Sixteenth-century university gardens in a medical and botanical context

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SIXTEENTH-CENTURY UNIVERSITY GARDENS IN A MEDICAL AND BOTANICAL CONTEXT

Introduction

In the middle of the sixteenth century, a young physician from the south of Germany undertook a long journey in order to improve his professional knowledge. During this medical peregrination that lasted some seven years (1548-1555), Lorenz Gryll (also Laurentius Gryllus, 1524?-1560) visited nearly the whole of Western Europe. His trip was funded by the extremely wealthy Fugger family, and one of its explicit purposes was that Gryll – after his return to Germany – would help improve the standards of medicine and medical teaching in his native region by introducing what he had learned in the core zones of medical innovation in Europe, that is Italy and France.[1] Gryll's journey, which we can follow thanks to his own account, triggers the main themes in this contribution about university gardens, medicine and botany in the 16th century: how medicinal were these university gardens, and in which contexts can we study their functions and uses?[2]

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[1] Gryll was from Landshut in Bavaria. He studied in Ingolstadt, Tubingen (with the famous botanist Leonhard Fuchs) and Vienna. See Gryllus 1566, which was published in that year, but finished in 1556. About Gryll, his journey and writings, see Cunningham 2010; cfr. Haye 2019.

[2] The best works on Italian collecting and natural history are Findlen 1994 and Olmi 1992 with crucial discussions of fieldwork, sites of knowledge, and public/private aspects of naturalia collections. One of the most inspiring publications on 16th and 17th century botanical university gardens is Tongiorgi Tomasi 2005. These works will not be continually referred to below, but have informed the whole of this article. See further, on gardens and knowledge, the excellent Fischer et al. 2016. For references to specific gardens and themes, see the notes below.

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Medical peregrination and the Padua hortus

Gryll started by crossing the Alps, slowly. He explored the local flora on the way and spent the first years of his *peregrinatio* in northern Italy: after a stay of about two years in Venice and especially Padua with its famous medical school, he travelled on to Ferrara, Bologna, Florence, and Rome. For the latter city he especially mentions the Dutch physician Gisbert Horst(ius) who worked in the hospital of Santa Maria della Consolazione next to the Forum. Gryll went further south to Naples, which he praised for its expert pharmacists. From there he turned back north to Pisa, traveling via Genoa, Marseilles and Lyon to Montpellier, where he lived and studied for some time (c. 1550-51) in the house of the eminent physician-naturalist Guillaume Rondelet (1507-1566), who was engaged in writing his great work on fish that would appear in 1554.[3] Gryll continued his *tour de France* northwest-wards, and spent a long time in Paris, where he met many French and German physicians. From Paris, Gryll continued to the Low Countries. Travelling for a number of months between Bruges, Ghent, Amsterdam, Louvain and Brussels (where he met Andreas Vesalius), he then proceeded to the northern, central and eastern zones of Germany and adjacent Central European territories, before ending his journey in the Fugger-funded pox-hospital in Salzburg. Gryll died young, only about four years after returning from this journey.[4]

Gryll's account touches upon several interesting characteristics of medical training at the time. Many of these have been discussed by Cunningham, such as the strong emphasis on autopsy, direct and personal experience, the importance of learning medical *praxis* by seeing and participating and not merely reading books, and the need to observe and accompany the best physicians-teachers in Europe at work.[5] Here I want to draw attention to the importance of plants in the itinerary of Gryll. First of all – and even though his account does not go into great detail about any of his activities – he repeatedly points out that he paid much attention to the observation and identification of the plants that

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[3] Rondelet 1554.

[4] See Gryllus 1566, and Cunningham 2010.

[5] Cunningham 2010. On observation and learning from practice in connection with early modern medicine and botany, see French 1985; De Angelis 2011; Stolberg 2013; and Egmond 2017. On Italian medical botany, see Palmer 1985a.

he encountered, whether during his travels in mountainous zones or while living for longer periods in a university town and exploring its environs and the countryside of that region.[6] During his *peregrinatio* Gryll showed a great interest, furthermore, in both indigenous and rare or exotic plants in the gardens that he found *en route*. He also closely studied the dried plants and plant substances (aromata, spices, gums, resins, et cetera) that arrived from far away, especially in the great ports of Venice, Naples and Antwerp, and the pharmacist's shops in these cities. Gryll's interest in plants was so strong, in fact, that he began to write his own commentaries on Dioscorides – as did several contemporary physician-naturalists, such as Pietro Andrea Mattioli (1501-1577) and Andrés Laguna (1510-1559).[7] Gryll's study of plants was by no means exceptional: all physicians at the time regarded the knowledge of medicinal plants (*materia medica*) as a 'core business' of their profession, since the vast majority of all medicines consisted of plant-based substances. To learn about plants, to be able to recognize and collect them, both fresh and dried, was in fact one of the main goals of Gryll's *peregrinatio*.[8] He called that expertise *doctrina & cognitio medicamentorum simplicium*.[9]

Looking at Gryll's account from the perspective of sites of knowledge, some further interesting aspects emerge that deserved to be inspected together and put into a somewhat wider context. These are the functions of university botanical gardens; the close links between those university gardens and the sites of (public) anatomical dissections; and the practice of botanical fieldwork. Gryll's account is all the more relevant since it covers the period 1548-55, while his stay in Italy must have been limited to the years 1548-50/51. Those are very early years in the history of botanical university gardens, as is immediately evident from a short list of the approximate founding years of the earliest European ones: Pisa 1543-44 (with two relocations/re-foundations still in the 16th century, in 1563 and the early 1590s); Padua 1545; Florence 1545; Valencia 1567; Bologna 1568; Jena 1586; Leiden 1593-94; Heidelberg 1593; Montpellier

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[6] For the environs of Padua and the area between Rome and Naples, see Gryllus 1566, f. 4: folio numbers given in these notes refer to the folio numbering of Gryll's *Oratio*, which is part of this volume.

[7] Cunningham 2010, p. 15.

[8] Gryllus 1566, f. 15.

[9] Ivi, f. 12.

1593/1598.[10] Gryll travelled through Italy, therefore, at a time when the Padua, Pisa, and Florence gardens were very new and their collections of living plants and other naturalia in an early phase of development. Elsewhere in Europe, there were no university gardens yet during his journey.

Gryll mentions all three Italian university gardens that existed in his day. The first and foremost of these – in terms of international reputation – was the Padua hortus. The Venetian patrician, church official, humanist and collector but also expert on architecture, optics and mathematics Daniele Barbaro (1514-1570) had been one of the key figures in its foundation. At exactly the same moment in time, Padua was also known as the university where the most advanced medical-anatomical knowledge and practices were taught. In 1537, nine years before Gryll, Andreas Vesalius from Brussels had arrived in Padua, where he very soon became chair of the university's department for anatomy and surgery. He remained in this position until the early 1540s, and his famous *De Humani Corporis Fabrica Libri Septem* was published in 1543. As is well-known, precisely this combination of high-quality anatomical instruction and botanical facilities made Padua extremely attractive to northern students on their medical peregrination. In 1548-49/50 Gryll regularly attended both private and public dissections in Padua – not, of course, in its famous anatomical theatre, since that was only constructed half a century later (1594-95). Nor did Gryll neglect, as he put it, to avail himself of the extremely convenient opportunity that Padua offered to learn about plants, by visiting its hortus.[11]

Gryll writes that he went to the Padua garden because it gave him pleasure *and* because it was useful for his study of the great variety of plant species and shapes, which he could observe, examine and note down in writing; he also mentions plucking plants in the hortus, to keep

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[10] Founding years are not always unequivocal, and depend on what moment is selected – the start of debate to create a garden; official decisions by university bodies; founding charters or statutes; the beginning of the lay out and planting; the opening of the actual garden – and naturally on available documentation. For details about the founding and relocations of the Pisa hortus, see Tongiorgi Tomasi 2005, pp. 98-100. The earliest university chairs for the teaching of medicinal botany were Italian too: Rome, 1513/14 in the form of a separate lectureship, and 1539, in that of a chair; Padua, 1533; Bologna, 1534.

