

Medieval Mediterranean Pharmacology

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[R]ecipe for the small *tryphera*; beneficial for internal haemorrhoids, pain, and weakness of the stomach due to the accumulation of moistness; it also preserves health and is used for a great number of diseases. Take one part each of the bark of Chebulic myrobalan, or, if you want, use the Indian [myrobalan] instead, beleric and emblic [myrobalans]. Chop up, strain, and add rose oil; mix with scummed honey and place [the mixture] in a vessel made of fine pottery; the dosage is two to three *hexagia*¹ of this [mixture] along with tepid water.²

Called *tryphera* in Greek, and mostly known as *triphalā* in Sanskrit or *itrifal* in Arabic, it was an extremely popular drug in the Middle Ages, from India to Baghdad and Cairo, and from Constantinople to Salerno and Paris, while various versions of it are still used nowadays in Ayurvedic medicine.³ The recipe given above provides the short version of this composite drug, including five distinct categories of data: a) title or name of drug – that is, small *tryphera*; b) indications for its use, including for the treatment of various kind of ailments such as haemorrhoids and pain; c) list of

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¹ One *hexagion* is equal to 4.444 grams. See Schilbach (1970: 183, 276).

² *Ephodia tou apodēmoutos*, 4.19, Vaticanus gr. 300, f. 145v, ll. 4–13: ‘... στήλη τῆς μικρᾶς τρυφερᾶς, ὠφελοῦσα εἰς τὰς ἐσωχάδας καὶ εἰς πόνον στομάχου καὶ ἀδυναμίαν αὐτοῦ, ἀπὸ τοῦ πλήθους τῆς ὑγρότητος, καὶ φυλάττει τὴν ὑγείαν, ἀποπέμπεται δὲ εἰς χρῆσιν πληθὺς ἀρρωστίων· λαβὼν τὸν φλοιὸν τοῦ μυροβαλάνου τοῦ κέπουλι· καὶ ἀντὶ τούτου εἰ θέλεις θῆς τὸ ἰνδικόν· καὶ πελῖλιζ καὶ ἔμλεζ, ἀνὰ ἐνὸς μέρους· κόψας σήσας (correcti: σείσας cod.) ἀνάμιγε (an ἀνάμισγε?) μετὰ βοδελαίου καὶ φύρασον σὺν μέλιτι ἀπαφρισμένῳ· καὶ ἀπόθου εἰς κοροῦπιν λείον· ἢ δὲ πόσις ἐξ αὐτοῦ δύο ἐξάγ., μέχρι τριῶν μετὰ ὕδατος χλιαροῦ’. For the original Arabic version, see Suwaysi et al. (1999) I.376–8. All translations from Greek are mine, unless otherwise stated. All transcriptions from Greek retain the same spelling and punctuation as in the relevant codex, apart from the fact that I have supplied the iota subscript.

³ On the importance of myrobalans in premodern medical practice across Eurasia, see Yoeli-Tlalim (2021: 63–84).

ingredients – that is, three kinds of myrobalan fruits, rose oil, and honey, along with posological details; d) method of preparation; and e) information about the administration – that is, it should be consumed with tepid water – and dosage.⁴ This example has been taken from a twelfth-century Southern Italian or Sicilian manuscript of the unedited Greek translation of an Arabic medical work by Ibn al-Jazzār (fl. tenth century), *Zād al-musāfir wa-qūt al-hādir* (*Provisions for the Traveller and Nourishment for the Sedentary*/Gr. *Ephodia tou apodēmoutos*), better known by its Latin title, *Viaticum*.⁵

The recipe for this panacea medicine can be discussed in a variety of overlapping contexts. First, the geographical and the transcultural. An originally Indian medicine, it was introduced to the Mediterranean through the Islamicate medical tradition and naturalised in various environments, becoming a common therapeutic agent for people all around the Mediterranean and transcending linguistic, regional, and political boundaries. In this case, it was part of a large manuscript, Vaticanus gr. 300, containing texts connected with the medical practice of Greek-speaking physicians in the multicultural milieu of southern Italy and Sicily. In other words, Mediterranean cultures – whether Byzantine, Islamicate, Jewish, or Latin – shared common elements of *materia medica* that defined pharmacological knowledge and practice. The substances themselves, in this case the myrobalans, originated in Asia (e.g. India and the Indochinese Peninsula) and, apart from being ingredients in compound drugs, they were commodities that travelled long distances before they were mixed with local Mediterranean ingredients, such as honey.⁶ The long distances these substances travelled illustrate the global connections between the peoples of the Mediterranean and Eurasia as a whole and shows the interrelation of medicine and pharmacology with other fields, such as trade.⁷

