

2015

PREPRINT 469

Dominic Olariu

**The Misfortune of Philippus de Lignamine's
Herbal or New Research Perspectives in Herbal
Illustrations From an Iconological Point of View**

The Misfortune of Philippus de Lignamine's Herbal or

New Research Perspectives in Herbal Illustrations From an Iconological Point of View

Herbals originating from the Renaissance Period have increasingly become a research topic over the last few decades. This is unsurprising, as they have represented an intriguing phenomenon from the very onset of print culture. Not only were they amongst the most published natural history books in an age where the definition and discipline of natural science just began to emerge, they were also symptoms of a new and more visual culture.¹ At a rapid pace, from the 15th century onwards, herbal books started to feature images in vast quantities, while pictorial information had previously been a rather neglected matter in medieval herbals. Next to anatomy treatises – like the well-known *De humani corporis fabrica libri septem* by the Brussels anatomist Andreas Vesalius, published in 1543 at Basel in Johannes Oporinus' *officina* – herbals, for a long time, were the most illustrated and most productive representatives of what might be the precursor of scientific books from the 15th century onwards.² Both these types of books initially shared the same wish: the advancement of medicine and its healing powers. Since Antiquity, herbals had belonged to curative texts explaining the specific ways in which plants could be employed in the treatment of diseases. However, even if linked to medicine, herbals encounter specific visualisation problems not identical to those connected to anatomy books. It is for this reason that the study of herbal books can be undertaken independently from anatomy books, even if some aspects are correlated.

Research over the last years has produced a number of very revealing insights into the use and the production of plant books during the Renaissance, mainly from the perspective of the history of science.³ Additionally, an older research tradition exists offering a botanical point

¹ A still very valuable overview of the history of herbals in 15th and 16th centuries is Landau, D. and Parshall, P. (1994) *The Renaissance Print* (New Haven/London: Yale University Press) pp. 245-258. For the gradual emergence of disciplines of natural science in the Early Modern Times see Ogilvie, B. W. (2006) *The Science of Describing. Natural History in Renaissance Europe*. (Chicago: University of Chicago Press); Daston, L. and Park, K. (eds.) (2006) *The Cambridge History of Science. Volume 3. Early Modern Science* (Cambridge: Cambridge University Press), especially Daston, L. and Park, K.: Introduction: The Age of the New, pp. 1-17.

² For herbals and anatomy books see the recent Kusukawa, S. (2012) *Picturing the Book of Nature. Image, Text and Argument in Sixteenth-Century Human Anatomy and Medical Botany* (Chicago: University of Chicago Press).

³ For instance Ogilvie, *Science* (2006); Swan, C. (2006) „The Uses of Realism in Early Modern Illustrated Botany“, in: Givens, J., Reeds, K. and Touwaide, A. (eds) *Visualizing Medieval Medicine and Natural History, 1200-1550* (Burlington: Ashgate), pp. 239-249; Smith, P. H. (2006) *The Body of the Artisan: Art and Experience in the Scientific Revolution* (Chicago: University of Chicago Press); Daston, L. and Galison, P. L. (2007) *Objectivity* (New York: Zone Books); Schmidt, B. and Smith, P. H. (eds) (2007) *Making Knowledge in Early Modern Europe. Practices, Objects, and texts, 1400 – 1800* (Chicago: University of Chicago Press); Dackerman, S. (ed) (2011) *Prints and the Pursuit of Knowledge in Early Modern Europe* (exhib. cat. Harvard Art Museum, Cambridge, MA / Block Museum of Art, Evanston; Sept. 2011 – April 2012) (New Haven: Yale University Press); Kusukawa, S. (2012) *Picturing the Book of Nature. Image, Text and Argument in Sixteenth-Century Human Anatomy and Medical Botany* (Chicago: University of Chicago Press).

General investigations are: Arber, A. (1990², 1912) *Herbals. Their Origin and Evolution. A Chapter in the History of Botany 1470-1670* (Cambridge/New York: Cambridge University Press); Nissen, C. (1951, 1966) *Die botanische Buchillustration. Ihre Geschichte und ihre Bibliographie*. 2 vol. (Stuttgart: Hiersemann); Anderson, F. (1977) *An Illustrated History of Herbals* (New York: Columbia University Press); Müller-Jahncke, W.-D. (1995) Die Pflanzenabbildung im Mittelalter und in der frühen Neuzeit, in: Peter Dilg (ed) *Inter folia fructus* (Frankfurt a/M: Govi-Verlag), pp. 47-64; Müller-Jahnke, W.-D. (1987) Die botanische Illustration des 14. und 15. Jahrhunderts in Italien, in: Beyer, A. and Prinz W. (eds) (1987) *Die Kunst und das Studium der Natur vom 14. zum 16. Jahrhundert* (Weinheim: Acta Humaniora, VCH), pp. 75-81; Reeds, K. (1991²) *Botany in Medieval and Renaissance Universities* (New York/London: Garland); Blunt, W. and Raphael, S. (1994², 1979) *The Illustrated Herbal* (London: Frances Lincoln); Collins, M. (2000) *Medieval Herbals. The Illustrative Traditions*

of view, which is corroborated with philological perspectives from the history of medicine and pharmacy. This botanical tradition provides identifications of plants shown as well as references of synonyms used in herbals.⁴ Attention has also been devoted to a range of specific questions pertaining to the chronology of publications or dependencies amongst certain herbals.⁵ Moreover, academic literature on a few specific herbal books can also be found, notably in the form of essays and commentaries to facsimile publications.⁶ Nonetheless, one aspect of early plant books has been somewhat neglected, although several studies have highlighted its scientific relevance. Quite recently, Renzo Baldasso's essay on the "The Role of Visual Representation in the Scientific Revolution" has brought the visual matter of scientific books of Early Modernity back into the debate, as has been noticed also by other studies on the same topic.⁷ In a more recent publication, Claudia Swan states that in current research on herbals, "what is less frequently asked – or explained – is why the publications were illustrated in the first place?"⁸ Indeed, little effort has been made to examine the general role of illustrations within the emergence of Renaissance botany and its scholarly discourse. This paper will not provide an answer to these questions, but will propose some possible analytical angles and clues on how research on herbal illustrations from the Renaissance may advance. By concentrating on images of plants during and after the shift from manuscripts to typescripts, it offers a perspective based on *Bildwissenschaften* and the history of science, and is therefore potentially different from the majority of papers presented in this volume. Thus, a further research aim would be to understand the mechanisms underlying these illustrations in becoming scientific "tools". This would lead to an understanding of the ways in which knowledge of plants was transferred into herbal illustrations, and to a disclosure of the specific ideas that effected their inclusion in books. To put it yet another way, the herbals of the interim phase from manuscripts to typescripts may help in understanding the role visual representation played in the 15th and 16th centuries.⁹

(London: The British Library).

⁴ See for instance Dressendörfer, W., Keil, G. and Müller-Jahnke, W.-D. (1991) *Älterer deutscher "Macer". Ortlhof von Baierland "Arzneibuch". "Herbar" des Bernhard von Breidenbach. Färber- und Maler-Rezepte: die oberrheinische medizinische Sammelhandschrift des Kodex Berleburg, Berleburg, Fürstlich Sayn-Wittgenstein'sche Bibliothek, Cod. RT 2/6* (München: Helga Lengenfelder); Hayer, G. and Schnell, B. (eds) (2010) *Hartlieb, Johannes: 'Kräuterbuch'*. (Wiesbaden: Ludwig Reichert).

⁵ See for instance the recent Baumann, B. and Baumann, H. (2010) *Die Mainzer Kräuterbuch-Inkunabeln* (Stuttgart: Hiersemann).

⁶ See e.g. Di Vito, M. and Segre Rutz, V. (eds) (2001) *Historia plantarum Ms.459, Roma, Biblioteca Casanatense (facsimile and commentary)* 2 vol. (Modena: Franco Cosimo Panini); Müller, I. (ed) (2004) *Anholter-Moyländer Kräuterbuch. Das Kräuterbuch von Johannes Hartlieb (facsimile)* (Bedburg-Hau: Stiftung Museum Schloss Moyland); *Codex Berleburg* (as in fn. 3); Koning, J. d. (ed) (2008) *Drawn after Nature. The complete botanical watercolors of the 16th-Century libri picturati* (Zeist: KNNV Publications); Zoller, H. (ed) (1972-1980) *Conradi Gesneri Historia plantarum (facsimile edition)*. 8 vol. (Dietikon-Zürich: Urs-Graf); Collins, M. and Raphael, S. (eds) (2003) *A medieval herbal. A facsimile of British Library Egerton MS 747* (London: British Library).

⁷ Baldasso, R. (2006) The Role of Visual Representation in the Scientific Revolution: A Historiographic Inquiry. *Centaurus*, 48, pp. 69-88. For another study that addresses illustrations in atlases, see: Daston, L. and Galison, P. (2007) *Ojectivity* (New York: Zone Books). See also Ivins' highly interesting outline of an investigation proposal and the desiderata concerning illustrations in herbals. Ivins, W. M. (1944) The Herbal of "Pseudo Apuleius". *The Metropolitan Museum of Art Bulletin*, 2.7, 218-221, p. 220. Ivins proposes a wide investigation on herbals and gives its outlines. Many of the aspects mentioned by Ivins have been taken for serious in scientific research over the last decades. However, one point Ivins is referring to and describing as „... it would have to consider the history of the search for logical methods of classification in the descriptive biological sciences“, has with regard to the early herbal prints not yet been examined.

⁸ Swan (2006) *The Uses*, as in fn. 3, p. 239.

⁹ I cite here the title of Renzo Baldasso's essay, Baldasso (2006), as in fn. 7.

Research undertaken in the fields of the history of pharmacy and medicine has correctly stressed some seemingly simple facts. According to these earlier studies, it is very likely that the phytographic material was useful, if not essential for the identification of the herbs commented on in the respective chapters. The images must have guided the reader, whether it was a physician, an apothecary or a scholar, when trying to find information about a specific plant observed in nature. Hence, images would be subordinated to the text, aiding the reader in his attempt to localise the plant within the herbal book. They would complement the textual description of the plant with a depiction. This particular approach of images in herbals seems to be the underlying logic of Brian Ogilvie's interesting book *The Science of Describing*. He notes, for instance, that the changes occurring in the early Renaissance "prompted the development of new descriptions modeled after the old. Initially, these descriptions were pictorial, but soon a technical descriptive language was elaborated that eventually took precedence, within the community [i.e. the scholarly community, editorial note], over pictures."¹⁰

However, contrary to this point of view, this paper would like to stress the crucial role of images for the development of botany as a discipline in the natural sciences. The apparent obviousness of the arguments presented above, which emphasise the bare identification of plants, does seem to be interfered by several observations. In focussing here on these interferences and the complexity surrounding the use of illustrations, this paper does not wish to deny the cognitive function of herb illustrations. Neither does it imply rejection of the importance of pictures as field guides, as seems to have been the purpose of some herbals, nor the importance of recognising plants for scholarly studies; it also admits the herbals' necessity for teaching in the mid-16th century, when "... botanical study came to involve direct and sensory study of its objects" and botany lectures had become a process recurring to direct observation.¹¹ These aspects are of enormous importance in order to understand the use of illustrations in the 15th and 16th centuries. Notwithstanding, in concentrating on crosscurrents to the view that botanic illustrative material was a simple matter responding to the simple needs of physicians and apothecaries at that time, this paper tries to underline facets of phytographism that go beyond the mere quality of recognition.