[11] Gryllus 1566, f. 4. On the early history of the Padua hortus see esp. Azzi Visentini 1984; Minelli 1995.

– presumably in a personal herbarium with dried plants. The 1530s-40s are, in fact, the earliest years for which herbariums are documented that present large collections of systematically arranged and annotated dried plants.[12] The aims of the Venetian Senate in authorizing the creation of the garden had been somewhat different. Again in Gryll's words, the Senate wished to found a garden worthy of the great wealth and magnificence of Venice; it should host herbs, fruits, and foreign trees unknown to the common public that had been brought from all those parts of the world to which the explorations and investigations of the Venetians extended.[13] Put differently, the Venetian authorities saw the Padua hortus as a status symbol that could showcase the worldwide reach and magnificence of their city. Though the motivation was completely different, their goal overlapped to a considerable extent with the encyclopaedic aims of many naturalists at the time, who wanted to collect, document, and identify the huge variety of living nature.[14] The Padovan professors of medicine, who had campaigned at least from the mid 1530s for the creation of a university hortus, in their turn wanted a garden with living herbs to facilitate the teaching of medicinal botany to medical students and young physicians. Besides living plants, the hortus collection should, moreover, contain a "*speziaria*" with samples of dried medicinal plants and substances. These could serve as both teaching material and reference items against which to compare the many fake, mixed and substandard drugs that circulated in Venice – at the time the largest market city in Europe for drugs from the Middle and Far East.[15] The new hortus thus was intended from the start to serve many different purposes at once. Synergy would perhaps be the closest modern term to describe their connections and overlaps.

That multi-functionality does not appear to have changed in the following decades. In their analysis of botanical teaching in the 16th scentury Padua hortus during the 1560s-80s, Cappelletti and Ubrizsy have shown that medical students followed a theoretical course on medicinal

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[12] Gryll does not mention a herbarium, but it is hard to imagine how else he would have kept these plants. For a recent survey of early European herbariums, see Thijsse 2016. The practice of plant drying is much older.

[13] Gryllus 1566, f. 4.

[14] Some of the most famous 16th-century naturalists with encyclopaedic aims are Gessner, Clusius and Aldrovandi. On early botany see esp. Ogilvie 2006.

[15] See Azzi Visentini 1984, here esp. p. 25.

plants as well as an *ostensio simplicium*, which consisted of showing the actual plants to the students in the botanical garden. Apparently, the booklets with a ground-plan of the four segments of the Padua garden and with blank pages in which each student could fill in the names of the plants per compartment came into use only after the prefecture of Melchiorre Guilandino (Melchior Wieland, c. 1520-1589), and thus some two decades after the garden's creation. In the 1550s-70s, along the lines devised by the Venetian Senate, the Padua hortus also continued to function as a repository for newly discovered plants from both Europe and other continents. According to the plant names written on Giovanni Vincenzo Pinelli's map of the Padua hortus, which dates from the years c. 1565-71, the garden had a tomato plant, tobacco and sunflower (from the New World), a lilac (from Turkey), and various other exotica.[16]

Anatomy and botany: Evidence of the senses

Was the early multi-functionality of the Padua hortus unusual, and can information about the plant collections and development of other university gardens provide new insights? A look at Leiden and Montpellier shows some interesting parallels with the Padua story, first of all in the proximity of two only apparently very different branches of medicine: anatomy and botany.

Gryll mentions his attendance at dissections and his visits to the Padua botanical garden in one and the same passage. He once more links the study of naturalia (plants and aquatic creatures) and his presence at anatomical dissections in the account of his stay in Montpellier. As mentioned above, Gryll lived there (c. 1550-51) for some time in the house of Guillaume Rondelet, naturalist, fish specialist, physician and anatomist, and teacher of many of the most famous naturalists of the later 16th century, such as Mattias de Lobel (1538-1616), Jacques Dalechamps (1513-1588), Carolus Clusius (1526-1609), Felix Platter (1536-1614), and Jean Bauhin (1541-1612).[17] In fact, not long after Gryll left Montpellier, he corresponded from Paris about Mediterranean fish and fish descriptions with Clusius, who at that time was himself a stu-

[16] Cappelletti & Ubrizsy 2012, pp. 76-78.

[17] Gryllus 1566, f. 6.

dent-lodger in Rondelet's house in Montpellier. The two young men may even have met there, and some fifteen years later (1564) Clusius acted as paid tutor to one of the young Fuggers during the first part of his long journey *cum* fieldtrip through Spain and Portugal.[18] At the time of Gryll's and Clusius's studies in Montpellier, Rondelet was famous for taking his students on field expeditions into the hilly and wooded environs and to the nearby Mediterranean coast. Montpellier also had a great anatomical tradition. Dissections of human and animal bodies – sometimes illegally obtained, as Felix Platter describes for 1554 – were a common practice.[19]

The close connection between anatomy and medicinal botany in 16th-century universities concerned not merely the sites where knowledge was produced and transmitted but also the professional staff and methodology. Professors of medical anatomy regularly doubled as botanical experts and teachers, and used both their private houses and university buildings for teaching and practical demonstrations. To name only three examples, late in the 16th century Felix Platter in Basel combined a great reputation as an anatomist and eye specialist with an equally great one as naturalist and collector of naturalia. In Montpellier, Pierre Richer de Belleval (c. 1564-1632) was appointed to the combined chair of anatomy *and* botany in 1593. He started creating the *hortus botanicus* there in the same year upon the request of the French King Henry IV, though it would take many years (c. 1593-1605) for the garden to become fully functional. In Leiden, a similar personal union could be found in the person of the physician Petrus Paauw (1564-1617), who in 1598 took over as prefect of its hortus from the by then old and ill founder of the garden, the same Clusius with whom Gryll had corresponded almost fifty years earlier. Paauw was already teaching medical botany in Leiden, which also included on-the-spot teaching about medicinal plants. He had studied medicine in Paris, Orléans, Rostock and Padua, used human and animal bodies for his dissections, studied the development of the foetus and was – perhaps not coincidentally like Platter – reputed to have a great knowledge of the eye and the human skeleton. Such personal unions did not only exist at the

[18] These two letters (in Latin) from Gryll in Paris to Clusius in Montpellier, dated 24-12-1551 and 21-08-1552, are in Leiden University Library. On Clusius and his European correspondents, see Egmond 2010.

