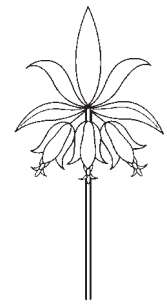
HUNTIA

A Journal of Botanical History



VOLUME 14 NUMBER 2
2011

Hunt Institute for Botanical Documentation
Carnegie Mellon University

Pittsburgh

The Hunt Institute for Botanical Documentation, a research division of Carnegie Mellon University, specializes in the history of botany and all aspects of plant science and serves the international scientific community through research and documentation. To this end, the Institute acquires and maintains authoritative collections of books, plant images, manuscripts, portraits and data files, and provides publications and other modes of information service. The Institute meets the reference needs of botanists, biologists, historians, conservationists, librarians, bibliographers and the public at large, especially those concerned with any aspect of the North American flora.

Huntia publishes articles on all aspects of the history of botany, including exploration, art, literature, biography, iconography and bibliography. The journal is published irregularly in one or more numbers per volume of approximately 200 pages by the Hunt Institute for Botanical Documentation. External contributions to *Huntia* are welcomed. Page charges have been eliminated. All manuscripts are subject to external peer review. Before submitting manuscripts for consideration, please review the "Guidelines for Contributors" on our Web site. Direct editorial correspondence to the Editor. Send books for announcement or review to the Book Reviews and Announcements Editor. The subscription rate is $60.00 per volume. Send orders for subscriptions and back issues to the Institute. Hunt Institute Associates may elect to receive *Huntia* as a benefit of membership; contact the Institute for more information.

Hunt Institute for Botanical Documentation
Carnegie Mellon University
5th Floor, Hunt Library
4909 Frew Street
Pittsburgh, PA 15213-3890
Telephone: 412-268-2434
Email: huntinst@andrew.cmu.edu
Web site: http://huntbot.andrew.cmu.edu/HIBD/Publications/HI-Pubs/Pub-Huntia.shtml

Printed and bound by RR Donnelley, Hoechstetter Plant, Pittsburgh, Pennsylvania

ISSN 0073-4071

HUNTIA 14(2) 2011

On the establishment of the principal gardens of botany: A bibliographical essay by Jean-Philippe-François Deleuze

Roger L. Williams, translator and editor

Abstract

The botanist J.-P.-F. Deleuze, editor of the *Annales du Muséum d'Histoire Naturelle* in Paris, profited from his access to a great library to document the establishment of the principal botanic gardens in the sixteenth and seventeenth centuries, whose purpose was scientific teaching and research. Authorized by secular political authorities, directed by laymen and attached to universities with medical schools, the new botanic gardens were distinct from medieval herbal gardens, which were utilitarian in purpose, attached to monasteries, and under clerical direction. His document provided a record of botanical authors and their published works, becoming a bibliographical essay. In the process, he charted the influx of exotic species that inaugurated a public passion to possess them.

Prologue

J.-P.-F. Deleuze [1753–1835, Fig. 1] understood botanic gardens, as distinguished from the typical herbal gardens of the medieval era associated with convents and monasteries, to be collections of living plants for the purpose of scientific teaching and research as well as for conservation. Writing at the outset of the nineteenth century, he saw these foundations as innovations of the sixteenth and seventeenth centuries in Europe, with an infrequent nod to the eighteenth century. They would be widely copied, to be sure, as Western cultural and intellectual ideas spread worldwide by the nineteenth and twentieth centuries (Deleuze 1807).

The medieval gardens had been entirely utilitarian in their layout, contents, and intent. The rich private gardens of the Italian Renaissance, a creation of the sixteenth century, were planted simply for the beauty of flower and foliage, although they could be used for acclimating exotic fruits and vegetables coming from overseas (Morton 1981, p. 119).

Deleuze revealed indirectly, perhaps without recognizing the historical implications of his evidence, that the new botanic gardens were sanctioned by secular authorities with laymen put in charge of their direction. The only exception was the Vatican garden, but a lay physician was given charge. They were frequently attached to universities with established medical schools where herbal medications continued to be recognized; but the fact that professors of botany usually became the superintendents of the new botanical gardens pointed to the eventual separation of botany from medicine. The challenge to the efficacy of herbal medications as empirically unproven would await the beginning of the nineteenth century, and then only in medical schools with an attached botanic garden.

The coincidence of the founding of botanic gardens in the sixteenth century with the upsurge of sea voyages to Asia and America meant a new opportunity to explore for unknown exotic species. The more the new gardens became repositories of such exotic species, the more their directors were forced to construct shelters for plants from alien climates; and the more they were motivated to organize their own explorations in the

1701 South 17th Street, Laramie, WY 82070 U.S.A.

Figure 1. Jean-Philippe-François Deleuze (1753–1835), photo reproduction of a lithograph by de Frey after a portrait by Oudart, Hunt Institute for Botanical Documentation Archives portrait no. 1.

quest of species perhaps adaptable to Europe for nutritional, medicinal, or ornamental benefits. The gradual accumulation of great numbers of domestic and exotic species, augmented by a vigorous correspondence between botanists, would culminate before the end of the sixteenth century in efforts to find a method of classifying plants that could be applicable worldwide, not merely to Western Europe. This search for knowledge overseas, and an eagerness to absorb and benefit from it, became a characteristic unique to Western Civilization.

Although a competent botanist, François Deleuze has long since become an obscure figure. Those interested in the career of André Michaux [1746–1802], his friend and associate, will recognize the short biography of Michaux he published (Deleuze 1804). Otherwise, one will look in vain for evidence that his article on the history of botanical gardens was even recognized, much less influential, in the nineteenth and twentieth centuries. His name does not even appear in such major references as Jackson (1881), Davy de Virville (1954), or Morton (1981); and he is only recognized in the bibliography of Spary (2000) as the author of *Histoire et description du Muséum royal d'histoire naturelle*, but not in the text. Republishing him two hundred years later will make his citations, after long neglect, useful to historians of the natural sciences.

Little reliable information has been published about his early years, except that he was born in 1753 in the village of Valernes, just north of Sisteron in what is now the Département des Alpes de Haute-Provence. He seemed initially bent on a military career and saw some military service in the mid-1770s. Then there is a blank until 1795 when he entered the Muséum de l'Histoire Naturelle as a naturalist-aide, and where he would remain in several additional capacities until his retirement in 1834. How he acquired the technical competence to qualify for such employment remained a mystery until the recent publication of the letters of the abbé Dominique Chaix [1730–1799] of Les Baux to Dr. Dominique Villars of Grenoble (1745–1805) (Williams 1997). They reveal that by the 1780s, Deleuze was laboring to master botany by undertaking fieldwork in his native region with the support of what appears to have been a single work by Linnaeus, presumably *Species plantarum*. From both Chaix's letters, and from occasional attributions to Deleuze's collections in Chaix's short flora of the region around Gap, his collecting range in south Dauphiné was bounded by Valernes, Sigoyer, and Ventavon. He sought Chaix's advice on plant determinations, visiting Les Baux on several occasions; and we learn that the now obscure Etienne Danthoine of Manosque was also a collaborator in botanizing and correspondence

with both Deleuze and Chaix. In Chaix's opinion, Deleuze was a hard worker and good observer. He called Danthoine very learned (Chaix 1785).

After December of 1786, the Deleuze correspondence with Chaix ended without explanation. Not until May of 1788 did Chaix learn that Deleuze was in Paris, in charge of the children of M. de Primini, a member of the Parlement de Paris. Chaix left no evidence that he knew later that Deleuze began service in the Muséum de l'Histoire Naturelle in 1795. Officially a naturalist-aide, he worked with L'Héritier de Brutelle, René Desfontaines, Adrien de Jussieu, and A.-P. de Candolle. He edited the *Annales du Muséum d'Histoire Naturelle* between 1802 and 1813, when it ceased publication. At the end, he became librarian of the Muséum, 1828–1834, succeeding Georges Toscan (Le Tourneur 1962). The association of Deleuze and Candolle could account for the inspiration to honor Etienne Danthoine: the genus *Danthonia* DC (1805). He is remembered in the grass family if not in his native Provence (Archives Départementales, Département des Alpes de Haute-Provence, pers. comm.).

It must be added, however, that a social factor probably contributed to his obscurity. Deleuze did not have the medical doctorate that was still the usual source for botanical training. He did not hold one of the chairs in the Muséum de l'Histoire Naturelle, therefore was not engaged in teaching and research. As a research assistant, he was a servant of the great scholars, just as the gardeners in the Jardin des Plantes were their servants. No matter that their services were essential, they remained nonentities.

For reasons that also remain obscure, Deleuze became a believer in mesmerism for a brief period beginning around 1810. The matter is notable for several reasons. The notion of curing an illness by passing a magnet over the body was introduced to Paris in 1778 by the German physician, Fredrick Anton Mesmer, attracting the enthusiasm of the unsophisticated susceptible to the occult. A royal commission appointed to investigate the claims of mesmerism condemned it as useless in 1784. Consequently, when a learned man was drawn to mesmerism in 1810, something very passé, publishing some tracts on the subject, he was ridiculed by his colleagues, perhaps contributing to his later obscurity as a serious scholar. It may be that Deleuze had reason by 1810 to be concerned with deteriorating health, and the gullibility rate can be observed to double or triple under such circumstances.

In 1823 Deleuze would write an extended history of the Muséum de l'Histoire Naturelle, which is often cited for its valuable detail. Although he described the organizational and administrative changes that converted a royal institution into national ownership, preserving it during the Revolution, he muted his anger over the magnitude and implications of a predicted Jacobin-inspired assault on the institution, namely, by men who ranked virtue above knowledge. Those who had experienced the Terror, who had feared for the loss of collections and libraries, had learned the need for political discretion from the example of André Thouin [1747–1824], the chief gardener. His deferential attention to communications from the revolutionary government contributed immensely to forestalling a Jacobin assault. Deleuze was aware that political or religious fanatical puritans can destroy in a day the evidence of centuries of advances in civilization (Deleuze 1823, pp. 72–73).

In translating and editing Deleuze's work, I have expanded abbreviated renditions of authors' names and titles of botanical references on the assumption that many are unfamiliar to readers today. Deleuze also had the French habit of converting foreign names of people

and places into their French equivalents, requiring reversion to their original forms. Whenever editorial comments have been introduced into the text, either for clarity or explication, they will appear in brackets. His history, in sum, now has the added value of becoming a bibliographical essay. The integrity of his work was recognized by both P. A. Cap (1854) and Ernest Hamy (1893) by reliance on his history of the Muséum in their later works. Most, if not all, of the titles cited by Deleuze have been verified in B. D. Jackson's *Guide to the Literature of Botany* (1881). The reader should be struck, finally, by the absence of nationalist bias in his text and his evident desire to praise the contribution of those from all nations.

Part 1

On private gardens antecedent to public gardens

Although the ancients wrote considerably on the history of plants, and even as they attributed wonderful virtues to them, they did not envision having botanic gardens. Pliny, in his *Naturalis historia* (A.D. 77), tells us that most of the plants about which he spoke were raised in great numbers in the garden of Antonius Castor. Over one hundred years old, Castor's health had remained unaltered; and he retained all the vigor of his memory. The collection of this illustrious old man was composed uniquely of plants for medicinal use. It does not appear that anyone after him in the ancient world persevered with this culture.

At the beginning of the sixteenth century, the love of botany drew a few people to gather the most interesting plants into one place in order to see them flower and to compare one with another. Euricius Cordus [1426–1535] in Erfurt, Nordecius in Cassel, and Gasparo di Gabrieli in Padua, it would seem, were those providing an example about 1525. The latter, one of the greatest seigneurs of Italy, went to considerable expense to provide a substantial collection of plants, and he wanted it to be open to all those who wanted to study them, as was described in Carolus Stephanus, *De re hortensi* (1536). Soon after, the celebrated Conrad Gesner [1516–1565], one of the restorers of the natural sciences, sensed the necessity of cultivating the plants he wanted to know and to describe. His wealth was not great enough to enable him to have a very extensive terrain or to hire several gardeners, but his own activity made up for what was lacking. In his garden in Zurich, he put together what he could obtain through his numerous trips and through correspondence.