Ancient and medieval herbal illustrations

At this point, it might be helpful to call to mind some general facts in the history of plant illustrations in order better to understand the specific questions underlying the herbals of the print period.¹² Pictureless herbals are known to have existed in ancient Greece at the latest since the 4th century BC.¹³ In 75 BC, the physician Cratevas was first to produce an illustrated herbal book for his king Mithridates VI of Pontus. Despite the fact that no herbals of classical Antiquity have survived, the pictures of the Cratevas herbal seem to have been drawn according to living models as contemporary sources as well as its influence on late antique herbals show.¹⁴ The impact of the Cratevas paintings may be evaluated vis-à-vis the so-called *Vienna Dioscorides*, a lavishly illustrated late antique copy of the Greek physician's first

¹⁰ Ogilvie, *Science* (2006), p. 6.

¹¹ Swan, *Uses of Realism*, 245. For the importance of illustrations in the teaching, see also Reeds, K. M. (1991²) *Botany in Medieval and Renaissance Universities* (New York/London: Garland); Cunningham, A. (1997) *The Anatomical Renaissance. The Resurrection of the Anatomical Projects of the Ancients* (Aldershot: Scholar Press).

¹² Parts of the following are owed to the interesting survey of Baumann, F. A. (1974) *Das Erbario carrarese und die Bildtradition des Tractatus de herbis: Ein Beitrag zur Geschichte der Pflanzendarstellung im Übergang von Spätmittelalter zu Frührenaissance* (Bern: Benteli), p. 15.

¹³ For antique herbals see Collins, *Medieval Herbals* (2000), pp. 31-35; Singer, C. (1927) *The Herbal in Antiquity and its transmission to later ages. Journal of Hellenic Studies*, 47, 1-52.

¹⁴ Singer, *Herbal* (1927), p. 5.

century medical book *De materia medica*, dating from 512.¹⁵ After the so-called fragmentary *Papyrus Tebtunis 679* and the *Johnson Papyrus*, the *Vienna Dioscorides* is the oldest herbal remaining.¹⁶ It is important to note the lifelike quality of many of its paintings, which were however combined in one book alongside schematic, artificially composed as well as less naturalistic, archetypical representations.¹⁷

We possess limited knowledge about the extent of pictorial practice in antique plant books, but given the passage in Pliny the Elder's *Naturalis Historia* explicitly devoted to herbal book paintings, it cannot have been a rare one, at least in Greek culture.¹⁸ Pliny bemoans the degeneration of plant illustrations caused by repeated processes of copying without the use of natural samples. In doing so, besides hinting at the noticeable role plant illustrations must have played in Antiquity, Pliny draws attention to the trickiness and subtlety inherent in phytographism which were known to his contemporaries: in Book 25, which is concerned with herbals by the Greek Cratevas, Dionysios and Metrodoros, he notes the deceptiveness of colour illustrations, as copyists produced faulty illustrations whenever they did not study the chromatic quality of the real plant.¹⁹ Pliny also underlines the poor utility of paintings displaying just one of the stages of a plant's life cycle, since its appearance undergoes visible changes throughout the four different seasons. In the same breath, he informs us of the practical dimension plant pictures took for antique physicians in particular. Pliny emphasizes that the pictures of plants in treatises like the Cratevas herbal were of principal interest, whereas captions to the illustrations solely indicated the curative effect.²⁰

These particular complexities connected to the painting of herbals might partly explain their low occurrence during the Middle Ages. As had been the case in Antiquity, medieval plant manuscripts focused on the curative effects of the simples, as well as on synonyms of plant names and their translations in different languages. They did not, however, include illustrations.²¹ Instead, the scribes copied and recopied the antique sources of knowledge –

¹⁵ The work *De materia medica* by Pedanios Dioscorides of Anazarba came into being about 65 AD. For the *Vienna Dioscorides*, see Collins, *Medieval Herbals* (2000), pp. 39-50; Toresella, S. and Battini M. (2005) *La principessa bizantina Giuliana Anicia e il suo erbario. L'esopo*, 101/102, March-June, 35-64.

¹⁶ For the *Papyrus Tebtunis 679*, Berkeley, Bancroft Library, dating from the second century AD, see Stückelberger, A. (1994) *Bild und Wort. Das illustrierte Fachbuch in der antiken Naturwissenschaft, Medizin und Technik* (Mainz: Philipp von Zabern), p. 79, who refers to Johnson, J. M. (1912) *A Botanical Papyrus with Illustrations*, *Archiv für die Geschichte der Naturwissenschaften und der Technik*, 4, 403-408. For the *Johnson Papyrus*, London, Wellcome Institute for the History of Medicine, MS 5753, dating from around 400 AD, see Collins, *Medieval Herbals* (2000), pp. 36-38.

¹⁷ Baumann, *Erbario* (1974), p. 15; Collins, *Medieval Herbals* (2000), pp. 46-50.

¹⁸ Pliny, *Naturalis historia*, book 25, chap. 4: "*Praeter hos Graeci auctores prodidere, quos suis locis diximus, ex his Cratevas, Dionysius, Metrodorus ratione blandissima, sed qua nihil paene aliud quam difficultas rei intellegatur, pinxere namque effigies herbarum atque ita subscribere effectus. Verum et pictura fallax est coloribus tam numerosis, praesertim in aemulationem naturae, multumque degenerat transcribentium fors varia. Praeterea parum est singulas earum aetates pingi, cum quadripertitis varietatibus anni faciem mutant. Quare ceteri sermone eas tradidere, aliqui ne effigie quidem indicata et nudis plerumque nominibus defuncti, quoniam satis videbatur potestas vimque demonstrare quaerere volentibus.*" For a discussion of Plinius' view on botanical illustrations, see Fögen, T. (2009) *Wissen, Kommunikation und Selbstdarstellung. Zur Struktur und Charakteristik römischer Fachtexte der frühen Kaiserzeit* (Munich: Beck) pp. 236-238; Collins, *Medieval Herbals* (2000), pp. 37-38.

¹⁹ For a discussion of Pliny's complaint about the chromatic quality of herbal illustrations as well as for the revival of the preoccupation with colour in herbals, see Freedberg, D. (1994) *The Failure of Colour*, in: Onians, J. (ed) *Sight and Insight. Essays on Art and Culture in Honour of E. H. Gombrich* (London: Phaidon Press), 243-262.

²⁰ Pliny, *Naturalis historia*, book 25, chap. 4: „*pinxere namque effigies herbarum atque ita subscribere effectus*". See the note 18.

²¹ See Hunger, F. W. T (1935) *The Herbal of Pseudo-Apuleius from the Ninth Century MS. in the Abbey of Monte Cassino - Codex Casinensis 97. Together with the first printed edition of Joh. Phil. de Lignamine [Editio princeps Romae 1481] both in facsimile* (limited edition of 200 copies) (Leiden: E. J. Brill), p. XIX. The

mainly those created by Dioscorides, Galen and Theophrastus – in writing. Gradually, several medieval scholars, such as Albertus Magnus and Thomas of Cantimpré, were added to the list of referenced authors. The erudition of these authors was transmitted through time via different sources and translations, so that in the 15th century herbal manuscripts existed in Greek, Latin, Arabic as well as vernacular languages.²²

As mentioned previously, the vast majority of medieval herbals was entirely textual. Little medieval herb illustration existed and can be divided into two main stylistic groups. The first stylistic group consists of what is called Romanesque illustrations. This illustrative style is abstract and schematic, and the illustrations were mainly produced for copies of the so-called *Pseudo Apuleius*: a herbal originally put together using Greek medical material from around the year AD 400, which was very popular in the Middle Ages. Its anonymous author is often referred to as Apuleius Barbarus or Apuleius Platonicus, who should not be confused with the author of *The Golden Ass*.

The second stylistic group of illustrations was produced for copies of the *De simplicibus medicinis* that Platearius, a member of the Salernitan medicine school, composed in the 11th century. Platearius' oldest manuscript paintings date from the mid 14th century. Felix Baumann provides a detailed description of elements characterising both these groups.²³ He highlights both the bias towards flat and schematic compositions without line intersections, as well as the efforts to show the plant in its completeness, i.e. all its important parts such as the roots, stem, leaves, flowers and fruits. The illustrations lack any sort of depth effect and the herbs seem to be spread out flat. Therefore, all of the component parts are shown either in frontal or in profile view. The proportions of the parts are neglected in order to be able to enlarge details, and the plants are organised symmetrically on the central axis.

Herbal illustrations from the 15th century on

Considering the scarceness of medieval simple illustrations, it is surprising that herbals featuring illustrations start to spring up towards the very end of the 14th century, and are seen more and more frequently from the 15th century onwards. Thus, the question arises as to why botanic illustrations suddenly became necessary in this period of time, and even more so, how their closer resemblance to nature and sometimes even lifelike quality could have evolved so rapidly from the herbal tradition of schematic illustrations that directly preceded these developments. The reference to the new naturalism discovered by the art of this time is certainly correct; however for a number of reasons, it does not suffice as an explanation. Dating from the 15th century, there are still important herbals employing schematising pictures; for instance, the *Kräuterbuch* by Johannes Hartlieb and its eight stylistically coherent copies, or the *Codex Berleburg*.²⁴ Additionally, as has been shown above, illustrations in herbals followed their own laws, which in parts contradicted the principles of naturalism. Naturalistic botanic illustrations begin to occur roughly around 1400 with the *Carrara Herbal* (between 1390-1404) and the *Historia Plantarum* (before 1400).²⁵ (fig. 1)

synonyms were probably taken from the Alexandrine lexicographer Pamphilos living in the 1st century AD. This kind of herbals seem to have appeared at that point in time.

²² Mazal, O. (2006) *Geschichte der abendländischen Wissenschaft des Mittelalters* (Graz: Akademische Druck- u. Verlagsanstalt) 2 vol., vol. 2, pp. 220-239.

²³ Baumann, Erbario (1974), p. 16-17.

²⁴ The *Kräuterbuch* was written between 1435 and 1450. It is the first entirely illustrated German herbal. The copies date from the 3rd quarter of the 15th century. Hayer, G. and Schnell, B. (2010) *Johannes Hartlieb 'Kräuterbuch'* (Wiesbaden: Dr. Ludwig Reichert).