[19] On Montpellier medicine, see esp. Reeds 1991; on Rondelet, Clusius, and fieldwork, see also Lewis 2007; Egmond 2018, p. 181; and for descriptions of body snatching and private dissections in Platter's diary, see Loetscher 1976.

professorial level. In Leiden, during the late 1590s-early 1600s, the same person who acted as gardener's help in the hortus during the warmer part of the year also assisted with the dissections and anatomical lessons in the colder months. In various European universities – for instance in Basel, Montpellier and Leiden – botanical excursions in the field and lessons in the university garden in the warmer months formed a temporal counterpart of the public anatomical dissections and further anatomy lessons that were of necessity held mainly in the cold season.[20]

At a methodological and sensorial level, botany and anatomy matched closely, moreover. Field research of plants usually involved uprooting plants, cutting open bulbs, taking apart fruits and flowers, and paying meticulous attention to the evidence of sight, taste, smell and touch. In 1600, two French physicians even cut in half the bulb of a precious crown imperial and put the two halves back together in the soil – purely, it seems, for the sake of scientific curiosity. It is likely that their professional background inspired them to experiment with plants in a way that is reminiscent of human and animal dissections.[21] Close inspection in a botanical garden made students focus on the surfaces, structure, colours, and detailed characteristics of plants that distinguished them from similar species. Field botany and the recognition and identification of wild plants in their specific ecological context posed even higher demands on sensorial experience and its correct evaluation. In both outdoors plant research and anatomical lessons there was a strong emphasis on personal experience and observation (autopsy), comparison and discussion of that experience in a group, note taking and often drawing, the combination of information based on reading with that based on sensorial experience, and to some extent on manual dexterity. The concept of botanical anatomy was certainly known at this time: a manuscript album of 1583 with nature prints of plants and comparative drawings of plant parts by the German physician Theophilus Kentmann (1552-1610) bears the title *Botanatomia*.[22]

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[20] See on the Leiden situation esp. Veendorp & Baas Becking 1938, p. 65; Tjon Sie Fat & de Jong Eds 1991; Egmond 2010, pp. 159-160; and Egmond 2016. On the complementary activities in winter and summer, see Paauw 1603, ff. 3-4.

[21] Letter from François de Saint-Vertunien (*c.* 1540-1607) to Clusius, 10-04-1601, Leiden University Library.

[22] Theophilus was a physician in Meissen and the son of naturalist-physician Johannes Kentmann, a friend of Conrad Gessner. Theophilus' manuscript has some 180 folios and together with his father's naturalia drawings forms the *Codex Kentmanus*, Herzogin Anna Amalia Bibliothek, Weimar, Fol. 323.

Fieldwork and the university gardens

As Cappelletti and Ubrizsy have pointed out, there is no proof that botanical fieldwork was used at the university of Padua *as a teaching practice* in the 1540s-50s. Yet, circumstantial evidence regarding other universities and contemporary practices makes it likely that Padua was no exception in this respect. Both Gryll's travel account and a wide range of information concerning the practices of medical students, physicians and naturalists – Italian and from other countries – points in the direction of a longstanding practice of botanical fieldwork that served a variety of different purposes.[23]

On the one hand, botanical fieldwork was of major importance to the collection acquisition of the botanical gardens newly created in the 16th century, whether these were privately owned or university-linked. Where else would rare European plants have come from? The naturalist Luigi Anguillara (*c.* 1512-*c.* 1570; original name Luigi Squalermo), for instance, was the first director of the Padua hortus in 1546-61. His fieldwork had begun much earlier, in 1539 at the very latest, and covered the whole of Italy, the south of France, as well as some of the Italian islands, Croatia, Albania, parts of northern Greece, Crete, and almost certainly also parts of Turkey, Syria and Tunisia. Late in the 16th century, Onorio Belli (1550-1604) donated many plants from Crete to the university gardens of Padua and Leiden as well as to various private botanical gardens in the environs of Verona. Belli lived on Crete from 1583 until *c.* 1600, first as a physician in the service of its Venetian governor-general and later as town physician of Chania. He had begun an ambitious project to investigate and chart as much of the Cretan flora as he could manage. During the second half of the sixteenth century professional and highly expert 'plant hunters' provided the exquisite botanical gardens founded by ruling noble families in Italy with rare plants from the wild. Giuseppe Casabona (*c.* 1535-1595; original name Joost Goedenhuyse), who came from the Netherlands, for instance, worked in the service of the Medici from the early 1570s and collected plants during fieldtrips in Tuscany, the foothills of the Alps, the area of Rome, the Apuan Alps, along the Ligurian coast, and on Corsica and Crete (1590-91). Shortly after Casab-

[23] Hodacs 2011, p. 192 rightly emphasizes with respect to Linnaeus and students how a modern separation of education and research can distort our understanding of a historical situation. This is, if possible, even more the case for the 16th century.

ona's return from Crete, he was appointed by the Medici to supervise the reconstruction of the Pisan hortus; in 1592 he became prefect of the new university garden.[24]

Fieldwork as a practice involving medicine students and teachers is particularly well documented for the second half of the 16th century. In Italy, Luca Ghini (1490-1556), teacher of a whole generation of Italian naturalists including Anguillara, Michele Merini, Andrea Cesalpino, and Ulisse Aldrovandi, undertook many botanical campaigns with his students and colleagues; the trip to the island of Elba and the ascent in 1554 of Monte Baldo on Lake Garda are best known. Extremely close in time to Gryll's stay in Padua was the Italian journey (1543-44) undertaken by the German naturalist Valerius Cordus (1515-1544) and his companions from north of the Alps. In the two years immediately preceding that journey, Cordus had already been a key figure in the introduction of botanical field work as a teaching method at the university of Wittenberg, where he studied and taught at the same time. While in Padua, Cordus supported those who were engaged in founding the hortus. In the spring of 1544 Cordus met up in Padua with several other young physicians and medicine students from north of the Alps. The group decided to travel further south and botanize along the way. They proceeded towards Rome via Livorno, Pisa, Lucca, Siena and Florence, collecting plants and studying fish along the coast. Cordus died shortly after arriving in Rome in September 1544.[25]

As the German example of Cordus and friends and the earlier mentioned activities of Rondelet and his Montpellier students show, fieldtrips were by no means limited to the Italian academic sphere in the years 1540-60. By the late 16th century fieldwork had become institutionalised in many parts of Europe and more clearly incorporated into the university curriculum. In 1590s Montpellier, for instance, the botanical garden's founder Pierre Richer de Belleval took groups of medical students of up to sixty participants botanizing in the countryside (Fig. 4.1).

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[24] For a more extensive discussion of 16th-century botanical fieldwork and these examples, see Egmond 2018, with further references.

[25] For fieldwork as a teaching practice, see especially Ogilvie 1996. The examples in this paragraph are discussed in more detail in Egmond 2018. On Cordus's Wittenberg activities, see Dannenfeldt 1972, and on his support of the Padua hortus plan, see Azzi Visentini 1984, p. 25; cf. Ongaro 1970.

The Montpellier hortus served as both a focal point in teaching and a repository for the wild plants that Richer de Belleval and his assistants and students found in the surrounding countryside. He was also engaged in a – it seems more or less systematic – botanical exploration of the Languedoc with his students. This was, of course, as much part of teaching practice as innovative research. Richer de Belleval's dedicatory preface to his description and plant list of the Montpellier hortus of 1598 shows that not only medicinal plants formed part of its collection, and that he also considered a future investigation of the flora of the Pyrenees. In another treatise he phrased the description of his research into the flora of the Languedoc in utilitarian-medical terms, arguing that the French vastly underestimated the riches in medicinal and otherwise useful plants of their own flora, and that the variety in plant species of the Languedoc was directly related to its ecological diversity, or as he called it "*différence de territoir*". However pragmatically phrased, he emphasizes not only the "*divines & rares vertus*" of the plants of the Languedoc, but also their beauty.[26]

In an approach that looks strikingly modern, Belleval recreated that same ecological diversity in the Montpellier hortus itself. In 1604 the French antiquary, astronomer and archaeologist Nicolas Fabri de Peiresc (1580-1637) described its lay out in great detail in a letter to his friend Clusius in Leiden; a coloured drawing accompanies his letter (Fig. 4.4).

