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Travels of European botanists of the 16th-18th centuries in search of Mediterranean plants described by Dioscorides and Theophrastus

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Abstract. To Renaissance botanists, the correct identification of plants described by Dioscorides and Theophrastus was often problematic: descriptions are often insufficient to ensure correct identification and nomenclature is often inconsistent. Even more serious, the ancient authors described plants of the Eastern Mediterranean flora, which is different from the flora of the countries that hosted the Renaissance revival of botany. Modern botanists needed to see those plants in their native places and habitats. The first botanical expeditions to the Levant are from the first half of the sixteenth century. Best documented is Leonhard Rauwolf's journey, whose herbarium is preserved to this date. Fragmentary and often indirect is instead the evidence about botanizing in Eastern Mediterranean countries by Anguillara and Guilandinus, the first two prefects of the Padua botanical garden. Botanical research trips to the Eastern Mediterranean gradually gave many of the plants described by ancient authors a precise identity, an effort eventually culminating with Sibthorp's *Flora Graeca*.

Keywords: Anguillara, Guilandinus, Rauwolf, Tournefort, plant collecting in the Levant.

INTRODUCTION

Among the works of classical antiquity that have survived into modern times, those dealing with plants, especially those of interest to medicine, occupy a special place. Along the centuries, the authority of Dioscorides, Theophrastus and Galen is not questioned; nevertheless, the precise interpretation of their texts appears increasingly problematic (e.g., Reeds 1976, 1991; Walter 2009). Descriptions are generally short and poorly informative, thus often insufficient to ensure correct species identification. Nomenclature is also far from certain, as one and the same plant has often been called by different names and, conversely, the same name may have been used by different authors for plants that are little related to each other.

In addition to these problems, and perhaps even more serious, the plants referred to by the ancient authors are mainly those of Greece, including the islands of Crete and Rhodes, or more generally belong to the flora of the

Eastern Mediterranean, while the revival of European botany in the Renaissance is centered on Germany, Switzerland, France, the Netherlands and north-central Italy, countries that host a flora other than the one described in the works of antiquity. Early modern authors try to match the names found in ancient texts to the plants of their countries, but sooner or later difficulties arise, and this contradiction calls for a solution. Moreover, it cannot be always be taken for granted that the old texts can be trusted in all and any of their contents. Modern botanists become aware of these problems, witness the following excerpt from a letter of Melchior Wieland (Guilandinus) to Ulisse Aldrovandi:

> I find so many errors, & lies in the writers of all times, [...] the Balsam is not native to Egypt [...]. I also have clear evidence about the Baharab root, the Sitthim wood, the Cedar, the Currant, the Henne, the Persea, and the tree from which Moses uproot his so famous rod, & of many other very noble plants, which grow in those countries, such as you will appreciate in detail in the fifth book *susceptæ a Guilandino peregrinationis*[1].

It was therefore not enough to get a copy of the ancient works of Dioscorides and Theophrastus and more recent authors such as Serapion, Averroes and Ratzes[2]. Modern botanists needed to see those plants in their native places and habitats:

> From my youth I had the strong desire to go to foreign lands, especially those of the Orient, as these were more famous and more fruitful than the others [...] but also much more to discover and to learn to know the beautiful plants and herbs described by Theophrastus, Dioscorides, Avicenna, Serapion, etc. in the location and places where they grow so that their habitus, especially of those that are more foreign and unknown, would become more familiar and understandable to me and partly also allow the pharmacists and also those who need them / to recognize them.[3]

By mid-sixteenth century, European botanists had already made significant progress with original works based largely on direct observation of plants of their local flora, and of some foreign plants in cultivation, rather than mere copying or translating the pages of classical authors. Of particular importance are Otho Brunfels' *Herbarum vivae eicones* (Brunfels 1530) and Leonhard Fuchs' *De historia stirpium commentarii insignes* (Fuchs 1542). How much value the latter author placed on the direct observation of plants is shown by the fact that he gave a place of honor to the artists who produced the book's magnificent plates by mentioning their names and even including their portraits. Illustrations are particularly beautiful in the copies with hand-colored engravings. The artists who worked for Fuchs were the painter Albrecht Meyer, who drew the plants from nature, Heinrich Füllmaurer, who copied the drawings onto wooden blocks, and Veit Rudolf Speckle, who engraved them. Conrad Gessner's *Historia plantarum* (1541) is also important, but it was published without illustrations: the numerous plates that the author had begun to prepare for it would only appear much later in a collection (Gessner 1751, 1771) enriched by contributions of other botanists (Funk 2018).