²⁵ *Carrara Herbal*, MS Egerton 2020, British Library, London. *Historia Plantarum*, MS 459, Biblioteca Casanatense, Rome. A similar manuscript is mentioned in a Latin verse sent about 1340 from the town of Prato to king Robert of Anjou (British Library, Royal MS. 6E ix, fol. 15v). Blunt, W. and Stearn, W. (1994) *The Art of Botanical Illustration* (Woodbridge: Antique Collectors' Club), p. 47. For the *Carrara Herbal*, see Baumann,

Other herbals of the 15th century, containing strikingly lifelike illustrations, are for instance the *Roccabonella Herbal* (between 1415-1448); the *Belluno Herbal*, a Venetian manuscript from the early 15th century in the British Library (Add. MS 41623); the fifteenth century *Livre des Simples* at Brussels (Codex Bruxellensis IV. 1024); the herbal painted by Guarnerino Antonio of Padua, dated 1441; the *De medicinis simplicibus* (Ms. Fr. F. v. VI. 1) in St. Petersburg, and finally the *Codex Berleburg* dating from around 1470, to mention just a few.²⁶ However, it has not yet been observed that these manuscripts, in spite of their naturalistic style, show characteristics corresponding to the paintings that had dominated the older herbal tradition for hundreds of years.

Similar to the earlier illustrations displayed in the *Pseudo Apuleius* and the *Circa instans* copies, the 15th century copies also tend to show botanic specimen in frontal view, concentrating on the outline of the plants, avoiding intersections and arranging the plant in a not so rigorous, yet evident axiality. (fig. 2)

The style of 15th century illustrations may point to an influence of dried plants used as models. Some phytographics indeed suggest this practice, such as the violet in the *Carrara Herbal* for example; with its overlapping stems and leaves, and the atypical detailed representation of the root, the general *habitus* does bring to mind a flattened violet.²⁷ Yet, certain elements cannot be explained by this technique. This particularly comes to the fore when, for example, the same plant is shown from two different points of view in one image (the leaves seen from above, but turned parallel to the page so that they face the reader frontally, while the petals are seen in profile²⁸) (fig. 3) or, when schematic and naturalistic painting styles are combined in the depiction of one plant²⁹ (fig. 2) or, to give one more

Erbario (1974); Kyle, S. R. (2010) *The Carrara Herbal in context, imitation, exemplarity, and invention in late fourteenth-century Padua* (PhD Thesis, Art History, James T. Laney School of Graduate Studies, Emory University, Atlanta). For the *Historia plantarum*, see Di Vito, M. and Segre Rutz, V. (eds) (2001).

²⁶ For these herbals see: 1.: *Roccabonella Herbal*, Cod. Lat. VI, 59 = 2548, Marciana, Venice: Ambrosoli, M. (1997) *The Wild and the Sown: Botany and Agriculture in Western Europe, 1350-1850* (Cambridge: Cambridge University Press), pp. 104-106; Collins, Medieval Herbals (2000), pp. 281; Marcon, S. (2003) *Effetto natura. L'erbario di Nicolò Roccabonella. Alumina (Italian edition). Pagine miniate*, 2003, 1, 4-13; Mariani Canova, G. (ed) (2006) *Codex Bellunensis. Erbario bellunese del XV secolo. Londra, British Library, Add. 41623* (Feltre: Parco Nazionale Dolomiti Bellunesi), 2 vol. 2.: *Belluno Herbal*, Add. M.S. 41623, British Library, London: Collins, Medieval Herbals (2000), pp. 279-281; Mariani Canova, G., *Codex Bellunensis* (2006) 3.: *Livre des simples*, Cod. Bruxellensis IV. 1024, Biliothèque royale, Brussels: Opsomer, C. (1984) *Livre des simples medecines. Codex Bruxellensis IV. 1024. A 15th century French Herbal* (Antwerp: De Schutter), 2 vol. 4.: the Herbal of Guarnerino Antonio da Padova, MS MA 592 (già Lambda 1.3), Biblioteca Civica Angelo Mai, Bergamo: Mariani Canova, G., *Codex Bellunensis* (2006) 5.: *De medicinis simplicibus*, Ms. Fr. F. v. VI. 1, Russian National Library, St. Petersburg: López Piñero, J. M. (ed) (2000-2001) *Le livre des simples médecines* (Barcelona: M. Moleiro), 2 vol. 6.: *Codex Berleburg*, Cod. RT2/6, Fürstlich Sayn-Wittgenstein'sche Bibliothek, Berleburg: Dressendorfer, W., Keil, G. and Müller-Jahnke, W.-D., *Älterer deutscher "Macer"* (1991).

²⁷ British Library, MS Egerton 2020, f. 94r. See the photo in Smith, P. H. (2008) *Artisanal Knowledge and the Representation of Nature in Sixteenth-Century Germany*, in: O'Malley, T. and Meyers, A. R. W. (eds) (2008) *The Art of Natural History: Illustrated Treatises and Botanical Paintings, 1400-1850. Proceedings of the Symposium "The Art and History of Botanical Painting and Natural History Treatises" 3 - 4 May 2002 in Washington* (New Haven/London: Yale University Press) 15-31, p. 17. Photo also on the website of the British Library:

https://imagesonline.bl.uk/en/asset/show_zoom_window_popup.html?asset=6490&location=grid&asset_list=12,375,20564,20561,20558,20557,31508,31509,31510,31511,31512,31513,31514,31515,31516,31517,31518,1333,2476,6451,6455,6490,6505,6701,6833,12134&basket_item_id=undefined (June 23, 2014)

²⁸ See also *Martagon* (Martagon lily), fol. 66v, *Belluno Herbal*, Add. M.S. 41623, British Library, London. See photograph in Mariani Canova, G., *Codex Bellunensis* (2006).

²⁹ For instance *Dens leonis*, (*Taraxacum officinale*), fol. 107r, MS MA 592 (già Lambda 1.3), Biblioteca Civica Angelo Mai, Bergamo. See also *Scariola* (*Taraxacum officinale*), *Vitus Auslasser Codex*, MS Clm 5905, fol. 141r, Bayerische Staatsbibliothek, Munich, dated ca. 1479. See Goehl, K. and Englert, K. and Mayer, J. G. (2009) *Die Pflanzen der Klostermedizin in Darstellung und Anwendung : mit Pflanzenbildern des Benediktiners*

example, when the components of the simple are represented true to nature, but its proportions have been neglected. It is in these incoherencies that one can clearly see the medieval heritage these herbals are tied to: despite being examples of a newly introduced naturalism in botanic pictures, they still respect the traditional patterns. Otto Pächt, when referring to an early 14th century herbal, called the union of the aforementioned features “artificially arranged, prepared for the herbarium; half picture, half diagram”.³⁰

Pächt only refers to one side of the coin when he regards the beginning of the naturalistic quality in the *Carrara Herbal* as “an entirely new conception”.³¹ Without any doubt, the manuscript stands for the initial phase of nature studies, but shares the aforementioned traditional characteristics of the much older forerunners of herbal painting. These characteristics, especially when employed in lifelike illustrations, are rather symptoms of the tension between the awareness of the plants’ mutability (expressed by the naturalistic features) and the desire to express those qualities that were unchanging (expressed by the diagram-like features).³² These illustrations, in spite of their lifelike character, can still only be classified as half diagrams, half pictures. The artists or the commissioners of the herbals, or both, must have been aware of their “scientific” character, since the abovementioned patterns, more or less explicitly articulated, determine the herbals from the 15th century onwards. The traditional tendency of the aforementioned plant books extends even further. In the *Carrara* and other herbals, such as the *Codex Berleburg*, the herbs are often represented without roots, and sometimes only components of the plants are depicted as representations of the whole species (like the ear of oats standing for the whole plant).³³ (fig. 1, 2) Pächt understood this modality as a break with the tradition in botanic pictures. Granted, with regard to the custom of representing the full herb with the root, it was certainly a change. However, as far as the illustrations’ focus on details is concerned, it was not. For instance, herbals produced in the Salernitan School, dating from the 14th century, sometimes display naturalistic details that are fit into accustomed, simplified plant schemes representing the full plant.³⁴ The plum, pine and peach trees in MS Egerton 747 (ca. 1280-1310) and have naturalistic or identifiable leaves,

Vitis Auslasser (15. Jh.) aus dem Clm 5905 der Bayerischen Staatsbibliothek München (Baden-Baden: Deutscher Wissenschafts-Verlag), pp. 82-83. Fig. 3 shows fol. 314, *Phaffenkrudt*, of the *Codex Berleburg*. It appears to show rather *Taraxacum* than *Leontodon*. Fol. 313v in the *Codex Berleburg* carries the synonyms *Tharascon / Crispina italice* for *Phaffenkrudt*. Leonhart Fuchs uses the name *Pfaffenröhrlein* for *Taraxacum*. *Ibid.*, p. 83. Müller-Jahncke, *Älterer deutscher "Macer"* (1991), p. 89, and by Baumann and Baumann, *Mainzer Kräuterbuch-Inkunabeln* (2010), p. 122.

³⁰ Pächt, O. (1950) Early Italian Nature Studies and the early Calendar Landscape. *Journal of the Warburg and Courtauld Institutes*, 13, 13-47, p. 30. Pächt refers to the early 14th century herbal *Compendium Salernitanum*, MS Egerton 747, British Library, London, however the same statement can be made for the 15th century herbals, under different premises.

³¹ *Ibid.*, p. 31.

³² Freedberg stresses this point, p. 245, referring to a review by Ernst Gombrich of William Ivins’ book *Prints and Visual Communication* in: Freedberg, D. (1994) The Failure of Colour, in: Onians, J. (ed) *Sight and Insight. Essays on Art and Culture in Honour of E. H. Gombrich* (London: Phaidon Press) 245-262; Ernst H. Gombrich in *The British Journal for Philosophy of Science*, 5 (1954), p. 168-9; Ivins, W. M. (1953) *Prints and Visual Communication* (Cambridge (Mass.): Harvard University Press).

³³ *Oats, Carrara Herbal*, MS Egerton 2020, fol. 19r, British Library, London. See also *Ear of Corn*, fol. 21r.

³⁴ Spurge laurel and pine, Italian, between 1280 and 1310, *Compendium Salernitanum*, MS Egerton 747, fol. 40v and 74v, British Library, London. Thus these herbals did employ the practice of selecting details for illustrating purposes long time before Leonardo da Vinci, Andreas Vesalius and Conrad Gessner. It is therefore likely that these early herbals influenced the visualising methods of 15th and 16th century scholars, in the sense that the latter drew on representational benefits of older schemes. For the statement that the mentioned personalities were the founders of the mentioned method, see Pfister, A. (1963) Die Pflanze und das Buch. Grundsätze ihrer Darstellung in Handschriften und Drucken älterer Zeiten. *Librarium. Zeitschrift der Schweizerischen Bibliophilen Gesellschaft*, 3, 147-184, pp. 150-151.

needles and fruits, but the miniatures seem to show only small plants rather than trees.³⁵ (fig. 4) Uncommonly, spurge laurel is not even rendered as a full shrub, but solely represented in the form of leaves on a twig.³⁶

It may be surprising to read these notes referring to plant codices in a collection of essays on print culture. Yet they intend to show that investigations on printed herbal illustrations must take into account the preceding manuscript tradition. Considering the many comments on plant books of the Early Modern Period, and their role within the so-called scientific revolution, it is rather surprising that manuscripts and printed botanic pictures have seldom been associated in academic research. In fact, only few authors have done so. Pamela Smith, in a comparison of the *Carrara Herbal* and the woodblock prints prepared by the painter Hans Weiditz for Otto Brunfels' *Herbarum vivae icones* (1532-36), regarded the naturalism of the manuscript as "emerging out of a new-self-consciousness on the part of the artisan".³⁷ She also stressed that herbal pictures did not play an auxiliary role to textual descriptions, but were at least of equal importance for the transmission of knowledge. Also, Karen Reeds has been concerned with nature prints, and in particular the difficulty of defining naturalism in this kind of illustration.³⁸ This paper would like to pursue the latter point of view while focussing on the link between manuscripts and first prints.