The hortus comprised a wet and shaded zone with water plants, a protected section for very rare or sensitive plants in pots, and at least three zones with different aridity or humidity, soil types, and structuring that replicated the diverse habitats of plants transplanted from the wild: one, as Peiresc writes, marked by N in de drawing, for the plants "that grow in rough, rocky, sunny places or along the seashore"; another (marked with O) that is shaped like a mountain for "plants that grow on slopes, mountains, in thickets, and gravelly places"; and yet another section for "plants that are found in shaded woods, in humid places, or in marshes and wetlands".[27]

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[26] See Reeds (1991), esp. p. 89; and Belleval 1598; Idem 1605, pp. 2-5. The Montpellier and Leiden (see below) fieldtrips with groups of students show many similarities with those of almost 150 years later by Linnaeus and his students; see Hodacs 2010; Idem 2011.

[27] "Plantae quae in asperis, saxosis, apricis, et in ipso littore nascuntur […]. Plantae quae in clivis, montibus, frutetis, dumetis et sabulosis adolescunt […]. Plantae quae in umbrosus sylvis, udis, uliginosis et palustribus proveniunt"; letter (in French and Latin)

Close links existed in late 16th-century Leiden too between teaching medical students in the hortus, collecting rare plants in the field for the hortus collection, and field trips as teaching expeditions. In 1593, the university appointed the by then internationally renowned but elderly naturalist Carolus Clusius and the Dutch expert pharmacist Dirck Cluyt (1546-1598) to create its university garden. Clusius would be the prefect (director) of the Leiden hortus, while Cluyt would act as his second in command. Both had a vast knowledge of medicinal and non-medicinal, European and exotic plants. Both also had a long experience in creating gardens: in earlier decades Clusius had supervised the planning of an imperial court garden in Vienna and advised Wilhelm IV of Hesse-Kassel on the lay out and planting of his gardens. Together with some assistants Clusius and Cluyt laid out and planted the Leiden hortus in the spring and summer of 1594. It's simple rectangular shape, four squares, and straight beds suggest that practical horticultural reasons strongly influenced the layout, as was also the case – though resulting in a very different organization – in the contemporary new hortus of Montpellier.[28]

The pharmacist Dirck Cluyt was a botanical expert in his own right with a famous plant collection that comprised both medicinal herbs, exotica and European rarities. He had a personal international network of plant collectors and pharmacists, and Cluyt had worked very closely together with Pieter van Foreest (1521-1597), the most famous Dutch physician of the period, who in 1544 had been one of Valerius Cordus' companions during the latter's fatal journey from Padua to Rome.[29] During the earliest years of the Leiden hortus, Dirck Cluyt's son Outgert (Lat. Augerius Clutius; 1577-1636) regularly assisted his father in the *hortus* and instructed students there (Fig. 4.3).

He also took groups of Leiden medical students on herborizing trips in the dunes, peat bogs and woods of Holland. In spite of a request by

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from Peiresc in Aix-en-Provence to Clusius in Leiden, 27-02-1604, published in Tamizey de Larroque 1898, pp. 948-950. For a detailed discussion of the Montpellier garden's construction and organization, see Rath 1998, who does not mention the coloured drawing with the Peiresc letter reproduced here, probably because it was not published by Tamizey. Rath suggests that the Montpellier garden may well be the first (university) garden organized on a habitat basis; on 16th-century notions of plant ecology see Ubrizsy Savoia 1998.

[28] See Egmond 2010, esp. pp. 157-164; and Egmond 2016.

[29] Cluyt married the niece of Foreest's wife. Foreest was personal physician of Prince William of Orange, leader of the Dutch Revolt.

the medical students, Leiden's university board refused to appoint Outgert as his father's successor when Dirck Cluyt died young in 1598. According to the students, Cluyt Jr was the only person who understood the *register* of the Leiden hortus – which should warn us that such early university collections were not always systematically organized or administered. The young Cluyt also had good Latin and Greek (unlike his father) as well as great ability and expertise in drying plants and the preparation of medicines. The missed Leiden appointment of 1598 actually furthered the career of Outgert Cluyt, who was already a trained pharmacist by this time: he went on to study medicine in Montpellier, where he assisted Richer de Belleval with the development of the new university garden; he travelled and botanized in Spain and North-Africa, from where he sent back seeds and other plant material to the Leiden hortus; and he eventually returned to Holland (1607), where he became a highly respected physician and botanist.[30]

These are not the only traces of how plants and seeds collected during field expeditions of young Dutch physicians entered the collection of the Leiden hortus during the first fifteen or so years of its existence.[31] Further plant material arrived in Leiden, for example, via Clusius's correspondent Tobias Roels, a young physician from Zealand, whose medical peregrination had taken him across the Alps and to Padua in the years 1589-91. Just like Gryll half a century earlier, Roels familiarized himself with the plants in the Padua botanical garden. And just like Cordus, he undertook botanizing trips from Padua, for example to the Tyrolean Alps. One of his companions was his fellow student Joachim Jungermann (1561-1591), the nephew of Clusius's close friend Joachim II Camerarius, and the presumed artist of the famous *Camerarius Florilegium*. Jungermann died shortly afterwards on his way to Crete for a botanizing trip in Greece and the Levant with Giuseppe Casabona, the 'plant hunter' who worked for the Medici.[32]

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[30] During his travels, Cluyt Junior developed contacts with physicians and botanists in Padua and Montpellier, with the herborists of the Medici in Florence, and those of the French king, father and son Robin in Paris. See Egmond 2010, pp. 157-164.

[31] On the early years of the Leiden hortus and its living collection see esp. Veendorp & Baas Becking 1938; de Jong 1991; Van Uffelen 2008; Idem 2009; Idem 2012; Van Uffelen & Kessler 2015; Egmond 2010, pp. 157-164; Egmond 2016; and Grämiger 2016 who overestimates the role of Paauw, however, in the very first years of the hortus's creation (1593-94).

[32] See Egmond 2010, esp. pp. 141-155.

From the creation of the earliest Italian university gardens in the 1540s, multiple connections can thus be traced between these gardens as sites of knowledge and locations where medical students were taught about *materia medica*; fieldwork (whether as official teaching method or as an extra-universitary activity) as a formative experience in the professional identity of physicians, naturalists and most probably also pharmacists; and fieldwork as a means to create, maintain and expand the collections of the university gardens.[33] It is important, however, to emphasize that the outdoors study of living plants long predates the founding of university gardens. This does not merely apply to the probably age-old tradition of examining and collecting medicinal herbs in the wild by local medical practitioners and herb women. It also concerns the outdoors examination of living plants as an explicit teaching method, as Olariu has shown. In his analysis of the treatise *Aggregatio simplicium medicinarum* composed in 1453 by Mathaeus Bolderius (who taught medicine in both Bologna and Padua), Olariu demonstrates that botanical autopsy outdoors using all the senses was part of the teaching practice in Padua university already a century before its hortus was founded.[34]

Seen in this long-term perspective, it is likely therefore that the European university gardens founded from the early 1540s onwards were an institutional innovation of (and addition to) an autoptic practice already since long regarded as indispensable to the education of medical students. While plant observation had formerly required trips to private gardens and out into the field, the university gardens offered more convenient sites of knowledge in the vicinity of other university constructions. The university gardens were planned and organized. They offered a controlled experience – can we speak of a laboratory? – of the world of plants and kept the chaos of real, 'wild' nature outside.[35]

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[33] On the complex issue of the status, training and image of apothecaries, which were not identical throughout Europe, see (for Italy) e.g. Palmer 1985b and Di Gennaro Splendore 2017.

[34] The single exemplar of Bolderius's text survives via a manuscript by his student, the Nuremberg physician, humanist and cartographer Hartmann Schedel (1440-1514); see Olariu 2019.

[35] See Fleischer 2016 on stabilizing botanical knowledge in 17th-century gardens in Northern Europe. I do not want to push the comparison with the laboratory as site of experimentation, precisely because these gardens had so many different functions and uses.

