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Plants and Mediterranean Flora in *Hypnerotomachia Poliphili*[1]

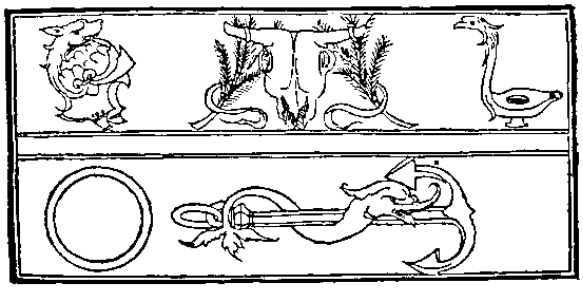
Introduction

Hypnerotomachia Poliphili is the short title of one of the most influential, illustrated books of the Renaissance, which was published by Aldus Manutius Press in Venice (1499).[2] It is noteworthy to mention that among the illustrations of *Hypnerotomachia Poliphili* (hereafter *HP*), one represents (f. d7) a dolphin twining around an anchor (Fig.1), i.e. a mark that Aldus Manutius

[1] I am grateful to colleagues and the organizers of the "gli uernacoli, proprii, et patrii uocabuli" – Terminologia e fonti dell'*Hypnerotomachia Poliphili* (Venezia 1499), 22-25 October 2018, Deutsch-Italienische Zusammenarbeit in den Geistes- und Sozialwissenschaften 2018, which gave us the opportunity to foster interdisciplinary inquiry and bring in *HP* different perspectives to, in the amazing physical and civilized environment of Villa Vigoni in Loveno di Menaggio (Como, Italy).

[2] L. Farrington, "*Though I Could Lead a Quiet and Peaceful Life, I Have Chosen One Full of toil Toil and Trouble". Aldus Manutius and the Printing of the "Hypnerotomachia Poliphili"*, "Word & Image", n. 31, 2015, pp. 88-101.

(1450-1515) subsequently adopted it[3] as the bookmark of his books.[4] Hence, the distinguishing mark of the Aldine Press, the well-known dolphin and anchor, first made its appearance on Dante's *Terse Rime* in 1502.[5] It is interesting to note that similar motifs (Figure 2) have been discovered on mosaics[6] (2nd century B.C.), in the Archaeological site of Delos Island.[7]



Da laltra parte tale elegãte ſcalptura mirai. Vno circulo. Vna ancora Sopra la ſtangula dillaq̃le ſe rouoluea uno Delphino. Et q̃ſti optimamẽti cuſi io li iterpretai. ΑΕΙ ΣΠΕΥΔΕ ΒΡΑΔΕΩΣ. Semp feſtina tarde.

Fig. 1. The woodcut in the *HP* d vii *r*. "I saw this elegant carving, a circle and an anchor around whose shaft a dolphin was entwined. I could best interpret this as ΑΕΙ ΣΠΕΥΔΕ ΒΡΑΔΕΩΣ, i.e. always hasten slowly".

The etymology of the invented term '*Hypnerotomachia*' (i.e., hypn-erotomachia) is derived from three Greek words i.e. hypnos (ὑπνος): sleep, eros (ἐρως): love and mache (μάχη): strife. Also, the term 'Poliphili' is of Greek origin, meaning beloved.

The *HP* is a bizarre romance, a mixture of pedantry and sensualism,[8] describing a love story between Polifilo and Polia, which takes place in a dream[9]

[3] W. Kemp, *Aldus Manutius. Printer and Publisher of Renaissance Venice*, "Papers of The Bibliographical Society of Canada", n. 35, 1997, pp. 101-103.

[4] J.H. Slater, *Book Collecting*, London, Swan Sonnenschein & Co, 1892, p. 54.

[5] *Ibidem*.

[6] C. Broodbank, *An Island Archaeology of the Early Cyclades*, Cambridge, Cambridge University Press, 2002.

[7] [https://howlingpixel.com/i-en/Mosaics_of_Delos] – 15 X 2015.

[8] J. Laughlin, *The Hypnerotomachia*, "Harvard Review", n. 7, 1994, p. 38.

[9] H.K. Szépe, *Desire in the Printed Dream of Poliphilo*, "Art History-Oxford", n. 9, 1996, pp. 370-392.

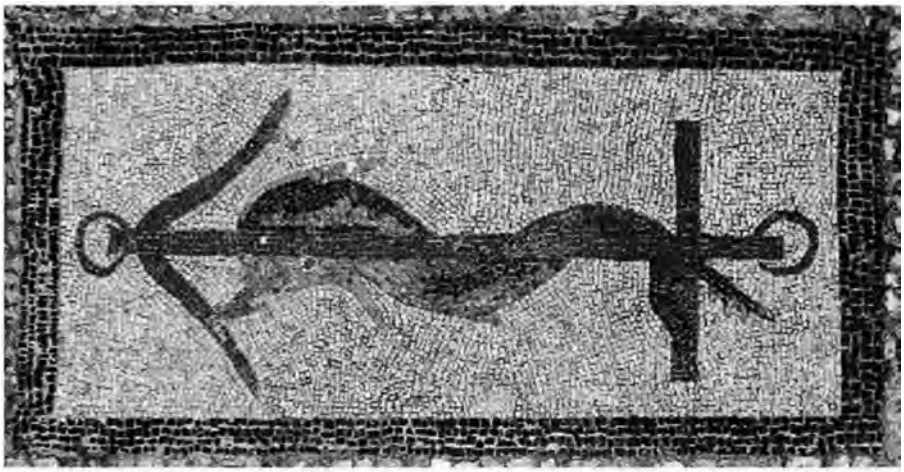


Fig. 2. Detail of a mosaic floor in an ancient house, with a dolphin twining around an anchor found on Delos island in Greece (37°23'57" N, 25°16'17" E).