The Philippus de Lignamine herbal and the first incunabula herbals

In Italy, the very first printed herbal carrying illustrations, which is also the very first illustrated incunabulum herbal, is an edition of the aforementioned *Pseudo Apuleius*. It is a treatise completely and solely dedicated to plants. This kind of print had only been produced once before, i.e. the 1477 edition of *De viribus herbarum* by Macer Floridus, printed at Naples by Arnoldum de Bruxella.³⁹ While the Naples print was not illustrated, the *Pseudo Apuleius* was a lavish production and contained botanical illustrations for all of its 131 chapters.⁴⁰ It was printed anonymously in Rome for the publisher Johannes Philippus de Lignamine. Since Hunger's investigation in 1935 as well as Frank Anderson's *An Illustrated History of the Herbals*, who seems to repeat Hunger's point of view, its *editio princeps* has repeatedly and erroneously been dated at 1480/81.⁴¹ Although the incunabulum lacks both an

³⁵ Pächt, (1950) *Early Italian Nature*, p. 29, gives the example of pine. See *Pine*, fol. 74v, see also *Plum*, fol. 74v, *Peach*, fol. 81v.

³⁶ *Compendium Salernitanum*, MS Egerton 747, fol. 40v, British Library, London.

³⁷ Pamela H. Smith: „Artisanal Knowledge and the Representation of Nature in Sixteenth-Century Germany“, in: O'Malley and Meyers, *Art of Natural History* (2008), p. 15-31, p. 18. See also Smith, *The Body of the Artisan* (2006). A few studies in history of medicine and pharmacy have investigated the relationship between codices and prints from their point of view, for instance Baumann and Baumann, *Mainzer Kräuterbuch-Inkunabeln* (2010), referring to the herbal incunabula produced in Mainz at the end of the 15th century. See also Pfister, *Die Pflanze und das Buch* (1963); Müller-Jahnke, *Pflanzenabbildung im Mittelalter und in der frühen Neuzeit* (1995); Müller-Jahnke *Die botanische Illustration des 14. und 15. Jahrhunderts in Italien* (1987); Lucia Tongiorgi Tomasi, 'Toward the Scientific Naturalism: Aspects of Botanical and Zoological Iconography in Manuscripts and Printed Books in the Second Half of XV [sic] century', in: Prinz, W. and Beyer, A. (ed) (1987) *Die Kunst und das Studium der Natur vom 14. zum 16. Jahrhundert* (Cologne: Acta humaniora), 91-101.

³⁸ Reeds, K. H. (2006) *Leonardo da Vinci and Botanical Illustration: Nature Prints, Drawings and Woodcuts ca. 1500*, in: Givens, J., Reeds, K. and Touwaide, A. (eds) *Visualizing Medieval Medicine and Natural History, 1200-1550* (Burlington: Ashgate), 205-237.

³⁹ Anderson, *Herbals* (1977), p. 35.

⁴⁰ The treatise is giving the name, synonyms, the spreading of the plants and curative effects. Following Anderson, the work contains 131 chapters. Anderson, *Herbals* (1977) p. 26, mentions editions containing 130 or 131 chapters, and an Anglo-Saxon manuscript translation containing 132 chapters. Possibly Anderson did not take into account that the tabula of the book numbers mistakenly chapters I-CXXXII, while chapter LIII is missing, so that LII is immediately followed by LIV. For the most extensive investigation of this print, see Hunger, *Herbal* (1935).

⁴¹ Hunger, *Herbal* (1935), p. XX. Anderson, *Herbals* (1977), p. 29.

indication of the year of publication and a title, Vito Capialdi, in a scarcely known biography on the publisher, had already convincingly dated the publication at the period between February 4, 1482 and January 22, 1483 by the middle of the 19th century.⁴²

The print of this herbal is rather striking. The plants are very schematised, hardly allowing identification by visual means. One would assume that the *Pseudo Apuleius* would have tried to introduce lifelike illustrations in print drawing on the naturalistic features in the herbal manuscripts of the much earlier *Carrara Herbal* and the *Codex Rocabonella*. Supposedly, there were no naturalistic manuscripts or drawing patterns available for copy in Rome at that point in time. However, Johannes Philippus de Lignamine himself provides us with information on this subject. As he indicates in his preface, the illustrations in the book copied the miniatures of an older manuscript that he had discovered a little earlier on in the monastery of Montecassino.⁴³ As he states in his dedication, he thought “Apuleius Platonicus” to have been a direct disciple of Plato.⁴⁴ He believed the manuscript to be a later Roman translation and to contain first-hand illustrative material. He may have supposed that it was written during Emperor Augustus’ rule. Thus Philippus ordered the miniatures and text of the Montecassino herbal to be copied.⁴⁵ According to present-day research, the manuscript is a ninth-century copy of *Pseudo Apuleius*, produced in the famous Italian School of Salerno. It is identified as the *Codex cassinensis 97*, formerly kept in the monastery at Montecassino, based on the clear analogies between the hand-painted and printed pictures. Because this manuscript was destroyed in a bombardment in 1944, further investigations have to rely on its facsimile of 1935.⁴⁶

The idea of producing a printed copy of the manuscript is of considerable interest. Since the *Pseudo Apuleius* was held in high esteem during the Middle Ages – it was one of the most read herbals during that time – the Lignamine print, on the one hand, reflects the contemporary custom of publishing texts which would likely result in high sales.⁴⁷ On the other hand, the inclusion of illustrations in an herbal was a novelty and Johannes Philippus – the very first typographer in Italy, who at that time had more than ten years of experience in this domain – would have carefully calculated the success of his project.⁴⁸ At first sight, it seems as if Johannes Philippus made a very reasonable choice, and the factors that should guarantee the success of the *Pseudo Apuleius* sound plausible, and even promising. Indeed, printing texts on plants had proven to be a successful practice in Italy in previous years.

⁴² Capialdi, V. (1853) *Notizie circa la vita, le opere, e le edizioni di Messer Giovan Filippo La Legname Cavaliere Messinese e Tipografo del secolo XV raccolte dal Conte Vito Capialdi Napoli* (Napoli: Porcelli), p. 43: „crediamo stabilirla dopo i 4 febbraio 1482, e prima de’ 22 gennaio 1483“. Capialdi established this period of time by investigating the datable events mentioned in the dedication.

⁴³ Hunger, *The Herbal* (1935), p. XXIV and XXXV-XXXVIII.

⁴⁴ See Anderson, *Herbals* (1977) pp. 24-25 for the medieval misinterpretation of the “Apuleius Platonicus” to be Plato’s disciple.

⁴⁵ Fol. 3v: “*ipse libellus cui preponitur Apuleium Platonicum de viribus herbarum nuper apud Cassinum inventum diligenti studio correctum imprimi iussi [...] fuit enim vir iste platonis [sic!] discipulus.*” See also Hunger, *The Herbal* (1935), p. XXIV. Philippus composed a title for the book, dedicating it to a certain Marcus Agrippa, to who was dedicated another medical treatise, the *Liber de herba Vettonica*. This latter treatise is imputed to Ant. Musa, physician of emperor Augustus. Hunger, *ibid.*, p. XIX. Compared to the Montecassino manuscript, Philippus’ text contains though interpolations. See Hunger, *ibid.*, p. XXXVsq.

⁴⁶ Montecassino, Archivio della Badia, Cod. 97. Hunger, *The Herbal* (1935), p. XXXV. Collins, *Medieval Herbals* (2000), pp. 179-180, and p. 229, note 128 with bibliography. Blunt, W. and Raphael, S., *Illustrated Herbal* (1994²), p. 113.

⁴⁷ For the production of *Pseudo Apuleius* copies between the 6th and the 15th centuries, see Collins, *Medieval Herbals* (2000), p. 165. See the interesting example of a *Pseudo Apuleius* herbal manuscript MS Ar. 26 n. 1283, Biblioteca Orto Botanico, Padua, dated last quarter of the 15th century.

⁴⁸ Alaimo, C. (1988) De Lignamine, Giovanni Filippo. *Dizionario Biografico degli Italiani*, vol. 36, 643-647.

A brief chronology of the first herbal incunabula shall underscore the facts that Johannes Philippus most likely took into account when he made his project decision. The following enumeration of printed plant books is complete. Indeed, around the time that Philippus carried out his project, texts on plants in incunabula had already existed for over ten years. Despite featuring no illustrations, the *Naturalis historia* by Pliny the Elder, printed in 1469 by the German Johannes Spira at Venice, marks the starting point of the fast and steep career of herbal prints.⁴⁹ As is commonly known, the *Naturalis historia* is concerned with a wide range of subjects, yet large sections are dedicated to discussions of plants, trees and simples in chapters 12-27 respectively. It must therefore be considered in the chronology of incunabula herbals. The *Naturalis historia* was one of the first printed books in Venice and in Italy since the monopoly on printing was granted to the printer Johannes by the Venetian Senate on 18th September of the same year.⁵⁰ Initially, it was followed by editions of purely text-based books containing, amongst other subjects, only a few chapters on herbs. The *Liber de proprietatibus*, which features descriptions of plants in chapter 17, was printed around 1470 by Bartholomaeus Anglicus at Basle.⁵¹ Another edition of this work is said to have been printed in 1470-1471 at Cologne by William Caxton, but it does not contain references to either the place or date of publication or the printer.⁵² *De medicinis universalibus* of Mesue in Venice by Clemens Patavinus⁵³ followed in 1471 as well as the *Opus ruralium commodorum* of Pietro Crescenzi in Augsburg by Johannes Schussler,⁵⁴ again followed by the *Liber Serapionis aggregatus* in Milan by Antonius Zarotus of Parma in 1473.⁵⁵ In 1475 *Das buch der natur* by Konrad of Megenberg appeared. Printed in Augsburg, Germany by Hans Bämmler,⁵⁶ it was the first incunabulum ever to contain plant illustrations devoted entirely to plants rather than serving as mere ornaments or parts of a landscape. Furthermore, it is the first text written in the vernacular which contained a section on plants. Two plant woodcuts introduce chapters four and five, which discuss trees and herbs respectively. Even if strongly schematised, the pictures refer directly to the accompanying chapter. Each one of them fills a full page and shows a group of plants pretending to unify several of the discussed herbs in the following chapter. The woodcut introducing the fifth chapter on herbs shows nine herbs, four of which may be identified as a lily, a calabash (*Lagenaria vulgaris*), a violet and a lily of the valley (*Convallaria majalis*). The plants are arranged from the rear to the front in three horizontal lines; showing high, middle high and low growing plants as if trying to systematize the different plants according to their height. In 1477, the abovementioned *De viribus herbarum* by Macer Floridus printed in Naples by Arnoldum de Bruxella, was the first proper herbal, dedicated entirely to plants. However, it did not feature any plant illustrations. In Colle, Tuscany, the German Johannes Allemanus de

⁴⁹ Anderson, *Herbals* 1977, p. 22.

