtained a job at the Institute of Botany, Czechoslovak Academy of Sciences, J. Kubíková in state nature conservation institutions, and M. Rejmánek also at an institute of the Czechoslovak Academy of Sciences before ultimately leaving for the USA in 1983. In spite of these devastating losses of personnel, vegetation research continued at Charles University, with Jiřina Slavíková, the leader of the geobotanical group, trying to give as much support to students and colleagues as possible under the generally oppressive conditions imposed by the political establishment and the Department's head R. Hendrych.

Vegetation studies also continued at Masaryk University (in 1960–1990 renamed J. E. Purkyně University), but here the botanical research was even more adversely affected by the communist regime than at Charles University. Jan Šmarda, successor of J. Podpěra as the Department head in the 1950s, studied mainly mountain vegetation in the Hrubý Jeseník Mountains and bryophyte communities in the Tatras. He was forced to leave the university in 1961, being subsequently employed in Brno institutes of the Czechoslovak Academy of Sciences. A new vegetation research programme was developed by Jiří Vicherek in the 1960s, which focused on phytosociology of Pontic-Pannonian vegetation including dry grasslands, sandy grasslands and saline vegetation at a broad scale ranging from Moravia to Eastern and South-eastern Europe (e.g. Vicherek 1973). In 1975 Vicherek was also expelled from the university and his applications to obtain an alternative job in science were declined; he had to accept a position as a technician on a cooperative farm. Consequently, very few vegetation studies were conducted at Masaryk University in the late 1970s and 1980s, all of which were vegetation descriptions of local significance.

In spite of the worsened political situation after 1968, vegetation research successfully continued at the Institute of Botany of the Czechoslovak Academy of Sciences. Vegetation scientists at the Institute of Botany were able to keep in contact with the international community even in these difficult times, especially through the symposia of the International Association for Vegetation Science (IAVS) organized by Professor Reinhold Tüxen in Germany. After Tüxen died in 1980, the format of these symposia was changed and the first symposium of the new series was organized by Jaroslav Moravec and Robert Neuhäusl in Prague in 1982. This event was crucial for the transformation of the IAVS into a truly international English-

speaking organization with symposium venues in different countries. Jaroslav Moravec (1929–2006) made a significant contribution to the development of the (International) Code of Phytosociological Nomenclature, first published in 1976 (Barkman et al. 1976). He also led the compilation of more detailed and updated phytosociological overviews of Czech vegetation types at the level of associations (Moravec et al. 1983, 1995). Robert Neuhäusl (1930–1991) started and coordinated the international project of the Map of Natural Vegetation of Europe, but after his untimely death the project coordination was taken over by Udo Bohn in Germany (Bohn et al. 2000–2003). Since the 1960s researchers at the Institute of Botany also systematically studied the flora and vegetation of man-made habitats (Slavomil Hejný, Karel Kopecký, Zdeněk Kropáč and others) and related studies were also conducted by researchers not affiliated to the Institute of Botany, e.g. Antonín Pyšek in western Bohemia and František Grüll in Brno. Recent successful research on plant invasions at the Institute of Botany is partly based on this tradition.

Ecosystem research on grassland and wetland ecosystems, to some extent within the framework of the International Biological Programme, was carried out at the Brno branch of the Institute of Botany under the leadership of Milena Rychnovská (Rychnovská 1993). Her team included, among others, the grassland specialist Emilie Balátová-Tuláčková. Ecosystem studies were also successfully developed at the Hydrobotanical Department of the Institute of Botany in Třeboň, which focused mainly on southern Bohemian fishponds and related wetlands and was led by Slavomil Hejný, Dagmar Dykyjová and Jan Květ (Dykyjová and Květ 1978).

The palaeoecological group at the Brno branch of the Institute of Botany, in particular Kamil Rybníček, Eliška Rybníčková, Vlasta Jankovská and Helena Svobodová, carried out palaeobotanical studies throughout the former Czechoslovakia, and contributed significantly to the knowledge of Late Pleistocene and Holocene vegetation (Kuneš et al. 2009), interpretation of different vegetation types for vegetation mapping, and the ecology and classification of mire vegetation.