Public and private collections of living plants

Some further considerations serve to contextualize the roles and functions of the 16th-century university botanical gardens. First and foremost, these university gardens were by no means the only botanical collections of early-modern Europe; they were unquestionably not the earliest ones; and they were almost certainly not the richest ones either. Large numbers of *private* botanical gardens existed in mid 16th-century Europe, many of them founded by physicians and pharmacists. In 1561 Conrad Gessner published one of the few surveys of such gardens; it roughly covers the German-speaking world and some adjacent territories.[36] Since outdoors botanical inspections and trips of medical students long predated the founding of university gardens, we may assume that private gardens played some part in the learning process of these students. The following examples point clearly in this direction.[37]

Evidence from late 16th-century Padua and Leiden shows that university plant collections and private botanical gardens in these towns were not strictly separated.[38] Medicine students and young physicians could have access to both. One of the richest private gardens in Padua during the 1590s was the one created by Torquato Bembo (born 1525), son of Cardinal Pietro Bembo (1470-1547). In 1590-91, the Bembo garden hosted a number of exotic plants that belonged to Joachim Jungermann, the same young physician-naturalist who died in 1591 on his way to Crete.[39] In Leiden during the early 1590s – just before the opening of the university garden – the private gardens of professors such as Justus Lipsius and Pieter Paauw were used for teaching until the *hortus*

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[36] Gessner 1561, pp. 236-298. To my knowledge no modern surveys exists of private botanical gardens in or before the 16th century for any other part of Europe. But see Schmölz-Häberlein 2013, 2015. More generally on the theme of private-public and the history of naturalia collections, see Beretta 2005.

[37] Lauterbach 2016, who focuses on urban German gardens of the 16th to 18th centuries, places 'scientific botany' far more exclusively in university gardens and some court gardens than I do here; she does not discuss Italy, and sees the German urban gardens especially in terms of civic pride and 'corporate identity'.

[38] For the mid 16th century Maggioni 1970, p. 6 mentions several further private and convent gardens for Padua that contained rare and exotic plants. A large part of Azzi Visentini 1984 is devoted to the discussion of (private gardens as) sources and models for the Padua hortus. I am not going into the history of garden design here, however.

[39] Bussadori 1988, p. 52; and Olmi 2007, pp. 350-353.

botanicus was ready.[40] Of course, these private gardens did not disappear or close after the opening of the Leiden hortus, and in fact several further magnificent private gardens in and near Leiden are known to have co-existed with the university hortus in the 1590s-1610s. The best of those private gardens can be qualified as combined medicinal gardens and botanical research collections, and had been created in the last two decades of the 16th century by either pharmacists or patrician collectors who also were in personal contact with the Leiden hortus. Collection exchanges took place between all these gardens in the small town of Leiden, and we know of personal contacts and friendships between their owners.[41]

For the most famous private botanical gardens in Europe that flourished during the 1540s-60s – and thus co-existed with or even preceded the early university gardens – direct use by medical students still needs to be investigated. The relevance of two such gardens for plant-medicinal research is more than evident, however, since they were created by professional pharmacists who used their gardens not merely themselves, but also opened them to expert colleagues and young physicians-naturalists. The gardens of Georg Oellinger (1487-1557) in Nuremberg and Peeter van Coudenberghe (1517-1599) in Antwerp contained large numbers of living indigenous and exotic plants as well as dried (often exotic) plant substances. Both had many medicinal herbs, but neither was a purely medicinal garden. Oellinger, a wealthy pharmacist and local dignitary in Nuremberg, had started a private garden as early as the 1520s. He visually documented this plant collection in 1553 in a famous manuscript album of almost 650 pages with mainly plant drawings: *Magnarum Medicinae partium herbariae et zoographiae imagines*.[42] The young Valerius Cordus visited Oellinger's garden in the course of his 1542 journey-fieldtrip through Germany, probably together with his student-companions. Oellinger also seems to have been instrumental in Cordus's presentation of his *Dispensatorium* (the earliest German

[40] van Uffelen & Kessler 2015, p. 15.

[41] For a more detailed discussion, see Egmond 2010, pp. 157-173; and Egmond 2016.

[42] University Library Erlangen-Nuremberg, shelf mark H62/MS 2362 (the album can be consulted online at this library). See Ludwig 1998, pp. 18-23, who discusses the Oellinger herbarium in the context of Nuremberg plant and flower painting.

pharmacopoeia) to the Nuremberg council, who accepted it and published it (posthumously) in 1546.[43]

Coudenberghe first planted his Antwerp garden in 1548. Guicciardini praised it in his *Descrittione di tutti i paesi bassi* (1567) as incredibly rich in species, and Coudenberghe himself spoke of some 600 exotic plants alone. Some of the drawings of his plants and of dried (often exotic) plant material such as resins, nuts, spices and woods, formed the basis for illustrations in Clusius's work on exotic medicinal plants. The fame of Coudenberghe's garden was such that some of the most famous naturalists of this period came to see it; Gessner, Dodoens, Lobel and Clusius refer in their printed works to information and plants received from him. Coudenberghe was no modest apothecary trained in practice, but a wealthy member of the Brussels patriciate with impeccable Latin. Interestingly, he corrected new editions (1568, 1571, 1579) of Valerius Cordus's *Dispensatorium* – undoubtedly making use of his experience with medicinal plants in his Antwerp garden. The Coudenberghe garden was destroyed during its founder's lifetime, most likely in 1585 by the troops of Alessandro Farnese during the siege of Antwerp.[44]

Although most 16th-century university gardens were accessible to the public, while private gardens were generally only open to relatives and guests of the owners, the distinction between them was fluid in other respects. This is perhaps most evident when we look at their contents. Some of the university gardens actually grew out of the private collections of ruling aristocrats. The most famous examples are the university gardens of Pisa (founded 1543) and Florence (founded 1545) which evolved from private gardens of the ruling Medici family. The Medici gardens already had a great reputation, famous plant collections, and highly expert staff long before they became associated with the universities.[45] Nor did the functions of these gardens suddenly or drastically change with the transition from private to public: they were and remained places of research, curiosity, delight, entertainment, experiment,

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[43] See Cordus's list of plants that he first observed in 1542 and during this trip, with some direct references to plants seen in Oellinger's garden, Cordus 1561. On exotic plants in gardens of south-west Germany, see Schmölz-Häberlein 2019.

[44] I have used the 1581-edition of Guicciardini 1581, p. 11; and the 1579-Coudenberghe edition of Cordus. On Coudenberghe and his garden, see VandeWiele 1993; and Egmond 2010, pp. 17-22.

[45] See Acidini Luchinat 2000.

prestige, display, and magnificence. The active involvement of the Medici themselves also continued, both in an institutional sense and in terms of interest in the collection. In fact, Gryll places Cosimo I de' Medici (1519-1574) in his long list of rulers – starting, of course, in antiquity – who had great personal expertise concerning plants and their uses in agriculture, food, and medicine: "Cosimo de' Medici, the praise-worthiest ruler of Etruria [=Tuscany] whose two gardens in Pisa and Florence are both stocked with a variety of plants, knows the name and properties of all but a few".[46] And that was written *after* the Medici gardens had become university gardens.