⁵⁰ Franck, J. (1881) Johann von Speyer. *Allgemeine Deutsche Biographie*. Ed. by Historische Kommission bei der Bayerischen Akademie der Wissenschaften, vol. 14, 472–475; Del Torre, G. (1993) Emerich, Johann (Giovanni da Spira). *Dizionario Biografico degli Italiani*, vol. 42, p. 583-585.

⁵¹ First illustrated edition in 1482 in Lyon by Matthias Huss. Anderson, *Herbals* 1977, p. 65. 25 editions of it appeared before the end of the fifteenth century: Arber, *Herbals* 1986, p. 13. Bartholomaeus Anglicus was a monk, contemporary of Albertus Magnus, writing an encyclopaedia containing an account of a large number of trees and herbs.

⁵² Anderson, *Herbals* 1977, p. 60.

⁵³ Anderson, *Herbals* 1977, p. 44. Mesue is supposed to have lived 926-1016 A.D.

⁵⁴ Anderson, *Herbals* 1977, p. 72. Book V and VI contain information on arboriculture and horticulture, but the greater emphasis is placed on medicaments made from fruits and herbs.

⁵⁵ Anderson, *Herbals* 1977, p. 42.

⁵⁶ There will be six reprints in Augsburg before 1500. For the incunabula of the *Buch der Natur* of Konrad of Megenberg, see Spyra, U. (2005) *Das "Buch der Natur" Konrads von Megenberg. Die illustrierten Handschriften und Inkunabeln* (Köln: Böhlau), pp. 345-381. See *ibid.* p. 349-350, for the illustrations. See also Baumann and Baumann, *Die Mainzer Kräuterbuch-Inkunabeln* (2010), p. 51.

Medemblick printed the antique reference treatise *De Materia Medica* by Dioscorides in 1478. The volume had been translated into Latin by Pietro d'Abano some 178 years before.⁵⁷ In the year 1482 *alterae editiones* appeared: on November 19, 1482, a second edition of *De viribus herbarum* by Macer Floridus was published in Milan by Antonius Zarotus, while the *quarta* and *quinta editio* of *Das puch der natur* were published in Augsburg.⁵⁸ Finally, on February 20, 1483 *De causibus plantarum* by Theophrastus was published, *Impressus Tarvisii per Bartholomaeum Confalonarium de Salodio*, while on July 31, 1483, the herbal *Promptuarium Medicinae* was printed in Magdeburg by Bartholomäus Ghotan.⁵⁹

It was within this context of botanical prints that Johannes Philippus decided to place his herbal. We may conclude that, until 1482/83, printing texts about plants had become a significant practice in Italy as well as in Germany. Other countries do not seem to have had any herbals put into print before then. Thus, Johannes Philippus' decision to print the very first illustrated herbal must be regarded as a well calculated risk. In the end, the choice to publish an entirely illustrated herbal was certainly a difficult one considering the novelty of it. However, Johannes Philippus must have estimated its imponderability to be restricted by his choice for pictorial material, legitimised by its antique provenance.

In fact, the Lignamine *Pseudo Apuleius* was not destined to be successful. A second edition was published only in 1528 in Paris by Christian Wechel, and followed by the last one in 1543 at Petrus Drouart in Paris again, both times containing no images at all.⁶⁰ The answer to this rather surprising situation may be explained by the fact that the images the *Pseudo Apuleius* offered its readers were considered to be old-fashioned. Italy did not produce any

⁵⁷ For the Dioscorides, see Morton, A. G. (1981) *History of Botanical Science* (London: Academic Press) p. 117. Anderson, *Herbals* 1977, p. 15. For the reception of Dioscorides' *Materia medica* in 15th century's Europe, as well as for its printed incunabula, see Touwaide, A. (2008) Botany and Humanism in the Renaissance. Background, Interactions, Contradictions, in: O'Malley and Meyers, *Art of Natural History* (2008), 33-62, pp. 38-40; Stannard, J. (1966) Dioscorides and Renaissance *Materia Medica*, in: Florkin, M. (1966) *Analecta Medico-Historica, I: Materia Medica in the XVIth Century* (Oxford: Pergamon Press), 1-21; Riddle, J. M. (1980) Dioscorides, in: Kranz, E. F. and Kristeller, P. O. (1980) *Catalogus Translationum et Commentariorum: Medieval and Renaissance Latin Translations and Commentaries. Annotated Lists and Guides* (Washington, D.C.: Catholic University of America Press), vol. 4, 1-143. For the Latin translation by Pietro d'Abano, see Riddle, J. M. (2008) Dioscorides, in: *Complete Dictionary of Scientific Biography*. Retrieved June 23, 2014 from Encyclopedia.com: <http://www.encyclopedia.com/doc/1G2-2830901183.html>.

⁵⁸ Anderson, *Herbals* (1977) 35, erroneously mentions the first illustrated edition as having been printed in 1482. This extremely rare edition is also un-illustrated: *Liber Macri philosophi de virtutibus herbarum*. Mediolani: Antonius Zarotus Parmensis impressit, 1482. The first illustrated edition seems to be *De viribus herbarum*, Geneva, undated, ca. 1495/98, printed by Jean Belot. See facsimile: Lökkös, A. and Joris, R. (ed) (1970) *De viribus herbarum. Reprint of the edition Genève 1485/98* (Genève: Typ. Genevoise). *Editio altera* of *Das puch der natur*, Augsburg, by Johannes Bämmler, 1478; *editio tertia* Augsburg, by Johannes Bämmler, 1481; *quarta editio* Augsburg, by Johann Schönsperger, 1482; *editio quinta* Augsburg, Anton Sorg, 1482. See Spyra, *Buch der Natur* (2005), 345-381.

⁵⁹ The *Promptuarium Medicinae* is the first proper herbal printed in Germany, and its language is a Middle Low German dialect. The textual model for it was a "Aderlaßbüchlein", a blood-letting book, to which a bulky but unillustrated *herbarius* was added. Only 13 copies of it are known in different libraries. The *Promptuarium medicinae* is introduced by a title woodcut saying "Eyn schone Arztedyge boeck van allerleye ghebreck vnnde kranckheyden der mynschen", "A beautiful medical book about different afflictions and illnesses of human beings." The woodcut shows two late medieval physicians during the visit of a patient lying in bed, controlling his pulse and urine. It pretends therefore, together with the title, to have been compiled under the supervision of one or several physicians, although the editor Bartholomäus Ghotan was no qualified doctor. It has therefore been considered as the print of a not completely finished manuscript whose author is unknown to us. Within few years, several other prints with similar textual contents were printed in Germany. There is a second edition of the *Promptuarium Medicinae* in 1484 by Ghotan himself, who moved to Lübeck where he printed it. Baumann and Baumann, *Mainzer Kräuterbuch-Inkunabeln* (2010), pp. 75-97.

⁶⁰ Later editions of *Pseudo Apuleius* are not to be considered *editiones alterae* of the Philippus de Lignamine *editio princeps*.

typographic herbal with genuine illustrations over the following decades. Editions of the posterior German *Gart der Gesuntheit* (Mainz, 1485 by Peter Schöffer) and *Hortus sanitatis* (Mainz, 1491 by Jacobus Meydenbach) certainly reached Italy, but it was not until 1554 that Pierandrea Mattioli's Latin commentaries on Dioscurides work *Commentarii in sex libros Pedacii Dioscoridis* (Venice, by Vincentius Valgrisius) contained woodcuts produced in Italy.⁶¹

Despite the lack of Italian illustrative material in typography present in the aftermath of the *Pseudo Apuleius* and during the first half of the 16th century, processes of producing manuscript herbals should be taken note of in the northern half of the peninsula. As shown above, this activity took place throughout the 15th century in manuscript painting, but manifests itself strongly over the course of the last quarter of the 15th century and the first quarter of the 16th century, when an intense occupation with naturalism and visualising techniques seems to have existed. Unlike the *Pseudo Apuleius* incunabulum, these herbal manuscripts show a vivid interest in overcoming schematic representations and focussing on lifelike depictions by special means. Besides painting herbs, there are two distinct, but correlated ways of recording the appearance of simples used within these manuscripts.

The first method is exemplified by a treatise now kept at the Biblioteca Nazionale in Florence. In the centre of the folio, surrounded by medical comments on the corresponding plant, traces of a plant leaf once glued to the page can be distinguished. The book is dated at the end of the 15th century. In another herbal employing the same technique of fixing natural herbs to the paper, currently to be found in Brescia, two flattened branches of, apparently, "*filipendula*" and "*imperatoria*", as they are labelled, are presented to the readers.⁶² The folio carries the date "1506". A final interesting example of this "nature gluing", as analogy to "nature prints", may be mentioned. It is a much later painting in a Venetian book (MS Sloane 5281), containing mainly medical imagery, dating from c. 1560.⁶³ The illustration shows a drawn and coloured copy of the plant "Salomon's seal" (*Polygonatum latifolium*) as printed in the herbal *De historia stirpium* by Leonhart Fuchs (Basle, 1542 by Michael Isingrin). The artist of the manuscript added three natural leaves of the same plant to his copy painting, imitating the alignment of the painted leaves and in this manner, their organic way of growing. (fig. 5)

In the context of botanic knowledge at the beginning of the Early Modern Period, these examples turn out to be far more than mere dried plants herbaria. In imitating the layout of older herbals, like the *Roccabonella Herbal*, by fixing the plants to the centre of the book folios and operating with similar flattened structures, and finally by adding written explanations, they certainly represent a less expensive variation of a herbal for a less prosperous owner. By the same token however, they are also a statement about the visualising capacities and limitations of "simply" painted or printed herbals. By recurring to the use of natural leaves, the Venetian image clearly wants to add a quality to the illustration that was missing in the printed version (as well as in the solely painted one). In the introduction of genuine leaves into his painting and therefore comparing them to the printed originals, it is

⁶¹ On Mattioli's woodcuts, see Lack, H. W. (ed) (2001) *Ein Garten Eden. Meisterwerke der botanischen Illustration* (Köln: Taschen); Bain, I. and Raphael, S. and Watson, W. P. e.a. (eds) (1989) *The Mattioli Woodblocks* (London: Hazlitt/Gooden & Fox); Bidwell, J. (2003) *Mattioli's Herbal. A Short Account of Its Illustrations, with a Print from an Original Woodblock* (New York: Pierpont Morgan Library); Delisle, C. (2004) The Letter: Private Text or Public Place? The Mattioli-Gesner Controversy about the *aconitum primum*, in: *Gesnerus* 61, 161-176.

⁶² Florence, Biblioteca Nazionale di Firenze, MS B. V. 24 (no indication of the folio nr.). The plant does not seem to be identifiable. Brescia, Biblioteca Queriniana, MS B. V.24 (no indication of the folio nr.). The plants are *Spiraea filipendula* and *Aegopodium podagraria*. See Toresella and Battisti (1988) Gli erbari a impressione e l'origine del disegno scientifico. *Scienze. Italian Edition of Scientific American*, 239, 64-78, p. 72-73, for images of the respective folios.