and was written in a difficult,[10] invented language, composed by ancient Latin, Italian and Greek.[11]

Poliphilos falls asleep and dreams of traversing landscapes, groves and gardens containing ancient ruins and allegorical figures, to be reunited with Polia. The narration is enriched by lengthy descriptions of natural and human-induced landscapes, sacred groves, seductive gardens and pergolas overarched by lianas, roses and vines. During the period that the *HP* was written, gardens and parks were created for pleasure,[12] while groves and the physical environment appeared as a space between nature and culture.[13] It has also been argued that landscape-descriptions in the *HP* reflect the different stages

[10] V. Kirkham, *Hypno What? A dreamer's Dreamer's Vision and the Reader's Nightmare*, "Word & Image", n. 31, 2015, pp. 102-111.

[11] I. White, *Multiple Words, Multiple Meanings, in the Hypnerotomachia*, "Word & Image", n. 31, 2015, pp. 74-80.

[12] E. Woodhouse, *Spirit of the Elizabethan Garden*, "*Garden History*", n. 27, 1999, pp. 10-31.

[13] E. Priki, *Crossing the Text/Image Boundary. The French Adaptations of "Hypnerotomachia Poliphili"*, "The Journal of the Early Book Society for the Study of Manuscripts and Printing History", n. 25, 2012, pp. 337-355.

of the lovers' rapprochement[14] and garden-descriptions may be linked to a sophisticated approach of a cultivated garden.[15]

It seems likely that the *HP* is a many-layered text; a surface reading establishes the novel's role as a conduit for culture by combining historical with fictional events. On a deeper level, the *HP* may be an archetypal journey of discovery that includes processes involved with storing and retrieving memory. Therefore, the *HP* may also be viewed as a conduit for cognition. Although the *HP* influenced a wide range of disciplines, such as architecture,[16] art,[17] landscape architecture,[18] garden design[19] study of motifs[20] and literature,[21] and attracted very different levels of attention,[22] yet until recently[23] the study

[14] R. Stewering-L. Maher, *The Relationship between World, landscape Landscape and Polia in the "Hypnerotomachia Poliphili"*, "Word & Image", n. 14, 1998, pp. 2-10.

[15] J.D. Hunt, *Experiencing Gardens in the "Hypnerotomachia Polifili"*, "Word & Image", n. 14, 1998, pp. 109-118.

[16] R. Weddle, *Polyphilo, or, the Dark Forest Revisited. An Erotic Epiphany of Architecture*, "Journal of Architectural Education", n. 4, 1994, pp. 265-267. R. Stewering, *Architectural Representations in the "Hypnerotomachia Poliphili" (Aldus Manutius, 1499)*, "Journal of the Society of Architectural Historians", n. 59, 2000, pp. 6-25. D. van der Plaat, *Would You Know the New, You Must Search the Old. William Lethaby's "Architecture, Mysticism and Myth" (1891) and the "Hypnerotomachia Poliphili" (1499)*, "Fabrications", n. 12, 2004, pp. 1-26.

[17] P. Holberton, *Botticelli's "Hypnerotomachia" in the National Gallery, London. A Problem of the Use of Classical Sources in Renaissance Art*, "Illinois Classical Studies", n. 9, 1984, pp. 149-182. A. Oettinger, *The "Hypnerotomachia Poliphili". Art and Play in a Renaissance Romance*, "Word & Image", n. 27, 2011, pp. 15-30.

[18] L. Morgan, *The Monster in the Garden. The Grotesque, the Gigantic, and the Monstrous in Renaissance Landscape Design*, "Studies in the History of Gardens & Designed Landscapes", n. 31, 2011, pp. 167-180.

[19] E.B. MacDougall, *Fountains, Statues and Flowers. Studies in Italian Gardens of the Sixteenth and Seventeenth Centuries*, Washington, Dumbarton Oaks, 1994. A. Segre, *Untangling the Knot. Garden Design in Francesco Colonna's "Hypnerotomachia Poliphili"*, "Word & Image", n. 14, 1998, pp. 82-108.

[20] A. Klimkiewicz, *Meandri e misteri del rinascimento italiano. "Hypnerotomachia Poliphili" di Francesco Colonna*, "Atti dell'Accademia Polacca", n. 5, 2017, pp. 52-63.

[21] U. Eco, *The Mysterious Flame of Queen Loana*, London, Secker & Warburg, 2004. M. Ruvoldt, *The Italian Renaissance Imagery of Metaphors of Sex, Sleep, and Dreams*, Cambridge, Cambridge University Press, 2004.

[22] A.E. Moyer, *The Wanderings of Poliphilo through Renaissance Studies*, "Word & Image", n. 31, 2015, pp. 81-87.