TRAVELS AND PILGRIMAGES

Among these impressive sixteenth-century works, Pietro Andrea Mattioli's bulky treatise occupies a prominent position, not only because of the extraordinary success of this book, written in the form of a commentary to Dioscorides and published in several languages, and the rich iconography that accompanies it, but also because of Mattioli's awareness of the importance of field research to be undertaken in the countries whose plants were described by the ancient authors:

> I certainly would not have shunned the hardships and dangers of travelling to make long pilgrimages to different and distant parts of the world or to cross the seas (as Galen did) to reach Crete, Cypros, Lemnos, Syria, Egypt and other more distant countries of the world to see and find plants, minerals and other simple medicines, if I had not been hindered by domestic care, the bond of marriage, the obligation to heal the sick, and my very weak constitution, which could hardly have withstood the dis-

[1] *ritrovo tanti errori, & busie nelli scrittori d'ogni tempo, […] il Balsamo non nasce in Egipto […]. Sono anchora chiaro, della radice Baharab, del legno Sitthim, del Cedro, del Ribes, del Henne, della Persea, del arbore dal quale dispicò Moisè quella sua verga tanto famosa, & di molte altre piante nobilissime, che nascono in quelli paesi, come ampiamente intenderà la Ch.ma M. V. nel libro quinto susceptæ a Guilandino peregrinationis.* (Letter dated *Del Cairo alli 9 di Giugno 1559*, as transcribed by Fantuzzi 1774, p. 220).

[2] For an early printed collection, see Serapion *et al.* (1531).

[3] *Als Ich gar nahe von Jugendt auff sondere Begierde gehabt / in ferne Landschaften zu ziehen / fürnemlich aber in die Morgenländer / als die für andere mehr berühmt unnd fruchtbar seind / … / sonder auch und vilmehr die schöne Gewächse und Kreuter vom Theophrasto, Dioscoride, Avicenna, Serapione, &c. beschrieben / an den enden und orten / da sie wachssen / zu erkündigen / und zu erkennen / damit mir jre Beschreibungen in ansehung und betrachtung deren sonderlich aber der mehr frembden und unbekannten zum theil bekanntlicher und verstendlicher würden / zum theil auch den Apothekern ursach gebe / ferrner auch denen / die ihnen zu haben von nöten / zutrachten* (Rauwolf 1582, p. 1-2). An English translation of these lines, largely but not literally followed here, was given by Dannenfeldt (1978, 9. 31), and republished in part by Findlen (1994, p. 158).

> comfort, the hardships and the great dangers to which one is very often exposed on long voyages by ship and long journeys between lands[4].

The literature is unclear as to who were the first modern botanists who travelled to Eastern Mediterranean countries[5] with similar purpose, but the earliest substantial evidence of botanical expeditions comes from the first half of the sixteenth century (Nicolas 2007; Egmond 2018).

In a recent edition of Dioscorides' work accompanied by an extensive historical analysis and a rich bibliographical apparatus, it is stated that,

> Johann von Cube, a German physician, travelled to the East to find the plants of Dioscorides and other masters. In 1485 he published *Hortus Sanitatus* [sic], one of the earliest printed herbals (Dioscorides 2000, pp. xxxvi-xxxvii)

but this is wrong and misleading. Apart from the obvious typo (*Sanitatus* pro *Sanitatis*), this short sentence about Johann von Wonnecke Caub or Johannes de Cuba (1430–1503) is based on two false assumptions. First, the plant book first published in 1485 and currently known as *Gart der Gesundheit* was written in German rather than in Latin. Second, and more important, the fact that Johann Wonnecke von Kaub contributed to the *Gart der Gesundheit* does not qualify him as a voyager through the Levant. The issue has been recently fixed in the following terms (Rudolph 2020). The *Gart der Gesundheit* was published anonymously, but three authors have been identified as contributing to it. Cuba wrote the descriptive part, including the many factsheets about plants, whereas the introduction was written by Bernhard von Breydenbach (ca. 1440–1497), canon of the cathedral of Mainz, who enrolled Cuba as author of the descriptive part of the book, and the Flemish painter Erhard Reuwich for the drawings. There is no evidence that these illustrations reflect observations on living plants, although the painter had opportunity to see examples of the East Mediterranen flora during the journey to the Holy Land in which he accompanied von Breydenbach; the recit of this journey is the subject of another book, *Peregrinatio in Terram Sanctam* (von Breydenbach 1486), of which von Breydenbach was the sole author and Reuwich again the illustrator. Thus, the person who mentions his travel in the Levant in the first pages of the *Gart der Gesund* is not Cuba, who probably never left Germany, but von Breydenbach.[6]

