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‘Where have all the flowers grown’: the relationship between a plant and its place in sixteenth-century botanical treatises

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ABSTRACT

The article investigates Renaissance naturalists’ views on the links between plants and places where they grow. It looks at the Renaissance culture of botanical excursions and observation of plants in their natural environment and analyses the methods Renaissance naturalists used to describe relations between plants and their habitat, the influence of location on plants’ substantial and accidental characteristics, and in defining species. I worked mostly with printed sixteenth-century botanical sources and paid special attention to the work of Italian naturalist Giambattista Della Porta (1535–1615), whose thoughts on the relationship between plants and places are original, yet little known.

Keywords: History of Botany, History of Ecology, History of Empiricism, Giambattista Della Porta

ARTICLE

Introduction: Context Matters

In the context of emergence of modern botany, some historians speak of a ‘decontextualization’ of plants. In the sixteenth century, we witness the development of new practices and methodological approaches which took plants out of their natural environment and placed them in new contexts. Plants were transplanted, pulled out, and dried to be measured and compared (JACOBS 1980; ATRAN 1990: 134; OGILVIE 1996: 222). But that is only part of the story of flourishing specialised interest in plants in the sixteenth century. Andrea Ubrizsy Savoia recently drew attention to the fact that Renaissance scholars were also interested in the relationship between plants and their environment. She showed that although ecology became a separate branch of science only in the nineteenth century, precursors to ‘ecological thinking’ can be found already in classical texts and in sixteenth-century botanical treatises references to the close relationship between plants and their environment are increasingly frequent (UBRIZSY SAVOIA 1998; ZEMANEK, UBRIZSY SAVOIA, ZEMANEK 2007).

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Although interest in the role of fieldwork in the formation of botanical disciplines has been growing, questions pertaining to the relationship between plants and their environment in the Renaissance are still insufficiently explored. The sixteenth century has been described as a time when empiricism played an increasingly important role in the investigation of nature: naturalists observed plants in their natural environment repeatedly and personal experience with particular species became an important part of the practice of Renaissance natural history. Excursions, fieldtrips, and observations *in situ* flourished and recently, historians of science started emphasising the role of empirical knowledge, sensory experience, and direct observation of nature in Early Modern science. Plants imported from the New World provided new impulses to various investigations into acclimatisation and spurred further exploration of new forms.¹ Experimentation with plants in Early Modern science has also been recently noted. This aspect of interest in plants was closely linked to agricultural and horticultural practice and lively contemporary discussions about plant cultivation and plant manipulation often touched upon questions of nutritional conditions and properties of particular places.² While this part of enquiry focused mainly on cultivated plants and places where they were grown (fields and gardens), we shall see that consideration was also given to wild plants and their relation to particular places and their environmental conditions. By ‘places’, *loci*, are meant particular types of natural locations with specific environmental conditions, such as meadows, marshes, mountains, etc. In other words, places characterised by certain humidity, shadiness, temperature, quality of soil, and other factors, rather akin to what we would nowadays call ‘habitat’.³

In the following, we shall first learn more about the nature of Renaissance field work. In particular, I outline how naturalists perceived particular places during their field trips and how they observed and described the changes in vegetation and in the appearance of particular species caused by different environmental conditions. Secondly, I investigate some methodological approaches adopted to deal with descriptions of places. Many of these methods were inspired and adapted from botanical treatises by classical authors. And finally, I explore the work of naturalists who went further in their theoretical reasoning about places and developed novel concepts of the causal relationship between plants and their place.

Most sources this contribution draws on come from the time of the ‘botanical Renaissance’, a period often defined by the dates of publication of two botanical treatises. At its beginning was the first Latin edition of Theophrastus (1483) and at its end the comprehensive opus of Caspar Bauhin (1623) (MORTON 1981: 100, 115, 148 and ZEMANEK 1998: 11–12). The first half of the article deals with sources of a predominantly descriptive nature, such as herbals by Hieronymus Bock, Leonhart Fuchs, Pietro Andrea Mattioli, and Jacques Daléchamps. These works do not aim at describing causal relationships between the properties of plants and properties of places where the plants grow. The second half of the article focuses on more philosophical works, which addressed questions such as how a place where a plant grows influences its characteristics, appearance, and medicinal powers. I examine works by Girolamo Cardano, Julius Scaliger, and Andrea Cesalpino, with special attention to the work of Italian naturalist Giambattista Della Porta. Della Porta developed the most comprehensive conception of the relation between plants and places and his thoughts on plants and their habitat are quite remarkable, and yet little known.

1 For recent research in the history of field work, see, e.g. EGMOND (2017b) and MACGREGOR (2018). For the importance of direct experience for Renaissance naturalists and physicians, see DEAR (2008), STOLBERG (2013), KLERK (2014). For some recent examples of treatment of New World specimens, see, e.g., ČERNÁ (2016), GIGLIONI (2018).

2 For more on the experimental approach to plants in Early Modern Era, see especially MATEI (2018) and BALDASSARI (2018). On the history of gardens and horticulture, see FLEISCHER (2010), FLEISCHER (2016), and RODRIGUES (2017).

3In the following, I refrain from discussing investigation of plants from distant geographical regions. It is a specific subject that would require a more extensive treatment because it opened novel questions, such as whether exotic plants can be used to heal local diseases, the issue of acclimatising them in Europe, etc. For more on this subject, see esp. COOPER (2007), OGILVIE (2006).

In general, it could be said that descriptive treatises on plants belong to natural history, while works of a more philosophical leaning belong to natural philosophy, but a strict distinction between the two fields, a division of Renaissance authors in two groups, is not well justified. The definition of Renaissance natural history and natural philosophy is a complex issue and in practice, these fields overlapped, influenced one another, and the content and meaning of both of these terms changed and shifted over time.⁴ Nevertheless, as Florike Egmond recently pointed out, it is fair to say that some Renaissance naturalists were not very interested in the metaphysical aspect of botanical studies: they focused on carefully collecting plants, describing them, and listing their characteristics (EGMOND 2018: 179 and 2017b: 39–40). Unlike the more theoretically oriented authors, they usually made no claims about causal relations between a plant and its habitat and did not attempt to formulate general rules about plant distribution. Oana Matei and Fabrizio Baldassari in their introduction to the special issue on botanical practices and natural philosophy mention also the two directions in Renaissance botany.

Plant collecting, res herbaria, and catalogues unfolded the knowledge of this period as directed at specimens, and aimed to define a way of classifying plants [...] In parallel with this endeavour, another scholarly inquiry into flora aimed to distinguish between the innate principles of herbs, and thereby to reveal the sympathetic links between the vegetal world and minerals, stars and parts of the human body. (BALDASSARI & MATEI 2018: 414f).