2.9 Recent Period (Since 1989)

The collapse of the communist regime in November 1989 ('Velvet Revolution') started a transition towards liberal democracy and a market economy. This transition was accompanied by tensions between the Czech and Slovak political elites, which affected a large part of the Czech and Slovak populations. The 1992 election results offered only limited options for creating a stable Czecho-Slovak federal government. Therefore, following a parliamentary decision, on 1 January 1993 Czechoslovakia was peacefully separated into two independent countries, the Czech Republic and Slovak Republic. The tensions between Czechs and Slovaks gradually decreased, and the current relationships between the two countries are very friendly and cooperative. The Czech Republic joined NATO in 1999 and the European Union in 2004.

2.9.1 *Institutions*

The 1990s were extremely difficult for the Czechoslovak Academy of Sciences, as its budget was substantially reduced due to austerity measures introduced by the government and even its existence was challenged by some politicians and the media. The Academy lost one third of its employees and some institutes were dissolved. With the end of Czechoslovakia, it was transformed and renamed to the Academy of Sciences of the Czech Republic, later renamed as The Czech Academy of Sciences. It continues to exist as a network of research institutes. The long-serving director of the Institute of Botany Slavomil Hejný was replaced by Robert Neuhäusl in 1990 and, after Neuhäusl's untimely death in 1991, by Jan Štěpánek, who led the institute through its most difficult period. Since the early 1990s the institutional funding of basic research has been combined with a system of grants from the newly established Czech Science Foundation. The scientific infrastructure and research support substantially improved with the country's accession to the European Union.

The devastated botany departments of universities needed to be restored in the early 1990s. At Charles University Professor Jan Jeník and his assistant Jarmila Kubíková returned to their former positions in 1990 and new staff members came mainly from the Institute of Botany in Průhonice. Professor Jiří Vicherek was able to resume his work at the restored botanical department at Masaryk University in Brno, and his natural personal authority facilitated the department's rehabilitation. The present Department of Botany and Zoology came into existence by the merge of the former Department of Botany and Department of Zoology and Ecology in 2006. Also at Palacký University the quality of the field of botany was substantially improved during the 1990s, based on the research activities of young staff members. Several new universities were established in the 1990s, of which the most important, at least in biological sciences, is the University of South Bohemia in České Budějovice. Its Faculty of Biology, now reorganized and renamed to Faculty of Science, which includes the Department of Botany, quickly reached the scientific level of the botanical departments at the traditional universities. The key to this success was the involvement of scientists from several biological research institutes of the Czech(oslovak) Academy of Sciences that the government in the 1980s decided to move from Prague to České Budějovice.

2.9.2 *Czech Botanical Society*

The Czechoslovak Botanical Society was also affected by the changes in Czech society after the collapse of the communist regime. In 1990 Slavomil Hejný was replaced as the Society's President by its former Scientific Secretary Josef Holub (1930–1999; Fig. 2.9b), who served in this position until his death in 1999. Vladimír Řehořek, Lubomír Hrouda and Karel Prach served as the next presidents. The Society got back its status of an independent legal entity but lost some members due

to the separating off of the Plant Physiology Section to form the Czech Society of Experimental Plant Biology in 1992, and the Algology Section to form the Czech Phycological Society in 2003. Already in 1992 the Society returned to its original name, Czech Botanical Society. However, the relationship with the sister society in Slovakia remained friendly and close: once every three years since 1991 the Summer School of Field Botany takes place in Slovakia as a joint event of both societies. The Society's Bryological-Lichenological Section started a series of workshops called the Autumn Bryological-Lichenological Days in 1988 at Svätý Júr near Bratislava, which since then have been held annually, and Spring Meetings of the Bryological-Lichenological Section started 6 years later.

The tradition of the Society's decennial congresses continued with events held in Olomouc (in 1992), Lednice in southern Moravia (2002) and Prague (2012). For the 2012 congress, organized to celebrate the Society's 100th anniversary, a special issue of *Preslia* was published, including reviews of Czech flora and vegetation and updated checklists and Red Lists of vascular plants and the bryophyte flora (Danihelka et al. 2012; Grulich 2012; Kučera et al. 2012). Regardless of the scientific topics, the main message of the last two congresses was that the Czech botanists had reintegrated themselves into the Central European botanical community, which was documented by the participation of many botanists from neighbouring countries.