While in Pisa and Florence the whole garden thus changed its status, in many other cases private plant collections were literally transplanted to or otherwise incorporated in newly created university gardens, where they contributed in crucial ways to the identity of these new collections. Anguillara, the first director of the Padua hortus (1546-61), moved back and forth between the 'public' and the 'private' sector. Both before and after his employment at the Padua hortus he worked in the private gardens of the highest aristocratic families in Italy: before 1546 in Bologna and Pisa; after 1561 in Ferrara.[47] Plants that he collected during extensive fieldwork entered these collections, and it is impossible to believe that some plants would not have moved with him. Rare plants from the famous private botanical garden in Venice of the patrician-naturalist Pietro Antonio Michiel (c. 1510-1576) must also have found their way into the Padua hortus while he acted as its supervisor and as advisor to its first prefect, Anguillara, in 1551-56.[48]

For the Leiden hortus some detailed evidence is available about the provenance of the plant material used in its creation by Clusius and Cluyt in 1593-94. Van Uffelen, who recreated the Clusius-garden in 2009 on its original location within the modern (and much larger) Leiden hortus, used plant lists from 1594-95 (*Index Stirpium*) for this purpose. There were medicinal plants such as mandrake and foxglove, herbs such

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[46] Gryllus 1566, ff. 13v-14r. For the continued institutional involvement of the Medici, see Tongiorgi Tomasi 2005, pp. 98-100; and for a special volume devoted to the Pisa garden and its history, see Garbari et al. 2002.

[47] Egmond 2018, p. 174.

[48] The exact dates of Michiel's garden are unknown, but he must have started collecting plants during or before the 1540s. From 1555 until his death Michiel had more than a thousand plants depicted in various albums. See Mason & Pardo Tomás 2020.

as rosemary and thyme, but also many decorative garden plants such as pinks and primulas,

> […] some European, many Mediterranean ones, and some of even more exotic origins, such as sugar cane and tomatoes. […] The garden had a large number of bulbous and tuberous plants, such as crocuses, hyacinths, anemones, and tulips. Most of the plants had no medicinal function; it was a hortus botanicus, with a collection for research, teaching, and pleasure, rather than a hortus medicus.[49]

Both Clusius and Cluyt transferred large numbers of plants from their personal gardens to the Leiden hortus. Clusius had transported plants, roots, bulbs and cuttings as well as a collection of seeds from Frankfurt. His own garden there had included plants that Clusius himself had collected during many journeys and field trips in Europe; bulbs received from Constantinople and the Levant; and rare plants from Southern Europe and France, in particular gifts from friends in Italy, Crete, and the Provence. Clusius' plant collection thus reflected the international research interests of European naturalists as well as the fashionable interests of aristocratic collectors. Cluyt's personal garden was both a pharmacists' garden of medicinal herbs and a botanical research garden; it had large numbers of rare plants as well as dried specimens. Leiden university accepted hundreds of rare plants from Cluyt to stock the hortus.[50] The third key figure in the creation of the Leiden hortus was the physician-anatomist Petrus Paauw (hortus director from 1598 until his death in 1617). It was he who initiated the construction of the *Ambulacrum* (1601): a long building that flanked one side of the garden and served as both conservatory to protect sensitive plants from the

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[49] Van Uffelen 2009, p. 21: Cluyt presented the *Index Stirpium* as a report of activities to the Board of Leiden University on 9 February 1595; cf. Van Uffelen & Kessler 2015. See also Egmond 2010; Idem 2016; and Grämiger 2016, who uses this same *Index Stirpium*, but focuses more on the order of planting. For the 1603 planting list of the Leiden hortus, see Paauw 1603.

[50] If Paludanus had become prefect of the *hortus*, part of his famous collections would have accompanied him to Leiden, as specified in the university's invitation of 1591. Between Cluyt and the university financial problems arose almost immediately after his appointment (and persisted until after his death) in connection with insufficient financial compensation by the university for Cluyt's valuable plant collection. Cluyt himself estimated its value at c. 1,500 guilders – a fortune. See for more details Egmond 2010, pp. 157-160.

winter cold and gallery for the display of rare *naturalia* and ethnographica. Many of those items – especially naturalia and ethnographica from the East Indies – came from Paauw's private collection.[51]

The Leiden *hortus* thus did not originate as a specifically medicinal garden, but as a research and experimental botanical garden with a considerable number of rare plants from various parts of Europe and the Levant as well as some living exotica from other continents. During the first phase of its existence (1593-1602) the private collections of Clusius, Cluyt and Paauw were no additional stocks, but the substantial core of its living collection in the garden and its curiosa in the *Ambulacrum*. The Leiden anatomical theatre too depended on the incorporation of several different private collections which had originated outside a university setting and had been shaped by fashions, passions and fascinations that overlapped but were not identical with academic purposes.[52] While all early plant collections of the sixteenth-century university gardens in Europe were used to teach medical students and young physicians about medicinal plants, those collections – thanks to their variegated origins – reflected the purposes and interests of private collectors (aristocrats, professional naturalists or apothecaries) as much as the training exigencies for medical students.

Finally, with respect to the contextualization of university gardens, it is interesting to note that the governing boards of 16th-century universities regularly operated like aristocratic patrons in their approach to and uses of these gardens and the anatomical theatres. Concepts of urban honour, glory, and magnificence were closely linked with the foundation of these structures, as we have already seen in the case of the Padua garden. Leiden's university too discussed the founding of the garden and anatomical theatre in terms of urban and indeed national prestige, and of competition with other universities.[53] While the Padua garden was supposed to show and symbolize the worldwide extension of Venice's mercantile contacts, the Leiden hortus too came to be used as a symbol of the rapidly expanding Dutch reach overseas and as a repository of

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[51] For some remarks about Paauw's collection in the *Ambulacrum*, see Paauw 1603.

[52] See Lunsingh Scheurleer 1975; and Rupp 1991.

[53] Leiden University itself was founded in 1575 on the personal initiative of Prince William of Orange, as symbol of the Dutch Republic's independence from Habsburg Spain, and therefore as a direct rival to the much older university of Louvain in the Southern Netherlands.

exotic naturalia within the first two decades of its existence. On the engraving of 1610 that represents the layout and planting of the Leiden hortus, the gallery which housed Paauw's exotica can be seen in the background (Fig. 4.4).

Some of its contents are depicted in the foreground, such as two 'crocodiles', the shells of an enormous sea-turtle, a blowfish, and the jawbone of a (polar) bear from *Nova Zembla* (Novaya Zemlya), which in 1596-97 had been the location of the dramatic overwintering of the Dutch navigator Willem Barentsz and his companions in the Arctic seas north of Russia. Depicted as growing in the garden itself, there are at least two recognizable exotic plants which form a symbolic counterpart to the dried exotic animals in the foreground: the bamboo close to the wall on the left, and the crown imperial (*fritillaria imperialis*) in a fenced-off section meant for special rarities in the left bottom corner of the image. The crown imperial had first appeared in Europe not long before 1600, and quickly became one of the most fashionable and prestigious plants; it was widely used as symbol of rarity and high status in decorative arts, flower still lifes, and of course alive in gardens.[54]

Plans to create a collection attached to the hortus also existed in late 16th-century Montpellier and Padua. On the drawing of Belleval's Montpellier hortus of 1604 (Fig. 4.2), the letter M marks "a large gallery that should be filled with animal skins, minerals and all other kinds of natural *singularités*".[55] For Padua a museum was planned as well. The publication of 1591 printed by Girolamo Porro from Venice, which also contains the earliest plan of the Padua hortus, describes various improvements to the garden (Fig. 4.5). These included a fountain and several statues as well as a series of rooms along the outer walls of the garden. Some of those would be used for various medicine-connected practices, such as distilling and smelting. Others would function as a museum, with one room for minerals, stones, and earths; one for all aquatic creatures; one for the animals living on land; and one for the birds. Together they would form a "beautiful and marvellous museum", and in this "small theatre, as if in a small world there

[54] On the 1610 engraving, which figures in nearly all publications about the Leiden hortus, see in particular Tjon Sie Fat & De Jong Eds 1991, pp. 3-12, 37-60.