Second, there is the textual and therapeutic context. A recipe is a textual entity which may have undergone several stages of editing, transmission (including translation), and elaboration as a result of scribal activity, often

⁴ A long version, the so-called large great *tryphera* (‘μεγάλη τρυφερά’), including a large number of additional ingredients, is found just after the recipe for the small one in the Greek translation in Vaticanus gr. 300, f. 146r, l. 10–f. 146v, l. 15.

⁵ On Vaticanus gr. 300, see Lucà (1993: 36–63), who argues that the manuscript was copied, most probably in the area of Messina in Sicily, around 1130/40. On the Greek translation, which remains unedited, see Miguet (2017). On Ibn al-Jazzār and his work, see Bos (1993: 296–7) and Bos, Käs. and McVaugh (2022: 1–29).

⁶ On the various kinds of myrobalan, see Amar and Lev (2017: 83–8).

⁷ On the medieval spice trade, see Freedman (2012).

informed by the practical knowledge of experimentation by practitioners. A large number of pharmacological texts remain unedited or are available only in outdated and inadequate editions. Thus, we still know very little about the transmission of these treatises and their audiences. At the same time, a drug could be made up and used as a therapeutic agent in daily practice, thus defining pharmaceutical techniques in a hospital, at an apothecary's shop, in a domestic setting (e.g. a patient's home), or in other contexts.

The third context is non-medical. Studying pharmacological substances in non-medical texts can provide an excellent way to explore how pharmacological knowledge had to be adapted to such contexts. A recipe, for example, might contain methods of preparation that originated in cooking or alchemy or indeed the derivation might be the other way around. Furthermore, drugs, whether simple or composite, were often associated with magic, religion, philosophy, and even diplomacy, thus adding an interdisciplinary aspect to the study of medieval pharmacology.

I.1 Towards a Holistic Study of Pharmacological Knowledge in the Mediterranean

This volume explores medieval Mediterranean pharmacological knowledge or 'drug lore' by focusing on simple and compound drugs (i.e. those consisting of more than one ingredient) and their applications in contemporary societies. It aims to construct a Mediterranean-wide view for understanding more general medieval phenomena, such as the cross-cultural exchange of knowledge in the field of pharmacology from the ninth/tenth century to the fifteenth.⁸

For the purpose of this volume, the term 'Mediterranean' includes evidence from places across the Mediterranean, whether in Europe, the Middle East, or Africa, but it is not a merely geographical designation.⁹ It is something broader because, culturally speaking, even places that did not

⁸ Cross-cultural exchange often works on many levels and was invariably influenced by the relevant social and cultural milieus. In this I follow the approach of Brentjes, Fidora, and Tischler (2014: 30–3), who considered the 'cross-cultural exchange of knowledge as a way of life, not merely a linear act of translating'. Determining the multifaceted interactions involved and 'their loci of contact, transfer, transport and transformation and their participants either as identifiable individuals or as a representative of a social, professional, cultural, linguistic or other group' is an important element in the process.

⁹ The use of 'Mediterranean' as a geographical expression is a modern construction and goes back to the nineteenth century. On this and the study of the 'Mediterranean' as a region, see Horden and Purcell (2000: 530–4).

have access to the Mediterranean were predominantly informed by its cultures. Thus, the volume also includes evidence from people not geographically situated in the Mediterranean, but who had very close links with it. One chapter, for example, concentrates on Abbasid Baghdad (Chapter 1), which is an inland region, but through its political status as the capital of the Abbasid caliphate was nevertheless an important centre for charting and understanding cultural exchange in the Mediterranean.