The following analysis includes both directions. Their main features are illustrated using particular cases, that is, concrete representatives whose work should hopefully demonstrate the main strategies, approaches, and methods which Renaissance botanists adopted when talking about the relationship of a plant and its place.

Through the Dark Forests and Deep Valleys: Observing Places in the Field

The roots of botanical exploration of plants in their natural environment reach to late fifteenth century, but the bloom came in the sixteenth century (EGMOND 2018: 203). Wandering through the landscape was highly praised and botanists often described the beauties and difficulties of their trips and the diversity of habitats in introductions to their treatises. The German botanist Leonhart Fuchs (1501–1566) thus sung praises to ‘wandering around forests, hills, meadows, and other places festooned and decorated by the most beautiful flowers or plants’ (FUCHS (1542: a2v), while his colleague Hieronymus Bock (1498–1554) complained about ‘the fear, the worry, immeasurable amount of work, hunger, thirst, and heat, the horrible, long, and meticulous travels again and again through German forests, hills, valleys, and wide plains’ (BOCK (1552: praef).⁵ Pietro Andrea Mattioli (1501–1577), a famous Italian physician and commentator of Dioscorides’ classical text, described the diversity of places he passed through during his field trips as follows:

... now through dark and dense forests, now on lofty and steep mountains, now on gentle and pleasant hills, now in hazy and chilly valleys, now in dark caves, now in muddy and wet marshes, now near sparkling springs, now through meadows full of herbs and flowers, now through the fertile fields, now along river banks and the coast of vast seas [...] now through private gardens of the most famous and important cities. I have wandered with great effort. (MATTIOLI (1549: praef) ⁶

In a sense, these descriptions were a fashionable literary genre but more often than not, they captured a personal experience and personal perception of the struggles and joys of fieldtrips. Excursions and field trips soon

⁴ For recent discussions about the meaning of natural history in Early Modern Era, see, e.g., FINDLEN (1996), JALOBÉANU (2012), BALDASSARRI (2014).

⁵ For Hieronymus Bock’s travels, see EGMOND (2018: 177) and HOPPE (1969).

⁶ Translation quoted from EGMOND (2018). For Pietro Andrea Mattioli’s field work, see EGMOND (2018: 170) and CIANCIO (2015: 36).

became a collective instrument and a sort of fashion among naturalists.

Descriptions of habitat were part of the notes taken during fieldtrips and they also appeared in printed botanical works. Naturalists often emphasised their personal experience with a particular plant in nature, for instance Pietro Andrea Mattioli mentions in his herbal that he observed alpine valerian in the mountains near Gorizia or saw viper's bugloss in various dry locations in Etruria, Trident, and Gorizia (MATTIOLI 1569: 29–30, *Valeriana celtica* and 1569: 638, *Echium*).⁷ In Leonhart Fuchs' herbal, we find a special paragraph entitled *locus*.⁸ It was part of each plant's description and contained information about the kind of place where a particular plant grows. Fuchs for instance describes that western wild ginger grows in shady places, mainly in the mountains and in forests, and seems to be partial to harsh, poor, and dry places,⁹ or that cleavers grows in fields and gardens, around fences and walls.¹⁰ Such information about preferred habitat thus provided practical clues as to where a plant could be found (and either observed or collected for medicinal or scientific purposes), but also demonstrated the naturalist's empirical knowledge of plants and their habitats, which contributed to the author's credibility and reputation within the relevant botanical circles.¹¹

Sometimes, sixteenth-century botanical materials even include visual representations of plant habitats. For example, the Italian painter Gherardo Cibo (1512–1600) produced an interesting collection of paintings which depict plants in their natural habitat.¹² His depictions sometimes even include people who botanise, observe, or gather plants. Florike Egmond notes that the landscape in Cibo's paintings is usually not a real place (EGMOND 2017a: 111–113). The depicted environment was supposed to serve as an aid to recognising a particular plant and the kind of context in which it is likely to be found.

In printed herbals, depictions of habitat are rather rare. More frequently, plant's typical location was described verbally in the text. Nevertheless, exceptions can be found, for instance in the case of plants that have no proper distinguishing marks (distinctive blossoms, leaves, etc.) and which may therefore be difficult to identify by other means. For example, the common duckweed, a tiny and humble plant, was often depicted with its entire habitat, usually a small pond (see Figures 4 and 5). Unlike the depictions of plants, which in this period became quite elaborate, these illustrations of habitat probably did aspire to high accuracy.¹³ Their purpose was to serve as a kind of clue or mnemonic tool that would help with recognition of the plant species in question.

Excursions first led naturalists to their vicinity, to university grounds, private gardens, and behind the city walls, but soon they started to venture to places that were more special. This is linked to the origin of a new genre, the local floras.¹⁴ The very first floras of particular interesting places started to appear in mid-sixteenth century and in the 1590s and 1600s, the genre flourished.¹⁵ For example, the Swiss botanist Conrad Gessner (1516–1565) published a detailed report from his field trip to Mont Pilatus, a mountain near Lucerne, in his *Descriptio Montis Fracti*

7 Here and in the following, trivial English names for plants are used in the main text and the original Renaissance names in the footnotes.

8 The term *locus* implies a particular place. In sixteenth-century treatises, we also find the term *situs*, which tends to have a broader connotation and is meant rather as a category. For example, the French physician Benoit Textor (more on him below), uses a category of *situs* which includes *aprica loca* (sunny places), *umbrosa loca* (shady places), etc. See TEXTOR (1534: 16v).

9 *Asarum*. Nascitur in umbrosis locis, montibus potissimum et sylvis, aspera enim macraque & sicca loca amat. (FUCHS 1542: 9)

10 *Aparine*. Nascitur in frumentario agro, aut hortis circa sepes et maceris. (FUCHS 1542: 51)

11 For more on the importance of experience with living nature in establishing scientific authority, see, e.g. FINDLEN (1994: 156f).

12 Cibo collected a large herbal of dried plants. He botanised mainly in the region of Marche and Umbria, but also during his travels abroad. See TOMASI (1989: 205, 212); FINDLEN (1994: 166–169); EGMOND (2018: 172–174); EGMOND (2017a: 111–113).

13 For a discussion of the role of images in Renaissance natural history, see KUSUKAWA (2012) and EGMOND (2017a). A nice overview of recent literature on the subject is provided by Alexander Marr (2016).

14 Cooper noticed that the field trips were usually centred on the human world, that is the town and its surroundings which anchored the investigations of local floras. This was then echoed in the titles of the floras (COOPER 2007: 84–85).