Like Bernhard von Breydenbach, the French apothecary and naturalist Pierre Belon (1517–1564) exemplifies the pilgrim's twin habits of curiosity and devotion (Oosterhoff 2023). He was well aware of the importance of critically comparing the plants personally collected in distant lands with the descriptions found in the old books: in Chapter II of *Les observations de plusieurs singularitez et choses memorables trouvées en Grèce, Asie, Judée, Égypte, Arabie et autres pays estranges* (Belon 1553) he explains with fitting examples

> That one should not trust too much in the names of things, even if they are commonly named, if they do not correspond well to the descriptions of the ancients, and are suitable to the thing that is being described[7].

However, his catalogue of singular objects worth of record includes a few items not found in nature, such as the winged dragon, and his botanical illustrations are of a naivety that cannot be justified solely by the technical limitations of the woodcut.

LUIGI ANGUILLARA

It is certain instead that Luigi Anguillara (c. 1512-1570), who later became the first prefect of the botanical garden in Padova, traveled not only through Italy,

[4] *Non mi sarebbe certamente rincresciuto, ne sarei restato per fatiche, ne per pericoli di far lunghi pellegrinaggi a diverse longinque parti del mondo, ne di passare i mari (come faceva Galeno) per andarmene in Candia, in Cipri, in Lemno, in Soria, in Egitto, & in altri piu longinqui paesi del mondo, per vedere, & ritrovare, & piante, & minerali, & altri semplici medicamenti, che ne mancano, se non mi havessero impedito prima le cure domestiche, il vincolo del matrimonio, il carico di curare gl'infermi, & con ciò la mia assai debile complessione di tutto il corpo, laquale invero malamente harebbe possuto star salda alli incommodi, travagli, & pericoli grandi, che si patiscono ben spesso nelle lunghe navigationi, & ne i lunghi viaggi fra terr*a (Mattioli 1568, unnumbered p.).

[5] In those years other European botanists were travelling through the Western Mediterranean countries, where Carolus Clusius (1526-1609) gathered important informations not only through field research, but also through exchange of experiences with colleagues in Montpellier and Salamanca (Clusius 1576). Clusius' contributions to the renaissance of botany in the second half of the sixteenth century and the first decade of the seventeenth has been illustrated in a monograph by Egmont (2010).

[6] *Nam ich mitt mir eÿnen maler von vernunfft vnd handt subtil vnd behende. Und so wir von teütschēm landēn gereÿßet haben durch wälhische landt Histriam vnd darnach die Schlauonei oder windische landt- Croatien Albaneÿ-Dalamacien- Auch durch die krÿechischen lande Corfon Moream Candiam- Rodiß und Cÿprien – bÿß in das gelobet lande unnd auch so in die heÿligen stat Jherulsalem vnd von dannen durch klein arabien gegen den bergen sÿnai – von den bergen sÿnai gegen den roten moere, gegen calcair – Babylonien vnd auch Allexandriam in egipten vnd von dannen wider in Candiam... Ich mit fleisse mich erfahren habe der kreüter daselbst und die in jren rechten farben und gestalten lassen kunterfeÿen vnd entwerffen* (von Breydenbach *et al.* 1485, fol. 2v).

[7] *Qu'on ne se doibt trop fier aux appellations des choses, encor qu'elles soyent vulgairement nommées, si elles ne sont bien correspondantes aux descriptions des anciens, & convenantes a la chose qu'on descrit* (Belon, 1553, p. 1v).

but also the Balkans and Greece, as vaguely referred to in the letter to Nicolò da S. Michiele that introduces the fifth series of *pareri* (opinions) in his book (Anguillara 1561). After confirming that he had

> not forgotten that a few days ago, when I was in Venice, Your Excellency asked me for my opinion on some plants of the Greeks, Arabs and Latins[8],

he went on confessing that

> this great desire I have always had and still have to help the world as much as possible [...] has caused me many times to undertake long and dangerous journeys by sea and land, and to abandon my life to the power of the Turks and other barbarians without ever receiving a reward from anyone[9].