This book seeks to move away from past prejudices in the study of Mediterranean medical traditions, which often valued one tradition over another. It thus aims to promote the practice of studying the entire region simultaneously by initiating a dialogue between scholars of diverse traditions and disciplines without focusing on or privileging one tradition at the expense of another or highlighting the influence of one tradition on others. The volume is divided into two parts: the first includes studies on the transmission of pharmacological knowledge across cultures and regions and deals with a wide variety of medical texts and contexts; the second concentrates on pharmacology's interaction with other areas, such as alchemy, cooking, magic, and philosophy. The thirteen chapters in this volume include contributions focusing on the Byzantine, the Islamicate, the Jewish, and the Latin traditions. These labels often tend to be reductive. Nevertheless, this book does not set out to solve the complicated issues related to the definition of the various medieval traditions. The use of 'Byzantine' and 'Latin' in this volume mainly relates to the language in which the available sources are written – that is, Greek and Latin – rather than to defined geographical spaces. The term 'Islamicate' medical tradition is employed with reference to authors and practice in regions where Muslims were culturally dominant.¹⁰ Lastly, the term 'Jewish' is used for evidence related to people identified as Jews, but who might often write in languages other than Hebrew, such as Arabic, and who could be situated in any region of the Mediterranean.¹¹

It is hard to define a starting point for any study of the transmission, circulation, and adaptation of pharmacological knowledge in the wider medieval Mediterranean. Two significant parameters must be considered: first, the

¹⁰ The term was coined by Hodgson (1974: 59), who states that "Islamicate" would refer not directly to the religion, Islam, itself, but to the social and cultural complex historically associated with Islam and the Muslims, both among Muslims themselves and even when found among non-Muslims'.

¹¹ On Jewish medical authors and practice, see Caballero-Navas (2011). On Jewish authors who specifically wrote in Arabic, see Chipman (2013). For a recent critical survey of views about 'Jewish medicine' in general and about 'Jewish medicine' in the medieval era, see Lehman (2021a: 9–20) and (2021b: 39–49), respectively.

reception of the classical medical knowledge, and, second, the introduction of new knowledge from the Islamicate world, especially from the eleventh century onwards. By the ninth century, as part of the large corpus of Greek medical texts that were translated into Arabic, Greek pharmacological knowledge had been combined in a unique way with Indian pharmacological lore in Abbasid Baghdad. Classical pharmacological knowledge, based on work by authors such as Dioscorides (fl. first century CE)¹² and Galen (129–216/17 CE),¹³ was elaborated with the addition of new vegetal and animal substances from Asia, such as myrobalsans, sandalwood, musk, and ambergris.¹⁴ Also, some medical authors in the Islamicate world introduced their own pharmacological theories often based on experimentation – for example, al-Kindī (d. 873), who instigated a new theory of calculating the degrees of primary qualities of composite drugs (hot, cold, dry, moist) and modified earlier corresponding Galenic concepts.¹⁵ Pharmacological knowledge from the Islamicate world reached other Mediterranean traditions by the eleventh century, initiating a period of assimilation and adaptation that lasted for many decades, even centuries in some cases.

The introduction of Islamicate pharmacological lore in the Byzantine, Jewish, and Latin medical traditions and their interaction with one another was neither a unified nor a simultaneous phenomenon, but rather showed a variety of patterns of adaptation and reception. First, it is evident that there was piecemeal introduction of oriental *materia medica* even before the tenth century.¹⁶ For example, in the Byzantine and Latin traditions, one can see the steady introduction of ingredients such as musk, ambergris, galangal, camphor, and sugar, including new forms of sugar-based recipes/ingredients from the ninth century onwards in medical and non-medical

¹² On Dioscorides, see Riddle (1985).

¹³ For an overview of Galenic pharmacology, see Vogt (2008). On Galenic pharmacological theories, see the comprehensive study by Harig (1974).