[23] S. Rhizopoulou, *On the Botanical Content of "Hypnerotomachia Poliphili"*, "Botany Letters", n. 163, 2016, pp. 191-201.

of the botanical content displayed in the *HP* has been largely overlooked; nevertheless, vegetative aspects are essential elements of the text and appear in numerous passages.[24] It is likely that the *HP* includes 285 botanical entities associated with 672 textual passages.[25]

Plant names quoted in the *HP* predate the establishment of the Linnaean, Latin, binomial classification by three centuries.[26] However, early naturalists did try to identify plants described in ancient and medieval sources.[27] In fact, systems of plant classification existed long before Linnaeus (1707-1778) introduced the modern systematic order.

Literary sources related to plants capture customs, beliefs, and traditions of the culture and the time in which they were written. The rediscovery of knowledge that has been preserved in textual sources may reflect the accumulation of information.[28] In the *HP* the revealed perceptions of wild and cultivated plants contribute to a better understanding of relationships and interactions between natural components and human activities.

In this study, the endeavour of matching vernacular plant names quoted in the *HP* (i.e. English names, Latin names, laymen colloquial names of antiquity and transliterated Greek names) with the scientific Latin binomials was based on literary sources,[29] dictionaries[30] and archival research.[31] Textual passages in

[24] *Ibidem*.

[25] *Ibidem*.

[26] H. Wellisch, *Early Multilingual and Multiscript Indexes in Herbals*, "The Indexer", n. 11, 1978, pp. 81-102.

[27] J. Stannard, *A Fifteenth-Century Botanical Glossary*, "Isis", n. 55, 1964, pp. 353-367. C. Hünemörder, *Aims and Intentions of Botanical and Zoological Classification in the Middle Ages and Renaissance*, "History and Philosophy of the Life Sciences", n. 5, 1983, pp. 53-67.

[28] E.J. Buenz et al., *Techniques. Bioprospecting Historical Herbal Texts by Hunting for New Leads in Old Tomes*, "Trends in Pharmacological Sciences", n. 25, 2004, pp. 494-498.

[29] F.N. Egerton, *Botany during the Italian Renaissance and Beginning of the Scientific Revolution*, "Bulletin of the Ecological Society of America", n. 84, 2004, pp. 130-137. A. Cooper, *Latin Words, Vernacular Worlds. Language, Nature, and the "Indigenous" in Early Modern Europe*, "East Asian Science, Technology, and Medicine", n. 26, 2007, pp. 17-39.

[30] A. Radcliffe-Smith, *Three-Language List of Botanical Name Components*, Kew, Royal Botanic Garden, 1998. D. Gledhill, *The Names of Plants*, Cambridge, Cambridge University Press, 2008.

[31] B. Elliott, *Victorian Gardeners and Botanical Nomenclature*, "Botanical Journal of the Linnean Society", n. 109, 1992, pp. 473-483. G. Cristofolini-U. Mossetti, *Interpretation of Plant Names in a Late Medieval Medical Treatise*, "Taxon", n. 47, 1998, pp. 305-319.

the *HP* folios linked to plants are presented hereafter in square brackets, according to the first complete English translation of the book by J. Godwin.[32]

It has been investigated that some vernacular names of plants, cited in the *HP*, correspond to the same generic plant name;[33] for example, both vermilion [o5, z6] and wormwood [p2', t3, t7, u4', u6'] refer to *Artemisia* species,[34] while ranunculus [e1', k7, l5', y8], Adonis flower [z2] and crowfoot [a7] are all related to *Ranunculus* species. Also, some plants with unidentified names[35] are cited in the *HP*, e.g. cervicello [a7], cynacanth [m3'], geusia (aquatic plant) [e8], pulliphora [y1], terrambula[36] [u5] and vitilago [s7']. In the English translation of the *HP* by J. Godwin, there is a quotation for corn[37] [n4]; as there is no evidence for the presence of corn (*Zea mays*) in Europe in the 15th century, the term 'corn' mentioned in the *HP* depends on the meaning to be assigned to the Latin word *spica* (i.e. ear) and is most probably linked to wheat.

It has been argued that references to plants in the *HP* might be used as a kind of linguistic code that contributed to the intellectual dimension of the novel.[38] It has also been stated that the author of the *HP* probably had no direct knowledge of the considered plants and included them in the text after encountering them in other books and manuscripts, i.e. by extracting botanical information from earlier texts, transmitted and inherited from antiquity.[39] For example, an unknown, early reader noticed that in the marginalia[40] of an

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32 F. Colonna, *"Hypnerotomachia Poliphili". The Strife of Love in a Dream*, London, Thames & Hudson, 2005.

33 S. Rhizopoulou, *On the Botanical Content*…, cit., pp. 191-201.

34 A. Arber, *Herbals, Their Origin and Evolution*, Cambridge, Cambridge University Press, 1953.

35 Few names are synonyms; therefore, identification is often impossible. Where identification is possible it is achieved by comparison of the names in related languages or by indirect evidence from their use.

36 Either *Glechoma* (*hederacea*) or *Allium vineale,* see T. Reiser, *Lexical Notes to Francesco Colonna's 'Hypnerotomachia Poliphili' (1499) – Cruces, Contradictions, Contributions*, "Lexis – Poetica, retorica e comunicazione nella tradizione classica", n. 33, 2015, p. 502.

37 The meaning of 'corn' in British English dictionary is 'grain' and/or seeds of plants (i.e. wheat, maize, oat, rice and barley) that can be used to produce flour.

38 M. Szafrańska, *The Philosophy of Nature and the Grotto in the Renaissance Garden*, "The Journal of Garden History", n. 9, 1989, pp. 76-85.