As noted by Herrmann (2015), the physician and anatomist Sanmichiele also collected plants in Greece and in Crete, and Anguillara got from him information about plants of those regions:

> The Apios, which is called ιχάς by Theophrastus in the book 9. chap. 10. is called today Pirraria in Greece, & in Candia. The Most Excellent Messer Nicolò da San Michele Comasco was the discoverer of this plant & first brought it to Italy on his return from those regions[10].

However, the only source of information about his field activity is Anguillara's book *I semplici* (Anguillara 1561), and some doubts remains if we take his text literally.

Most of the references to plants personally observed by him can be traced back to species cultivated in the Botanical Garden of Padua[11], or from different localities in Italy[12], but he also mentioned collecting in Provenza, Corsica, Croatia, Albania, and Crete[13]. Thus, De Toni's (1911a) remark, that we do not know if Anguillara travelled further afield, is exceedingly dismissive. True, many times Anguillara mentions plants e.g. from Crete[14], without saying that this is based on his personal observations. More important, some important information about Greek plants does not derive from Angullara's personal observations, but from fresh information and specimens he got from his correspondents:

Now I say that the true and legitimate Scylla is today found in Candia and in Cephalonia, very white in color and not too large, and can be eaten. And the common one is called Cepolla canina & those people throw it away as something poisonous, while we expect it to be used in medicines. The Magnificent M. Donato Barbi, a gentleman from Padua, was the one who discovered this mistake by sending me both kinds from Cephalonia, where he was at the time. And this was in the year 1548[15].

Anguillara was cautious in identifying with those described by the old authors his plants, especially those observed in Italy rather than in the Balkans or in Greece. For example,

> To this day I have not known any plant which corresponds to Dioscorides' description of Cyclamen II[16].
> Second lonchitis [a fern] - In 1545, I was in the hills of Monte Nero near Pisa picking herbs in the company of the Reveren. Monsignor of Cesena, I found a plant, which

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[8] *Non mi sono scordato che Vostra Eccellenza alli giorni passati essendo in Vinegia mi domandò il parer mio sopra alcune piante di Greci, Arabi, & Latini* (Anguillara 1561, p. 88).

[9] *quel desiderio grandissimo, che sempre ho avuto, & hò, di giovar al mondo in quanto per me si può [...] mi ha indotto molte volte a far lunghi, & pericolosi viaggi, così per mare, come per terra, & a por la mia vita nel potere de1 Turchi, & altri barbari senza mai riceverne premio da alcuno* (Anguillara 1561, p. 89).

[10] *L'Apios, che è chiamato da Theofrasto nel lib. 9. cap. 10. Ιχάς hoggi nella Grecia, & in Candia si chiama Pirraria. Lo Eccellentissimo Messer Nicolò da San Michele Comasco fu lo inventore di questa pianta & primo la portò in Italia nel suo ritorno che fece da quelle parti* (Anguillara 1561, p. 298).

[11] E.g., *Il Cipero così descritto da Teofrasto, come quel di Dioscoride è notissimo in Italia, & ambedue sono nel giardino pubblico di Padova* [*The cyperus, both the one described by Theophrastus and the one by Dioscorides, is very well known in Italy and both are in the public garden of Padua*] (Anguillara 1561, p. 21).

[12] Anguillara mentions his botanical observations in many regions of Italy: Lombardia, Veneto, Friuli, Emilia, Romagna, Toscana, Umbria, Lazio, Abruzzo, Puglia.

[13] *Spina Bianca –– Holla trovata io al principio della Schiavonia passato il Quarnaro [...] e anco in Candia nel monte di Iuppiter* [*Spina Bianca –– I found it at the beginning of Schiavonia past the Quarnaro [...] and also in Candia on the mountain of Iuppiter*] (Anguillara 1561, p. 142-43).

[14] *I platani non nascono da per se in Italia; ma ben in Candia nascono Copiosissimi ne' luoghi vicini alli fiumi.* [*Plane trees are not native to Italy; but in Candia they are very abundant in places close to rivers*] (Anguillara 1561, p. 49). *L'halimo ... si mangia in Candia* (ibid..,p. 57). [*Halimo... is eaten in Candia*]. *Scordio [...] Il secondo si trova per le ripe della Pescara fiume in Abruzzo, con foglie larghe, simili alla Melissa, over al Calamento della prima specie. L'istesso si vede ancora in Candia, & per la Grecia, & in altri luoghi: ne è dissimile dal primo nell'odore, & qualità.* [*The second species of scordio [probably, one of the species of* Teucrium*, English germander*], *is found on the banks of the Pescara river in Abruzzo, with broad leaves, similar to Melissa, or to the Calamento of the first species. The same is also seen in Candia, & in Greece, & in other places: it is like the first in smell and quality*] (ibid., p. 226). *Le specie de' Bulbi, che si mangiano, sono copiose molto in Candia, à Corfù, al Zante, & parimente in Italia* [*Edible species of bulbs are very abundant in Candia, Corfu, Zakynthos, and likewise in Italy*] (ibid., p. 119).