This taste for culture grew in Germany, in Switzerland and in France. We see in the history of the gardens of his day, written by Gesner in 1560, that there were already more than fifty of them in various countries. Although titled *Horti Germaniae*, Gesner's book mentioned gardens in France and Italy. It was published as a sequel in the *Annotationes* of Valerius Cordus (1561), the preface to the latter by Gesner. [Cordus had died in 1544.]

Gesner's work, however, said virtually nothing about the gardens in The Netherlands where exotic plants were prized more than anywhere else. The Flemings, then having a considerable commerce, had plants brought from the Levant and the East and West Indies. They spared neither expense nor care to preserve them despite the rigor of the winters, and one found in their gardens many more rare and interesting plants than in all those of the rest of Europe. It even appears that this taste was even earlier among them; that under the government of the dukes of Burgundy (1384–1519) and even in the time of the Crusades, they had received and cultivated many species from the Levant. During the Dutch war for independence from Spain, beginning in 1568, which ravaged the country, several

such gardens were abandoned or destroyed. Matthias de Lobel [Lobelius], in the eloquent preface at the head of a new edition of his *Plantarum seu stirpium historia* (1576), deplored the misfortunes of that time but gave a list of the major gardens in The Netherlands.

For other European countries that had the most notable gardens, see Albrecht von Haller, *Bibliotheca botanica*, 2 vols. (1771–1772); Girolama Tirabaschi, *Storia della letteratura italiana*, vol. 7 (1791); and Conrad Gesner, *Horti Germaniae* (1561).

In Venice, note the garden of Senator Gerolamo Corner, who, having held the intendancy of the island of Cyprus for many years, had plants brought to him from Egypt and the Levant.

In Milan, there was the garden of Scipio Simonetta, an amateur who sent out a ship every year to various countries for the collection of new plants; and he communicated his treasures very freely.

In Lucca, the garden of Vincenzo di Monte-Cattino was notable, about which Pierre Belon spoke so highly in *Remonstrances sur le défault du labour et culture des plantes* (1558).

In Rome, several convents had gardens, but in particular that of the Recollects situated on the Capitoline Hill, confided to the care of Angelus Palla and B. della Villa, commentators on the pharmacology of the Arabic physician called Jean Mesua in Europe, Abu-Zabaria Yahiah ben-Masauiah (777–857).

In Naples, the garden of Giovanni-Vincenzo Pinelli was notable, where Bartolomeo Maranta improved his knowledge of botany and composed his *Methodus cognoscendorum simplicium*, published in Venice (1559).

In Switzerland and in Germany, several apothecaries and priests had gardens; and in Augsburg, the garden of the Fuggers.

In France, the garden of the bishop of le Mans, René du Bellay, who sent the celebrated Pierre Belon [1517–1564] to Asia during 1547–1549 to conduct research in natural history, and who was subsequently patronized by Cardinal François de Tournon, was outstanding.

For readers who may desire to know more detail about gardens that existed by 1560, we refer them to the works of Matthias de Lobel [1538–1616], Charles de l'Ecluse, [1526–1609], Rembert Dodoens [1517–1585], and Conrad Gesner. It appears that the gardens of Joachim Camerarius in Nuremberg and of the landgrave Wilhelm in Cassel postdate that era. See the preface in Camerarius, *Hortus medicus et philosophicus* (1588).

Part 2

On public gardens

The oldest of the public gardens dedicated to the teaching of botany were in Pisa and Padua. Cosimo dei Medici of Florence, later the first grand duke of Tuscany, restored the medieval University of Pisa in 1543, establishing there a chair of natural history. He called Luca Ghini [1490–1556] to that post. Ghini had taught that science for the previous sixteen years in Bologna. Cosimo ordered him to build a garden and confided its direction to him, donating a terrain for that purpose in 1544, along the Arno River north of the city near the arsenal. Ghini sent out appeals to plant lovers in other Italian provinces to send him duplicates and traveled himself to collect plants growing naturally in the mountains and near the sea. He also sought shipments of seeds from foreign countries, principally from Candia (Iraklion), where his brother resided. As early as 1554, the garden was in order and stocked with a great number of species. He had continued to enrich the garden and to teach at Pisa until his return to Bologna in 1554.

Ghini's student, Andrea Cesalpino [1519–1603], succeeded him in Pisa in 1555. The new establishment could only prosper under

the direction of a man celebrated equally in all the branches of the natural sciences. It is recognized that Cesalpino was the first to contemplate botany in a philosophical manner, and who distributed plants, not from characters drawn from size or virtues, but according to a method founded principally on a consideration of their fruit. See Cesalpino, *De Plantis Libre XVI* (1583). Pierre Belon, who passed through Pisa in 1555, was astonished by the beauty of the garden, by the quantity of plants it enclosed, and by the care taken to have them prosper.

As the numerous occupations of Cesalpino, and the variety of his studies, prevented him from overseeing all the details relating to the cultivation of the garden, he gave its supervision to Luigi Leoni with the title of Simpler-General. In 1563, after Francesco, son of Cosimo, moved the plants to a new location, Cesalpino resumed the intendancy of it, keeping it until 1583, when it passed to Lorenzo Mazzanga.

Francesco's brother, Ferdinand I, became grand duke in 1587. As zealous for the progress of the sciences as his two predecessors had been, Ferdinand took a particular interest in agriculture and botany. He sent a very able naturalist, the Fleming Joseph Benincasa (sometimes called Giuseppe Casabona, his Italianate name) to Crete and elsewhere in the Levant to collect seeds from the most interesting plants. The result of that trip was the acquisition of beautiful flowers that had not been seen before, cultivated initially in the gardens of Pisa and Florence, then throughout Italy, and from there to all of Europe.

In the year following his return in 1591, Benincasa was named director of the garden and the museum. That same year, the grand duke wanted to move the plants once again to a more suitable, more spacious location. A residence was built to house the director and the gardeners. A heated greenhouse was constructed, divided into compartments for plants requiring different culture; and two large flatbeds were designated for the Liliaceae and other ornamental flowers. That garden still exists today [1807]. Its plan can be found in Michelangelo Tilli, *Catalogus plantarum horti pisani* (1723); and in Giovanni Calvi, *Historiae pisani vireti botanica academici* (1777). [Benincasa is remembered with the genus *Benincasa* Gaetano Savi (1818).]

The position of professor of botany and that of director of the museum and the garden, nearly always separated after the time of Cesalpino, were only reunited more than eighty years later, which accounts for some of the errors found in the lists of garden intendants [superintendants], whether in Pisa or in Padua. The logic behind the reunification is explained by the fact that the professor of botany in those days was not responsible for making the Vegetable Kingdom known, or for presenting students with the methods of distinguishing and classifying plants, but only to demonstrate useful plants, to hold forth on their virtues, real or alleged, by commenting on Dioscorides. Botany would have to make considerable progress for one to teach it independently from medicine and as one of the most interesting parts of natural history.

The garden of Pisa was slowly augmented from year to year in the seventeenth century, but only at the outset of the eighteenth century did it again experience substantial growth. Michelangelo Tilli, named intendant of the museum while he was still collecting in Asia, brought back a great number of new plants. Subsequently, he obtained from the magistrates of Amsterdam duplicates of plants that Jan Commelin had gathered, some of which, favorable to the climate of Italy, succeeded better than in Holland. Tilli published the *Catalogus plantarum horti pisani* (1723) with a synonymy and drawings of the new plants. The prior catalogue published by Bellucci (1692)

had only been a list of plants. It would have been more interesting to see the catalogue that Benincasa had produced as well as the drawings he had made by talented artists; but his work was never published. See Giovanni Calvi, *Historiae pisani vireti botanici academici* (1777).

The University of Padua enjoyed a fine reputation after the beginning of the sixteenth century. A great number of foreigners gathered there, even from the remoteness of Russia, to study the sciences and *belles lettres*. The various parts of natural history were not yet taught as specialties. A chair in botany was only founded in 1533, given to François Bonnefoi, with a remuneration of 120 florins, later 180 florins. Given this remuneration, the professor was responsible for obtaining those plants he judged appropriate for demonstration. It was soon recognized how advantageous it would be to assemble the plants for cultivation in one location. Daniele Barbaro, Patriarch of Aquilia, who enjoyed a considerable reputation, advocated that cause very strongly. By a decree of 30 June 1545, the senate of Venice provided for a public botanic garden with funds from its treasury [Fig. 2].

In 1546, Luigi Anguillara [ca.1512–1570], another student of Ghini, was charged with the development of that garden and named its director. He had previously made several trips to observe plants in foreign countries. He now gave every effort to make the new establishment worthy of the university of which it was a part; and he was assisted by several savants including Pietro di Noali, a physician, and Luigi Mondela.

Following the departure of Anguillara in 1561, the position of director was given to Melchior Guilandin, born in Prussia, with a subsidy of 600 florins. His successor was Giovanni-Antonio Cortusi, whose voyages in Asia had made him well-known. He became the author of *L'horto dei simplici di Padova* (1591). Next in line was the illustrious Prospero Alpino. He had spent five years in Egypt and the Greek islands before returning to Genoa, from where he was called to Padua to be professor of botany in 1593. Two titles were attributed to him: *De plantis Aegypti* (1592) and *De plantis exoticis* (1627). Two gardeners or simplists were employed at that time to collect the most interesting plants bordering the sea, in the Alps, and on the islands of Crete and Corfu.

The garden of Padua added great luster to the University as it continued to be directed by able men. It notably increased the contingent of foreign students and was cited as a marvel by all travelers. Even so, when Guilandin compiled the first plant list in 1581, the garden possessed only about 400 plants, cultivated in the ground or in pots that could be brought in under roof for protection from the cold. Among those plants, however, several were found from the Levant and India that were still quite rare, such as the banana tree, the hyacinth, and several cassias among others. The numbers increased from year to year thereafter as can be seen from the catalogues published by Cortusi (1591); by J. G. Schenck a Grafenberg, *Hortus patavinus* (1600); up to the one by Giorgio a Turre, *Catalogus plantarum horti patavini* (1660 and 1662). Also see Girolamo Tiraboschi, *Storia della letteratura italiana*, vol. 7 (1791).

After the botanic gardens of Pisa and Padua, the most famous garden was in Bologna, founded in 1568 by Ulysses Aldrovandi, another Ghini student. By examining the works of this illustrious naturalist, you note his extensive erudition, his brilliant literature, and his great taste for the marvelous. Like his master Ghini, he must have been a teacher who could attract many students. [Yet he died in 1605, ruined by his expenditures for specimens; and his major work, *Dendrologiae naturalis* (1668), was not published until more than sixty years after his death.]

Guiseppe Monti, a professor of botany at Bologna, during a lecture opening his course in 1723, asserted that the local botanic garden had existed long before it was confided to Aldrovandi, even suggesting that its foundation went back to the mid-fourteenth century. But the authorities on whom he based his claim lacked integrity. The error was rectified by his son, Cayetan Monti, in 1755. Using the registers of the University, he declared firmly that the garden was established by a decree of the senate in 1568.

The age of the botanic garden in Florence cannot be fixed with precision. Duke Cosimo loved botany very much, sparing nothing to obtain interesting plants. They were planted and cultivated with great care in the garden of his castle. New species were planted there before being in Pisa. He was delighted to converse with botanists who came to study them. A garden in Florence, dedicated to public instruction, was not founded and endowed with an annual income until about 1556. Luca Ghini directed its planting as he had done for the garden in Pisa. Some time later, under Grand Duke Ferdinand I, Joseph Benincasa enlarged and enriched it with a multitude of plants from the Levant.