39 L. Petrucelli, *Monastic Incorporation of Classical Botanic Medicines into the Renaissance Pharmacopoeia*, "American Journal of Nephrology", n. 14, 1994, pp. 259-263.

40 The study of marginalia has also opened new research directions in the study of the *HP*.

HP copy[41] all the riparian plants listed in the *HP* [a3–a4] are found in the 25th chapter of *Naturalis Historia* by Pliny the Elder (1st century AD); it is known that *Pliny* the Elder[42] included ancient knowledge from numerous Roman and Greek authors in his *Naturalis Historia*. Two early readers underlined the name of one plant, i.e. 'barba silvana' that was not derived from this chapter of Pliny, while 'barba silvana'[43] was recorded in other herbals[44]. Information related to plants and plant products could also be derived from literary sources preserved in medieval, monastic scriptoria.[45] In this concept, numerous textual passages of the *HP* represent literal evidence of a botanical lore and/or a collection of erudition.

Verbal, Verde beauties and rarities

On the one hand, several frequently quoted plants are presented in the *HP*, i.e. roses (*Rosa* spp.[46]) [a2, e6', g3', g7', h4, i4, i5, k2', l5', m6', o5, o8, p1, p3, r6', s1', t2, t2', t6, y6, z6, C7', D6], myrtle (*Myrtus communis*) [f4', g1', k2', l7,

41 J.C. Russell, *The Annotated copy of "Hypnerotomachia Poliphili" at the Chapin Library, Williams College, Inc. C699*, "Bulletin of the Society for Renaissance Studies", n. 30, 2013, pp. 9-13.

42 C.G. Nauert, *Humanists, Scientists, and Pliny. Changing Approaches to a Classical Author*, "The American Historical Review", n. 84, 1979, pp. 72-85.

43 "Barba silvana dicitur quae est plantago aquatic que solum in aquis" Simone da Genova *Synonima Medicinae seu Clavis Sanatationis* (Milan, 1473), in: F. Colonna, *Hypnerotomachia Poliphili*, eds. G. Pozzi-L.A. Ciapponi, Padova, Antenore, 1964, p. 56. Niccolò Roccabonella di Coneglio (1386-1459), *Liber de simplicibus*, BAV cod. Marc. Lat. VI 59, in: F. Colonna, *Hypnerotomachia Poliphili*…, Pozzi & Ciapponi, cit., p. 56. *Ortus Sanitatis*, Mainz, Jacobus Meydenbach, 1491, f. 27r, Smithsonian Institution Libraries Digital Collections – Renaissance Herbals, "Plantarum Aetatis Novae Tabulae", [http://www.sil.si.edu/digitalcollections/herbals/HerbalsEnlarge.cfm?id=14274] – 22 II 2013. T. Reiser, *Lexical Notes to Francesco Colonna's "Hypnerotomachia Poliphili" (1499) – Cruces, Contradictions, Contributions*, "Lexis – Poetica, retorica e comunicazione nella tradizione classica", n. 33, 2015, pp. 490-525.

44 M. Ambrosoli, *The Wild and the Sown. Botany and Agriculture in Western Europe, 1350-1850*, Cambridge, Cambridge University Press, 1997.

45 K. Stewart, *Nature and Narratives. Landscapes, Plants and Animals in Palaiologan Vernacular Literature*, doctoral dissertation, University of Oxford, 2015. S. Rhizopoulou, *Rhizotomos. Radical Research on the Wanderings of Dioscorides' Materia in Manuscripts, Codices and Books*, Athens, Diavlos, 2008.

46 Generic names of plants followed by 'spp.' refer to some of the species in a genus.

m3', o5', o6', p5', q6, s7, t7, u6, u5,u6', y1, y6, z5', C7'], pine (*Pinus* spp). [d7, d7', g2', l7', m3, m3', s8, u3, u4', z3', z6], cypress (*Cupressus sempervirens*) [a2, b4', e8', h2', h4, l8', p3, p5', s7, s8, u3, y5', z6], laurel (*Laurus nobilis*) [c1, f7', g1', l6', l7, m3', p5', s7', u3', y1, z6], acanthus (*Acanthus* sp.[47]) [a8, c5', c6', g7', k4, k4', o3, u4', u5'], oaks (*Quercus* spp.) [a3, a6, a6', d6', m3', s8, E5', F3], junipers (*Juniperus* spp.) [d7, m3', s8, t6', u3', u6', y5', z5'], thyme (*Thymus* sp.) [o5, s4, t3, t4', u6, z6', u4', u5, u6'], violets (*Viola* spp.) [f8', i5, l5', t8', u4', u7, x8, y1, y7], orange trees (*Citrus sinensis*) [e1', e8, g1', l8', m3', u1, y1, z6] and wormwood (*Artemisia* sp.) [p2', t3, t7, u4', u6']. On the other hand, numerous plants were cited in the text with the lowest frequency; surprisingly, this category includes some characteristic, Mediterranean plants, such as carob tree (*Ceratonia siliqua*) [e2, s8', t1], oleander (*Nerium oleander*) [d7'], rosemary (*Rosmarinus officinalis*) [u3'], dittany (*Origanum dictamnus*) [i8], Spanish broom (*Spartium junceum*) [s8'] and fig tree (*Ficus carica*) [t1].