¹⁴ Kahl (2019). See, for example, the cases of Al-Ṭabarī's (fl. c.830–50), *Firdaws al-ḥikma* (*Paradise of Wisdom*), and the *Kitāb al-ḥawī* (*Comprehensive Book*) by Al-Rāzī (d. c.925), who wrote medical works attesting to the merging of Greek and Indian medicine. Greek texts were translated either directly into Arabic or via Syriac, while Sanskrit texts were translated either directly into Arabic or via Persian. On al-Ṭabarī, see Meyerhof (1931) and Kahl (2020); on al-Rāzī, see Kahl (2015). See also Amar, Lev, and Serri (2014), who discuss the case of Ibn Juljul (d. after 994).

¹⁵ Pormann (2011); Chipman (2019).

¹⁶ The term 'oriental' is used to refer to ingredients originating from India and the Far East. The term has been used with reference to the importation of spices from Asia to the Mediterranean by Jacoby (2016: 196).

works.¹⁷ The most significant medium for the introduction of Arabic medical knowledge into the wider Mediterranean world was translation. The huge and systematic job of translating Arabic medical works into Latin by Constantine the African (d. before 1098/9) in the late eleventh century led to the creation of new medical compendia in Latin, such as the *Articella*, which remained the main textbook for Latin medical teaching in Europe until the sixteenth century.¹⁸ The period was marked by the rediscovery of classical and late antique works,¹⁹ which were combined with new knowledge from the Islamicate tradition. To give a few characteristic examples from the area of pharmacology, two important Latin *antidotaria* had appeared by the end of the eleventh century. The so-called *Antidotarium magnum*, which is a large collection of composite drugs that can number up to 1,300 recipes in some manuscripts, shows a unique elaboration of earlier pharmacological lore with newly introduced oriental substances. A certain Nicolaus created a much smaller and more user-friendly work, the *Antidotarium Nicolai*, by excerpting the most commonly used recipes from the *Antidotarium magnum*.²⁰ By the twelfth century an influential and very well-circulated Latin work on simple drugs, the *Circa instans*, had been put together in Salerno, which became the centre of medical activity in the western Mediterranean from then

¹⁷ On the Byzantine and Latin traditions, see Bouras-Vallianatos (2021) and BurrIDGE (2020: 235–7), respectively. The issue of theoretical versus actual *materia medica* is relevant here, or, in other words, whether the ingredients mentioned in medical works were actually in circulation before the tenth/eleventh centuries. In fact, there are non-medical sources that confirm the presence of oriental ingredients in the wider Mediterranean world in this period. For example, that galangal was supplied every year as far afield as the Abbey of St. Bertin in north-west France is confirmed in a charter of 867 (see Gysseling and Koch (1950) I.68.11–12). In the Byzantine world, the appendix to the *Book of Ceremonies*, ascribed to Emperor Constantine VII Porphyrogenetos (sole r. 945–59), includes, for example, musk, ambergris, and sugar, among the spices that the emperor would have with him when he went on campaign. See Constantine VII Porphyrogenetos, *What Should Be Observed When the Great and High Emperor of the Romans Goes on Campaign*, ed. Haldon (1990) 108.219–22. Another important work which makes early references to oriental *materia medica* is *Hippiatrica*, a Byzantine horse medicine manual, emphasising the importance of a more holistic assessment of medieval medical literature, including veterinary works. Its tenth-century recension (in Berolinensis Phillippicus 1538) includes notable mentions of ingredients such as ambergris and galangal. On this, see McCabe (2009: 288–90).

¹⁸ We know very little about the life of Constantine the African. There is no doubt that he made his translations in Montecassino, where he lived as a monk. On Constantine the African and the transformation of Latin medicine in the late eleventh century, see Green (forthcoming) with further recent bibliography.

¹⁹ For example, late antique Latin translations of Dioscorides' and Alexander of Tralles' (c.525–c.605) works or Theodore Priscianus' (fl. later fourth/early fifth century) Latin handbook, as well as new translations from Greek, such as Paul of Aegina's (fl. first half of the seventh century) *Epitome*. See Green (2008).