The garden was still prospering at the time of the accession of Grand Duke Cosimo III in 1670, who gave its intendancy to Angelo Donnini. Yet, by the end of the century, the botanic garden had become entirely neglected. Determined to conserve what remained of the plants gathered by Benincasa, Boccone, and Donnini, some savants and plant lovers organized a botanical society and purchased an appropriate terrain. Their zeal attracted the attention of Cosimo, favoring the reestablishment of the public botanic garden. By charter in 1718, he gave its direction of the botanical society, assisting it with funds sufficient to replant and maintain it. The illustrious Pier Antonio Micheli [1679–1737], a member of the botanical society, was named head gardener; and the establishment then took on the luster it thereafter preserved. The history of the botanic garden in Florence can be found in the scholarly preface added by Giovanni Targioni-Tozzetti to Pier Antonio Micheli, *Catalogus plantarum horti Caesarei Florentini* (1748).

The botanic garden at the Vatican was founded about the same time as the garden in Bologna. Pius V (1566–1572) gave its direction to Michele Mercanti, Cesalpino's cherished student, who had acquired a great reputation while still quite young. (He was born in 1541.) This savant benefited from his credit with Sixtus V (1585–1590) to obtain the construction of a splendid natural history cabinet in that part of the palace adjacent to the garden. He assembled the most interesting products of the Mineral Kingdom, writing its history under the title *Metallotheca Vaticana* (1717), published posthumously during the pontificate of Clement X (1700–1721).

The dates we have adopted differ from some to be found in the most well-known and exact works on the history of botany. Tournefort, Haller, Linnaeus, and Adanson are in accord by citing the garden in Padua as earlier than all the others. Some refer its foundation to the year 1533, others to the year 1540. The errors, introduced by Tomasini, *Gymnasium Patavii* (1654), and by Rolfinc, *De Vegetabilibus* (n.d.), were first rectified by Jacopo Facciolata in his *Fasti gymnasium Patavii* (1757), as established in 1545 by order of the senate and based on original titles; and later by Giovanni Calvi, *Historiae pisani vireti botanici academici* (1777). The latter, with an uncommon erudition and sagacity, has shown the sources of the errors, pointing out the ambiguous passages that gave rise to them. Finally, the learned Girolamo Tirabaschi, in the new edition of his *Storia della letteratura italiana,* 7: 606 (1791), in deferring to Calvi's opinion, added irrefutable proof that

the decree of the Venetian senate was dated 30 June 1545. He cited as well the contract between Senator Foscarini and the monks of St Justine by which the terrain was purchased, still in the hands of Marsigli, professor of botany in Padua, see G. Marsigli, *Notizie del pubblico giardino de' semplici di Padova* (1771).

Similar mistakes have been made about the origins of the gardens in Pisa, Bologna, Florence, and Rome; but further discussion on the matter would be fruitless. In the works cited above, one will find verification of the conclusions to which we came.

While the first botanic gardens were established in Italy, their example was soon followed in The Netherlands where subsequently the finest gardens in Europe were to be found. The one in Leiden must concern us in particular [Fig. 3]. Once the University of Leiden was founded in 1575, its rectors asked the city magistrates to add a botanic garden to which a professor should be assigned. This was authorized by decree, and the terrain was acquired in 1577. The direction of the new garden was given to Theodore Auger Cluyt [Clutius], a botanist very interested in culture, who had gathered the rarest of plants at his home. Cluyt transplanted all his own plants to the university garden and, at the end of that year, began to give botany lessons even though not appointed to do so. Having inspired in his son, Auger, the same enthusiasm for science, Cluyt sent him to Spain, to Italy, and the coasts of Africa to collect living plants and seeds.

A professor in actual title, Gerard Bondt [Bontius], was nominated to direct the Leiden garden in 1587; and a physician from Amsterdam, Pieter Paaw, was appointed to assist him in 1589. The two were instructed by the magistrates to enrich the garden, new plants to be procured either by purchase, by plant exchanges, or through correspondence with all botanists. The famous French botanist, Charles de l'Ecluse [Clusius], then living in Frankfurt, was urged several times to come to Leiden, not to give lessons as his advanced age precluded that, but only to direct everyone with his advice. In 1592, he consented to come, sending to the garden all the seeds that the grand duke of Tuscany had ordered collected for him on the island of Crete. L'Ecluse engaged the rectors to separate the functions of Bondt and Paaw, so that one of them would be responsible for explicating Theophrastus, Dioscorides, or other authors; while the other would demonstrate the 800 plants the botanical garden then possessed, about which Pieter Paaw would publish *Hortus publicus academicus Lugdunum Batavorum* (1603). A temperate greenhouse was added in 1599.

A revised edition of Paaw's catalogue was published by Adolph Voorst [Vorstius] in 1633 containing 1104 species. A third edition of the catalogue published by F. Schuyl in 1668 showed an increase of about 220 species by that date.

Meanwhile, Dutch savants, magistrates, and wealthy merchants were occupied by the desire to promote the progress of botany. No ship left the ports of The Netherlands without its captain being under orders to procure seeds and living plants everywhere he put into a port, products he had to preserve in cases to bring home. Personages of the greatest distinction had magnificent personal gardens that they planted with exotic plants at great expense, making it a pleasure for them to transmit their plants to the public garden in Leiden: Men such as Jerome van Beverninjk, Caspar Fagel, John William Bentinck, and Simon van Beaumont, who may have written *Horti beaumontiana . . . catalogus* (1690), sometimes attributed to F. Kiggelaer; and H. A. Rheede tot Draakenstein, *Hortus indicus malabaricus*, 12 vols. (1678–1703), a celebrated pre-Linnaean work.

Paul Hermann, above all others, enriched the public garden with shipments he made during voyages to Ceylon and the Cape of


GIARDINO BOTANICO DI PADOVA

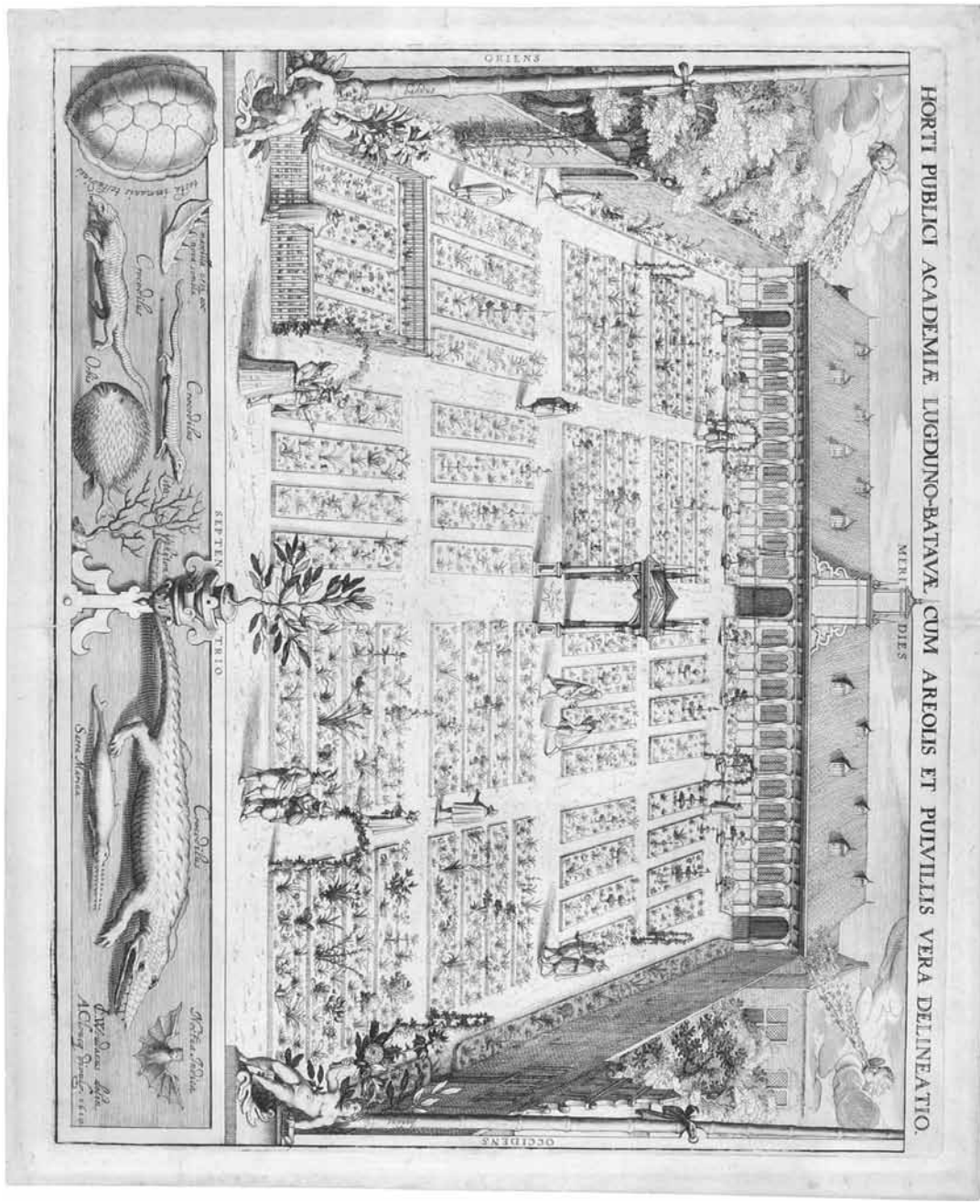


Figure 2. *Left*, Giardino Botanico di Padova [Botanical Gardens at Padua], frontispiece for Roberto de Visiani's *L'Orto Botanico de Padova nell' anno MDCCCXLII* (Padua, Coi tipi di A. Sicca, 1842), Hunt Institute for Botanical Documentation Library call no. DB1 270 P125V; Figure 3. *Above*, Horti publici Academiae Lugduno-Batavae cum Areolis et pulvillis Vera Delineatio [Botanical Gardens at Leiden], engraving with etching by Jan Cornelisz Woudt (1570–1615), 1610, Hunt Institute for Botanical Documentation Art accession no. 1774.

Good Hope; and by the attention he gave them when, upon his return, he was named professor. See Hermann, *Horti academus Lugdanum Batavorium catalogus* (1687). By then, the construction of hothouses had begun, and the garden possessed more than 3,000 plants.

Hermann was succeeded initially by Pieter Hotton, thereafter by Herman Boerhaave [the most famous physician and scientist of his day], who made every effort to augment the garden. He published a new catalogue of the garden featuring 6,000 plants. That number at first appears extraordinary, but it must be recognized that in that era distinction was given to the slightest variations or varieties; and that catalogues would be found reduced to a third if they had been limited, as today, to including only species and notable, constant varieties. Note the history of the botanic garden in Leiden that Boerhaave placed at the beginning of his *Index alter plantarum hortuns Lugdanum Batavorum* (1710 and 1720). Most of the ornamental plants from South Africa, such as the geraniums and fig-marigolds, were brought to Europe for the first time to the Leiden garden.