Navelwort (*Umbilicus rupestris*) and centaury (*Centaurea cyanus*), as well as thorny vegetation composed by prickly prunes, sharp thistles, prickly cedars, and other spiny plants [a3] are quoted as sprouted among historical ruins and rugged terrain. Pellitory and hammer-wort (*Parietaria* sp.) are cited as grown in dry cracks of tombs [c8', n1', r4']. The cosmopolitan purslane (*Portulaca oleracea*) grown on sandbanks [p2'] was known since Roman Times.[48] Rushes (*Juncus* sp.), reeds (*Arundo donax*) and sedges (*Carex* sp.) grown in wet places and on marshy ground [t8'], dewy grass and damp habitats, and repeatedly mentioned in the *HP*, might be considered as indicators of a period of increasing rainfall and flooding.[49] In contrast, the salt-loving, littoral cock's crest (*Echinochloa crus-galli*), oxeye (*Buphthalmum salicifolium*), saltwort (*Glaux maritima*) and wormwood (*Artemisia* sp.) were cited as grown in fissures of sea-dashed moles. Water plants were well arranged with water lotuses (*Nelumbo nucifera*) and water lilies (*Nymphaea alba*) among them [h7].

47 Generic names of plants followed by 'sp.' refer to a plant in a genus of uncertain binomial and identity.

48 A. Danin et al., *The History of the Portulaca oleracea Aggregate in the Emilia-Romagna Po Plain (Italy) from the Roman Age to the Present*, "Plant Biosystems", n. 148, 2014, pp. 622-634.

49 E. Guidoboni, *Human Factors, Extreme Events and Floods in the Lower Po Plain (Northern Italy) in the 16th Century*, "Environment and History", n. 4, 1998, pp. 279-308.

In the *HP*, there are quotations related to the Homeric plant moly[50] (μώλυ) and the ancient plant silphium[51] (σἰλφιον). The black rotted moly[52] [a6] has been a subject of debate among scholars, because it has been diversely identified as different *Allium* species (i.e. *Allium siculum* subsp. *dioscoridis*, *Allium nigrum*, *Allium magicum*, *Allium moly*, *Allium multibulbosum* and *Allium roseum)*, *Atriplex halimus, Galanthus nivalis*,[53] *Leucojum aestivum*, *Peganum harmala* and *Withania somnifera*. Silphium[54] that has been described by Theophrastus[55] during the 4th century B.C. and exhibited social[56] and economic[57] values for Romans' could have been a *Ferula* species, although some authors argued that it was either a variety of *Thapsia garganica* or *Margottia gummifera*.[58] Ancient plant names such as (μώλυ) and silphium[59] (σἰλφιον) might also reveal the author's fascination with antiquity, as well as some knowledge of historical aspects of botany.[60] Also, there is a quotation to manna[61] [g2'] that might

[50] J. Clay, *The Planktai and Moly. Divine Naming and Knowing in Homer*, "Hermes", n. 100, 1972, pp. 127-131.

[51] E. Fabbricotti, *Silphium in Ancient Art*, "Libyan Studies", n. 24, 1993, pp. 27-33.

[52] J. Stannard, *The Plant Called Moly*, "Osiris", n. 14, 1962, pp. 254-307.

[53] A. Plaitakis-R.C. Duvoisin, *Homer's Moly Identified as Galanthus Nivalis L. Physiologic Antidote to Stramonium Poisoning*, "Clinical Neuropharmacology", n. 6, 1983, pp. 1-5.

[54] R. Kandeler-W.R. Ullrich, *Symbolism of Plants. Examples from European-Mediterranean Culture Presented with Biology and History of Art. March. Silphion and Narthex*, "Journal of Experimental Botany", n. 60, 2009, pp. 715-717.

[55] M. Helbig, *Physiology and Morphology of σἰλφιον in Botanical Works of Theophrastus*, "Scripta Classica", n. 9, 2012, pp. 41-48.

[56] H. Koerper-A.L. Kolls, *The Silphium Motif Adorning Ancient Libyan Coinage. Marketing a Medicinal Plant*, "Economic Botany", n. 53, 1999, pp. 133-143.

[57] M. Kiehn, *Silphion Revisited*, "Medicinal Plant Conservation", n. 13, 2007, pp. 4-8.

[58] S. Amigues, *Des plantes nominées moly*, "Journal des Savants", n. 1, 1995, pp. 3-29.

[59] C. Haas, *Le Silphium de Cyrınaoque, une plante mıdicinale aujourd'hui disparue. Silphium from Cyrenaica, an extinct medicinal plant*, "Bulletin de l'Académie Nationale de Médecine", n. 192, 2008, pp. 153-160.

[60] J. Day, *Botany Meets Archaeology. People and Plants in the Past*, "Journal of Experimental Botany", n. 64, 2013, pp. 5805-5816.