The journals issued by the Society have remained the same since the 1980s, only the title of the Society's bulletin was changed to reflect the new name of the Society. The main journal, *Preslia*, with Josef Holub (1990–1999) and later Petr Pyšek (since 1999) as Editors in Chief, was profiled as a leading journal with geographical focus on Central Europe. Its inclusion in the Web of Science database in 2003 and the growing impact factor have had a stimulating effect on Czech botany (Pyšek et al. 2014).

2.9.3 *Studies on Vascular Flora*

The publication of the Flora of the Czech Republic continued, although with increasingly longer intervals between consecutive volumes. Bohumil Slavík, the main editor of volumes 4–6, died in 2004, and the following volumes were edited by Jitka Štěpánková, assisted mainly by Jindřich Chrtek Jr. and Zdeněk Kaplan. The eight volumes published so far contain altogether 5005 pages and include accounts of 2952 species authored by 68 botanists. The plates with plant drawings, from the first volume onwards drawn by Anna Skoumalová-Hadačová and Eva Smrčinová, are based mainly on fresh plants collected in the field. A field guide under preparation by Josef Holub since the 1960s unfortunately never advanced beyond the preparatory stage. The urgent need for a pocket guide was met by the publication of the Key to the Flora of the Czech Republic (*Klíč ke květeně České republiky*; Kubát et al. 2002). Texts for the new pocket guide were prepared by 45 botanists, coordinated by seven editors, with Karel Kubát as editor in chief. The second, extensively

revised and updated edition was prepared by a team led by Zdeněk Kaplan and submitted to the publisher in 2016.

Although the work on Slavík's distribution atlas of the Czech flora was discontinued, the research into the country's flora intensified. Already in the early 1990s Holub started to prepare the second version of the Red List of vascular plants: he organized a workshop and produced a draft list in 1995. The second edition of the Red List was finalized after Holub's death under the editorship of František Procházka (Holub and Procházka 2000). A year earlier the Red Data Book, authored by botanists from the Czech Republic and Slovakia and including both countries, was published (Čeřovský et al. 1999). These two publications stimulated further research on red-listed species.

An important achievement was a comprehensive inventory of alien plants, Catalogue of Alien Plants of the Czech Republic, produced by a team led by Petr Pyšek and published in two editions (Pyšek et al. 2002, 2012). It immediately became a basis for numerous ecological and biogeographical analyses and applications at the national scale and subsequently also continental and global scales. Currently the Department of Ecology of the Institute of Botany in Průhonice, led by Petr Pyšek, is a globally recognized centre of excellence for research on plant invasions, which has published many studies on alien plants both with a national and international focus.

Since 2002 records of red-listed, rare or recently introduced species provided by numerous botanists have been summarized annually in the *Additamenta ad floram Reipublicae Bohemicae* (Hadinec et al. 2002), with 15 instalments produced so far. This systematic registration of the records of rare and red-listed plants facilitated the work on the second edition of the Catalogue of Alien Plants of the Czech Republic (Pyšek et al. 2012) and the third edition of the Red List (Grulich 2012).

Flora mapping was made easier by the introduction of electronic databases. At the Institute of Botany in Průhonice the Database of the Distribution of Vascular Plants in the Czech Republic (*FLDOK, Floristická dokumentace*) was started in 1992 for storing published plant records. Several regional projects of flora mapping realized in the 1990s were designed to collect records of plant occurrences in grids that could be integrated into future distribution atlases. Examples include the mapping of the flora in the Podyjí National Park in south-western Moravia by Vít Grulich, Křivoklátsko Protected Landscape Area in central Bohemia by a team led by Jiří Kolbek and the White Carpathians by Jan W. Jongepier and collaborators. Some other recording schemes remain unpublished but are stored in databases. A regional database of plant records was established by the South Bohemian Branch of the Czech Botanical Society. In parallel, the Species Occurrence Database of the Nature Conservation Agency of the Czech Republic was developed, primarily for conservation purposes; it is by far the largest database of biological records (mainly of vascular plants), based mainly on field surveys of natural habitats, nature reserves and other protected areas. Large numbers of species occurrence records are also stored in the Czech National Phytosociological Database established in 1996. In 2009 the website florabase.cz established by Jiří Danihelka and collaborators made