15 EGMOND (2018: 194).

(1555). Most famous, however, were probably the field trips to Monte Baldo, a mountain near Lake Garda. All important Italian naturalists of the time visited that place, including Luca Ghini, Pietro Andrea Mattioli, Ulisse Aldrovandi, and others.¹⁶ Two printed works came out from these field trips: *Il viaggio di Monte Baldo* (1566) by Francesco Calzolari (1521–1600), Italian pharmacist and founder of a famous museum in Verona, and *Descriptio montis Baldi* (1600) by Giovanni Pona (1565–1630), a Veronese apothecary. Local floras provided naturalists with an opportunity to focus on a restricted number of species. These could then be described in a different context than was common in the large encyclopaedic herbals, such as those by Fuchs or Mattioli, who aimed at describing of a wide range of species mentioned by the classical authorities, adding species which were newly discovered. With the ever-growing number of known plant species, this approach became ineffective and untenable.¹⁷

Local floras also included information about particular places and their conditions as well as about plant variability due to the environment. For instance, Gessner noticed that vegetation changes as altitude increases. He observed that plants such as violas, coltsfoot, or butterbur, which in the plains bloom in the spring, in the mountains flower in summer or even in autumn.¹⁸ This is why he describes mountaintops as places of ‘everlasting winter’, while places at lower elevation have the appearance of the spring, and yet lower, one finds summer vegetation. Savoia Ubrizsy notes that Calzolari in his work praised the exceptional plant diversity of Monte Baldo, linking it to the special diversity of climate (*air*) on the mountain. Pona in his treatise mentions many places visited during the trip and he connects each such place to a list of plants that grow there. He even noticed some adaptations, as in the case of one variety of speedwell that has tiny blackish roots with fibres which attach themselves to the rough rocks, so it is difficult to pull them out (with a mattock).¹⁹ When focusing on a microcosm of a given place, when observing the changes in vegetation within a restricted area, naturalists had a better opportunity to realise that there exists a connection between plants and particular environments.

Places on the List: Methodological Approach to Habitat

With the increasing number of empirical field observations, the need for some methodological framework for plant studies had also increased and naturalists experimented with various tools that would help them grasp the diversity of newly found species. The methodological background was provided by classical authors, whose texts included examples and clues as to how one should proceed when observing and describing plants and their parts.²⁰

Methodological issues were discussed in detail especially by Aristotle’s pupil Theophrastus, who provided a comprehensive account of phenomena connected to plants in his *De historia plantarum* and *De causis plantarum*. His contribution to Early Modern botany is interesting especially because his work was not known in Europe during the Middle Ages.²¹ For some theoretical issues, Renaissance naturalists also consulted a pseudo-Aristotelian treatise *De plantis*.²² Especially in his *Historia plantarum*, Theophrastus deals with particular plant parts in terms of

16 For more details on field trips to Monte Baldo, see FINDLEN (1994: 180f), UBRISZY SAVOIA (1998: 77), EGMOND (2015: 83f), and EGMOND (2018: 176).

17 Nicholas Jardine and Emma Spray point to the importance of focusing on local floras and creating a ‘decentred’ natural history, since naturalists from different places naturally perceived different natural worlds (JARDINE, SPRAY 1996: 7).

18 *Viola, bechion, petasites*. GESNER (1555: 46). See LEU (2016: 267).

19 *Veronica petrea semper virens. Habet radices parvas fibrosas ac nigricantes, quae ita saxis illis horridis paucissima commixta terra includuntur et adherescunt, ut difficilime etiam ligonibus evelli possint* (Pona 1600, 336).

20 In his *Materia medica*, Dioscorides provided the best and most detailed plant descriptions, while Pliny’s *Historia Naturalis* was a source of information about various exotic and peculiar *naturalia* and Galen in his *De simplicium medicamentorum facultatibus* left the most accurate descriptions of the healing powers of plants. See REEDS (1976: 522) and FINDLEN (1994: 61).

21 The manuscripts were brought not before the beginning of the fifteenth century from Constantinople and translated into Latin by Theodoro Gaza around 1450 (SCHMITT 1972).

22 *De plantis* was believed to be a compilation of some of Aristotle’s lost writings on plants and some botanical texts of Theophrastus. Later, the au-

differentiae (αι διαθοραι), i.e. their distinguishing characteristics.²³ In the first book of *Historia plantarum*, he emphasises the importance of habitat as one of the *differentiae*:

And it is perhaps also proper to take into account the situation (τοπούς) in which each plant naturally grows or does not grow. For this is an important distinction, and specially characteristic of plants, because they are united to the ground and not free from it like animals.²⁴

The approach of Renaissance scholars to classical authorities was highly varied and creative: they discussed plant names and morphological terms used in these sources, compared them, and revisited old transcriptions and translations of classical sources. The *Stirpium differentiae* (1534), a treatise by the French physician Benoit Textor (1520–1556) about the distinguishing characteristics of plants, provides a wonderful example of thorough philological work. It includes a list of terms used in the Latin translation of Dioscorides' classical text to describe various plant qualities and quantities: their colours, odours, size, number of leaves and flowers etc. Among these, we also find a category of habitat (*situs*). Textor's work provided an exhaustive list of habitats, each connected with a plant or plants which should grow there according to Dioscorides. For example, plants attached to sunny places (*aprici loci*) include the cornflower, athamanta, delphinium, and so on.²⁵ In shady places (*umbrosi loci*), we should be able to find tarragon, forget-me-not, mouse-ear, etc.²⁶ Textor lists a total of 46 types of habitat, including sunny places, shady places, mountains, promontories, steep places, rocky places, enclosed valleys, and so on (see Figure 1). In some cases, Textor subdivides a type of habitat, for instance mountains are divided in high mountains, tops of high mountains, sharp peaks, and so on. Some of the habitats he describes are quite specific, for instance old mossy trees, a place where one can often find ferns.

A division of plants according to their habitat was also proposed by Ulisse Aldrovandi (1522–1605), a famous Italian naturalist and professor of natural history at the university of Bologna, known among other things for his vast *Historia animalium*. Unfortunately, an analogical work on plants has not been published. Among his manuscripts, however, we find texts where Aldrovandi enumerates various habitats and lists plant species that can be found there.²⁷ He calls it a division of plants 'according to their birthplaces' (*a natalibus locis*). He starts with the most basic division into aquatic plants or plants of wet and moist places (*udus, humidus, aquatilis*) and terrestrial plants, i.e. plants of 'not wet but dry places' (*non udus, siccus, terrestris*) (see Figure 2). Then he divides these two main categories in further subcategories. The whole attempt to classify plants according to their birthplace is quite extensive: in addition to common habitats that readily spring to mind, he also describes some rather specific ones, such as sulphur springs (*fons sulphureus*), bubbling springs (*scatebrae aquae*), etc.²⁸

We find similar but shorter lists of plants according to places also in introductions to encyclopaedic herbals. In a foreword to his commentary on Dioscorides, Pietro Andrea Mattioli gives a few examples of particular habitats and plants that grow there. First, he mentions trees that like to grow on mountains (cedar, larch, fir, and others), in plains and highland forests (oak, Turkey oak, cork oak, etc.), or near rivers (plane, alder, poplar, and so on). Some trees can grow in several different environments, for example in mountains, valleys, plains, or forests. Sim-

thorship was ascribed to Nicolaus Damascenus (first century BCE), whose original texts were also lost but some translations survived (FUNK 2013: 250, n. 20).