[15] *Hor dico, che la vera, & legitima Scilla hoggi si trova in Candia, & nella Ceffalonia, di colore bianchissima e non tropo grande, & mangiasi. Et la commune si chiama Cepolla canina. & quei popoli la gettan via per cosa velenosa, e noi altri comportiamo, che si usi nelle medicine. Il Magnifico M. Donato Barbi gentil'huomo Padovano fu quello, che mi scoperse questo errore co'l mandarmi dalla Ceffalonia, ove egli era allhora, l'una, & l'altra. E questo fu nell anno 1548.* (Anguillara 1561, p. 119).

[16] *Fino al giorno d'oggi non ho conosciuta pianta, che si confaccia alla descrittione di Dioscoride del Ciclamino secondo* (Anguillara 1561, p. 176).

> is a species of branched Citrach; and then I thought that it was the second Lonchitis, and therefore I took it to the Most Excellent Master Luca Ghini. & ever since then that plant has been held for the second Lonchitis. But since I then found another much more corresponding one in Dalmatia, Greece, & Zakynthos, I cannot say that the one from Monte Nero is the true one: because that one is not τρακύτερα [quite rough], like this other one[17]

Possible corruptions of the old text was sometimes indicated by him as a cause of potential misidentification:

> Hogweed of Asclepius – Born on the island of Candia, & in Sicily [...] Where we read in Dioscorides small root, the text is incorrect; because instead of μικρά one should read μακρά[18].

MELCHIOR WIELAND (GUILANDINUS)

Compared to Anguillara's field work in the countries East of Italy, evidence about the travels of Melchior Wieland (Guilandinus) (c. 1520–1589), his successor as prefect of the Padua botanical garden, is still more fragmentary[19]. His correspondence with Ulisse Aldrovandi indicates that he formed a herbarium[20] and collected extensive notes intended for a publication to be issued on his return from Cairo[21], but he was captured by Algerian pirates in the port of Cagliari and lost all his specimens and notes.

In a previous letter to Ulisse Aldrovandi, dated 4 January 1555 (De Toni 1911b), Guilandinus mentions plants he collected in the Levant, demonstrating that even before leaving for Cairo in 1558, he had already collected plants in the East. In that letter, Guilandinus regrets not being ready to send to Aldrovandi the plants he requested, including

> the Catanance [a plant of the daisy family native to dry meadows in the Mediterranean region] which with greater urgency than the other things you request, but patience, since my misfortune wanted it this way, so that my compatriot M. Roperto, who has all those things with him that I brought from the East, left Vinetia without letting me hear a word[22].

Another questionable point is the putative official nature of Guilandinus' mission to Cairo. According to Herrmann (2015, pp. 4-5),

> Wieland [...] was officially commissioned by the University of Padua and the Republic of Venice to carry out a comprehensive research trip to Asia Minor and North Africa in order to collect plant samples there and in this way to test the theses of the ancient naturalist Dioscorides[23].

Herrmann (2015) seems to derive this from Siraisi (2007), but the latter clearly says (p. 236) that

> Guilandinus' journey to various parts of the Eastern Mediterranean and Egypt had been supported by a Venetian senator who was a member of the Riformatori dello Studio, the Venetian magistracy in charge of the University of Padova.

This does not imply an official involvement of the institutions of which his patron was a member. The lack of any official charge or planning for the journey he started when leaving for Cairo in 1558 is clear in the words he wrote to Ulisse Aldrovandi shortly before leaving Egypt:

> I will leave for Lisbon without any doubt at the end of August; However, I would like Your Excellency to require me, for the few days that I have to stay in Egypt, to do

[17] *Lonchite seconda - Nel 1545, essendo io per le colline di Monte nero di Pisa a cogliere herbe in compagnia del Reveren. Monsignore di Cesena, trovai una pianta, la quale è specie di Citrach ramoso; e allora pensai, che ella fosse la Lonchite seconda, & per tale la portai all'Eccellentissimo Maestro Luca Ghini. & sempre da inde in quà quella piana è stata tenuta per Lonchite seconda. Ma per averne io poi trovato per Dalmatia, in Grecia, & al Zante un'altra molto più corrispondente, non posso dire, che quella di Monte nero sia la vera: percioche quella non è τρακύτερα, come quest'altra.* (Anguillara 1561, p. 241).