Once the utility of botanic gardens was recognized, several German princes desired to have one in their capitals. The elector of Saxony, having undertaken the reform of public instruction, established a public garden in Leipzig in 1580. In 1605, Ludovic Jungermann, a well-regarded botanist, obtained a garden for the university recently founded by the landgrave of Hesse-Darmstadt in Giessen. After laying out that garden, Jungermann moved on to Altdorf in Bavaria. In concert with Kaspar Hoffmann and Georg Nesler, he petitioned for the same favor for that city. The senate of Nuremberg conceded to his wishes in 1625 even though that region was suffering from the ravages of the Thirty Years War. Named professor, Jungermann exploited his fame to make the establishment prosper. Taking credit for it, he published a catalogue of its plants that he had assembled: *Catalogus plantarum, quae in horto medico altdorphino* (1635, revised 1646). A greenhouse was added ten years later. By then, the Altdorf garden was the finest in Germany. The garden established by Ernest, Graf von Schaumberg, in 1621 at Rintlen in Hesse-Cassel, also acquired considerable celebrity. The gardens in Regensburg and in Ulm date from the same period. See J. J. Baier, *De Hortis botanico-medico Germaniae* (1726); J. Oberndorffer, *Horti medici … Ratisbonae* (1621); and J. Schoepfius, *Hortus ulmensis* (1622).

Dating from the time of the foundation of the University of Jena in Saxe-Weimar (1558), botany was taught there by taking young people out to botanize in the country. As it would be clearly advantageous to assemble in one locale the plants you wanted to make known, the government had a botanic garden built in 1629. Its direction was given to Rolfinc, now obscure, who left an interesting work in which one finds a history of the principal public gardens of his day: Rolfinc, *De Vegetabile* (ign.). See J. T. Schenk, *Catalogus plantarum horti medico jenensis* (1659).

Pierre Belon, who had traveled in the Levant and through a great part of Europe conducting research in natural history, published his *Remonstrances sur le défault du labour et culture des plantes* (1558), which Charles de l'Ecluse translated into Latin as *De neglecta plantae cultura*. Belon indicated the places where one could procure the seeds of foreign trees, and he provided a description of the gardens he had seen in various countries. Above all, he celebrated enthusiastically the garden in Padua: "If the seigniory of Venice," he wrote, "had had a theater built of marble, enriched with gold and silver, they could not have acquired so great a glory as by the establishment of this garden where the rarest of plants have been assembled; which bring into the city of Padua

a multitude of foreigners who come to learn the sciences in their university." Belon went on to expose what a similar establishment would bring to his own country, and offered to name and to supply the most useful trees and plants.

By then, the political and religious turmoil deflected minds from the study of nature, and Belon's *Remonstrances* were ineffectual for the moment. They had made an impression on the enlightened, finally reaching the throne when Henri IV was its resolute possessor. In response to an appeal from the botanist Pierre Richer de Belleval [1564–1632], claiming that the university medical school in Montpellier was in danger of losing students to Italian universities, the king authorized a botanical garden in Montpellier in 1593, making Richer its builder and director. It gave the desired luster to the university in that city. See Pierre Richer de Belleval, *Onomatologia seu nomenclatura stirpium quae in horto regio monspeliensi* (1598).

In Paris at that time, the Ecole de médicine had a garden. As its locale was very small, and only useful plants were cultivated in it, the sciences drew little benefit from it. Consequently, there had as yet been no challenge to the reputation of Montpellier as the preeminent medical school in France. The most eminent botanists of that era had taken their medical training there: Conrad Gesner [1516–1565], Charles de l'Ecluse [1526–1609], Jacques Daléchamps [1513–1588], Matthias de Lobel [1538–1616], and the two Bauhins, Jean [1541–1613] and Gaspard [1560–1624]. Although there had not yet been a chair dedicated to the teaching of botany, the presence of such students awoke the taste for that science. When Richer de Belleval was given the title professor, he found the climate favorable to support his zeal. He was encouraged both by the students who attended his lessons, and by the Estates of Languedoc. The property ceded to him comprised between five and six acres. By 1598, the garden held 1,300 distinct species mostly collected in Languedoc, in the Alps, and in the Pyrenees, more than in either Padua or Leiden. The garden was destroyed a few years later during civil war, but Richer rebuilt and enlarged it. The eminent *agronome*, Olivier de Serres [1539–1614], cited it as the model.

If in size and number of species the Montpellier garden surpassed those in Germany, Italy, and The Netherlands, it was quite inferior for the culture of plants from the Levant and the two Indies. Moreover, the garden in Paris, whose foundation was ordered by Louis XIII in 1620, would soon surpass all other gardens in Europe. Its original name was the Jardin Royal des Herbes Médicinales, and the planting arrangement reflected the medicinal order published by Jacques Daléchamps, *Historia generalis Plantarum* (1587). [The first intendant was Guy de La Brosse [?–1641], responsible for its development (Williams 2001, p. 78).] The first catalogue was published by La Brosse, *Catalogue des plantes qui sont de present cultivées au jardin royal de Paris depuits deux ans et demie qu'il est dressé* (1636). On the dedication page, he explained that the garden had been open to those of all nations who wanted to visit and admire since 1634. Instructive demonstrations did not begin until 1640, by which time La Brosse claimed the garden in Paris surpassed all others. See La Brosse, *L'Ouverture du jardin royal* (1640).

Ornamental plants were more widely cultivated in botanic gardens in that era than they would be by the nineteenth century. As there were not yet gardener-florists who sold exotic plants, one still sought to naturalize them, to make them double-flowered, or to multiply varieties of them in botanic gardens. In the Paris garden in 1635, or in that of Copenhagen in 1653, there were many more varieties of tulips, hyacinths, poppies, anemones, and so on, than we have at the

Muséum today [1807]. As those plants are now available commercially, botanic gardens are limited to raising one or two individuals of the species that produced the varieties, reserving the labor and terrain at their disposal for new and very uncommon species.

Within the garden at the Muséum in Paris, two flower beds are now maintained for plants appropriate for decorating flower beds or making garden borders. Every year, several different species from the previous year are planted by choosing the rarest and most interesting to be multiplied. From there, they are distributed to private gardens, both in Paris and the provinces. Once they become available from commercial florists, they no longer occupy the employees of the botanic garden. As Georges Cuvier said, "The sciences are happy every time a subject escapes from them. Those things whose utility is generally recognized no longer concern the savants as savants; they can refer them to the majority of men."[1]

The arrangement in La Brosse's Jardin royal des herbes médicinales survived into the intendancy of Dr. Guy-Crescent Fagon (1693–1718), [Louis XIV's physician] despite continual efforts of the Paris faculty of medicine to preserve its exclusive control over the training of physicians. Fagon resolved the rivalry by recruiting and promoting scientific personnel of distinction, men devoted to research and teaching rather than medical instruction. The name *médicinales* ceased to be used in favor of the simplified Jardin du roi.[2]

It was not intended initially to provide a history of other public gardens in this essay after that of Paris. Nevertheless, we believe some others merit an additional word, either because of their celebrity; or because, having had direct correspondences with foreign countries, they introduced many new plants; or, finally, to take note of the establishment of the first gardens in different European countries.

Pietro Castelli, initially a professor of medicine in Rome, but subsequently in Messina [Sicily], induced the administrators of that city in 1638 to establish a botanic garden. He also published its catalogue, *Hortus Messanae* (1640). The garden was later neglected, unfortunately as Messina was that place in Europe most appropriate to acclimate plants from meridional countries. Not only is sugar cane grown in Sicily, but it has long been known as the European region most famous for the fertility of its soil and for the multitude and variety of its flowers, which cover the delightful open country around Enna. See Diodorus Siculus, *Bibliotheca historica*, Book 5. It was more difficult to assemble collections of such plants in the northern countries of Europe, although with ingenuity the obstacles could be overcome. Culture was even more perfected when it was necessary to take additional precautions to protect plants from a rigorous climate. The botanic garden in Copenhagen, for example, opened in 1640; and its catalogue, published by Simon Paulli, *Viridaria varia* (1653), revealed that an astonishing number of ornamental plant varieties had been collected there.

The garden in Uppsala was founded in 1657 under the auspices of King Charles X Gustavus and thanks to the care of Olof Rudbeck [1630–1702] with the financial assistance of Pontus-Frédéric La Gardie, chancellor of the Academy of Uppsala. La Gardie not only provided funds for the construction of a temperate greenhouse and to obtain exotic plants, but he made a gift of his private garden in 1662. One can trace the progress of the establishment by comparing the three editions of Rudbeck, *Catalogus plantarum hortum academicum ubsaliensium* (1658, 1666, and 1685). The last edition named 1,870 plants, among which one can count 630 distinct species of exotic plants.

The fire that consumed half the city of Uppsala in 1702 reduced the orangerie to

cinders, and the plants from warm climates would have perished if Professor Olof Celsius had not removed them to his house meaning to return them later. The garden itself remained in a deplorable state until 1740 when its walls were rebuilt. Two years later, the chair of botany and the direction of the garden were given to Carl Linnaeus [1707–1778]. The university, no doubt stimulated by that reformer of natural history, assumed responsibility for all expenses necessary for the requisition and preservation of plants.

Sensing how essential it was to be supported in every detail at all times, Linnaeus employed Dietrich Nietzel, a skillful gardener, who had closely studied gardens in Germany, The Netherlands, and England; and who had been put in charge of George Clifford's garden in Hartekamp [between Haarlem and Leiden]. Linnaeus had new greenhouses built intended for plants from different climates and began a correspondence with the directors of the principal botanic gardens of Europe in order to obtain plants. They hastened to accommodate him. He later testified that the person who had rendered him the most help was Bernard de Jussieu [1699–1777] of Paris. See Linnaeus, *Amoenitates academicae* (1749), 1: 197. You will also find the description and the plan of the garden in Uppsala in Dissertation no. 7 for 1745 (*Amoenitates academicae*) entitled *Hortus Upsaliensis*; and he published a catalogue of plants cultivated there, *Hortus upsaliensis* (1748). His most enduring work, *Species plantarum* (1753), included all the plants then known to him: 5,900 species placed within 1,098 genera.

For more than fifty years, Leiden was the only city in The Netherlands where a botanic garden existed. Yet, by the middle of the seventeenth century, one had been established in nearly all the seventeen provinces united as the Dutch Republic. Those in Amsterdam (North Holland) and Groningen (Holland) merit particular notice.

The medical school in Amsterdam had long had a garden supervised by a professor. Its small size limited it to the cultivation of useful plants. As the city enlarged, that plot was abandoned. The botanic garden dates only from 1684. The founder, Nicolas Witsen, was burgomaster, elected to that office thirteen times. Direction of the garden was entrusted to Jan Commelin [1629–1692], exceptionally qualified by great learning and a love of botany, to advance Witsen's intentions, namely, to make the Amsterdam garden a rival of those in Leiden and Paris, and to bring in plants from all countries, especially from India. Witsen, a member of the directorate of the Dutch East India Company, took advantage of that association. The number of exotics soon became so considerable that it was believed necessary to create a special chair for their demonstration.

Caspar Commelin [1667–1731], Jan's nephew, was appointed to that chair. Working together, they extended the garden's reputation by publishing the history of the new plants with which they enriched it. See Jan Commelin, *Horti medici amstelodamensi*, 2 vols. (1697–1701); and Caspar Commelin, *Horti medici amstelodamensi rariores* (1706), the fine engravings executed at the expense of the city. The garden later increased in size under the management of Jan Burman [1707–1780] beginning in 1738, but its reputation was eclipsed by other gardens after his death in 1780. See Jan Burman, *Horti medici amstelaedamensis* (1775).

It should not be forgotten that the first root of the coffee tree brought to Europe (*Coffea arabica* L.) was cultivated in Amsterdam. Nicolas Witsen had been eager to obtain the valuable plant. He wrote to Pieter van Hoorn, governor of the East India Company who resided in Batavia, asking him to obtain fresh seed from Arabia, to have it planted, and then to send him a plant. When Witsen received a stalk, he gave it to the Amsterdam garden.