²³ Theophrastus follows Aristotle, according to whom a definition should contain a *genus* and *differentia* (ARISTOTLE 1991: *Met.* 1037b29–30). See also HOPPE (1976: 34–40) and THEOPHRASTUS (1916: 1.2.3., 1.2.6.)

²⁴ Translation quoted from THEOPHRASTUS (1916: 1.4.3.).

²⁵ *Centaureum mains*, *Daucus creticus*, *Delphinium* (TEXTOR 1534: 16v).

²⁶ *Dracunculus*, *Myosota*, *Muris auricula* (TEXTOR 1534: 16v).

²⁷ For more details on Aldrovandi's 'Syntaxis Plantarum', see MORINI (1907) and UBRIZSY SAVOIA (2006).

²⁸ Bologna, Biblioteca Universitaria, ms. Aldrovandi 81 (154v, 158r). Accessible at <https://amshistorica.unibo.it/207>.

ilar distinctions also can be observed among herbs and shrubs: some grow in stagnant water, riverbanks, fields, vineyards, meadows, valleys, hills, or towns. While Textor's work is philological and he probably did not personally observe the habitats to create his list, the lists provided by Ulisse Aldrovandi and Pietro Andrea Mattioli are most likely based on their personal experience, since both of these scholars were known for their knowledge of plants in their natural environment.²⁹

We can interpret these lists as an attempt at classification of plants according to their distinguishing characteristics. It should be noted, however, that this did not create a system in a modern sense. In the abovementioned Renaissance treatises, plants are sorted not only according to their habitat, but also according to other criteria, other *differentiae*. Thus we also find lists of plants sorted according to their colours, tastes, healing properties, and so on. Habitat does not have an exclusive status in this respect. Rather than a comprehensive system of the plant kingdom, this kind of classification was for Renaissance scholars a way of bringing some order into the classical terms for particular *differentiae*. It was a way of navigating the vast diversity of plants and their characteristics. It could also help other naturalists to find a plant by noting the habitat where it typically grows or serve as an aid to defining a habitat by enumerating plants that are typical of it.

Brian Ogilvie emphasises that Renaissance naturalists were not concerned with plant classification in the modern sense. They usually viewed sorting plants as a practical and pedagogical, not a philosophical issue. In the Renaissance, most botanical works were organised intuitively, alphabetically, or according to the medical 'virtues' of plants (OGILVIE 2006: 182, 229). An interesting exception is a herbal by Jacques Daléchamps (1513–1588), alongside Mattioli's herbal one of the most extensive encyclopaedic herbals produced during the Renaissance (ARBER 1912: 99). Daléchamps arranged his herbal in a rather unusual way. He ordered some chapters according to what we would call the ecological needs of plants, so there is for instance a chapter on forest trees, a chapter on fruits that grow in thickets and shrubs, another one on trees grown in gardens and orchards, on cereals and plants that grow in the field, on garden plants and pot plants, on plants that grow in marshes, plants that grow in rough, rocky, sandy, and sunny places, those that grow in shady, wet, marshy, and fertile places, and plants that grow by the sea. He did not, however, implement this arrangement throughout the entire work and we also find grouping based on different principles, such as fragrant plants, umbelliferous plants, poisonous plants, etc. (DALÉCHAMPS 1586). His herbal was thus organised on the basis of – as Agnes Arber called it – a 'medley of ecological, medical, and morphological principles' (ARBER 1912: 143). Susana De Beer convincingly argues that this arrangement is the result of Daléchamps's effort to distinguish his herbal from the work of his most important competitor, Pietro Andrea Mattioli. Daléchamps speaks of the organisation of his herbal as being the one aspect where his work is quite distinctive. According to him, other scholars present the described plant species in 'undigested heaps as it were (since it was not permitted to Mattioli to choose another arrangement than Dioscorides himself)', while he managed to 'distribute them artfully in certain classes' (DE BEER 2014: 350). Nevertheless, Daléchamps did not explain why he chose the sorting principles he did. His classification can thus be viewed as an attempt to do something differently rather than an outline of a sophisticated ecologically based system of plants.

²⁹ Mattioli joined various field trips and excursions and extensively botanised in Trento; see CIANCIO (2015). Aldrovandi collected a famous herbal, still kept at the University in Bologna.

The Influence of Habitat on the Qualities of Plants

Among some scholars, the richness of the plant kingdom motivated questions concerning the relations between particular plants and the nature of genus and species.³⁰ Habitat played an important role in this respect, because a change of place can change the appearance and medicinal powers (virtues) of a plant. Sometimes, the changes in the overall habitus of a plant brought about by a change of place are small, so for example the German botanist Euricius Cordus notes that celery has a different size in his garden and in natural habitats, or that the silver cinquefoil has differently shaped leaves when growing in different places.³¹ In other cases, the difference due to different habitats is so remarkable that two similar plants that grow in different places are considered to be of a different kinds, whereby the habitat also appears as a distinguishing characteristic in their specific names. Pietro Andrea Mattioli describes a case of *Eryngium marinum* and *Eryngium montanum*. These two plants known under the same generic name grow in different habitats, whereby the former has broader leaves, prickly all around, and longer and softer root than the latter.³² But how should one decide which differences are significant enough to constitute a different species? What if some plants have different characteristics only because they grow in different places? Is the plant my colleague found during his trip to mountains the same species, or should we call it differently?