⁶³ London, The British Museum, Museum Number 1928, 0310.94.1-205 (previously MS Sloane 5281), fol. 161r.

less their high visualising quality that the artist wished to express than an attempt at accomplishing the perfect scientific illustration: an illustration that would combine the demonstrative character and clarity of the original Fuchs print with the texture, consistency, shape and colour indications of the dried plant. These latter qualities were undoubtedly the ones that were found to be missing in phytographics, and they were the reason why some artists or craftsmen produced the mentioned dried plant herbals.

In 1560, when the Venetian manuscript was produced, Italy's only contribution to printed herbal illustrations had been the abovementioned Mattioli treatise from 1554. Although printed in Venice and certainly known to the Venetian painter of the manuscript, it was not the one chosen to represent the "Salomon's seal". Instead, the miniaturist preferred the older print by Leonhart Fuchs. Several reasons may have led to this choice. One of them may be the fact that Mattioli's *Polygonatum latifolium* was a highly elaborated woodcut, containing a considerable amount of hatching. Also, Mattioli's illustrations were reputed to contain frequent inaccuracies, which may have been another reason for repudiating Mattioli.⁶⁴ Whatever reason finally guided the painter, the Venetian treatise, as well as the mentioned books containing dried plants, are an indicator of careful reflections on the several methods one can employ in order to visualise botanic knowledge. On the peninsula, these reflections seem to have been expressed mainly in the medium of manuscripts.

Sergio Toresella and Marisa Battisti, in a highly inspiring essay on nature prints of the Early Modern Times, have put forward the hypothesis that the absence of typographic herbals produced in Italy during roughly the first half of the 16th century may suggest that at the time there was a need for Italian "botanists to be convinced by the possibility and utility of disposing of stamped herbals".⁶⁵ This argument seems to be a very plausible one, considering the predominance of painted and glued herbals in Italy since the 15th century. It should however be expanded in order to affirm a conscious refusal by Italian scholars and their craftsmen to realise herbal illustrations through the medium of print. Recent research has repeatedly stressed that many plant scholars articulated criticisms against the use of illustrations in herbals.⁶⁶ At least as far as Italy is concerned, it seems that these objections have mainly been directed at the printed illustrations. For instance, in Venice of 1493, the exceptionally lifelike paintings of a herbal were exposed to the visitors of a pharmacy called the Ethiopian's head, as the plant scientist Pandolfo Collenuccio explains in his *Defensio pliniana*.⁶⁷ He praises the naturalism of the plants shown as being of such high quality that they indeed seemed to grow out of the pages of the book, rather than being a flat portrayal.⁶⁸ Pandolfo's admiration cannot have been a simple recurrence to the *topos* of lifelikeness in order to make his tribute to an extraordinary herbal. It must have been his ability to compare

⁶⁴ Ogilvie, Science (2006), p. 59.

⁶⁵ Toresella and Battisti, Erbari (1988) p. 78. Translation by the author

⁶⁶ Ogilvie, Science (2006), p. 39; Kusakawa, Picturing (2012), pp. 19-25.

⁶⁷ Collenuccio, P. (1493) *Defensio pliniana*. (Venice: André Belfort). The herbal is supposed to be the Roccabonella herbal and the mentioned pharmacy the "Testa d'oro" pharmacy at the Rialto bridge: Ambrosoli, The Wild and the Sown (1997), p. 99.

⁶⁸ Collenuccio, *Pliniana defensio* (1493), p. XVIIv-XVIIIr: „*Est Venetijs in eo vico quem speciarium vocant: seplasiarij cuiusdam non ignobilis taberna cui per titulo insignique sit aethiopsis caput. In ea liber est haerbarius tanta arte ac diligentia pictus: ut natas paginis illis suis haerbas non effigiatas credas: in eo pictam vidimus ijsdem prorsus quae hic diximus signis haerbam: folijs quinque: quae et ipsa quinque ut pinximus porrectiores angulos sinuatosque haberent: sed et fructus quos fraga dicas: tum ad ipsam haerbam latinum nomen Sanicula: germanicum sanichel scriptum est. Citanturque inibi de sanicula hac scribentes. In Dinamidij galenus et Petrus hispanus is qui postea summum pontificatum gessit. Et Johannes vigesimus primus nuncupatus eum de medicina librum scripsit qui pauperum thesaurus inscribitur: tum Ceruiensis eperus quidam: et Laudensis Maphaeus et Gilbertus Anglicus Chirurgi.*”

the plant *Pentaphyllon*, which he saw in the manuscript, to the real plant, and in effect to point out the characteristics of the herb.

The custom of producing manuscript herbals rather than stamped ones seems even more probable in Italy when taking into account a second method of recording the plants' appearance. The respective class of Italian manuscripts produced illustrations by use of nature prints. This technique of inking the plant and pressing it onto a page of paper in order to get a more or less precise imprint of the outer characteristics is preserved in several Italian and Southern German manuscripts. The oldest remaining today is to be found in Salzburg, and dates back to the first quarter of the 15th century.⁶⁹ It appears to be of German provenance even if some of the flora it contains is Italian. There is evidence, however, that this technique was known earlier, since a certain "Bihnam the Christian" included a nature print in his copy of an Arabic version of Dioscorides' *De Materia Medica* produced in 1228.⁷⁰

At least nine manuscripts and herbals containing nature prints were produced in the 15th century and the first half of the 16th century. They are, in chronological order: 1. MS M. I. 36, conserved at the University Library, Salzburg, dated 1425; 2. MS 326, conserved at the Muséum national d'histoire naturelle in Paris, dated 1485-87; 3. MS JD 50, conserved at the Bibliothèque Nationale de France Paris, around 1520; 4. MS 1716, conserved at the University Library of Leipzig, around 1520; 5. and 6. MS N. A. 90 and the slightly later MS N. A. 995, the latter dated 1522, both conserved at the Biblioteca Nazionale of Florence; 7. MS Aldini 522, at the Biblioteca universitaria in Pavia, dated around 1525-30; 8. MS Lat VI 250=2679, in Venice at the Biblioteca Marciana, dated about 1520-40. 9. MS G1/6246 in Hamburg at the Fachbereichsbibliothek Biologie of Hamburg University.⁷¹ In addition, single nature prints are conserved on separate paper leafs or inside manuscripts: 1. four nature prints amid a collection of German herbal remedies, MS XXIII F 129, Národní knihovna, Prague, dated at the end of the 15th century; 2. one print in the MS LJS 419, conserved at the

⁶⁹ MS M. I. 36, University Library Salzburg, Salzburg. One part of the manuscript, containing a compendium on astrology, astronomy and medicine, has been written and finished in 1425 by the German physician Conradus de Boutzenbach. On folios 154-177 are printed 88 herbs. The nature prints manuscript contains German, Italian and Latin inscriptions. See Toresella and Battisti, Erbari (1988), 75sq; Reeds, Leonardo (2006), pp. 212 sqq. See also note 71.

⁷⁰ Cave, R. (2010) *Impressions of Nature. A History of Nature Printing* (New York: Mark Batty), pp. 19 and 21. See also Collins, Medieval Herbals (2000), pp. 124-129. The manuscript was produced for the ruler of Anatolia and northern Syria, Shams-al-Din, by Bihnam bin Musa bin Yusu-al-Mawsili. The Arabic text it was copied of is now in the Bibliothèque nationale de France, Paris: Paris Arabe 4947. The manuscript containing nature prints on fol. 143v and 144v is conserved at the library of the Topkapi Sarayi Müzesi, Istanbul: MS Ahmed III.-2127. For the latter, see Toresella, S. (1994) Dioscoride, in: *Enciclopedia dell'arte medievale* (Roma: Istituto della enciclopedia italiana) 5, 655-663, p. 661.

⁷¹ For manuscript 1, see Reeds, Leonardo (2006), p. 215; Brévar, F. B. (1988) The German Volkskalender of the Fifteenth Century, in: *Speculum* 63, pp. 312-342; *idem* (1996) Chronology and Cosmology. A German 'Volkskalender' of the Fifteenth Century, in: *Princeton University Library Chronicle* 57, pp. 225-265; *Katalog der deutschsprachigen illustrierten Handschriften des Mittelalters I: 1. 'Ackermann aus Böhmen' – 2. Astrologie/Astronomie (Veröffentlichungen der Kommission für Deutsche Literatur des Mittelalters der Bayerischen Akademie der Wissenschaften)* (1991), started by Frühmorgen-Voss, H. Continued by Ott, N. H. (Munich: Beck). For manuscript 2, see Antoine, É. (ed) *Sur la terre comme au ciel. Jardins d'Occident à la fin du Moyen Âge* (2002), exhib. cat. Musée de Cluny, Paris, pp. 225- 229. For manuscript 4, see Conihout, I. (ed) (1993) *Botanica in originali. Livres de botanique réalisés en impression naturelle du XVIe au XIXe siècle*, exhib. cat. Bibliothèque nationale de France, Département des livres imprimés, pp. 11-13. For manuscripts 4, 5, 6, 7 and 8 see Toresella and Battisti, Erbari (1988) pp. 65 and 75-78. For manuscript 7, see in addition Lo Vasco, A. and Pollacci, G. (1941) Di un codice erbario inedito del sec. XV. Memoria di Agata Lo Vasco e Gino Pollacci, in: *Atti dell'Istituto Botanico dell'Università di Pavia*, serie 4, 13, pp. 67-98. For manuscript 9, see Lorch, H. (1980) *Ein Hamburger Herbarius des 16. Jahrhunderts und seine Stellung in der Geschichte des Naturselbstdrucks* (doctoral dissertation Fachbereich Mathematik, February 6).