[61] C.C. Toma et al., *Manna. The Ancient Vegetal Product between Faith and Medicine*, "European Journal of Science and Theology", n. 10, 2014, pp. 199-207.

be either the lichen[62] *Lecanora esculenta*, or juice from the plant *Fraxinus ornus* variety *rotundifolia*.[63]

Blossoming plants

Among the flowering plants – e.g. centaury (*Centaurea cyanus*) [a8, e1'], chicory (*Cichorium intybus*) [e1'], cyclamen (*Cyclamen* sp.) [g3', l5', u4', u5, x8, y7], dittany (*Origanum dictamnus*) [i8], euphrasia (*Euphrasia* sp. [e1'], lily-of-the-valley (*Convallaria majalis*, e1, g3, l5', t8', y7), loosestrife (*Lythrum salicaria*, a4', d7'), melilot (*Melilotus officinalis,* e1', k2', l5, y7, y8), ranunculus (*Ranunculus* sp.) [e1', k7, l5', y8] and periwinkle (*Vinca* sp.) [e8', l8', t3', u6', z5'] – roses were the most frequently cited in textual passages (as it has previously been mentioned in "Verbal, Verde beauties and rarities"). In the *HP* also includes citations linked to five-petalled [g4', k4', k5] and hundred-petalled [l5', z5'] roses, which indicate wild roses and the horticultural breeding of roses, respectively. The plant hyacinth quoted in three textual passages [g3', l2', o6'] might refer to gladioli species[64] (*Gladiolus* sp.), because the first bulbs of the heavily scented hyacinth (*Hyacinthus orientalis*) had been brought from the eastern Mediterranean[65] and were cultivated in the botanic garden at Padua,[66] shortly after its foundation in 1545.

Furthermore, flowering plants have been presented in the *HP* by colour order [e1', e2]. For yellow there were crowfoot (*Ranunculus* sp.), sweet clover (*Melilotus* sp.) and oxeye (*Buphthalmum salicifolium*). For blue there were satyrion (*Orchis* sp.), centaury (*Centaurea cyanus*) and eyebright (*Euphrasia* sp.). For azure there were chicory (*Cichorium intybus*) and periwinkle (*Vinca* sp.). For white there were myrtle (*Myrtus communis*) and lily-of-the-valley (*Convallaria majalis*),

62 R.A. Donkin, "*The Manna Lichen*". *Lecanora esculenta*, "Anthropos", n. 76, 1981, pp. 562-576.

63 S.G. Harrison, *Manna and Its Sources*, "Kew Bulletin", n. 5, 1950, pp. 407-417.

64 D.J. Mabberley, *The Plant-Book. A Portable Dictionary of the Vascular Plants*, Cambridge, Cambridge University Press, 1998, p. 350.

65 C.D. Darlington-J.B. Hair-R. Hurcombe, *The History of the Garden Hyacinths*, "Heredity", n. 5, 1951, pp. 233-252.

66 D.E. Rhodes, *The Botanical Garden of Padua. The First Hundred Years*, "The Journal of Garden History", n. 4, 1984, pp. 327-331.

and for purple there were cyclamen (*Cyclamen* sp.), dittany (*Origanum dictamnus*) and loosestrife (*Lythrum salicaria*). Varicoloured flowering plant taxa quoted in the text, such as violets with sky-blue, yellow and white flowers, gladioli with blue and purple flowers, jasmines with red, yellow and white flowers, and roses with scarlet and white petals, were also associated with certain virtues.

Odoriferous substances

Odoriferous natural substances were cited in the *HP*; in fact, labdanum[67] [r6', t5'] (a sticky brown resin extracted from leaves of the shrubs *Cistus ladanifer* and *Cistus creticus*, species of rockrose), mastic[68] [a8, o5, u3', y6] (the resin of *Pistacia lentiscus* variety *chia*[69] and two types of storax [o5, r6', u6', y6], i.e. scented exudates from either the liana *Styrax officinalis*[70] or the tree *Liquidambar orientalis*[71] were widely used in ancient and medieval times in the eastern Mediterranean. Other odoriferous substances from frankincense trees [r6'] and myrrh[72] [u6'], benzoin, amygdaloid-benzoin or almond-benzoin [o5, r6'] derived from *Styrax*[73] resin and mixed with almonds[74] provide an insight into exotic plant resources and cosmopolitism.[75] Furthermore, odoriferous,

67 K. Deforce, *The Historical Use of Ladanum. Palynological Evidence from 15th and 16th Century Cesspits in Northern Belgium*, "Vegetation History and Archaeobotany", n. 15, 2006, pp. 145-148.

68 P. Freedman, *Mastic. A Mediterranean Luxury Product*, "Mediterranean Historical Review", n. 26, 2011, pp. 99-113.

69 Uniquely cultivated in the southern part of the Aegean island of Chios in Greece.

70 G. Tayoub et al., *Composition of Volatile Oils of Styrax (Styrax Officinalis L.) Leaves at Different Phenological Stages*, "Biochemical Systematics and Ecology", n. 34, 2006, pp. 705-709. P.W. Fritsch, *Phylogeny of Styrax Based on Morphological Characters, with Implications for Biogeography and Infrageneric Classification*, "Systematic Botany", n. 24, 1999, pp. 356-378.

71 F. Yaltrik-A. Efe, *Liquidambar orientalis*, "Curtis's Botanical Magazine", n. 17, 2000, pp. 66-71. M. Öztürk et al., *Ecology of Tertiary Relict Endemic "Liquidambar orientalis" Mill. Forests*, "Forest Ecology and Management", n. 256, 2008, pp. 510-518.

72 A.O. Tucker, *Frankincense and Myrrh*, "Economic Botany", n. 40, 1986, pp. 425-433.

73 S. Amigues, *Le styrax et ses usages antiques*, "Journal des Savants", n. 2, 2007, pp. 261-318.

74 M. Hovaneissian et al., *Analytical Investigation of Styrax and Benzoin Balsams by HPLC-PAD- Fluorimetry and GC-MS*, "Phytochemical Analysis", n. 19, 2008, pp. 301-310.