In the following, we shall see that several scholars addressed these theoretical questions and sought answers within different philosophical frameworks. For them, habitat is not only one of the distinguishing characteristics, but also a factor that can influence other plant characteristics, either accidentally or substantially. According to Gerolamo Cardano (1501–1576), an Italian naturalist, famous mathematician, and astrologer, a particular place is endowed with a special power to maintain particular species. Plants grow in particular places according to their nature.³³ This applies both to particular geographical regions, so that barley grows in Scotland, grain in Sicily, and palms in Africa, and to particular habitats, so for instance hogweed, golden shower tree, cassia, moss,³⁴ etc. grow near water, while terebinth, fig tree, spartium,³⁵ and others grow in arid places. Soil is responsible for differences between the species of one genus.³⁶ Moreover, plants can change their appearance and qualities (such as flavour, odour, colour, size, form, time of fructification, powers, and nature) due to grafting, cultivation, change of place etc. In his treatise *De subtilitate* (1550), Cardano suggests that perhaps the forms of individuals perpetually vary over time and one can therefore find different forms in different regions.³⁷

Julius Caesar Scaliger (1484–1558) responded to this passage from Cardano's work. In his *Exotericarum exercitationum* (1557), which is a polemic with Cardano, Scaliger claims that a place cannot create a form: the concept of a species is derived from a metaphysical concept of substantial form, a place cannot change a species.³⁸ Cultivation, he adds, causes only accidental changes, so the observed differences between the wild and cultivated plant forms

30 The concept of genus and species was in Renaissance botany relative. Genus was seen as a group of various forms, while species was one form from this group. Genera were thus divided in species, but species could later be treated as genera for the purpose of some subsequent division.

31 *Hipposelinon* and *Pentaphyllum*. CORDUS (1534: 109, 124); OGILVIE (2006: 135). For gardens as places of experimentation, see EGMOND (2017b: 25) and BALDASSARI (2017).

32 MATTIOLI (1569: 461).

33 *Plantae omnes sponte proveniunt certis locis* (CARDANO 1557: 109). UBRIZSY SAVOIA (1998) pointed out that Cardano had some grasp of the concept of what we would now call bioindicators.

34 *Spondylium, siliqua india, cassia, muscus*.

35 *Terebrithus, caprificus, genestra*.

36 *In universum plantae mutant saporos, odores, colores, magnitudinem, formam, tempus edendi fructus, vim, naturamque, aut insitione seu mixtione cum aliis, vel loco, vel cultura [...]* (CARDANO 1557: 127) *Varietatem soli plurimum affere diversitatis, tum species varias sub eodem genere collocatas, alias docuimus* (CARDANO 1557: 107).

37 *... vel quod formae viventium numero quorundam, & viribus Siderum constituentur, vel quod perpetuo variantur temporum successu: indicio est diversitas illorum in regionibus aliis, atque aliis, ... necnon in temporibus* (CARDANO 1550: 208v–209r); cf. BLANK (2012: 507).

38 *Altera responsio non demonstrat substantiae, fed accidentium variationem. Si enim substantia, quae una erat, alia fieret, per locum: locus esset formarum dator [...]* (SCALIGER 1557, 323v). For a detailed discussion of Scaliger's views regarding substantial forms and his response to Cardano, see BLANK (2010: 275f) and BLANK (2012: 507f).

are merely accidental, not substantial, or touching upon the nature of a plant.³⁹ Already in his earlier book, a commentary on the pseudo-Aristotelian treatise *De plantis* (1556), Scaliger points to changes in plant appearance that occur due to habitat. For example, snapdragon has white flowers in shady places and scarlet ones in other habitats.⁴⁰ He explains this phenomenon in peripatetic terms as an effect of the heat of the sun, which evaporates a certain part of the colour spectrum. Scaliger even claims that we should not call changes which are due to the conditions of habitat *differentiae*, because *differentiae* – if what we understand by the term those characteristics which distinguish among species – are more substantial. Changes due to habitat are merely accidental.⁴¹ Scaliger thus views the relationship between plants and their place and changes due to habitat as less important and essential than his contemporary and opponent Girolamo Cardano.

Another Italian physician, Andrea Cesalpino (1519–1603), was also rather sceptical about the importance of the influence of place on plant's nature. He created his own plant classification based on the peripatetic notion of essential characteristics, whereby, according to him, essential characteristics are identified mainly on the basis of plants' reproductive organs; Cesalpino excluded habitat (as well as medical virtues, usage etc.) as a principle of classification, because it is not a part of the essence of a plant, in other words, because it is merely accidental.⁴² He even criticised Theophrastus for grouping plants based on their typical habitat.⁴³ Characteristics that vary due to cultivation, place, or climate and do not contribute to the arrangement of the whole plant or its fruit – such as colours, odours, or flavours – are accidental.⁴⁴ In another passage, Cesalpino notes that small differences in leaves or flowers which are caused by cultivation or variations in the conditions of a place do not necessarily imply differences between species.⁴⁵ According to Cesalpino – as well as Scaliger – the place where it grows thus does not essentially contribute to the plant's nature. It causes only accidental changes, irrelevant to the definition of plant species or distinction among species.

Giambattista Della Porta and his *Phytognomonica*

The Neapolitan scholar Giambattista Della Porta approached the issue of relationship between plants and places from a somewhat different position than Scaliger and Cesalpino, who were both adherents of Aristotelianism. Della Porta describes the natural world as a microcosm where things are interconnected by various sympathetic relations. The only way to uncover these hidden links and the concealed inner qualities is by thorough observation and examination of the manifest external signs. Outer appearances provide us with crucial hints at the inner properties, secret virtues, and the very essence of things.⁴⁶ This assumption echoed in his examination of plants as well. Especially *Phytognomonica*, his treatise on the physiognomy of plants, contains many careful observations of plant appearances and descriptions of analogies between plant forms and other objects, such as parts of human

39 Non enim Natura, aut substantia, sed accidente differe plantas, quae in agris habentur, quae in hortis culturam sui debet [...] (SCALIGER 1557: 194r)

40 *Os leonis*, SCALIGER (1556: 104v).

41 [...] quoniam locorum viribus nequaquam videntur praescribi plantis differentiae. Differentias intelligo substantiales. Nullo nanque natura opere usquam factum fuit, ut ab accidenti substantia mutaretur. (SCALIGER 1557: 105r)

42 Idcirco neque ex facultatibus medicinalis, neque ex alia utendi ratio neque ex locis, in quibus proveniant, aut aliis huiusmodi genera eorum, et species sunt constituendae. Haec omnia accidentia sunt. (CESALPINO 1583: 26). For more about Cesalpino as a pioneer of plant systematics, see HOPPE (1976: 52) and OGILVIE (2006: 222f).

43 Theophrastus genera assumpsit vulgo nota, quae ab usu magna ex parte accepta sunt, alia a loco ut Aquatilia, Montana, et huiusmodi (CESALPINO 1583: 46). See THEOPHRASTUS (1916: 1. 4. 2.).