University Library of Pennsylvania, Philadelphia; 3. a sage leaf in the *Codex Atlanticus*, probably produced around 1508 by one of the pupils of Leonardo da Vinci (possibly Francesco Melzi); 4. on a paper showing a nature study three nature prints, among which one in reddish brown colour of a leaf of an umbellifera (?) as well as two leaves of *Veronica hederifolia* in green colour.⁷²

It is not my purpose here to discuss all of these manuscripts in detail.⁷³ It may however be noted that employing the technique of nature prints was a frequent practice in Italy at the turn of the century. Given the anonymous note in the Parisian MS 326 saying: “Today, the 19th of April, this book has been begun one and a half years ago”, we may affirm with precision that herbals of this type were produced at the latest shortly after the *Pseudo Apuleius* print in Rome.⁷⁴ Most of the mentioned herbals containing nature prints or dried plants of the period here discussed are hardly or not at all investigated. At this point of research, there may be speculations, therefore, as to why Italians refused to produce printed herbals for more than 70 years after the *Pseudo Apuleius* print. Taking a close look at the mentioned documents, it is possible to maintain that the precise colour, shape, form and size of the plants were of immense importance. In this, they differ from the German herbal prints at the end of the 15th and the first half of the 16th century, where herb illustrations, in spite of an increasing accuracy in representation, are mostly uncoloured and produced by different individuals: the draughtsman producing a first image of the plant, a second person often transferring the drawing to the woodblock, and then again the cutter working the woodblock.⁷⁵ By contrast, the nature prints resulted in a genuine image reproducing the authentic size and shape of the dried herbs and displaying details that recall photographic quality. (fig. 6, 7) Although colour in nature prints is added in a fairly unsubtle way – for instance inside one manuscript only one green may be used for the leaves and one red for petals of different red nuances – it provides the reader with supplementary information related to the appearance of the herbs and must have been helpful for the identification of plants. Considering these facts, it was maybe the antique scepticism about the correct employment of forms and colours in herbals, expressed by Pliny and Galen, that was kept alive in Italy and thus led to the employment of this particular technique.⁷⁶

⁷² 1. MS XXIII F 129, Národní knihovna, Prague, dated late 15th century, compiled by the physician Wenzeslaus Brack. See Reeds, Leonardo (2006), pp. 212 *sqq.*; 2. *salvia salvatica*, [Herbal containing 192 drawings of plants], MS LJS 419, Longboat Key FL, Lawrence J. Schoenberg Collection, fol. 99v, for loan at the University Library of Pennsylvania, Philadelphia. See Reeds, Leonardo (2006) pp. 224-229. 3. *salvia*, *Codex Atlanticus*, fol. 197v, formerly fol. 72v-a, Milan, Biblioteca Ambrosiana, after 1507. Date after Reeds, Leonardo (2006). 4. German anonymous watercolour painting, Potsdam-Sanssouci, Staatliche Schlösser und Gärten, Inv.Nr. 536 b, dating from the beginning of the 16th century. See Koreny, F. (1985) *Albrecht Dürer und die Tier- und Pflanzenstudien der Renaissance* (Munich: Prestel), pp. 182-183.

⁷³ The author of this essay is currently conducting a monograph investigation of nature prints of the 15th and 16th century entitled *Pressure on Plants. Herb Impressions as Epistemic Images on the Cusp of the Early Modern Period*.

⁷⁴ MS 326, fol. 1r, Muséum national d'histoire naturelle, Paris: “AGi [sic] 19 de aprile 1487 fu commincatu il dite libro di Ano e mezo”.

⁷⁵ These working steps are exemplified in Leonhart Fuchs' (1542) *De historia stirpium* (Basel: In off. Isengriana). They have been subject of many studies. See the recent Kusukawa, Picturing (2012), pp. 45-47.

⁷⁶ For Pliny, see footnotes 18-20. Galen, *De simplicium medicamentum facultatibus*, 6.1.

Another aspect in these manuscripts is of paramount importance. The printing technique employed in some of them is a highly sophisticated one. At least both documents in Paris and the manuscript in Leipzig have applied a multicolour and multiprint method.⁷⁷ (fig. 8) Indeed, some of the plants were depicted through superposed imprints. This may suggest that knowledge of printing procedures in typographers' workshops was applied to the production of nature prints. By any means, the nature prints attest the consciousness on part of their producers about the intricacy of generating adequate plant illustrations and the fact that knowledge must be filtered. They manifest the wish of systematising knowledge and make it objectively reproducible by focusing on criteria that, in duplication, would eliminate, as much as possible, the interference of a human being. In this sense, the nature prints represent a crucial element within the history and the development of sciences.

Johannes Philippus de Lignamine could not possibly have anticipated the destiny of his herbal. The Parisian manuscript MS 326, amidst the nature prints, contains crude paintings of herbs that the author of the book was not able to find in order to inspect them on his own. In these cases, he copied the schematic illustrations of older, more traditional herbal books.⁷⁸ This may suggest that on October 19, 1485, when he started to work on his manuscript, the custom of introducing nature prints in herbals was still a rather rare practice. Nature prints and nature gluing, as stated above, became more frequent in the decades that followed. In the context of developing critical attitudes towards objective plant illustrations in Italy, and printing increasingly detailed and lifelike herbal illustrations north of the Alps, the project of the *Pseudo Apuleius* herbal of Johannes Philippus de Lignamine was, from the start, destined to be a failure.

⁷⁷ These manuscripts have been closely inspected. Inspection of the other manuscripts is in preparation. Upon inspection of photographs we may assume that nearly all of them used a multiprint technique.

⁷⁸ The Philadelphia MS LJS 419 proceeds similarly.



Fig. 1: Ear of Oats, Carrara Herbal, 1390-1404, MS Egerton 2020, fol. 19r., London, British Library © The British Library. Painting after natural sample. The ears stand for the whole plant.

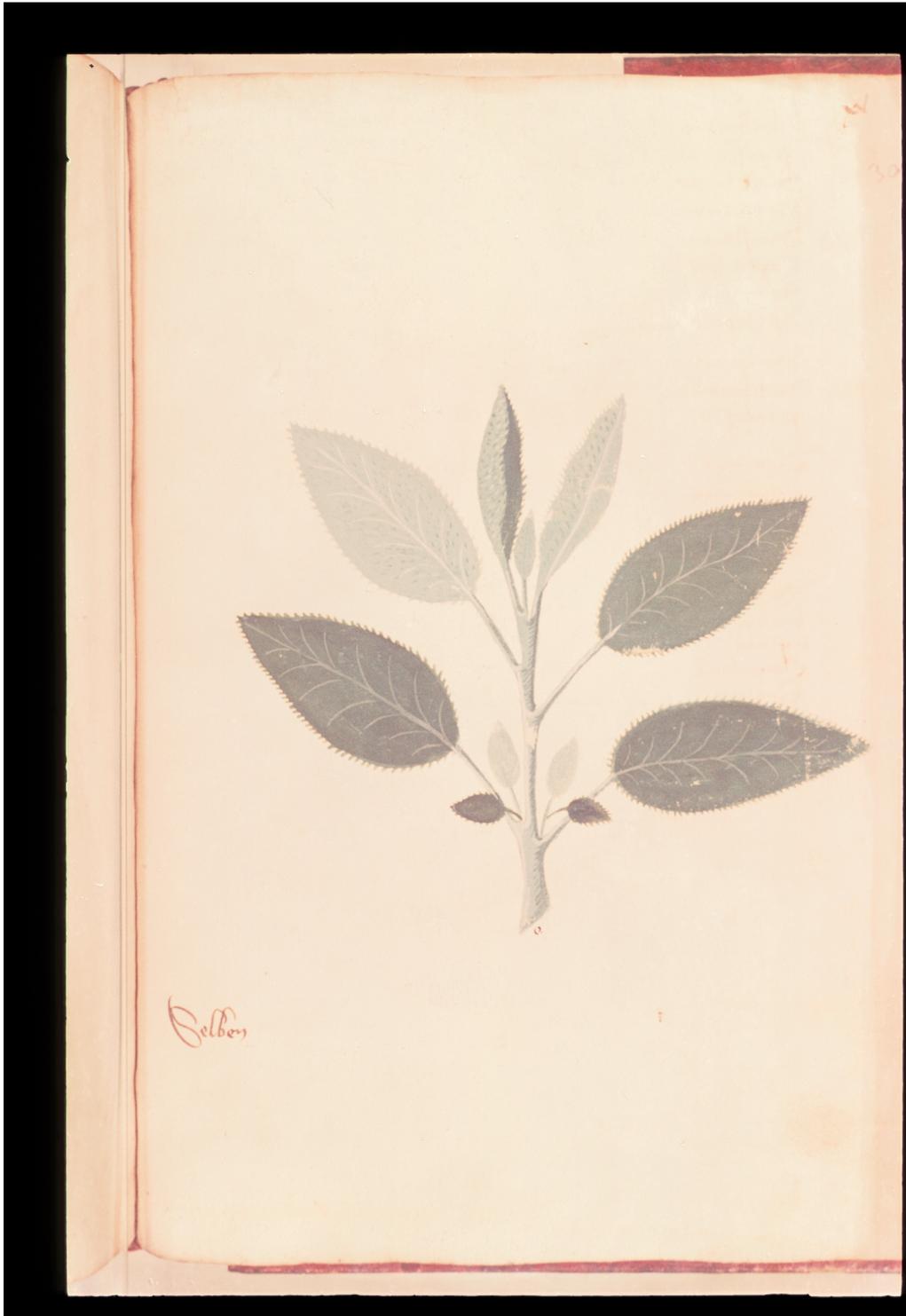


Fig. 2: *Selbey* (Sage), *Codex Berleburg*, ca. 1470, Cod. RT2/6, fol. 309r, Berleburg, Fürstlich Sayn-Wittgenstein'sche Bibliothek. Painting after natural sample. The naturalistic representation is arranged in an evident axially. Photo Wolf-Dieter Müller-Jahncke.