[55] "L'M marque une grande galerie qui se doibt remplir de peaux d'animaulx, de mineraulx et de toutes les aultres singularites de nature"; letter (in French and Latin) from Peiresc in Aix-en-Provence to Clusius in Leiden, 27-02-1604, published in Tamizey de Larroque 1898, pp. 948-950.

will be the show of all the marvels of nature".[56] Living plants from all parts of the globe would thus be matched by a micro-world of nature indoors. Both showed the global dominance of its owners.

Conclusion

This excursion through some 16th-century university gardens shows that their collections were multifunctional from the very beginning, which strongly suggests that they should not be regarded in a disciplinary (either medical or botanical) way or even in a purely academic one. Gryll's example indicates that students of medicine themselves did not regard these gardens as merely sites of learning. And the ruling princes, urban governors, guilds of pharmacists, and university officials involved in their creation were interested in both the display of the magnificence of their institutions and the quality of medical-botanical teaching. The one enhanced the other. The important role of private plant collections as constitutive collections of the early university gardens, the permanent interaction in the course of the 16th century between university and private gardens in terms of staff and plant material, and the importance of physicians and pharmacists as creators of private botanical gardens in various European countries, all indicate how important it is not to separate the university gardens of the 16th century from the wider phenomenon of early modern plant collecting and plant-medicinal research. The very multifunctionality of the early university gardens also raises questions about their presumed development in the course of the 16th and early 17th centuries. The examples discussed here indicate that no single pattern applied to all – neither the path from mainly display and delight to science, nor that from teaching to research garden, nor the one from mainly utilitarian medicinal plant collection to botanical research garden and eventually to display garden. Their appeal to the senses remained as much about beauty as about science.

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[56] "Et in questo picciolo Theatro, quasi in un picciol mondo si farà spettacolo di tutte le meraviglie della Natura"; see Porro 1591, unpaginated, unsigned introductory statement; it seems to be still uncertain whether Porro is not only the printer but also the author of this work. There are various other examples of museums or *Wunderkammern* attached to late 16th-century university gardens. See Findlen 1991; and Tosi 2005, esp. pp. 54-55.

Fig. 4.1. Plant illustration (moly) from Pierre Richer de Belleval, *Dessein touchant la recherche des plantes du Pays de Languedoc*, Jean Gillet, Montpellier, 1605.

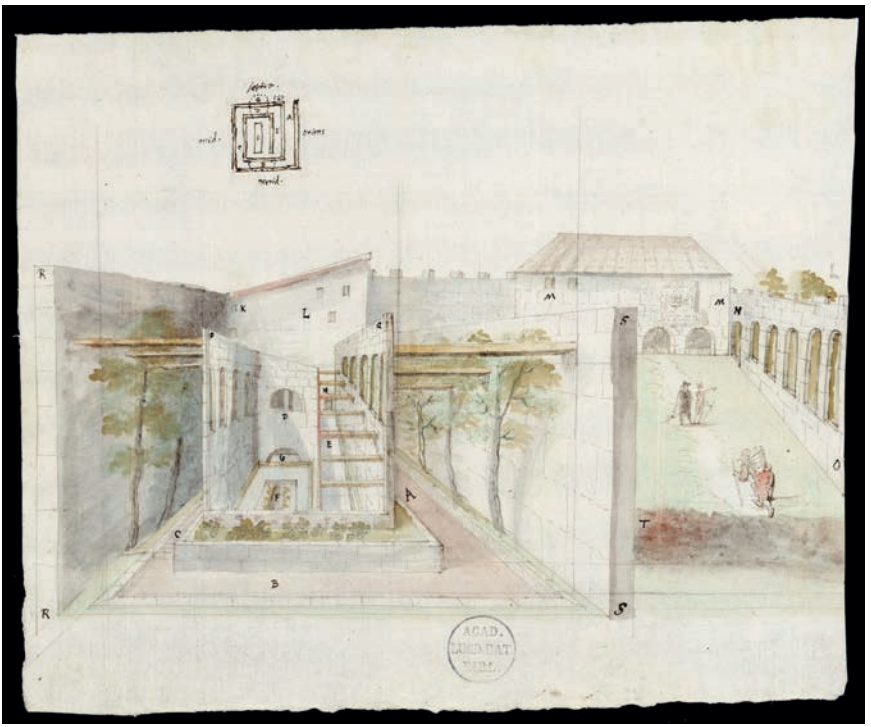


Fig. 4.2. Drawing of the Montpellier hortus by Nicolas Fabri de Peiresc, in a letter from Peiresc in Aix-en-Provence to Carolus Clusius in Leiden, 27-02-1604. Leiden University Library, VUL 101.

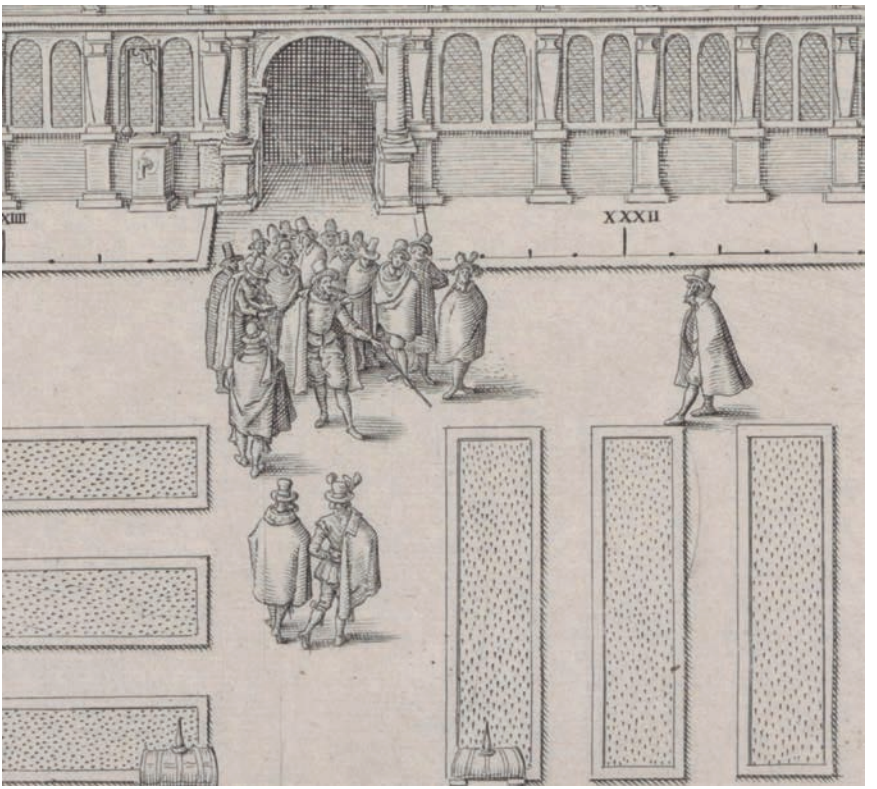


Fig. 4.3. Teaching in the Leiden hortus. Detail of an engraving of the Leiden hortus by Jacob de Gheyn (II), 1601.