44 Quaecunque autem neque ad totius plantae, neque ad fructus constitutionem faciunt, ut colores, odores, sapes, et alia huiusmodi, accidentia sunt. Ideo saepe aut ex cultu, aut locorum, aut coeli diversitate variantur. (CESALPINO 1583: 29)

45 Modica enim earumdem differentia non semper speciei diversitatem facit, cum saepe ob locorum diversitatem et culturam, multum immutentur tum folia, tum flores, tum reliquae partes, ut praecipue patet in arboribus. (CESALPINO 1583: 29)

46 For Della Porta's theoretical background, see EEAMON (1996: 195f) and FREEDBERG (2003: 72–73, 202).

or animal bodies, celestial bodies, etc. Nevertheless, so far, when writing about his *Phytognomonica*, historians tended to focus on catchy examples of similarities to parts of human or animal bodies and paid little attention to the ecological aspect of this work.⁴⁷

Della Porta's theoretical concepts also had an empirical background. He founded a natural history museum in Naples.⁴⁸ Later, he became one of the first members of the famous Academia dei Lincei, where his colleagues were interested in detailed investigations of nature, used some of the earliest telescopes and microscopes, and had access to new findings and first-hand information about exotic naturalia from the New World.⁴⁹ Della Porta did not just sit at his desk: in the introduction to *Phytognomonica*, he mentions his travels through wilderness, impassable mountain peaks, woods, and forests. He also describes that on his field excursions, he was 'observing numerous plant forms, various flower colours, number of leaves, dissections, likenesses of roots, stalks and branches'.⁵⁰ The term dissection (*dissectio*) is especially interesting because it probably implies that Della Porta investigated plants in more detail than the abovementioned field botanists and observed even some inner structures.

Empirical and theoretical knowledge of nature was for Della Porta a precondition to its transformation by human skills. He was interested in manipulating nature, in the production of new plants that cannot be found in nature, or plants that have different forms or growing seasons.⁵¹ This interest in plant 'physiology' was clearly closely linked to agricultural and horticultural practice. Della Porta conducted agricultural experiments in his Villa della Pradelle. This led to the publication of several works on agriculture: *Suae villae Pomarium* (1583), *Suae villae Olivetum* (1584), and finally, the *Villae libri XII* (1592).⁵² His work on the physiognomy of plants also had practical goals. The main aim of his *Phytognomonica* was to investigate plant virtues and he was well aware of the fact that anything that could influence or change the virtues and possible medical use of plants is worth investigating and noting.

According to Della Porta, changes in soil, air, place, and cultivation can influence the nature and thereby also the medicinal powers of a plant.⁵³ As an example, he describes a process of transformation of a wild plant to a cultivated one. A mountainous plant that grows in windy places and in porous soil has a rough and dry habitus, short, twisted, and scraggy stem with nodes and nerves, hard thorns, small hairy leaves, small flowers, short ligneous roots, small and woody fruit, sharp taste, outstanding virtues and distinguished use. When the same plant is grown in rich soil, with mild climate, and if we take care of it, it loses its wild and hairy habitus and develops in a more civilised way (*humanius vivet*). The thin stem will become thick and juicy, and the thorns disappear. The taste becomes more wet and moderate and the plant will lose its medical use.⁵⁴ According to Della Porta, we can find even more radical changes in nature, changes that lead to a mutation of the whole plant, so that for instance in the transformation of wheat to ryegrass, a mutation of form is accompanied by a mutation of the soul, medicinal

47 Della Porta's classification of plants based on their habitat was briefly mentioned by HOLM (1918), yet even Andrea Ubrizsy Savoia omits him in her list of the pioneers of ecological thinking.

48 Although, as Paula Findlen points out, for most of his contemporaries the museum of Ferante Imperato was much more tempting. For a very interesting discussion, see FINDLEN (1994: 228–229, 316–325).

49 The Neapolitan physician Nardo Antoni Recchi organised and published texts on the material brought from overseas by Francisco Hernández, who embarked on the first scientific mission in the New World. See FREEDBERG (2003: 247–248).

50 Unde avia rura, in via montium culmina, nemora, et silvas peragrans, totis viribus cometemplabar multiplicem plantarum formam; florum variegatam coloriam; frondium numerum, dissectionem, et effigiem, sic radicem, stipitem, et ramorum ... (DELLA PORTA 1608: Prooemium)

51 For a detailed analysis of Della Porta's approach to manipulating plants and its influence on Bacon's work, see RUSU (2013: 143–153). For some more aspects of reception of Della Porta's work by Bacon, see Rusu and Lüthy (2017).

52 See FINDLEN (1994: 316–317). With respect to agriculture and horticulture, Della Porta draws on classical sources as well, especially on Columella's *De re rustica*, Varro's *Rerum rusticarum libri tres*, Cato's *De agricultura*, and Virgil's *Georgica* and *Bucolica*.

53 ... nam soli mutatione, aetheris, situs et cultus, horum omnium, vel solius mutatur facile plantae indoles, et cum indole virtus (DELLA PORTA 1608: 2). Della Porta describes the variability of animals analogically in *De humana physiognomia* (1586), writing that 'when the soul changes a habit, the body changes the shape of the features and when the body changes its shape, the soul, too, changes its habits' (Translation quoted from MURATORI 2017: 16–17).

54 DELLA PORTA (1608: 2).

powers, and physical structure.⁵⁵

Likewise, plants transplanted to different soil receive completely different nourishment and move away from their nature.⁵⁶ They develop an almost different nature, like vine that differs in various regions. Della Porta lists exotic plants which were brought to Italy. Some prosper, but others refuse to grow in a foreign climate or foreign soil. These plants are of a wild, rough, and stubborn nature (*rudis, contumax, ferique ingenium*). He criticises scholars who do not mention the climate, the place, and the manner of cultivation when describing a plant, because these factors do, he says, importantly change the appearance and the virtues of plants.⁵⁷ Although after a transplantation, a plant can change its nature completely and to some extent ‘habituate’ itself to a different habitat, there is always a place that is most suitable for a particular kind of plant: its birthplace.

Plants are born of a particular mixture of qualities of a place and receive their temper from their birthplace.⁵⁸ Each is connected to its place of origin, this place is the most suitable for the particular plant, and there the plant also has its best powers. It is because particular parts of the earth produce plants according to their climate. Various places differ not only in soil but also with respect to the air (*aether*), which has a different nature in plains, hills, or valleys, and causes different climatic conditions in these places. Plants of these particular places therefore differ as well⁵⁹ – those that grow in high mountains have scraggy and gloomy appearance, are small in size, and so on, while plants growing in open plains have a lively appearance, rounded stems, etc. To prove the soil’s ability to produce plants that correspond to its own kind, Della Porta offers a description of an interesting experiment. He took some soil from a deep cellar, removed all visible seeds, and put it in an elevated place, so the wind could not bring any seeds to it.⁶⁰ Plants started to grow from the soil after just a few days. They were all characteristic of the Neapolitan soil and climate (*solum et coelum*), from which Della Porta concluded that the ground (*terra*) always produces the same plants according to its qualities.⁶¹