Fruit was obtained from it there, which was planted and produced new individuals. See Herman Boerhaave, *Index alter Plantarum Hortum Lugdamum Batavorum* (1710), 2: 217. Paneras, then burgomaster of Amsterdam, sent one of them to Paris in 1714. It was planted in the Jardin du roi where it flowered the same year. It was multiplied in greenhouses in Paris, and from there two shoots were sent to Martinique in 1726, from which descended all the coffee trees later cultivated in the French colonies. See the abbé François Raynal, *Histoire philosophique et politique des établissements et du commerce des Européens dans les deux Indes*, Book 16, chap. 20 (1770).

The garden in Groningen owed its inspiration to Hendrick Munting. Beginning in his youth, this savant had such a passion for botany that he traveled through various European countries for eight years to observe plants and to make acquaintances with botanists and cultivators. Returning to his homeland, he devoted the greatest part of his fortune to acquiring the rarest species. His personal garden soon acquired such a reputation that visitors came from afar to admire it. In 1641, the states of Groningen concluded that an establishment so celebrated and useful ought to be under the protection of the republic.

Munting was given the title Botanist of the Province with subsidies for the maintenance of the garden. A few years later, he was made responsible for giving lessons. A plant list dating from 1646 contained about 1,500 plants, not including more than 600 varieties, among them 100 poppies and 150 tulips. While among the plants only a few are noted as being in the orangerie or the greenhouse, the orangerie in fact must have been very large, as many of the trees could not have survived the winter in open ground in Groningen.

His son, Abraham Munting [1626–1683], reared amidst flowers and trees from all countries, and associated from childhood only with the curious who came to admire them, took on the tastes of his father whom he succeeded as professor. His various writings, but in particular his *Phytographia curiosa* (1702), published after his death by F. Kiggelaer, gave proof that various remarkable plants had flowered for the first time in Europe in Groningen. Kiggelaer inserted a eulogy of Abraham Munting in the preface.

Before the establishment of public botanic gardens in England, there were private gardens planted by botanists, such as those of John Gerard [1545–1612] and the two John Tradescants. For John Gerard, see *Catalogus plantarum in horto Gerardi* (1596), and *The Herball or general historie of plantes* (1597); and John Tradescant the Younger [?–1652], *Musaeum tradescantianam* (1656). Both gardens were in London.

The garden in Chelsea belonged to Sir Hans Sloane [1660–1752]. This savant made a gift of it to the Apothecaries' Company of London with the proviso that fifty plants, different from those previously there, must be introduced each year until the total number reached 2,000. That condition was fulfilled, and the catalogue of the fifty additional plants was published every year in the *Philosophical Transactions of the Royal Society of London* between 1722 and 1773. Some of the new plants had not appeared earlier in England according to William Aiton, *Hortus kewensis* (1789).

The garden at Oxford University, if founded in 1622, acquired no importance until the Sherard brothers, William [1659–1728] and James [1670–1735], donated their private garden in Eltham to the university. William Sherard endowed a chair of botany in 1728 on condition that Johann Jakob Dillenius [1687–1747] become its first occupant (Blunt 1971, p. 114). See Dillenius, *Hortus elthamenses plantarum rariorum* (1732).

As for Iberia, there was a marked interest in matters botanical early in the sixteenth century during the reigns of Charles V in Spain and Emanuel I of Portugal, stimulated by such travelers as Garcia del Huerto (sometimes Orta) and Nicolas Monardes, whose interests were primarily in *materia medica*. Note Orta, *Coloquios dos simples* (1563). The principal work on the local flora was produced by a foreigner, Charles de l'Ecluse, *Rariorum aliquot stirpium per Hispanias* (1576). Thereafter, interest in all the sciences lapsed in Spain and Portugal.

Madrid did not get a botanic garden until 1753 by order of Ferdinand VI, who gave its direction to his first physician, Don Jose Sagnol. To provide an immediate plant population for the Real Jardin Botanico, Sagnol arranged the purchase of the private garden of Don Jose Quer y Martinez [1695–1764]. The latter had cultivated a great number of exotic plants at his home. Named professor of botany at the royal garden, he was assigned Don Juan Minuart as an assistant. See Quer y Martinez, *Flora Espanola*, 6 vols. (1762–1784).

Sagnol also drew up instructions for travelers going to America, ordering them to bring back seeds along with indication of the climate and the nature of the soil where they had been collected. Later, he sponsored travelers especially designated to make plant collections. As a result of these measures, the Real Jardin Botanico in Madrid became the nursery for plants from Peru, Mexico, and Chile; and from there they were sent to other gardens in Europe. Paris received many of them from Antonio Jose Cavanilles [1745–1804] during the several years he studied botany in Paris before becoming director of the royal garden in Madrid. See A. J. Cavanilles, *Elenchus plantarum horti regii botanici matritensis* (1803). A substantial number of them became appropriate for the ornament of gardens, especially within the Compositae, the Bignoniaceae, and the Convolvulaceae. Plants from Brazil became the special feature of the botanic garden founded in Coimbra in 1773, associated with Portugal's only university. See A. I. R. Vidal, *Index plantarum in horto botanico conimbricensi* (1850).

We must now take note of some private gardens, which, if they were not useful for the progress of science, were at least useful for the propagation of ornamental species.

Part 3

On private gardens

Before the end of the sixteenth century, a great number of gardens existed solely meant to introduce, naturalize, and distribute exotic plants. Such gardens must not be confused with those contemporary pleasure gardens that some princes and large landlords had built, first in Italy and in Germany, such as by Prince Andrea Doria [1468–1560] in Genoa; or the garden Bernardino Rota [1509–1575] had planted in Naples in 1555 and dedicated to the Muses; or the garden of René du Bellay, bishop of Le Mans, which Pierre Belon enriched with numerous plants brought from Germany, Italy and the Levant; or the garden of Cardinal Jean du Bellay [1492–1560] at Saint-Maur-sur-Loire, which the same Belon cited as the most beautiful he had seen after the one in Padua; or the Cesi, Borghese, and Barberini gardens in Rome.

Charles de L'Ecluse, who devoted his entire life to the advancement of botany, whether in Vienna, Frankfurt, or Leiden, cultivated a multitude of plants whose history he provided. He had wandered through France, Germany, Spain, England, acquiring great esteem. For friends, he had those men most distinguished by their status and talents; and he benefited from their credit to obtain plants from the Levant and plants brought back from the two Indies by Spanish, Portuguese, Flemish, and English voyagers. He died in 1609 at the age

of eighty-four having had the pleasure of seeing a host of plants throughout the gardens of Europe whose seeds he had secured, and whose culture he was the first to attempt and to recommend.

In praising L'Ecluse, who was the premier botanist of the sixteenth century, we owe a testimony of gratitude to the enlightened princes who promoted his interests. Maximilian II, who occupied the imperial throne from 1564 to 1576, had a magnificent garden built in Vienna that he confided to L'Ecluse's direction. The emperor spared nothing to procure plants from all countries. In particular, he ordered his ambassadors accredited to the Ottoman sultan to send him all the plants that decorated the gardens of Constantinople. His son and successor, Rudolf II, 1576–1602, pursued the enrichment of the garden. The culture of ornamental plants was extremely elegant as can be seen in Emanuel Sweert [1552–?], *Florilegium* (l612), and was imitated by great aristocrats. Their wives in particular were delighted with the gardens.

When going through the works of L'Ecluse, Rembert Dodoens, and Matthias de Lobel, one is surprised by the great number of gardens they cite as belonging to the most distinguished persons, and the care taken to bring plants from foreign countries. This fashion subsided in Germany by the mid-seventeenth century, but was sustained in Flanders and Holland where it became the source of a considerable commerce. Some botanists in Spain and Portugal, such as Nicolas Monardes and Simon de Tovar, also began the cultivation of plants brought from the two Indies, and were commemorated by the genera *Monarda* L. and *Tovaria* Ruiz & Pav.

John Gerard had a botanical garden near London and published its catalogue: *Catalogus plantarum in horto Gerardi* (1596). One can tell from W. T. Aiton, *Hortus kewensis* (1789) that England owed many exotic plants to Gerard's occupation.

In Florence, Senator Nicola Gaddi was one of the first to obtain plants from Egypt and the Levant. He brought Jean Benincasa from Flanders to take charge of his garden. When he came to recognize Benincasa's superior talents, he recommended him to the grand duke; who, as we noted above, gave him direction of the botanic gardens of Pisa and Florence and had him travel as a collector.

In a private garden in Rome, Cardinal Alessandro Farnese [later Pope Paul III] assembled a great number of species new or very rare at that time, their history published by T. Aldini, *Exactissima descirptio rariorum quarundam plantarum, quae continentur Romae in horto Farnesiano* (1625). Therein was first introduced pomegranate and the species of mimosa today cultivated in Provence: *Acacia farnesiana* (L.) Willd.

Among all the known gardens in that era, the most famous was the garden Konrad von Gemmingen, bishop of Eichstadt in Bavaria, had built near his palace at the end of the sixteenth century. The bishop spent vast sums to have the most beautiful plants brought from Europe, the Levant, and the two Indies; and he acquired plants from botanical gardens as well. He wanted his plants to be illustrated in a magnificent book and entrusted their engraving to his botanist-gardener, Basil Besler [1561–1629], *Hortus eystettensis* (1613). The most beautiful work on botany to that date, it contained more than one thousand illustrations with a text by Ludovic Jungermann [1572–1653]. It is known that Besler employed at least six different engravers on the project, and that the plates have since disappeared. Even so, the work published a year after the bishop's death, made superb flowers more widely known, contributing to the desire to obtain them.

Jean Robin [1550–1629], a contemporary apothecary in Paris, had begun planting a private garden in his youth, enriching it

during subsequent years with exotic plants, especially from North America. See Jean Robin, *Catalogus stirpium tam indigenarum quam exoticarum Lutetiae* (1601), a list of 1,300 plants. Under Henry IV, he accepted the responsibility for planting the medicinal garden for the Faculty of Medicine with the title Simpliciste du roi.

His son, Vespasien Robin [1579–1662], shared his passion for botany and became a collaborator in enlarging their private garden. After the royal botanical garden was founded under Louis XIII, Vespasien had their collection of sixty years transferred to the Jardin du roi. He became employed as an assistant-demonstrator in the royal garden, becoming notable for his introduction of *Robinia pseudoacacia*, the name given by J. P. Cornut [ca.1606–1651], botanist-physician who had visited Canada. See Jacques-Philippe Cornut, *Canadensium plantarum aliarumque nondum editarum historia* (1635).

Luxury tapestry-work being particularly fashionable at the beginning of the seventeenth century, Pierre Vallet, embroiderer to Henry IV, had a large number of flowers engraved to serve as models in 1608. These engravings had a double effect: They inspired nature lovers with a desire to possess such plants because of their beauty; and inspired artists to cultivate them in order to portray them from a fresh point of view rather than rigorously copying designs already used. Thus, the culture of flowers contributed to great progress in the art of tapestry work, while the desire to perfect tapestry-work stimulated the search for new flowers.

That same practice survives today [1807] in Lyon where designers in factories have an association with botanists. When an elegant plant appears in some garden, they hasten to reproduce its image on their cloths. You can even see evidence of changes in floral taste over the years. Instead of using roses, tulips, or poppies, common fifty years ago, you now see the preference for garlands of small flowers such as the fuchsia or the lopezia; and the same plants are found again on porcelains.