²⁰ On the *Antidotarium magnum*, which remains unedited, see Green (2019). Francesco Roberg is preparing a new edition of the *Antidotarium Nicolai*. See Roberg (2007).

onwards; this treatise shows significant influence from the Islamicate pharmacological tradition.²¹ An abundance of evidence from Hebrew commercial documents (dated to the eleventh and twelfth centuries) in the so-called Genizah collection in Cairo shows the intense links between India and Egypt, including references to the importation of thirty-six spices, aromatics, varnishing plants, and medicinal plants to the Mediterranean.²² This is particularly important since it confirms that the transfer of knowledge through translation was not just theoretical, but that oriental ingredients were simultaneously spreading across the Mediterranean.²³

By the third quarter of the eleventh century, Symeon Seth, a Greek scholar active in Constantinople, who knew Arabic and most probably came from Antioch, had composed his *Treatise on the Capacities of Foodstuffs*, addressed to the Byzantine emperor Michael VII Doukas (r. 1071–8), which provides details on a large number of aliments and their properties. In this work, Symeon made a systematic attempt to introduce new data and codify Islamicate medical knowledge, which had been slowly infiltrating Byzantine medical circles in Greek since the tenth century.²⁴ It is worth noting that Symeon was an exact contemporary of Constantine the African, although his work is not comparable with the latter's grand-scale translation project. Southern Italy and Sicily played a significant role in introducing Islamicate pharmacological lore to the wider Byzantine world as well, which inevitably leads us to reconsider the role of Greek-speaking communities outside Byzantium proper. The *Ephodia tou apodēmountos* had been translated in the same area by the early twelfth century, along with other Arabic medical works, such as *On Purgative Drugs*, most probably from an Arabic treatise by Pseudo-Yūhannā ibn Māsawayh (d. 857).²⁵ These treatises were abundantly copied and used by Byzantine medical authors in later centuries, thus enhancing

²¹ The work survives in 138 manuscripts. See Ventura's (2016) comprehensive study of the text.

²² Goitein and Friedman (2008: 16). See also Yoeli-Tlalim (2021: 71–3). Commodities from India reached Egypt (Alexandria) via the Gulf of Aden. Of course, there were other trade routes between India and the Mediterranean – for example, the overland routes from Baghdad (via Siraf on the Persian Gulf) to Trebizond and Constantinople. See Durak (2021).

²³ Cf. Ventura (2016: 379–81). On the debate about theoretical versus actual/practical *materia medica*, see note 17, and Lev and Amar (2007).

²⁴ Harig (1967); Bouras-Vallianatos (2021: 979–82).

²⁵ The earliest surviving manuscript of this translation is Vaticanus gr. 300, ff. 273v–284v, where it is attributed to St John of Damascus. See Bouras-Vallianatos (2021: 987, n. 125). This was most probably due to these two historical figures having the same name in Arabic – that is, Yūhannā = John. The same confusion is also attested in the Latin tradition; see De Vos (2013: 683). On the Latin version of this treatise, see Ventura (2021: 185–99).

the dissemination of Islamicate pharmacological knowledge.²⁶ Further pharmacological works from the Islamicate world were translated into Byzantine Greek, including some Persian *antidotaria*, which led to a significant diffusion of oriental *materia medica* and new forms of composite drugs in the Greek-speaking eastern Mediterranean world.²⁷

A number of important contemporaneous developments can be seen in the field of Jewish medical tradition. It is worth noting that no medical works were written in Hebrew until the end of the twelfth century.²⁸ Jews often wrote in Arabic in medieval Islamicate milieus. For example, Ibn Biklārīsh, a Jewish physician and pharmacist who lived in the Spanish city of Almeria, wrote a pharmacological work in Arabic, *Kitāb al-Musta'īn* for al-Musta'īn (r. 1085–1109), the Hūdīd ruler of Saragossa, in around 1106. The work includes a long list of 704 simple drugs and their properties in tabular form, along with their names in various languages. The author refers to earlier Greek and Arabic works by authors such as Dioscorides, Galen, Ibn Māsawayh, al-Kindī, and al-Bīrūnī (d. after 1050), and follows the Galenic principles of the degrees of intensity of primary qualities.²⁹ Meanwhile, by the end of the twelfth century, the first translations of Arabic works from Latin into Hebrew were being made in the Western European Christian world, in particular Provence. Further translations directly from Arabic into Hebrew in subsequent centuries promoted the writing of Hebrew texts, including the dissemination of Islamicate pharmacological knowledge in Hebrew, thus coinciding with contemporaneous translation work in other parts of the Mediterranean.³⁰ Lastly, an interesting collection of pharmacological recipes in Greek had been produced by a certain – most probably Greek-speaking – Jew called Benjamin

²⁶ See, for example, Bouras-Vallianatos (2020: 152–7). On Arabo/Persian-Byzantine medical translations, see Touwaide (2016).