75 P. Freedman, *Spices and Late-Medieval European Ideas of Scarcity and Value*, "Speculum", n. 80, 2005, pp. 1209-1227.

natural products being extracted from plants might indicate transportation[76] motivated by trading, migration and conquest.

The botanic content of the *HP* constitutes a textual source of information for the functioning and featuring of plants, in a time when comparable sources are very scarce.[77] During the first years of printing, texts with botanical content were popular; however, they were not intended as general handbooks for the public, but rather as reference books for those with knowledge.[78] The frequency of vegetative references in the *HP* might reflect the importance of plants to everyday life, at the turn of the 15th century.[79] For example, plants such as arbutus, myrtle, laurel, box tree, cedars, cypress, fig tree, oleander, wild and cultivated olive trees,[80] labdanum, oregano, pines, oaks, thistles, thyme and vines, all quoted in the *HP*, are connected with the Mediterranean aesthetic;[81] whereas, citron, date palm, frankincense trees, banana, pepper, pomegranate, sandalwoods and jasmines mentioned in the *HP*, were introduced in the Mediterranean region.

Fruit-bearing plants

Fruit-bearing plants quoted in the *HP* include almond (*Prunus dulcis*) [g3, s8'], apple (*Malus* sp.) [d1, g4', m3', t3', u6'], apricot (*Prunus armeniaca*) [t5'], banana (*Musa* sp.) [m3'], chestnut (*Castanea sativa*) [d7], damascene plum (*Prunus damascena*) [t5'], date palm (*Phoenix dactylifera*) [a7, m3', A1'], orange (*Citrus sinensis*)

[76] F.N. Howes, *Age-Old Resins of the Mediterranean Region and Their Uses*, "Economic Botany", n. 4, 1950, pp. 307-316. W. Beinart-K. Middleton, *Plant Transfers in Historical Perspective*, "Environment and History", n. 10, 2004, pp. 3-29. K.V. Sykora, *Plants in the Footsteps of Man*, "Endeavour", n. 8, 1984, pp. 118-122.

[77] Ü. Sillasoo, *Plants in Late Medieval Festivals and Customs in Written and Pictorial Sources from Southern Central Europe*, "Environmental Archaeology", n. 14, 2009, pp. 76-89.

[78] E.J. Buenz et al., *Techniques. Bioprospecting Historical Herbal Texts by Hunting for New Leads in Old Tomes*, "Trends in Pharmacological Sciences", n. 25, 2004, pp. 494-498.

[79] K.M. Reeds, *Renaissance Humanism and Botany*, "Annals of Science", n. 33, 1976, pp. 519-542.

[80] S. Rhizopoulou, *"Olea europaea" L. A Botanical Contribution to Culture*, "American-Eurasian Journal of Agricultural & Environmental Sciences", n. 2, 2007, pp. 382-387.

[81] J. M. Muñoz-J. Alcántara, *The Value of Indicator Species for Landscape Characterization*, "Plant Biosystems", n. 147, 2013, pp. 418-428.

[e1', e8, g1', l8', m3', u1, y1, z6], citron (*Citrus medica*) [e8, m3', t1, u1, z6], lemon (*Citrus limon*) [e1', e8, t1, u1, z6], lime (*Citrus aurantiifolia*) [a6', e1', m3', s8], olive trees (*Olea europaea*) [a6', c1, g2', t1, u3', y1, y6], pear (*Pyrus communis*) [t4'], pine (*Pinus* sp.) [d7, d7', g2', l7', m3, m3', s8, u3, u4', z3', z6], pistachio (*Pistacia vera*) [g3', m3', t5'], pomegranate (*Punica granatum*) [g5', m3', s8', x1'], quince (*Cydonia oblonga*) [m3'], strawberry (*Fragaria* sp.) [e1'], vine (*Vitis vinifera*) [a3, f5, l2', l4', q3', s8, A6] and walnut (*Juglans regia*) [s8']. In northern Italy, during the late Medieval period, fruit was a symbol of social standing,[82] which probably explains the intensive cultivation of fruit-bearing trees, from the end of the 13th century.[83] Also, during Middle Ages, cosmological views extolled plant tissues grown close to the sky and deprecated plant tissues grown into and/or close to the ground; the taller the plant, the longer the digestion process, and the inferior earthbound sources were transformed into some kind of superior, more ethereal plant material.[84]

Medicinal plants

The medicinal use of plants was rarely mentioned in the *HP*, although of extreme interest in that era;[85] according to my research three botanical items with medicinal use are quoted in the *HP*: a) the sow-bread that "hinters child birth" [d6], b) the garlic that "heals human eyes" [n7] and c) the umbelliferous panacea [a7], i.e. a remedy held in high repute among the ancients for its medicinal virtues, most probably linked to a species of Umbelliferae.[86]

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82 J. Janick, *Fruits and Nuts of the Villa Farnesina*, "Arnoldia", n. 70, 2012, pp. 20-27. M.B. Mazzanti et al., *Plant Use in a City in Northern Italy during the Late Mediaeval and Renaissance Periods. Results of the Archaeobotanical Investigation of "The Mirror Pit" (14th-15th Century* a.d.*) in Ferrara*, "Vegetation History and Archaeobotany", n. 14, 2005, pp. 442-452.