almost nine million plant records from six databases available to the public. This opened the way for a new mapping project launched by a team headed by Zdeněk Kaplan in 2014, based on a distribution record database and mapping tools integrated within the newly established Pladias database of Czech flora and vegetation (www.pladias.cz). Apart from a large collection of data on biological traits and ecological characteristics of the Czech flora, this database includes records of species distributions from seven large or middle-sized databases that represent all the main national data sources (Kaplan et al. 2015). This project is based on the co-operation of specialists from several institutions and dozens of amateur botanists. The database records were in most cases rigorously checked against herbarium records by taxonomic specialists. By November 2017 maps in $\sim 5 \times 5.5$ km grid were published for 458 taxa and others are being prepared.

The taxonomic research combined traditional methods with multivariate morphometrics, chromosome counting, ploidy surveys across large areas using flow cytometry, studies of breeding systems and molecular methods. The studies on apomictic genera employing traditional methods focused mainly on the genus *Rubus* (Josef Holub, Bohumil Trávníček and others). The knowledge on species of *Taraxacum* has greatly improved, including descriptions of new species (Jan Kirschner, Jan Štěpánek, Bohumil Trávníček, Radim Vašut and others). Czech apomictic species of *Sorbus* were revised, using multivariate morphometrics, flow cytometry and molecular methods (Martin Lepší and collaborators), which resulted in a substantial correction of earlier opinions. The studies on the genera *Hieracium* and *Pilosella* included cultivation, chromosome counting and analyses of breeding systems (Jindřich Chrtek Jr., František Krahulec, Anna Krahulcová and Olga Rotreklová). Special attention was paid to endemic plants, such as *Cerastium alsinifolium* and *Dianthus arenarius* subsp. *bohemicus* (Petr Vít, Jan Suda and collaborators). Other taxonomically difficult genera and polyploid complexes were studied in detail for example by Petr Bureš, Jiří Danihelka, Libor Ekrt, Zdeněk Kaplan, Filip Kolář, Petr Kouček, Petr Šmarda, Milan Štech and Jan Suda. Many taxonomic studies involved collaborators from abroad and had a broader geographic scope than just the Czech Republic (see also Pyšek et al. 2014).

2.9.4 Bryology and Lichenology

In bryological research the main focus has shifted from classical taxonomy and phytogeography towards molecular systematics, population genetics, and ecology including molecular ecology, ecophysiology and conservation biology. The most active centres of bryological research and education in the post-2000 period became the University of South Bohemia, Masaryk University and the University of Ostrava. Several active bryologists are also in local and regional museums. Significant improvements in the knowledge of the Czech bryoflora have been reflected in several updates of checklists and Red Lists of Czech bryophytes, the most recent published by Kučera et al. (2012).

The current knowledge on the taxonomy, sensitivity, endangerment and distribution of lichens is summarized in the Checklist and Red List of lichens of the Czech Republic (Liška et al. 2008). Lichenological research continues mainly at the Institute of Botany in Průhonice, Charles University, the Czech University of Life Sciences in Prague, University of South Bohemia, National Museum, West Bohemian Museum in Plzeň and several regional museums. Current research is diverse in including studies on lichen photobionts (ecology, mycobiont-photobiont specificity and taxonomy), lichenicolous fungi (taxonomy and distribution) and lichenized fungi (ecology, diversity, chorology, taxonomy and molecular phylogeny). Lichenofloristic research has greatly intensified in the new millennium, resulting in the addition of more than 100 new lichen taxa to the latest checklist of Czech lichens (Liška and Palice 2010).

2.9.5 *Vegetation Studies*

The change in the political regime in 1989 was also followed by a boom in vegetation research, which was resumed at both Charles University and Masaryk University with the return of Jan Jeník and Jiří Vicherek, respectively, who became professors, and arrival of new young researchers. Vegetation research also started at the new University of South Bohemia in České Budějovice. At this university, the group of Jan Lepš is studying various general aspects of plant community assembly and that of Karel Prach deals mainly with vegetation succession and its application in restoration ecology. The 40th Symposium of the International Association for Vegetation Science was hosted by this university in 1997. Vegetation research also continues at the Institute of Botany of The Czech Academy of Sciences, where Tomáš Herben and František Krahulec started a research programme focused on spatiotemporal processes in grassland vegetation, Zdenka Neuhäuslová and colleagues updated the vegetation map of the Czech Republic (Neuhäuslová et al. 1998) and Jaroslav Moravec started a book series aiming at more detailed descriptions of all plant communities of the country, but only four volumes devoted to forest vegetation were published and the series has remained unfinished (Moravec 1998–2003).