The hidden connections between a plant and its birthplace can be revealed by signs apparent on the surface. As mentioned above – and this is the core of Della Porta’s doctrine – this is why one should observe and be guided by signs and appearances. Nevertheless, the value of plants’ external characteristics may vary. For instance, Della Porta speaks of characteristic marks (*notae propriae*) in those cases where the mark resembles some part of an animal, for instance in cock’s comb,⁶² which resembles an actual comb. Then there are marks that resemble some part of a human body, such as maidenhair fern or bristle fern,⁶³ which resemble human hair. And finally, he speaks of marks which resemble certain diseases. All these are characteristic indications (*indicia propria*) which follow the substantial form. Other signs are less important (*notae potius degeneres*), such as the form,⁶⁴ colour, odour, flavour, smoothness, roughness, and others, which change with habitat (DELLA PORTA 1608: 35). In another passage in his *Phytognomonica*, Della Porta makes a distinction between invariable characteristics (*signa fixa*) and variable

55 Igitur mutata corporis forma, mutatur et plantae anima; mutatisque viribus, mutatur corporatura (DELLA PORTA (1608: 3). Mutation of wheat to ryegrass was a traditional example of the transmutation of species, mentioned already by Pliny.

56 Omnino contrarium nascitur solum et alimentum, de sua natura demigrabunt [...] (DELLA PORTA 1608: 47)

57 DELLA PORTA (1608: 8). A similar formulation appears already in *Magia naturalis*: ‘Many are deceived in plants, and metals, and such like, because they use them that come next hand, never heeding the situation of the place where they grow. [...] for the place works diversly in the plants, according to his own divers temperatures; and sometimes causeth such an alteration in the vertues of them, that many, not only young Magicians, but good Physitians and Philosophers too, have been deceived in searching them out.’ (DELLA PORTA 1669: Book 1, cap. XVI)

58 Quod unaqueque orbis pars iuxta sui coeli qualitates ex terrea mistura plantas progignat. [...] plantas e vernaculis locis suas temperaturas nancisci [...] Et terra agitata semper illius loci familiaria producere. (DELLA PORTA 1669: 41)

59 DELLA PORTA (1669: 12).

60 This was actually a rather sophisticated experiment: Della Porta tried to imitate ‘laboratory conditions’ and avoid ‘pollution’ from the air.

61 DELLA PORTA (1669: 42). The term *terra* is usually used for particular regions of the Earth. *Sensu stricto*, it is also the soil from a particular region (e.g., *terra lemnia*, the famous soil from the island of Lemnos mentioned already by Galen as an excellent medicament).

62 *Alectorolophon*. See PLINY (1956: 27. 3.).

63 *Adiantum et trichomanes*.

64 In this context, Della Porta speaks of form in the sense of a particular shape.

characteristics (*signa mobilia*). Invariable characteristics can be discerned from the seeds, roots, and flowers, because these parts usually do not change with place or climate, such as the seed of viper's bugloss, which always resembles viper's head or orchid seeds. Variable characteristics include odour, flavour, form, smoothness, roughness, and all other qualities which change due to soil, climate, and cultivation, as we saw in the case of wild and cultivated plants.⁶⁵ According to Della Porta, the seed is the most reliable indicator of plant's nature, because it is the most important part of a plant. He quotes Theophrastus, who regarded seeds as the most perfect gift of nature, and Aristotle, who claimed that a seed is the ultimate cause of a plant.⁶⁶ Nevertheless, we should always investigate also some further characteristics, signs, and indications.⁶⁷

Della Porta states that certain characteristics of plants are specific to certain habitats, in other words, that the natural habitat of a plant is mirrored in plant's appearance and physiology. The basic division of habitats proposed by Della Porta is between wet and dry places. Generally speaking, the plants of dry or mountainous places have stronger powers, while plants of wet places are usually weaker and more fragile.⁶⁸ Further, trees that grow in sunny and windy places are small, because the spirit⁶⁹ and the sun desiccate them and slow down their growth. Plants of wet places, marshes, and swamps, on the other hand, germinate faster. Aquatic plants also age faster and have shorter lives than terrestrial plants. This is also due to the quality of the air: in the marshes, the air is always unclean, while in higher elevations, the air always moves thanks to the breath of the spirit and is therefore purer (DELLA PORTA 1608: 63–64). Plants of wet places are thinner and wider because humidity aids germination and sprouting. Plants that grow in swamps and shady places are not very knotty, because they are moister and more relaxed (e.g. juncus, flowering rush, cyperus, papyrus, elder, and willow).⁷⁰ Terrestrial plants, such as oak or horse chestnut,⁷¹ on the other hand, have hard and thorny nature. Cultivated plants (*urbanae*), which are more wet, have rounded leaves, while wild plants (*silvestreae*), which tend to be dryer, have angular leaves. These examples show that Della Porta not only points to certain important plant characteristics linked to particular types of environment, but also tries to provide a causal explanation of plant appearance based mainly on the primary qualities of the habitat, i.e. hot, dry, cold, and moist. The environment, he believes, shapes plants to its own image. Based on this knowledge, we can then draw some further conclusions, for instance group plants according to their relation to a particular habitat.

Della Porta develops this concept further and creates a rather original classification of the plant kingdom based on the place of origin of particular plants. As mentioned above, he draws a basic distinction between aquatic and terrestrial plants.⁷² Aquatic plants are further subdivided into freshwater plants (*dulcis*), which grow in lakes (*lacus*), swamps (*palus*), and rivers (*fluvius*), and saltwater plants (*salsus*) which grow in the sea (*mare*). Terrestrial plants, meanwhile, can incline either to rich (*pingue*), poor (*macra*), medium (*moderate*), rocky (*saxum*), or sandy soil (*arena*). Amphibious plants are those plants that grow in lakes as well as on land, see, in the mountains, wet places (*asperginosus*), and on the seashore (*litus*) (DELLA PORTA 1608: 58). In addition to their relationship to humidity or dry-

65 Fixa sunt, quae sumuntur ex seminibus, radicibus, et floribus, quae semper eadem sunt in omni loco, et coelo, ut in semine echii, et orchidibus, sed mobilia signa sunt odor, sapor, forma, hirsuties, laevitas, quae ad soli, coeli, cultusque mutationem mutantur, ut in urbanis et silvestribus plantis videbimus. (DELLA PORTA 1608: 39–40)

66 ... quia dignior pars semen est, ad quod natura praecipue intendit: vocat Theophrastus semen perfectissimum naturae munus, et Aristoteles stirpes ad semen esse natas dixit. (DELLA PORTA 1608: 36)

67 Uni signo non esse credendum, et praecipue communi, sed plura circa unum congruentia speculanda erunt, ut ex multis in unum congruentibus iudicium proferatur [...] inspicienda natalitia loca, situs, et coelum, his omnibus consideratis iudicandum (DELLA PORTA 1608: 37).