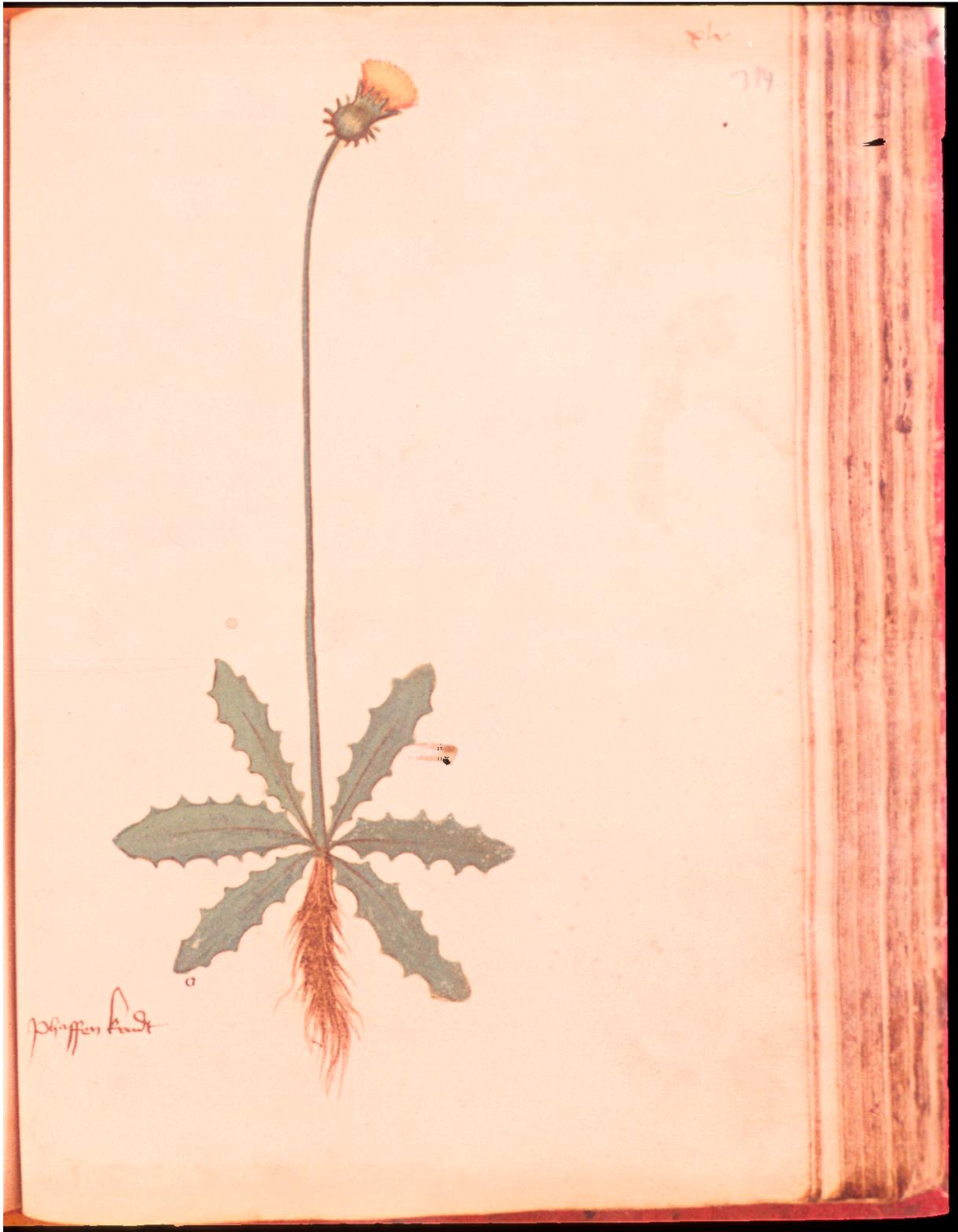
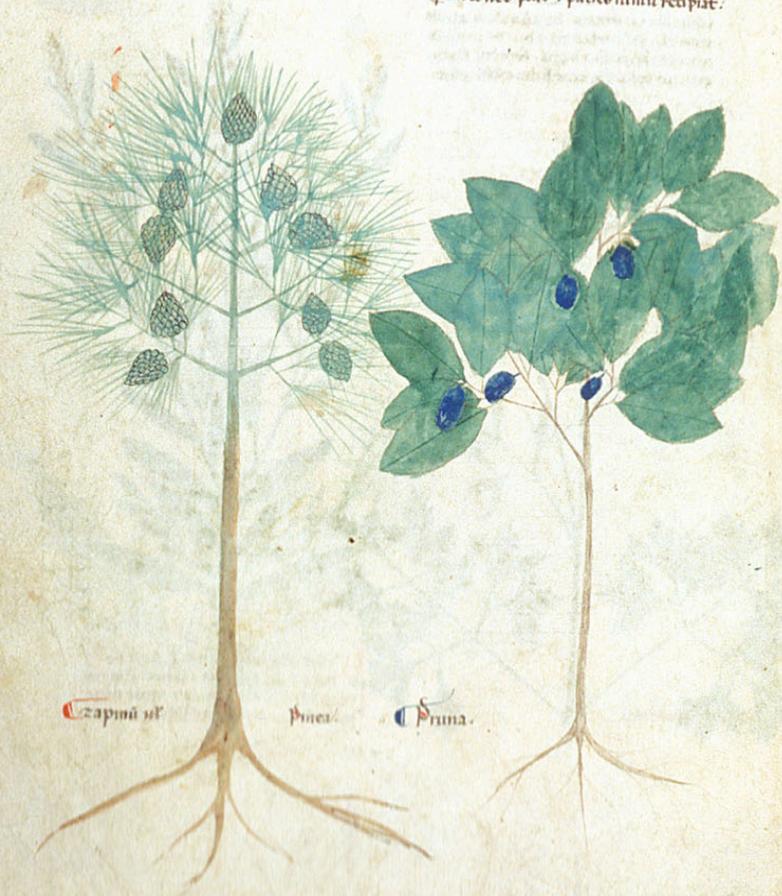


Fig. 3: *Phaffenkrudt* (Leontodon or Taraxacum?), *Codex Berleburg*, ca. 1470, Cod. RT2/6, fol. 314r, Berleburg, Fürstlich Sayn-Wittgenstein'sche Bibliothek. Painting after natural sample. Photo Wolf-Dieter Müller-Jahncke.

Supplic. pntatur imediōs. Virtute: he
 dit. et pū. **C**ymū cactōis pollicane
 et hōū sicam ualec aīmatōs. 7 s̄ frōs
 hu. i spūalib. **C**ā q̄ cactōis cū ut mō
 fiat fōmētū ualec admōdificōū māc
 ce uulū coartat. **C**ulus ei s̄ bōhōs
 sup̄pōit ualec s̄ cōmōmō. ex s̄ h̄. ca.
 fūhōū s̄ cōs cefolū s̄. et iūno cactū 7
 leo dolent sup̄pōit doloze ecuentōit
 te tollit. cū facta iesta sine liquore et
 capū sup̄pōit ualec s̄ reū.

Pinea. ca. ē. 7 hu. q̄ alio nōc. Stroblia.
 dī. cū sūt dī pōi imediō p̄tē p̄mū
 supra cartōnes ut aliq̄tūū p̄mū. p̄tē
 abiectō dūphōy cortōy. et q̄dī p̄llūū
 fēreū exp̄tē nūcīō. Virtute: sic lenīc
 dī. et hūcīdī. et aliq̄tūū ap̄cūdi op̄mū
 abus est laborāōy i spūalib. 7 ap̄tē. cefō.
 hu. aīmatō cefōc uācōy. ep̄tē 7 p̄s̄p̄tē.
 fūgūmō augmētāt libidīnē lētāt. p̄fē
 p̄tē dī ul' s̄ fūcīō ul' cōs ul' iōb. **C**ā dī s̄ h̄
 dīnā. ualec cortē cefōis hē mō cū p̄mū
 p̄mū abarōre sūtūr cōq̄tē b̄n i aqua p̄tē.
 s̄ cartōnes p̄tē 7 p̄tē s̄mū reū p̄tē.



Cypinū ul' **P**inea **C**Pruna.

Fig. 4: *Pinea* and *Pruna* (Pine and Plume), 1280-1310, MS Egerton 747, fol. 74v. London, British Library © The British Library.



Fig. 5: *Polygonatum latifolium* (Salomon's seal), *Drawing album*, ca. 1560, MS Sloane 5281, Museum number 1928,0310.94.1-205, fol. 161r, London, British Museum © The Trustees of the British Museum, London



Fig. 6: *Dens Leonis* (*Taraxacum*), about 1518, MS JD 50, fol. 131v, Bibliothèque nationale de France, Paris. Album with nature prints by Zenobius Pacinus. Photo by the author.



Fig. 7: *Dens Leonis* (*Taraxacum*), about 1518, MS JD 50, fol. 172v, Bibliothèque nationale de France, Paris. Album with nature prints by Zenobius Pacinus. Photo by the author.



Fig. 8: Detail of fig. 6. *Dens Leonis* (Leontodon), about 1518, MS JD 50, fol. 131v, Bibliothèque nationale de France, Paris. Photo by the author.

MAX-PLANCK-INSTITUT FÜR WISSENSCHAFTSGESCHICHTE

Max Planck Institute for the History of Science

Preprints since 2013 (a full list can be found at our website)

- 437** Jürgen Renn **Schrödinger and the Genesis of Wave Mechanics**
- 438** Pietro Daniel Omodeo **L'iter europeo del matematico e medico scozzese Duncan Liddel**
- 439** Irina Tupikova & Klaus Geus **The Circumference of the Earth and Ptolemy's World Map**
- 440** Pietro Daniel Omodeo und Jürgen Renn **Das Prinzip Kontingenz in der Naturwissenschaft der Renaissance**
- 441** Horst Kant und Jürgen Renn **Eine utopische Episode – Carl Friedrich von Weizsäcker in den Netzwerken der Max-Planck-Gesellschaft**
- 442** William G. Boltz and Matthias Schemmel **The Language of 'Knowledge' and 'Space' in the Later Mohist Canon** (TOPOI – Towards a Historical Epistemology of Space)
- 443** Stefano Bordoni **Looking for a Rational Thermodynamics in the late XIX century**
- 444** Sonja Brentjes and Jürgen Renn **The Arabic Transmission of Knowledge on the Balance**
- 445** Horst Nowacki **Archimedes and Ship Design**
- 446** Matthias Schemmel **Elements of a Historical Epistemology of Space** (TOPOI – Towards a Historical Epistemology of Space)
- 447** Martin Thiering and Wulf Schiefenhövel **Spatial Concepts in Non-Literate Societies: Language and Practice in Eipo and Dene Chipewyan** (TOPOI – Towards a Historical Epistemology of Space)
- 448** Jürgen Renn **Einstein as a Missionary of Science**
- 449** Hubert Laitko **Der Ambivalenzbegriff in Carl Friedrich von Weizsäckers Starnberger Institutskonzept**
- 450** Stefano Bordoni **When Historiography met Epistemology.** Duhem's early philosophy of science in context
- 451** Renate Wahsner **Tausch – Allgemeines – Ontologie oder Das Auseinanderlegen des Konkreten und seine Aufhebung**
- 452** Jens Høyrup **Algebra in Cuneiform.** Introduction to an Old Babylonian Geometrical Technique
- 453** Horst Nowacki **Zur Vorgeschichte des Schiffbauversuchswesens**
- 454** Klaus Geus and Mark Geller (eds.) **Esoteric Knowledge in Antiquity** (TOPOI – Dahlem Seminar for the History of Ancient Sciences Vol. II)
- 455** Carola Sachse **Grundlagenforschung. Zur Historisierung eines wissenschaftspolitischen Ordnungsprinzips am Beispiel der Max-Planck-Gesellschaft (1945–1970)**
- 456** David E. Rowe and Robert Schulmann **General Relativity in the Context of Weimar Culture**
- 457** F. Jamil Ragep **From Tūn to Turun: The Twists and Turns of the Tūsi-Couple**
- 458** Pietro Daniel Omodeo **Efemeridi e critica all'astrologia tra filosofia naturale ed etica: La contesa tra Benedetti e Altavilla nel tardo Rinascimento torinese**
- 459** Simone Mammola **Il problema della grandezza della terra e dell'acqua negli scritti di Alessandro Piccolomini, Antonio Berga e G. B. Benedetti e la progressiva dissoluzione della cosmologia delle sfere elementari nel secondo '500**

- 460** Stefano Bordoni **Unexpected Convergence between Science and Philosophy: A debate on determinism in France around 1880**
- 461** Angelo Baracca **Subalternity vs. Hegemony – Cuba's Unique Way of Overcoming Subalternity through the Development of Science**
- 462** Eric Hounshell & Daniel Midena **“Historicizing Big Data” Conference, MPIWG, October 31 – November 2, 2013** Report
- 463** Dieter Suisky **Emilie Du Châtelet und Leonhard Euler über die Rolle von Hypothesen. Zur nach-Newtonschen Entwicklung der Methodologie**
- 464** Irina Tupikova **Ptolemy's Circumference of the Earth** (TOPOI – Towards a Historical Epistemology of Space)
- 465** Irina Tupikova, Matthias Schemmel, Klaus Geus **Travelling along the Silk Road: A new interpretation of Ptolemy's coordinates**
- 466** Fernando Vidal and Nélia Dias **The Endangerment Sensibility**
- 467** Carl H. Meyer & Günter Schwarz **The Theory of Nuclear Explosives That Heisenberg Did not Present to the German Military**
- 468** William G. Boltz and Matthias Schemmel **Theoretical Reflections on Elementary Actions and Instrumental Practices: The Example of the Mohist Canon** (TOPOI – Towards a Historical Epistemology of Space)