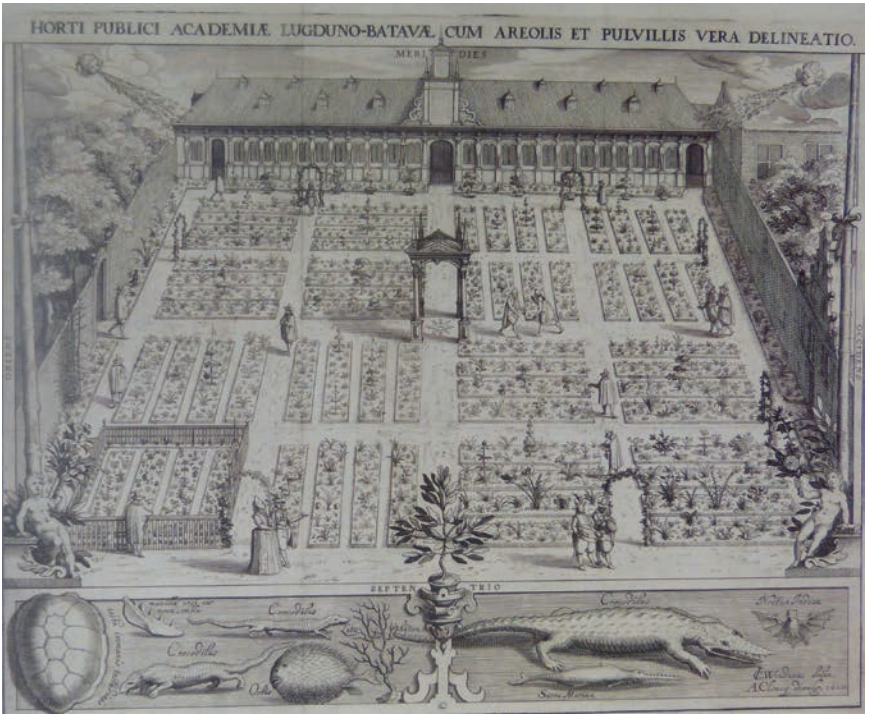
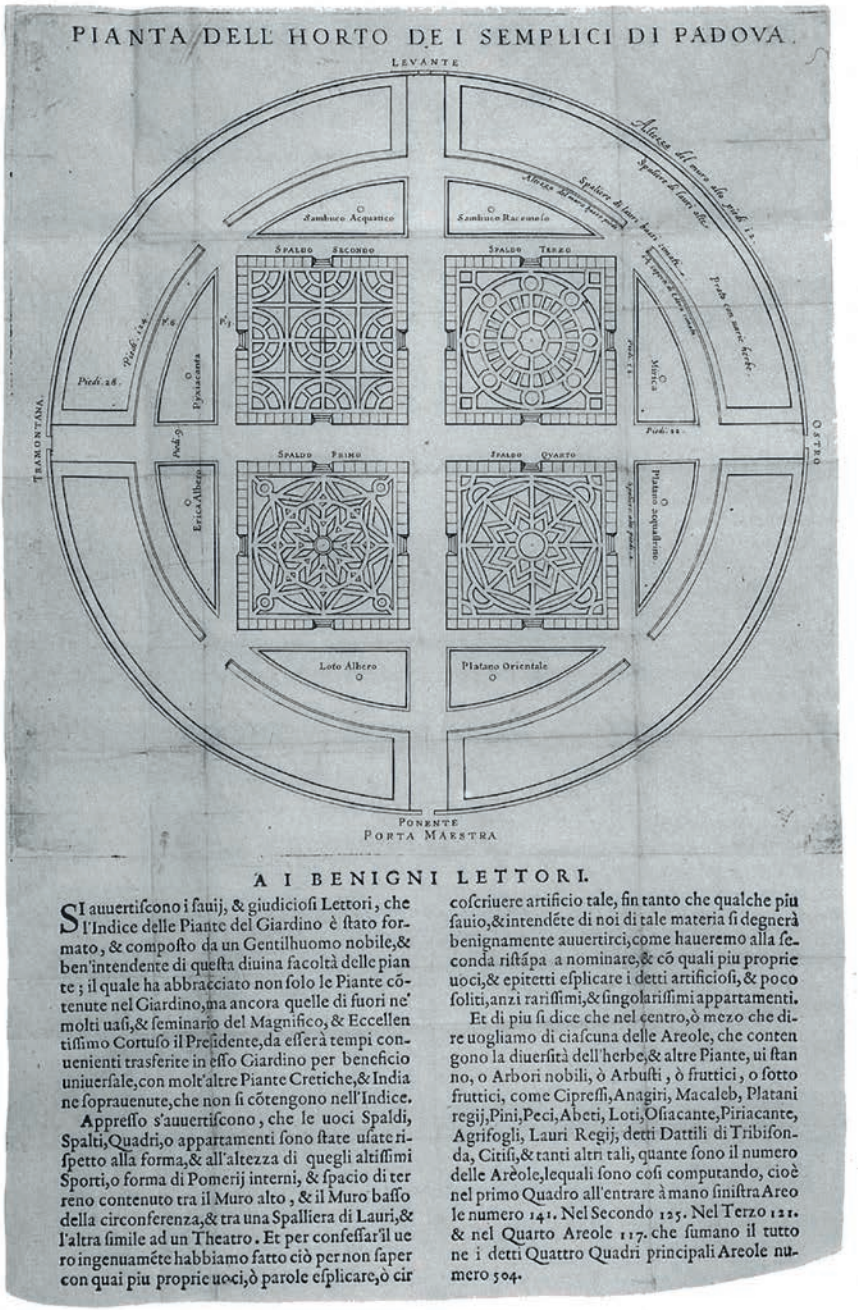


Fig. 4.4. The Leiden hortus with its gallery, and some exotica in the foreground. Print by Jan Cornelisz. Woudanus and Willem Isaacsz. van Swanenburg, 1610.



A I BENIGNI LETTORI.

SI auuertiſcono i ſauij, & giudicioſi Lettori, che l'Indice delle Piante del Giardino è ſtato formato, & compoſto da un Gentilhuomo nobile,& ben'intendente di queſta diuina facoltà delle piante; il quale ha abbracciato non ſolo le Piante cõtenute nel Giardino,ma ancora quelle di fuori ne' molti uaſi,& ſeminario del Magnifico, & Eccellentiſſimo Cortuſo il Preſidente,da eſſerà tempi conuenienti trasferite in eſſo Giardino per beneficio uniuerſale,con molt'altre Piante Cretiche,& Indiane ſoprauenute,che non ſi cõtengono nell'Indice.

Appreſſo s'auuertiſcono, che le uoci Spaldi, Spalti,Quadri,o appartamenti ſono ſtate uſate riſpetto alla forma,& all'altezza di quegli altiſſimi Sporti,o forma di Pomerij interni, & ſpacio di terreno contenuto tra il Muro alto, & il Muro baſſo della circonferenza,& tra una Spalliera di Lauri,& l'altra ſimile ad un Theatro. Et per confeſſar'il uero ingenuamẽte habbiamo fatto ciò per non ſaper con quai piu proprie uoci,ò parole eſplicare,ò circoſcriuere artificio tale, fin tanto che qualche piu ſauio,&intendẽte di noi di tale materia ſi degnerà benignamente auuertirci,come haueremo alla ſeconda riſtãpa a nominare,& cõ quali piu proprie uoci,& epitetti eſplicare i detti artificioſi,& poco ſoliti,anzi rariſſimi,& ſingolariſſimi appartamenti.

Et di piu ſi dice che nel centro,ò mezo che dire uogliamo di ciaſcuna delle Areole, che contengono la diuerſità dell'herbe,& altre Piante, ui ſtanno, o Arbori nobili, ò Arbuſti, ò fruttici, o ſotto fruttici, come Cipreſſi,Anagiri, Macaleb, Platani regij,Pini,Peci,Abeti, Loti,Oſiacante,Piriacante, Agrifogli, Lauri Regij, detti Dattili di Tribiſonda, Citiſi,& tanti altri tali, quante ſono il numero delle Areole,lequali ſono coſi computando, cioè nel primo Quadro all'entrare à mano ſiniſtra Areole numero 141. Nel Secondo 125. Nel Terzo 121. & nel Quarto Areole 117. che ſumano il tutto ne i detti Quattro Quadri principali Areole numero 504.

Fig. 4.5. Oldest plan of the Padua hortus, in Porro, 1591.

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