After the publication of Besler's *Hortus eystettensis*, Sweert's *Florilegium*, and Pierre Vallet, *Le Jardin du roy Henri IV* (1608), the taste for ornamental plants became more common. Cultivation produced some remarkable varieties, and a number of amateurs wanted to have gardens decorated with new and exotic plants. Among them, we mention only a few that enjoyed the greatest reputation: The garden in Blois belonging to Gaston de France, duc d'Orléans, its catalogue by Robert Morison [1620–1683], *Hortus regius blesensis* (1669), a revision of a prior catalogue by Abel Brunyer (1653), the royal physician; the garden of D. Joncquet, *Hortus, sive index onomasticus plantarum , quae exolebat Parisiis annis 1658 et 1659* (1659), who later became a professor at the Jardin du roi; the garden at Beaugencier near Toulon belonging to the well-regarded attorney Claude Fabri de Peiresc, who was the first to obtain and cultivate the double-flowered myrtle (*Myrtus communis* L.), the jasmine from India (*Jasminium officinale* L.), and trumpet-creeper (*Campsis radicans* (L.) Seem.) from North America.

In England, the garden planted by John Tradescant about 1630 at South Lambeth was the oldest private garden after that of John Gerard. Charles I and his noble courtiers, who visited it frequently, acquired there a taste for the culture of exotic trees. Several of the plants introduced by Tradescant became designated under his name, such as *Aster tradescanti* L. and *Tradescanti virginiana* L., a spiderwort. When the English divine, Henry Compton, became bishop of London in 1675, he assembled at Fulham a great number of exotic trees not yet seen in Europe. [He was remembered subsequently as primarily a competent amateur botanist, not as a divine.] The garden of the

merchant Peter Collinson [1694–1768], located at Mill Hill near London, was celebrated for its collection of American plants acquired from John Bartram [1699–1777] of Philadelphia, and also because Linnaeus conducted research there. Collinson's garden, however, dated from the early eighteenth century, not the seventeenth. See Lewis Dillwyn, *Hortus Collinsonianus: An Account of the Plants Cultivated by the Late Peter Collinson* (1843). As noted above, the private garden of William and James Sherard at Eltham, celebrated in J. J. Dillenius, *Hortus Elthamensis* (1732), was donated to Oxford University.

In Padua, the Mauroceni garden was described in Antonio Tita, *Catalogus plantarum Patavii di J. F. Mauroceni (1713)*. A history of the garden of the prince of Catholica, at Misimeri southeast of Palermo, was written by Francesco Cupani, *Hortus Catholicus* (1696–1697).

The garden of Prinz Friedrich von Wurttemberg at Montbélliard was managed by Jean Bauhin, who cited it on virtually every page of his *Historia plantarum universalis* (1650–1651). The garden of Caspar Bose in Leipzig, where *Amygdalis nana* L. was first cultivated [later *Prunus tenella* Batsch], was featured in three successive histories: Paul Amman, *Suppelex botanica* (1675); E. Peine, *Der Bosensche Garten in Leipzig* (1690); and A. F. Wehmann, *Hortus Caspar Bosianus* (1723). The garden contained a multitude of ornamental flowers including several asters from America.

The Prinz von Baden-Durlach had a garden built in 1715 at Karlsruhe for which he had his gardener, Thran, attached to a collecting expedition sent to Africa by the king of Poland, Augustus II. See C. Thran, *Index plantarum horti Carlsruhani* (1733). The garden contained 154 varieties of orange and lemon trees by 1737. Two superb palm trees, *Chamaerops humilis* L., were sent from that garden to the Muséum in Paris, where they are put out every summer at the gate of the amphitheater.

In Jacobsdal near Stockholm, the garden of Senator Pontus-Frédéric La Gardie was published by Olof Rudbeck, *Deliciae vallis Jacobaeae* (1666).

Among the United Provinces in The Netherlands by the end of the seventeenth century, Holland was the province featuring many distinguished botanists and the region most devoted to the culture of gardens. A great number of exotic plants were brought in for the gardens of Simon van Beaumont, secretary of the States in The Hague. See S. H. van Beaumont, *Horti beaumontiani catalogus* (1690); as well as those of Jerome van Beverninjk and Caspar Fagel, both major statesmen.

The most famous of all the gardens in Holland, because of its richness and its description published by Linnaeus, was the garden of George Clifford at Hartekamp between Leiden and Haarlem. See Linnaeus, *Hortus Cliffortianus* (1737). Clifford sought all new plants reaching either England or Holland, maintaining a correspondence with botanists in many countries. Herman Boerhaave donated plants from his own garden. Johan Siegesbeck sent plants from Russia, Albrecht von Haller [1708–1777] plants from the Alps. Johannes Burmann [1706–1779], Johan Gronovius [1690–1762], and Philip Miller [1691–1771] shared with him seeds received from various parts of the world. He had four very fine greenhouses: One for plants from southern Europe and the Levant; one for plants from Africa; a third for plants from India; and a fourth for those from hot climates in America.

The owners of such collections noted above were not satisfied merely to excite the admiration of botanists, or to provide them the means for research and comparative study, or to preserve that which could expand the domain of science. They propagated and multiplied what seemed of interest to them; they distributed without charge what they had

procured with so much trouble and expense. Consequently, the taste for exotic plants became more general, especially among the English. Philip Miller, who had collected and cultivated all those plants yet known, observed in the eighth edition of his *Gardener's Dictionary* (1768) that, in the thirty years gone by since the first edition (1731), the number of those plants had more than doubled. That increase continued in the garden founded at Kew about 1760, which, as we will see below, was the first to assemble a mass of species collected in newly explored countries.

Among the exotic plants sown in botanical gardens, numerous trees were to be found that, if very small during their first years, had become splendid and tall, which attracted the attention of all viewers, either because of their unique habit or because of their majesty. This was the probable cause of the revolutionary change in the art of gardening in England midway in the eighteenth century when gardens took on a new character of grandeur and variety.[3] Numerous lords meant to populate their parks with exotic shrubs and trees. One studied the art of blending them and of contrasting them. One saw shrubs that attracted no attention when alone or isolated, but produced picturesque effects if grouped in masses or combined with others. Hedge-rows of yew, box, and hornbeams, and paths of severely clipped trees, were abandoned. The tamarisk, so light and moving, was set against the arbor vitae, whose branches resembled the grooves in a rock. The weeping willow, the Russian olive, the Asian almond, in silvery color and in habit, contrasted with the Canadian white spruce whose pyramidal shape is always covered in a dark green. Along paths, one planted climbing vines that formed garlands or bowers; clusters of shrubby wisteria appeared hanging from the branches of maples. One planted shrubbery of diverse seasons, arranging trees in amphitheater form depending upon height, so that the tulip tree raised its superb head above the acacias, and the cedar of Lebanon extended its branches above the junipers. Walls were decorated with trumpet vine, passion flower, and blue clematis.

The taste for exotic trees passed from England to France, but their excessive price and the difficulty in procuring them would have delayed any acceptance for some time if a few men distinguished by their reputation and their wealth, plus their zeal for the public well-being, had not put their fame to the task of enriching their country. Henri-Louis Duhamel du Monceau [1700–1782] was the first to engage in the project, and he put into its execution an inconceivable pursuit and energy. From his friend, Admiral Roland-Michel Barrin, marquis de La Galissonnière, he received casks of tree and shrub seeds collected at random in North America, mainly Canada. He made trial plantings of them on a large scale on his properties at Denainvilliers, le Monceau, and Vrigny. They succeeded so well, and the species were so numerous, that botanists, coming to visit his nurseries, often found plants there unknown to them. See Duhamel du Monceau, *Traité des arbres et arbustes qui se cultivent en France en plein terre*, 2 vols. (1755).

The duc d'Ayen, later maréchal de Noailles, established a vast plantation of exotic trees at Saint-Germain-en-Laye. Several nut trees from America and the Japanese pagoda tree (*Sophora japonica* L.) flowered there for the first time in Europe. His park was open to all plant lovers. Accompanying Louis XV on a visit to the park, he encouraged the king to establish at Trianon, for the amusement of the royal family and for the progress of botanical science, that school of botany where Bernard de Jussieu arranged the plants in the order of natural families for the first time.

Chrétien-Guillaume Lamoignon de Malesherbes [1721–1794], illustrious magistrate, whose name remains cherished by friends of

the sciences and philosophy, recalling all the virtues, made natural history, especially botany, his great pleasure for the entirety of his life. It pleased him to be in the society of those who shared that taste, as he sought to widen botanical knowledge and make it useful. On his property at Malesherbes, he cultivated a great number of exotic trees and shrubs; and he was the first to make plantings of fruit trees on a large scale to obtain new varieties. While rendering tributes of gratitude and admiration to his memory, let us put aside any recollection of the calamity of which he was the victim. Let us not sully the tableau of the beauties of nature by a recital of the crimes that could lead to the destruction of principles and the overthrow of society. [Deleuze was lamenting the decapitation of Malesherbes during the Jacobin Terror in 1794 after his legal defense of Louis XVI.]

The men about whom I have just written maintained a continual association with a savant of the first rank, able to assist them with advice and to support their projects. I refer to the eminent royal physician, Louis-Guillaume Lemonnier [1717–1799], the one among all his contemporaries to whom ornamental botany owed its greatest obligations. The collection of plants he assembled over forty years had one advantage over those available in public botanic gardens. He was not constrained to demonstrate any plant order, only concerning himself with new species and those he believed to be useful. Consequently, he could give more care to their culture and their reproduction. Numerous flowering plants in our flowerbeds, and several of the trees that adorn our parks, are the result of his attention and research. Dedicated by profession to medicine, which he practiced with particular benevolence, botany was his only diversion.

Because of his reputation, he was summoned to the royal court. That position augmented his wealth, income used to acquire exotic plants and to pay the expenses of botanical voyagers. He cultivated the rarest species in his garden; all the work he could not do with his own hands was executed under his eyes and direction. He himself planted and harvested seeds, deriving happiness from distributing them to those on whose property he hoped to see them succeed. In a small area, he prepared grounds of a varying nature, managing sites suitable for plants from different climates. On a base of heath compost, numerous species of *Kalmia, Itea, Azalea,* and *Rhododendron* grew in a mass without any order, the superb *Lilium canadense* L. raising its flowered stems among them. Some hillocks covered with moss were irrigated by spurting water, which gently infiltrated, maintaining a constant freshness. There, pretty *Saxifraga, Mitella, Gentiana, Soldanella, Moehringia*, and other delightful plants reminded botanists of the moist turf in the Alps. In the shade of hemlocks, acacias, tulip trees, and magnolias, you saw small plants from Lapland, Siberia, and the Magellanic region; while a greenhouse exposed to the south housed the most valuable productions of the tropics. The enthusiasm that Lemonnier had for botany since his youth did not slacken in his old age. It became his consolation in the midst of the losses and afflictions that overwhelmed him during the storms of the Revolution. At the age of eighty-four, he enjoyed, as had L'Ecluse in the sixteenth century, the happiness of finding widespread the plants and trees he had introduced.

Among those who followed Lemonnier's example, one savant stands out whose recent loss has been keenly felt by lovers of agriculture and botany. Jacques-Martin Cels [1743–1806] understood to perfection the art of raising exotic plants. Propagating and caring for them occupied his entire leisure until the loss of his wealth [during the Revolution] drove him to convert his knowledge into a commercial enterprise. Numerous widely-known species

today were introduced by him. One can see in their description published by Etienne-Pierre Ventenat, *Description des plantes nouvelles et peu connues dans le Jardin de M. Cels* (1800–1802), how much they have contributed to the progress of science.[4]

We have neglected to speak about numerous less extensive gardens, whether in France or in the principal cities of Europe; but we cannot pass in silence those of Schoenbrun and Kew. The palace of Schoenbrun was barely under construction when the Emperor Franz I, in 1753, designated a portion of the garden for the culture of exotic plants. He wanted the establishment to be worthy of imperial magnificence, and to extend the domain of botany by collecting plants as yet unknown in Europe. Following the advice of Gerard, baron van Swieten, he brought in two celebrated florists, Adriaan Stekhoven from Leiden to supervise the construction of greenhouses; and Richard van der Schat from Delft, who brought along all the specimens he could collect from the gardens and nurseries of Holland. Thus, from the very first year, many interesting species were to be found in Schoenbrun; but that was only the first step toward the emperor's goal.