[18] *Panace di Asclepio – Nasce nell'isola di Candia, & in Sicilia [...] Ove si legge in Dioscoride radice piccola, il testo è scorretto; perciocche in vece di μικρά si dee leggere μακρά* (Anguillara 1561, p. 210).

[19] Scattered references to his travels are found in his later work *Papyrus* (Guilandinus 1572).

[20] *La lettera ... del 4 gennaro 1555... menziona le raccolte di piante in Levante, ciò che pone in luce un fatto, finora ignorato a quanto mi consta, ossia che il Guilandino, anche prima di recarsi al Cairo [in 1558], aveva già erborizzato in Oriente* [*The letter ... of 4 January 1555 ... mentions collecting plants in the Levant, which highlights a fact, hitherto ignored to my knowledge, namely that Guilandino, even before travelling to Cairo [in 1558], had already been collecting plants in the Levant*] (De Toni 1911b, p. 152).

[21] *come ampiamente intenderà la Ch.ma M. V. nel libro quinto* susceptæ a Guilandino peregrinationis. Letter from Guilandino to Ulisse Aldrovandi, from Cairo, dated 9 June 1559; Fantuzzi 1774, p. 220).

[22] *la Catanance [a plant of the daisy family native to dry meadows in the Mediterranean region] la qual con maior instanza delle altre cose rechiedete, ma pacienza, poi che la mia disgrazia ha voluto così, per che M. Roperto mio paiesano, il qual ha tutte quelle cose apresso de se che portai di levante, si ha partito di Vinetia senza farme intender parola.* (Letter from Guilandino to Ulisse Aldrovandi, dated 4 January 1555; published by De Toni 1911b, p. 159).

[23] *Offiziell wurde Wieland [...] von der Universität von Padua und der Republik Venedig beauftragt, eine umfassende Forschungsreise in Kleinasien und Nordafrika durchzuführen, um dort Pflanzenproben zu sammeln und auf diese Weise Thesen des antiken Naturforschers Dioskurides zu überprüfen.*

> something of the kind that can be committed to someone of such small fortune and such little experience as I am[24]

It was only after the journey and its adventurous sequel until Guilandinus was eventually rescued, that his previous experience with the Eastern Mediterranean flora offered a good argument for his appointment to the Padua botanical garden.

Last in the number of would-be prefects of the Padua botanical garden to travel to East Mediterranean countries, including Corfu, Zakynthos and Crete, Prospero Alpini (1553-1617) spent three years in Egypt, and on his return published two works on the Egyptian plants (Alpini 1591, 1592) where he described the coffee plant, until then unknown to Europeans, but also numerous plants whose names had reached Europe through the Arab medicinal-botanical tradition. For these reasons his botanical contributions are more popular than those of his two predecessors[25].

LEONHARD RAUWOLF

Leonhard Rauwolf[26] (1535?–1596) dedicated an entire volume (Rauwolf 1583) of his extensive travelogue to the plants of the Eastern Mediterranean countries he visited. Before him, no other author had systematically taken the trouble to identify them based on ancient works, especially those of Dioscorides. Apparently, he often succeeded, as in the case of *Christianwurtzel, which is the right* Astragalus *Dioscoridis*[27]. However, many other plants presented difficulties, so that Rauwolf' remained to varying degrees in doubt as to their identification, for example

> A thorny herb which is held for the right *Silybum* Diosc. and *Hacub alcardeg* Serapionis.
> An unknown plant called *Morgsani*, which is considered to be *Andirian* Rhazis and *Ardifuigi* Auicennae.
> A foreign herb which can be taken for the right *Chrysogonum* Dioscor:
> An unknown tall herb, which is considered to be the right *Medium* Diosco: and *Mindium* Rhasis.
> A wild thorny shrub, which is considered to be the right *Lycium* Diosc:, whose stem also retains the same name in apothecaries. Arabic: *Hadhadh*.
> *Baccharis* Diosc: which herb is called by some Lady's glove.
> A very wild thorny shrub, which the Moors call *Bellan*.
> *Hippophaës* Diosc:
> A free unknown herb, which is considered to be the right *Gnigidium* Diosc:[28]

How close Rauwolf came to correctly identifying the plants he collected can be verified with great accuracy today, because the herbarium of plants he collected between 1573 and 1575 has survived to this date (Ghorbani et al. 2018).