The first attempts to create a national database of vegetation plots were made at the Institute of Botany in Průhonice already in the 1980s (Neuhäuslová and Kolbek 1982), however, the database was developed only after John Rodwell of Lancaster University (UK) offered to train a group of young Czech vegetation ecologists in vegetation database management and Stephan Hennekens of Wageningen University (the Netherlands) provided his software Turboveg for this purpose. The Czech National Phytosociological Database was established in 1996 by Milan Chytrý as a national collaborative effort coordinated at Masaryk University (Chytrý and Rafajová 2003). This database and the analytical software Juice developed by Lubomír Tichý (Tichý 2002) provided the infrastructure for the project Vegetation of the Czech Republic, in which a team from Masaryk University, Institute of Botany of The Czech Academy of Sciences and other institutions used more than

139,000 vegetation plots to critically evaluate the concepts of all the plant associations occurring in this country, created a computer expert system for their identification and prepared descriptions, distribution maps and comparative synoptic tables of the floristic composition of these vegetation types (Chytrý 2007–2013). An applied by-product of these synthetic vegetation studies was the Habitat Catalogue of the Czech Republic (Chytrý et al. 2001, 2010), which provided a simplified vegetation classification for the purpose of habitat mapping. An ambitious project of habitat mapping at a scale of 1: 10,000 based on a legend defined in this catalogue was realized in 2001–2004 across this country, supervised by the Nature Conservation Agency of the Czech Republic. Since 2006 this mapping has been regularly updated by field surveys (Härtel et al. 2009). The results of these projects were presented to the international scientific community at the 17th Meeting of European Vegetation Survey (Brno 2008) and the 58th Symposium of the International Association for Vegetation Science (Brno 2015).

Research into forest vegetation dynamics has also flourished since the 1990s. The group of Tomáš Vrška in Brno (now at The Silva Tarouca Research Institute for Landscape and Ornamental Gardening) started studies on natural forest dynamics, including resurveying of forest reserves sampled by Eduard Průša in the 1970s. Later on, the research programme on forest dynamics was also established by the group of Miroslav Svoboda at the Czech University of Life Sciences in Prague. Forest history and changes in species diversity of forest vegetation have been studied at the Brno branch of the Institute of Botany of The Czech Academy of Sciences by the team of Radim Hédl and Péter Szabó. The Forest Management Institute digitized field records collected during the forest site type research running since the 1950s and created the second largest vegetation-plot database in this country (Zouhar 2012).

A new palaeoecological group established at Charles University under the leadership of Petr Kuneš created the Czech Quaternary Palynological Database (Kuneš et al. 2009). The analysis of this database using the Landscape Reconstruction Algorithm resulted in a new reconstruction of the history of the Holocene vegetation in the Czech Republic (Abraham et al. 2016). Important studies on vegetation history in the 2000s and 2010s were also carried out by Petr Pokorný and palaeoecologists based at Masaryk University, University of South Bohemia and Institute of Botany of The Czech Academy of Sciences.

Other remarkable research programmes have recently been developed for example on the ecology of clonal plants and grassland diversity by Leoš Klimeš and Jitka Klimešová in the Třeboň branch of the Institute of Botany, on mire ecology by Michal Hájek at Masaryk University, on population and metapopulation ecology of rare plants by Zuzana Münzbergová at Charles University and on ecology and management of grasslands by Michal Hejman at the Czech University of Life Sciences in Prague and Vilém Pavlů in the Crop Research Institute in Liberec.

In summary, currently Czech botany is capitalizing on a strong tradition of field surveys and a wealth of data and herbarium material on the country's flora. At the same time current botanists are using the most up-to-date research methods ranging from laboratory analyses of plant genomes to statistical evaluation of large databases

of plant occurrence and vegetation records. This work is benefitting from international scientific cooperation. The state of the art of current knowledge is presented in the chapters of this book.

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