He arranged to send the famous botanist, Nicolaus-Joseph, baron van Jacquin [1724–1817], to the West Indies. Jacquin departed in 1754, accompanied by Van der Schat and two Italian zoologists, responsible for procuring animals for the menagerie and the museum. These voyagers visited Martinique, Grenada, St Vincent, St Eustatius, Jamaica, Cuba, Curaçao, among others. They made their first shipment of plants in 1755; and Van der Schat accompanied a second collection of trees and shrubs in 1756, nearly all in the best condition. The trees were between five and six feet tall, several having already produced fruit. They were removed with a ball of dirt; and the ball, packed in banana leaves, was tied up with cords from *Hibiscus tiliaceus* L. Balled in this manner, they weighed about one hundred pounds each. These plants, plus the water necessary to irrigate them, made up the greatest part of the cargo on the ship sent from Martinique to Livorno. From Livorno, the plants were carried by mules to Schoenbrun and put in the ground within the greenhouses prepared to receive them. A third and fourth shipment arrived in the same manner. The fifth and sixth shipments were sent from Curaçao via Amsterdam. Jacquin, finally, left from Havana, bringing the last collection to Schoenbrun in 1759.

During that period, additional shipments were received from other countries. Needless to say, in proportion to expenses made to procure plants, greenhouses and orangeries had to be built; and the size of the edifices reflected the size of the trees they wanted to fructify there. In fact, there are several greenhouses forty to fifty *toises* [78 m to 98 m] in length and thirty feet high. The trees are not in cases but in the ground, remaining in the same place winter and summer.

In 1780, an accident caused the loss of most of the plants in the large greenhouse. Van der Schat being ill during a very cold night, the deputy gardener forgot to fire up the stoves. Perceiving the error in the morning, he thought to remedy the damage by building a very hot fire. The sudden changes in temperature led to the death of numerous trees of substantial trunk size. To repair the loss, Emperor Joseph II organized naturalists to undertake a new expedition. Professor Matter was appointed leader of the expedition and given, as companions, the physician Stupiez, the gardeners Frans Boos and Bredemeyer, and a draftsman named Mol. They went first to Philadelphia, visiting in the United States from Rhode Island to Florida.

Bredemeyer returned with a collection from Carolina in 1784. Then, joined by another

gardener, Schucht, the two set out almost immediately to rejoin Dr. Matter, visiting numerous American islands and a portion of South America as far as the mouth of the Orinoco.

Boos, having spent eight months collecting in the Bahamian islands, returned to Schoenbrun in 1785. He was reassigned at once to go to the Ile-de-France (Mauritius) and the Ile-de-Bourbon (Reunion) along with the gardener Georg Schall. They made collections so immense that Boos could not find shipping for them to Europe. A temporary haven for them was found at the Cape of Good Hope where Boos left Schall in charge of the plants with instructions to send the plants home in smaller lots, along with a collection still being made on the Ile-de-France by a gardener name Céré. By 1791, no parts of the collection had yet been transshipped to Europe; and the plants, protected and growing in a nursery, were becoming increasingly difficult to transport.

At Schoenbrun, they were awaited with growing impatience, and Schall had become anxious to return home. Accordingly, Emperor Leopold II sent the gardener Bredemeyer and Van der Schat's son to the Ile-de-France. Upon arriving, they encountered the French Captain Nicolas Baudin [who had a deep interest in natural history]. He consented to put the Céré and the Schall collections on board the ship he commanded, and they were taken back to Trieste in 1792. As Leopold II died that year, Franz II had a greenhouse built, 235 feet in length, to accommodate only the plants from the Cape. See "Short account of the imperial botanic-garden at Schoenbrunn," *Annals of Botany*, London, no. 5, p. 382.

As the greenhouses of Schoenbrun are the most extensive to be built in Europe [as of 1807], trees from the tropics develop their branches there without restraint, producing flowers and fruits. The most rare palm trees, *Cocos nucifera* L., *Caryota urens* L., and *Elaeis guinensis* Jacq., grow vigorously. *Corypha umbraculifera* L. extends its large leaves to twelve feet around. Birds from Africa and America flit about amidst trees from their own countries. See Robert Townson, *Voyage en Hongrie*, 2 vols. (1797), 1: chap. 1.

But it was not enough to have assembled so many exotic plants, or to get them to grow as in their native soil; it did not even suffice to distribute their seeds and young offshoots. To make that collection useful for the progress of botany, it had to be made known by giving the description and the figure of all the plants that could be seen flowering for the first time far from their native countries, whether they were new, or whether they had been included in *Species plantarum* (1753), in other herbaria, or mentioned by travelers. Jacquin undertook that enterprise by publishing three large works: N. J. van Jacquin, *Icones plantarum rariorum*, 3 vols. (1781–1793); *Plantarum rariorum horti caesarei schoenbrunnensis*, 4 vols. (1797–1804); and *Fragmenta botanica* (1800–1809).

Let us now turn to the garden in Kew, whose character is very different from that of Schoenbrun, even richer in species and more dedicated especially to botanical progress. Frederick Louis, Prince of Wales, son of George II, was an enlightened protector of the sciences. In 1721, he acquired the house of Samuel Molineux, secretary to George II, at Kew along the Thames, seven miles from London, meaning to make an elegant palace of it with an adjoining garden of exotic plants. The establishment, he did not live to carry through, was completed between 1757 and 1762, by Augusta, Princess Dowager of Wales, who chose Kew as her residence.

Sir William Chambers [1726–1796], architect to the king, accepted the responsibility for the constructions of the buildings, publishing their description and plans in 1763. The garden for exotic plants, he noted,

had not been undertaken until 1760 and had not yet been completed. But given the wealth of knowledge possessed by the one given its direction, and after the care taken to assemble plants from all parts of the globe, Chambers was confident that, in a few years, the garden would hold the richest collection of plants to be found in Europe. He had already built an orangerie 140 feet long, 20 feet wide, and 20 feet high, as well as several greenhouses to accommodate such plants. See Sir William Chambers, *Plans, Elevations, Sections and Perspective Views of the Gardens and Buildings at Kew in Surrey* (1763).

The savant mentioned by Chambers was no doubt John Stuart, Earl of Bute [1713–1792], who had been the governor of George III, later his [controversial] prime minister. But Lord Bute, in fact, was very learned in botany and devoted to that science; and he directed everything related to the garden. [He was the author of *Botanical Tables containing the Different Families of British Plants*, 9 vols. (1785), a luxurious edition he limited to twelve copies. See Jonas Dryander, *Catalogus Bibliothecae historico naturalis Josephi Banks, Baronetti*, 5 vols. (1796–1800), 3: 139. Bute also covered the publication expenses of the massive work by John Hill [1716–1775], *The Vegetable System*, 24 vols. (1761–1775), with its fine plates. Bute was honored with two new genera: *Stewartia* L. in Theaceae, and *Butea* Roxb. ex Willd. in Leguminosae.] An early catalogue of the garden, John Hill, *Hortus kewensis* (1768), presented a great number of species, some previously unknown in Europe. George III supported Lord Bute's interests and granted Kew Garden his personal protection, making it a private royal garden. He sent Francis Masson to South Africa, and from there to the Azores, to Jamaica, and into North America to collect seeds. Those travelers who accompanied Captain James Cook (Sir Joseph Banks [1743–1820], Daniel Carl Solander [1736–1782], and Reinhold Forster) all brought their new plants back to Kew. The British establishment in Australia [dating from Captain Cook's visit in 1770 to an inlet Joseph Banks called Botany Bay] meant that everything British botanists would subsequently collect on that continent would be initially sent to Kew.

William Aiton [1731–1793], named superintendent of the garden in 1772, directed the cultures with as much zeal as intelligence; and he undertook a steady correspondence with foreign botanists. To do him justice, it must be said that he never wanted to reserve for himself what it was possible for him to share. In the catalogue published in 1789, William Aiton, *Hortus kewensis* (1789), featuring a collection more numerous than anything then known except for Paris (about 5,700 species not counting varieties), he indicated what period exotic plants had been introduced to England, and from whom he had received them. André Thouin is often cited. One must also note that William Aiton procured for the Jardin du roi in Paris plants that we would not have had from elsewhere. Aiton was assisted in his work by Jonas Dryander [1748–1810] (Jonas Eichmann, called Dryander) and Robert Brown [1773–1805].

Aiton was succeeded as chief gardener at Kew by his son, William Townsend Aiton [1766–1849], in 1793 and adhered to his father's principles. Botanists who knew the talents and the precision of the son vigorously urged him to provide a new edition of his father's flora to provide notice of plants acquired after 1789 and enriched by his own observations. See W. T. Aiton, *Hortus kewensis*, ed. 2 (1810–1813).

We shall conclude this notice on private botanical gardens by citing the garden of Paul-Gregorievich Demidov [1738–1821] in Moscow, the largest garden ever possessed by an individual. Demidov enjoyed great wealth from mining. He had an extensive knowledge of natural history, botany being

his dominant passion. Not satisfied to maintain correspondence within the civilized countries, he dispatched each year, during the fine season, two skillful gardeners into the vast wilderness of Asiatic Russia. The greenhouses he had built occupied more than two acres of land, as documented in his correspondence with André Thouin in Paris. The second edition of the catalogue of his collection contained 4,363 species or notable varieties, not counting 572 varieties of fruit trees, 600 varieties of flowers such as tulips, hyacinths, bear's ear, etc., plus 2,000 plant species that had not yet flowered. See Pierre-Simon Pallas [1741–1811], *Enumeratio plantarum quae in horti viri … Procopi à Demidof* (1781); P. G. Demidov, *Enumeratio … horto Demidof,* ed. 2 (1786).

We owe to Demidov the knowledge of certain special procedures to get the seeds of exotic plants to grow; and it was he who sent *Caragana arborescens* Lam., *Caragana pygmaea* (L.) DC, *Halimodendron halodendron (Pallas) Voss in Voss & Siebert,* some *Spiraea,* and numerous other fine plants from Siberia to Paris, which are now much prized for ornament and are available commercially.

A single example will illustrate the degree of importance Demidov put on enriching his garden. Being in Rome about 1773, he discovered an orange tree planted in open ground at an Augustinian convent. In form and beauty, it surpassed all he had seen. The monks did not want to be deprived of it, and he had to employ considerable money and much influence in order to overcome their resistance. Once he had obtained it, he had a large trench dug in order to remove the tree with a ball without damaging the roots. Having it thus encased, he had a wagon built for the express purpose of transporting it to Moscow. The incident was witnessed by the Portuguese naturalist, Jose Francisco Correa da Serra [1750–1823, who was later in France as a refugee from the court of the Inquisition].

Although the Jardin des Plantes in Paris today considerably surpasses all other public gardens in Europe, both in the number of plants and in the extent of its exchanges, our private botanic gardens to date do not have the same advantage. We are pleased to believe that France will soon have no reason to envy foreign countries in this respect. Even though the garden of the Malmaison was established only a few years ago [1798], the principles guiding its direction justify our confidence. The fine book by Etienne-Pierre Ventenat [1757–1808], *Jardin de la Malmaison*, 2 vols. (1803–1804), has made known the new plants that have already flowered there, and whose number is increasing day by day thanks to shipments from foreign courts and those from travelers.