JOSEPH PITTON DE TOURNEFORT

The last botanist whose journey to the Eastern Mediterranean we must mention is Joseph Pitton de Tournefort (1656-1708). He undertook this voyage as an official mission by order of king Louis XIV and his report was expected to cover issues as different as geography, botany, antiquities, but also history, religion, institutions and economy of local populations (Trivisani-Moreau 2016). However, by reading through his *Relation d'un voyage du Levant* (Tournefort 1717), it is clear that

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[24] *Io mi partirò per Lisbona senza dubio veruno alla fine de Agosto; però vorrei che la M. V. me imponesse per quelli pochi dì, che ho da stare in Egypto, a fare qualche cosa di quelle, che si possano comettere a uno di sì piccola fortuna, & di sì puoca sperienza come sono io.* (Letter from Guilandino to Ulisse Aldrovandi, from Cairo, dated 9 June 1559; published by Fantuzzi 1774, p. 221).

[25] On Alpino's work, see Ongaro (2009); on his Egyptian plants, see Cappelletti and Cassina (2009).

[26] On Rauwolfs life and travels, see Dannenfeldt (1968); Herde and Walter (2010).

[27] *Christianwurtzel, welches ist der rechte* Astragalus *Dioscoridis* (Rauwolf 1583, plate numbered 111). Based on Rauwolf's herbarium specimen (see next footnote), this corresponds to the legume species *Astragalus brachystachys* DC.

[28] Here are the original figure legends, with the corresponding plate numbers and followed by the current name of the plant as established by Walter et al. (2021), based on Rauwolff's original specimens preserved in his herbarium at the Naturalis Biodiversity Centre in Leiden (Ghorbani et al., 2018):
Dornkraut welches für das rechte Silybum *Diosc. und* Hacub alcardeg *Serapionis zuhalten* (plate n. 74) – *Gundelia tournefortii* L. [Compositae]
Ein unbekanntes Gewächs Morgsani *genannt, welches für* Andirian *Rhazis unnd* Ardifuigi *Auicennae zuhalten* (plate n. 113) – *Zygophyllum fabago* L. [Zygophyllaceae]
Ein fremdes Kraut, welches für das rechte Chrysogonum *Dioscor: zuhalten (*plate n. 119) – *Bongardia chrysogonum* (L.) Spach [Berberidaceae]
Ein unbekannts hohes Kraut, welliches für das rechte Medium *Diosco: und* Mindium *Rhasis zuhalten (*plate n. 284): – *Michauxia campanuloides* L'Hér. [Campanulaceae]
Frembde Dornstauden, welche für das rechte Lycium *Diosc: zuhalten, dessen Safft in Apotecken auch gleichen namen behaltet. Arab:* Hadhadh (plate n. 285) – *Rhamnus punctata* Boiss. [Rhamnaceae]
An Baccharis *Diosc: welches Kraut etliche under* Frawen-Handschuch *gennent* (another plate also n. 285) – *Helichrysum sanguineum* (L.) Kostel. [Compositae]
Ein gar frembde Dornstauden, welliche die Moren Bellan *nennent. An* Hippophaës *Diosc:* (plate n. 287) – *Sarcopoterium spinosum* (L.) Spach [Rosaceae]
Ein frembdes unbekannts Kreutlein, das für das rechte Gnigidium [sic, pro *Gingidium*] *Diosc: zuhalten* (another plate also n.: 287) – *Artedia squamata* L. [Apiaceae]

the author's main interest rested with the Greek flora. For example, when Tournefort and his fellow travelers reached the island of Makronisos near the coast of Attica,

> The only pleasure we had on this island was botanizing; it is the most pleasant for plants in the whole archipelago; they are even bigger, fresher and more beautiful there than on the other islands: We observed many there that we had not seen since we left France[29].

Elsewhere, collecting activity was more intense and focused:

> when we returned to the ruins of the city, we discovered there an admirable species of *Sphondylium*, which at first we took for the *Panacea Herakleia* of Dioscorides: but the flowers of our plant are white, those of Dioscorides' plant yellow[30].