83 M. Montanari, *Food is Culture*, New York, Columbia University Press, 2006.

84 A.J. Grieco, *The Politics of Pre-Linnaean Botanical*, "I Tatti Studies. Essays in the Renaissance", n. 4, 1991, pp. 131-149.

85 R. Palmer, *Medical Botany in Northern Italy in the Renaissance*, "Journal of the Royal Society of Medicine", n. 78, 1985, pp. 149-157.

86 M.G. Pimenov-L. Constance, *Nomenclature of Suprageneric Taxa in Umbelliferae/Apiaceae*, "Taxon", n. 34, 1985, pp. 493-501.

Seasonality

Phenological traits of plants, mentioned in the *HP*, also reveal the seasonality of Mediterranean ecosystems, e.g. late summer, when branches of myrtle [e2] and carob trees hung with berries and long ripe fruits [f4'], autumn when the fruitful vines [a3] lost their greenness and the sweet weigh of their sap [a4'], and the evergreen arbutus shrubs are red-fruited [z6]. While, colourful garlands [df', o5'] consisted of amethystine violets (*Viola* spp.), crimson and scarlet roses (*Rosa* spp.), myrtle (*Myrtus communis*), laurel (*Laurus nobilis*) and lysimachia (*Ranunculus*) coincide with spring, i.e. the main flowering season in the Mediterranean region.[87] In addition, the seasonality has been presented in the *HP* as an integral quality of ecosystems, e.g. the flowering spring [m4'], the yellow harvest [l6, m5] and the autumn vintage [m5].

Mediterranean landscapes preserve cultural, historical and biological memory; it is well known that Mediterranean ecosystems[88] have been affected by long-term socio-economic impact and anthropogenic activities, which profoundly influenced the functionality, the diversity and the distribution of plant species. Nowadays, there is a great concern for the particularly rich biodiversity of this region, which has been identified as one of the world's biodiversity hotspots.[89]

Symbolism

In the *HP* there is a connection between virtues (the spiritual) and plants (the mundane), which compose powerful repertories of symbolism in manu-

87 S. Rhizopoulou-H. Pantazi, *Constraints on Floral Status of successively Successively Blossoming Mediterranean Plants under Natural conditions*, "Acta Botanica Gallica", n. 157, 2015, pp. 97-102.

88 S.D. Paich, *Where Olive, Lemon and Laurel Trees Grow. A Diachronic Examination of Cultural Similarities under Different Names in Greater Mediterranean History*, "Journal of Intercultural Studies", n. 31, 2010, pp. 313-328.

89 F. Medail-P. Quezel, *Hot-Spots Analysis for Conservation of Plant Biodiversity in the Mediterranean Basin*, "Annals of the Missouri Botanical Garden", n. 84, 1997, pp. 112-127.

scripts.[90] Therefore, laurel was linked to immortality [f7', l6', z6] and oaks to strength, while firs and osiers to vulnerability and flexibility [m3']. Cane and reed were presented as symbols of emptiness [A6']. Aloe, cypress and oleander were symbols of bitterness [p3]. Junipers symbolised eternity [m3'], immortality and date palm victory [m3']. Flowering jasmine [g2', i3, s7', y1] was the symbol of divine love and happiness, and roses were cited as the floral symbol of affection, beauty and love [g7, t2].

Relevant woodcuts

The *HP* owed part of its fortune to its woodcuts.[91] It was estimated that out of the 172 greatly influential woodcut illustrations[92] in the *HP* with aesthetic, historic and symbolic associations, 53 illustrate botanical elements, as features of diverse landscapes and gardens sceneries, which include trees, i.e. palms (*Phoenix* sp.) [a7, p3'], olive trees (*Olea europaea*) [a6', e1] and cypresses (*Cupressus* sp.) [i2, z7, z8], leaves of grapevine (*Vitis*) [m5] and ferns.[93] The above mentioned illustrated, though simplified, plants have been found to grow in archaeological sites of the Mediterranean region.[94] The representation of plants in woodcuts of the *HP* might also stimulate a relationship with readers, even if that was not the primary purpose of the narrative. The *HP* would probably rather be considered as a cultural text (a combination of words and images) than as the idiosyncratic work of an individual.[95]

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[90] S. Rhizopoulou, "*Portrayals" of Long-Lived Mediterranean Plants Linked to Virtues*, "Plant Biosystems", n. 148, 2014, pp. 1358-1361.

[91] M.L. Gibbs, *Aldus Manutius as Printer of Illustrated Books*, "*The Princeton University Library Chronicle*", n. 37, 1976, pp. 109-116.

[92] G. Pozzi, *Un livre illustré exceptionnel. Le Polyphile in Sur le livre Vénitien (XV-XVIII siècles)*, "Revue des Etudes Italiennes Paris", n. 27, 1981, pp. 364-373.

[93] A. Kumbaric-G. Caneva, *Updated Outline of Floristic in Roman Iconography*, "Rendiconti Lincei", n. 25, 2014, pp. 181-193.

[94] S. Rhizopoulou, *Symbolic Plant(s) of the Olympic Games*, "Journal of Experimental Botany", n. 55, 2004, pp. 1601-1606.

[95] Doubts concerning the authorship of the *HP* and its illustrations, and the circumstances whereby it reached the Aldine Press have fostered a particular kind of criticism.