This garden is distinct from all others, because its owner, the Empress Josephine [1763–1814], has intended to dedicate it principally to the acquisition and propagation of useful species. Following her orders, seeds received at Malmaison have been shared with the Muséum d'Histoire Naturelle, where they have now even surpassed plants of interest only to botanists in order to multiply in great numbers those which ought to be of more general usefulness. Already the nurseries there have produced numerous species of exotic trees, and cases of young seedlings have been given to departmental administrators, ordered to distribute them in places where they can succeed. Thus, the hope expressed by Pierre Belon in 1558, and since by all friends of agriculture and natural history, namely, to bring together on the soil of France all the exotic trees that can bear the winter of our climates, will be realized. [Josephine's garden at Malmaison was sold after her death in 1814 to cover the great debts she had acquired through rash spending, ending its contributions to botany.][5]

Part 4

On the progressive augmentation in the number of ornamental plants dating from the fourteenth century

In 1300, the Bolognese senator Pietro d'Crescenti, at the age of seventy, wrote a work on agriculture that he dedicated to Charles II, [the Angevin] king of Naples and Sicily. He divided the work into twelve books, treating ornamental gardens in the eighth book. He instructed on the method of establishing and ornamenting them, separating the gardens into three classes: Those for people of limited wealth; those for people of means; and those for princes and kings.

He required those in the latter group to include a menagerie of peaceful animals and to populate their gardens with birds whose song would provide a sweet melody beneath the branches of trees and vines. As in the gardens of the less fortunate, there must be turf, aromatic herbs, and flowers. The aromatic plants named by Crescenti were rue, sage, basal, marjoram, and mint; the flowers were the violet, lily, rose, iris, *and similar others*. In the course of the work, he mentioned various trees, but the orange and pomegranate were virtually the only trees designated as suitable for ornament. He omitted nothing that could embellish gardens meant for princes to go to occasionally for relaxation from their affairs. It is notable that he did not mention either stock or gillyflowers as being there, which the ancient Romans cultivated widely.

In his *Decameron* (1344–1350), Boccaccio described the gardens around Florence with that rich and poetic style that belonged to him alone. You find orange trees, rose trees, jasmines, and rush-leaved broom, with turfs enameled with flowers; but never any mention of flower-beds dedicated especially to their culture.

In 1536, [the Parisian physician] Charles Etienne published a treatise on gardens with the title *De re hortensi*. The work is remarkable for its arrangement of ideas, and for the elegance and clarity of the style. One part is given to ornamental plants. One can see that they are few in number, that double flowers are extremely rare; and in order to make divisions within, and borders around, flower beds, they hardly ever used any other plants than boxwood in that day.

The description of gardens in Germany, Switzerland, and Italy by the Swiss Conrad Gesner in 1560, published in Valerius Cordus, *Anotationes* (1561), presented a considerable augmentation in the number of species. One also finds some exotic plants, and numerous indigenous plants, indicated as suitable for putting in borders.

Subsequently, Rembert Dodoens brought out a work on ornamental plants with the title *Florum et coronariarum arborum historia* (1579), a catalogue of all the plants cultivated in the gardens of Antwerp with their descriptions and figures. He added plants whose flowers struck him as remarkable although not yet cultivated. There were many more ornamental plants here than in Charles Etienne or Conrad Gesner, including several newly arrived from overseas such as the sunflower and the capuchin [probably *Tropaeolum majus* L., the garden nasturtium.] The number was still quite small in comparison to what the gardens of Eichstadt (1613) and Jean Robin (Paris, 1601) offered. Thus, only at the end of the sixteenth century, and through the influence of the botanical gardens, had the culture of flowers made progress. Even so, in the time of the Dutch florist, Emanuel Sweert, *Florilegium* (1612), neither double hyacinths nor double bachelor's buttons, nor most of the flowers common by the nineteenth century, were yet known. Only in the seventeenth century were they gradually introduced, and gardener-florists multiplied their varieties, making a commercial venture of them.

In the eighteenth century, finally, the number of ornamental plants increased tenfold. No longer limited to plants cultivated in pots or in flatbeds, one could look for plants for ornamental borders and exotic shrubs, which, thanks to their elegance, could offer a varied decoration through different seasons. Pleasing the senses by their beauty or by their odor, they called to mind the countries of their origin. The flower-sellers were no longer limited to selling innumerable varieties of hyacinths, tulips, carnations, and buttercups. Some of them welcomed and acclimated many kinds of exotic plants, an example being the firm of Kenardy and Lee in England, which accumulated a magnificent collection of this sort in London. In Paris, you cannot see without admiration the new plants acquired by the florists that appear each year successively on the Pont des Arts and the Quai des Fleurs. Nearly all had been cultivated the previous year in the garden of the Muséum.

In the past several years, the culture of plants and exotic trees has immensely expanded in France. The principal cause came from the governmental decision to attach a botanic garden to every Ecole centrale [the Napoleonic secondary schools opened in 1799, five in Paris and one in each department]. The Muséum sent a collection of plants to each one, taking care to select the most interesting, the least known, and those that promised the best chances of success in the places of their destination. Such acquisitions awakened curiosity. When the Ecoles centrales were suppressed [in 1802] and the gardens given to their respective towns, some of them were preserved and substantially enriched; others were converted into national nurseries; and if still others were abandoned, private individuals usually wrangled among themselves for the advantage of removing interesting plants and young trees to their own properties, from which they distributed seeds and cuttings.

Only one example is cited here, the garden in Ghent in the French department of the Scheldt (Flanders), founded in 1799. After the city took charge of it, 6,000 francs were provided annually for its maintenance. A large orangerie and two greenhouses were built, and plants were purchased in England and Germany. That garden today [1807] contains more than 3,000 species, and it has stimulated a taste for botany and the cultivation of exotic trees in its region.

As the taste for plants increased in France by the degree that they were revealed, plant lovers sought to obtain additional novelties and have even propagated them. Soon a great number of interesting species have been cultivated in regions where, only a short time ago, their existence was unknown. This disposition was felt in Paris. Florists and nurserymen, receiving increasing orders from those in the departments, redoubled their activities by augmenting their cultures and displaying their objects of value to the public eye to draw attention. In the fine season, one sees that the boulevards and numerous streets are decorated with boxes and pots full of plants and shrubs, not just on the Quai aux Fleurs, some of which were unknown ten years ago or only found in the gardens of amateurs.

A new circumstance favored the introduction of this increasing number of exotic plants, namely, the establishment of gardens outside of Europe that served as a depository for plants collected by travelers in neighboring countries. The benefit was immense, as certain seeds must be sown shortly after their maturity. If others may pass that limit without losing their faculty to germinate, there are numerous plants of which we would be deprived if they had not been raised in that depository country in order to be transported later to Europe as young shoots taken from a nursery at the time of ships' departures.

The garden of the Dutch East India Company at Cape Town, for instance, provided the greatest of services in the eighteenth century. The enthusiasm with which travelers spoke of it is well known as are the many plants it passed on to Holland. In recent years, that garden has been quite neglected, but compensation has been provided by numerous gardens that did not exist earlier. The principal ones:

The garden of Tenerife, Canary Islands, founded by the present king of Spain, Carlos IV, for naturalizing plants from the tropics; the garden of the Bengal Asiatic Society in Calcutta [1784], where Sir William Jones [1746–1794] raised and described the best known plants of India, see William Roxburgh [1759–1815], *Hortus bengalensis* (1814); the garden of Jamaica, directed by a Dr. Clarke, see T. Dancer, *Catalogue of the Botanical Garden* (1792); the garden of Cayenne, founded by Etienne-François de Turgot [1721–1789], later directed by Joseph Martin, and dedicated primarily to naturalizing spice-producing trees; finally, the gardens André Michaux had planted by gardeners in New Jersey and Charleston, which furnished us so many trees from North America.

The same resources are still offered us by newly established gardens in America meant to facilitate instruction, such as that in Mexico directed by Professor Cervantes; the garden planted by Dr. D. Hosack [1769–1835] in 1804 at Elgin, New York, where he gave lessons [as well as at Columbia College] and whose catalogue he has just published, see D. Hosack, *Hortus elginensis* (1806); and finally the garden of Charleston established in 1805 by an act of the South Carolina legislature, and whose expenses have been raised by subscription.

Botanical gardens are a source of wealth not only for the country in which they exist, but for all nations. Their mutual exchanges allow the passage into each of them what is found in the others, disseminating interesting varieties produced by chance or through culture. If the sovereigns multiply the number of them on various points of the globe, if they extend an enlightened protection to them, if they confide their direction to savants zealous for the public well-being, if they favor communications and voyages; these establishments will succeed in naturalizing all the useful plants in all the civilized countries, whose culture differences in climate will present no invincible obstacle.

Notes

1. In a report read to the Institute during the Year 13.
2. The garden was replanted to reflect Tournefortian classification (Williams 2001, p. 78).
3. This is a notable refutation of the conventional attribution of the English garden to Chinese influence.
4. In the details provided by Deleuze about Malesherbes, Lemonnier, and Cels, the reader should recognize that they were contemporaries of Deleuze whom he would have met at the Muséum. The gardens of both Lemonnier and Cels were just outside Paris, and he must have seen them.
5. It is curious that Deleuze, when describing the great plantations of Duhamel, Malesherbes, and Lemonnier, failed to mention the popular vandalism of such properties owned by the wealthy during the French Revolution. He also omitted the well-known fact that Napoleon was vigorously opposed to Josephine's excessive spending beyond her income for plants but repeatedly gave her advances because of his great affection for her. It may be that these omissions reflected extreme sensitivity to possible political retaliation after the threats experienced during the Jacobin domination or the deference of servants to their actual or future masters.

References

Blunt, W. 1971. The Compleat Naturalist, a Life of Linnaeus. London: William Collins.

Cap, P. A. 1854. Le Muséum d'histoire naturelle. 2 vols. in 1. Paris: L. Curmer.

Chaix, D. 1785. Plantae Vapincenses, sive enumeratio plantarum in agro Vapincensi a valle Valgaudemar adamniculum le Buech propè Segesteronum spontè nascentium, aut oeconomicè securum. In: D.

Villars. 1786. Histoire des plantes de Dauphiné. Grenoble: Chez l'auteur.
Davy de Virville, Ad. 1954. Histoire de la botanique en France. Paris: Société d'Edition d'Enseignement Supérieur.
Deleuze, J.-P.-F. 1804. Notice historique sur André Michaux. Ann. Mus. Natl. Hist. Nat. 3: 191–227.
Deleuze, J.-P.-F. 1807. De l'établissement des principaux jardins de botanique. Ann. Mus. Natl. Hist. Nat. 9: 149–205.
Deleuze, J.-P.-F. 1823. Histoire et description du Muséum Royal d'histoire naturelle. 2 vols. Paris: A. Royer.
Hamy, J. T. E. 1893. Les Derniers jours du Jardin du Roi et la foundation du Muséum d'histoire naturelle. Paris: Imprimerie Nationale.
Jackson, B. D. 1881. Guide to the Literature of Botany, being a Classified Selection of Botanical Works. London: Longmans, Green.
Le Tourneur, St. 1962. Deleuze, Joseph-Philippe-François, 1753–1835. In: J. Balteou, M. Barroux and M. Prévost. 1933–1993. Dictionnaire de Biographie Française. Paris: Letouzey et Ané. Vol. 10. P. 817.
Letouzey, Y. 1989. Le Jardin des plantes à la Croisée des Chemins avec André Thouin. Paris: Editions du Muséum.
Morton, A. G. 1981. History of Botanical Science. London and New York: Academic Press.
Spary, E. C. 2000. Utopia's Garden: French Natural History from the Old Regime to Revolution. Chicago: University of Chicago Press.
Williams, R. L. 1997. The Letters of Dominique Chaix, Botanist-Curé. Dordrecht: Kluwer Academic Publishers.
Williams, R. L. 2001. Botanophilia in Eighteenth-Century France: The Spirit of the Enlightenment. Dordrecht: Kluwer Academic Publishers.