Another day, they called to

> a monastery of Armenian monks, where we had dinner. Their courtyard is full of the beautiful species of cress that Zanoni had no reason to believe was the first species of *Thlaspi* of Dioscorides[31].

MORE TRAVELS, LINNAEAN NAMES, AND JOHN SIBTHORP'S *FLORA GRAECA*

These botanical research trips to the Eastern Mediterranean gradually made it possible to give many of the plants described by Dioscorides and other ancient authors a precise identity. To many, but certainly not all. The efforts of these botanical travelers gradually found a point of reference in the great works in which the classification of the entire plant kingdom took shape, where each species finally found a place and a scientific name that would be recognized by all.

Of fundamental help on this path was the meticulous compilation of Caspard Bauhin (1560-1624), who collected the citations of the previous authors in one large work (Bauhin 1596) and attempted to identify the synonyms, not always easily recognizable, among the different names attributed to the same plant by different authors and often even by one and the same author. While the *Phytopinax* of 1596 was an *enumeratio plantarum ab herbarijs nostro seculo descriptarum*, the much bulkier posthumous edition titled *Pinax theatri botanici* (Bauhin 1623) was an index in *Theophrasti Dioscoridis Plinii et botanicorum qui à seculo scripserunt opera plantarum*, linking the texts of the ancients with the growing production of modern botanists.

Eventually, the system of plants and the binomial nomenclature introduced by Linnaeus (1753) provided the framework to organize the knowledge of the Greek flora that has been collected over more than two thousand years. John Sibthorp[32] (1758–1796) accomplished this task with his magnificent *Flora Graeca* (Sibthorp, 1806-40) which was continued after his death by James Edward Smith (1759-1828) and finally completed by John Lindley (1799–1865). Smith made a special effort to translate once and for all the names of Dioscorides into modern scientific nomenclature, noting that

> The synonyms of [the plants described by] Dioscorides come from Sibthorp's manuscript, which he wrote mostly in Vienna, where he came across the most famous ancient codex decorated with painted plates. I have compared all these synonyms with the best editions of Dioscorides[33].

Six genera (*Dioscorea*, *Bellonia*, *Clusia*, *Alpinia*, *Rauvolfia* and *Tournefortia*) first named by Plumier (1703) for Dioscorides, Belon, Clusius, Alpini, Rauwolff and Tournefort, respectively, were retained by Linnaeus (1737, 1753) and are thus conserved to this date. Linnaeus created also a genus *Sibthorpia*, but this was not to honour the would-be monographer of Greek plants, but his father, Humphry Waldo Sibthorp (1713-1797), Sherardian Professor of Botany at the University of Oxford from 1747 to 1783.

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[29] *Le seul plaisir que nous eûmes dans cette Isle fut celui d'herboriser, c'est la plus agréable de tout l'Archipel pour les plantes; elles y sont même plus grandes, plus fraîches & plus belles que dans les autres Isles: nous y en observâmes beaucoup que nous n'avions pas encore vues depuis nôtre départ de France* (Tournefort 1717, 2, p. 19).

[30] *en revenant vers le ruines de la ville, nous y découvrîmes une espèce admirable de* Sphondylium *nous primes d'abord pour la* Panacée d'Heraclée *de Dioscoride: mais les fleurs en sont blanches, au lieu que celles de la plante de Dioscoride doivent être jaunes* (Tournefort 1717, 3, p. 15).

[31] *dans un Couvent de Moines Arméniens où nous dînâmes. Leur cour est toute pleine de cette belle espèce de Cresson que Zanoni a pris, sans raison, pour la première espèce de Thlaspi de Dioscoride* (Tournefort 1717, 3, p. 186). This plant is treated by Zanoni (1675) on pp.191-196 of his *Istoria botanica*.

[32] On Sibthorp's exploration of Greece, see Strid (2020). On the genesis of *Flora Graeca*, see Lack and Mabberley (1999).

[33] *Synonyma Dioscoridis sumuntur ex manuscripto Sibthorpiano quod Viennae plerumque conscripserat, ubi in codicem veterem celeberrimum, tabulis pictis ornatum, incidit. Omnia haec synonyma cum optimis editionibus Dioscoridis comparavi* (Smith in Sibthorp 1806-, 1, p. xiv). The codex mentioned by Smith is *Codex Vindobonensis Medicus Graecus 1*, the wonderful document of the Early VI century also known as *Codex Aniciae Julianae*.

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