68 *Aloe, eleoselino, hippolapatbo* (DELLA PORTA 1608: 63).

69 The Renaissance notion of spirit is quite complex and variable; generally, it implies a substance that is intermediate between the corporeal and the immaterial substances.

70 *Juncus, butomus, cyperus, papyrus, sambucus* and *salix* (DELLA PORTA 1608: 61).

71 *Quercus, esculus* (DELLA PORTA 1608: 61).

72 This distinction is fundamental also for Theophrastus. See Theophrastus (1916: 1.4.2., 1.14.3.) and THEOPHRASTUS (1976: 2.3.5.).

ness, plants can be also divided based on the altitude or some other general geomorphology of their habitat. This leads to a distinction between, for instance, mountain plants (*montanae*), plants of the plains (*campestrae*), valleys (*caviloci*), or hills (*colles*). The entire classification is based on the assumption that plants of certain places share certain common characteristics, either morphological or physiological.

It is interesting to note that Della Porta supplies with these ‘ecological types’ also their visual representation. He emphasises that his pictures show the common and not deceitful characteristics (*communiores et minus fallaces notas*). They do not depict actual particular plants, but rather a collection of characteristics shared by most species of a particular type.⁷³

Discussions about the importance of pictures were quite lively among Renaissance naturalists. Many believed that illustrations might depict typical representatives and most Renaissance botanists used in their books typified pictures of plant species. The function of an image was thus to ‘transcend the individual object by correcting individual defects and ignoring individual peculiarities, thereby creating a general object’ (KUSUKAWA 2012: 191; DASTON & GALISON 2007: 17–27). Della Porta went even further: his pictures show not just the types or characteristic representatives of a genus but representatives of entire ‘ecological groups’.

Let us take aquatic plants as an example. Della Porta lists the characteristics typical of each kind of aquatic plants. The first type (*incolae facie, idea, archetypus*) is a lake plant (see Figure 6, on the left). The stalk of lake plants is round, smooth, without nods, and soft with flaccid medulla. It is covered with many leaves, which are large, rounded or circuit, smooth, thick, fleshy, without nerves, and so on. It has a dissolving but drying power. Flowers are whitish and fruits are without smell, tasteless, and often sterile. Roots are large, fungous, and with tubers. Along the same lines, Della Porta describes all the typical features of plants that grow in the swamps (*palustreae*) and partly dip in water (see Figure 6, in the middle). Again, he also provides a list of their virtues. The powers of such plants are cold and dry, because of water and the terrestrial essence (*aqua et terrestre essentia*). They dry, dissolve, and so on. The third kind of aquatic plants are plants that grow in rivers, wet cavities, and flowing waters (*fluviatiliae*) (see Figure 6, on the right). They are dry and warm, which is why of necessity they must grow in such cold and wet places to be refreshed by waves. Finally, there are the saltwater plants (*in maritimis aquis nascentium*), which have cold and dry powers. They are cold because of the water and dry because of the salt. Each picture includes some visual information about features described in the text. Particular types of plants are thus described not only verbally but also visually.

In the *Phytognomonica*, we find also other attempts to divide plants into groups, for instance based on similarities with human organs, animals, or celestial bodies, whereby it is assumed that similarities may disclose some hidden connections between these objects. The ‘ecological’ classification is only one of more possible ways of looking at plants. As in the case of the lists of distinguishing characteristics mentioned above, habitat does not have a unique or exclusive position with respect to classification in the treatise. The more general purpose of Della Porta’s classification of plants is to show that outer similarities have a deeper meaning, that appearances can tell us more about the inner virtues and the nature of a plant as well as about various hidden connections, such as the connection between plants and their habitat.

⁷³ Schiesari, reporting about Della Porta’s *De humana physiognomia*, makes a similar point. Della Porta’s method does not describe actual animals: instead, it collects ‘a vast array of animalistic traits’. See SCHIESARI (2010: 60) and MURATORI (2017: 11).

Conclusion

During the enterprise of discovering, observing, and describing plants, Renaissance naturalists took into consideration also the context, the place where particular plants grow. The increasingly popular botanical field trips and excursions led them to various interesting places, which differed in their climatic conditions, i.e. in moisture, shadiness, elevation, etc. Habitat was seen as one of the distinguishing characteristics of a plant, a characteristic that was worthy of noting and which should be included in plant's description and taken into account in plant's identification. This was, after all, emphasised already by some classical authors, especially Theophrastus.

Places were described in printed herbals, depicted in some natural history paintings, and one can even find Renaissance lists of plants sorted according to their habitat (compiled, e.g., by Benoit Textor or Ulisse Aldrovandi). In these lists, however, place did not have an exclusive status. The lists also contained groupings based on other criteria, such as colour, taste, healing properties, etc. They served as a tool: they helped naturalists in dealing with classical terminology and definitions, they were useful when it came to sorting plants, and they assisted in naturalists' efforts to grasp the variability and to better understand the diversity of vegetable kingdom. These arrangements of plants made no claims to resting on solid theoretical foundations and they never gave much thought to the nature of the particular characteristics.

Collection of plants from different places, repeated observations, and repeated experience provided Renaissance naturalists with a treasure trove of plant forms and properties of their habitats. The variability of plants caused by their habitat captured the attention of some scholars who were interested in theoretical issues concerning plants, for instance in differences between accidental and substantial characteristics or the nature of genus and species. Aristotelians such as Julius Scaliger or Andrea Cesalpino did not believe the connection between plant and place was substantial. In their view, a place cannot determine the species and cannot change it. They were convinced that changes in plant's appearance or virtues caused by place are merely accidental. If, as Cesalpino wanted, we were to create a system based on the essential characteristics of plants, habitats would have no place in it.

Girolamo Cardano and Giambattista Della Porta, on the other hand, did believe in a deeper relationship between a plant and its place. Cardano is rather brief on the subject but Della Porta develops the concept further. In his view, a place may be the cause of a substantial change of a plant. The influence of a place on a plant can be strong and essential. The environment forms and shapes a plant and plant's characteristics therefore reflect the habitat where it grows. For some scholars, the appearances held no deeper meaning. Pietro Andrea Mattioli, Leonhart Fuchs, and many others observed various plant forms simply to identify and distinguish between species. Della Porta, on the other hand, believed that plants' appearance reflects their inner affinities and reveals hidden connections, and connection to a particular place is one of them. Natural places, he thought, mirror their character in their vegetation. Based on these assumptions, he provided explanations of the appearance of places which presented themselves before the eyes of Renaissance naturalists during their wandering through nature.

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