²⁷ See, for example, the two Persian *antidotaria* translated into Greek by Gregory Choniades and Constantine Melitiniotes in the fourteenth century. On these, see Bouras-Vallianatos (2021: 998–1002) and Kousis (1939), respectively.

²⁸ Caballero-Navas (2011: 1–2). There are two notable exceptions. The first is the so-called *Sefer 'Asaph* (*Book of Asaph*), composed in the Middle East by the eighth to ninth centuries, which includes a section on *materia medica*. See Yoeli-Tlalim (2021: 26–34). The second was written by Shabbetai Donnolo (913–c.982), who was active in Byzantine southern Italy. He wrote a medical book in Hebrew, *Sefer Mirqāhoth* (*Book of Remedies*), consisting of recipes for composite drugs. See Sharf (1995: 160–77) and Ferre (2004). It is worth noting that this treatise contains only limited references to oriental *materia medica*, such as cinnamon, ginger, myrobalan, and zedoary (*Sefer Mirqāhoth* (*Book of Remedies*), 9, ed. Ferre (2004): 7).

²⁹ Burnett (2008). See also Bos and Käs (2016), who discuss the case of Marwān ibn Janāḥ's (d. second quarter of the eleventh century) *Kitāb al-Talkhīṣ* (*Book of the Commentary*).

³⁰ Caballero-Navas (2011: 324–35).

by the fourteenth century.³¹ Unfortunately, we cannot identify where this author lived and worked. The work shows considerable influence from the Islamicate pharmacological tradition and must be seen as a piece of the multifarious puzzle that is the study of Jewish medical authors in the medieval Mediterranean.

This volume discusses examples of the transmission and circulation of medieval pharmacological knowledge in the Mediterranean, and aims to help us reconsider often neglected or little known stages in this process and ultimately to understand the entire area in a more holistic way. The chapters in both parts of this volume have not been arranged in chronological order; nevertheless, an attempt has been made to group together chapters dealing with the same tradition or a similar topic. My discussion of the chapters of this volume does not necessarily follow the order of the chapters in the table of contents.

Jeffrey Doolittle (Chapter 2) examines a group of oral and dental recipes transmitted as part of several Latin medieval medical compilations based on the *Natural History* by Pliny the Elder, including the *Medicina Plinii* as well as five witnesses of a later extended version, the *Physica Plinii*, dated to between the ninth and the fifteenth centuries. He shows how recipe collections relied on common sources, and how subtle but meaningful differences are observed in each version. Doolittle then argues that by the ninth/tenth centuries, ingredients coming from outside the Mediterranean, such as myrrh, pepper, and clove are increasingly recommended. The number of ingredients from Asia is even higher in the PP Flor-Prag manuscript of the *Physica Plinii*, which dates to the fourteenth/fifteenth century, thus confirming the significant spread of Islamicate pharmacological knowledge. This coincides with the facilitation of overland trade from Asia under the unified Mongol Empire, especially after 1304.³²

The various translations of pharmacological works from one language to another resulted in introducing new terms that were previously unknown to its native speakers. Authors and translators of medical works often made considerable effort to provide synonyms for the *materia medica* for the convenience of readers throughout the Mediterranean.³³ I have already referred to the work of Ibn Bīklārīsh, who in his work on simple drugs included equivalents for the names of ingredients in Syriac, Persian,

³¹ The work is unedited and survives in three manuscripts, the earliest dated to the fourteenth century. See Bouras-Vallianatos (2020: 145, n. 23). I am currently preparing its *editio princeps* along with an English translation.

³² Biran (2015: 551–2). ³³ Burnett (2016).

ancient and medieval Greek, Arabic, and ‘*ajamiyyah*’ (Latin and Romance languages). Fabian Käs (Chapter 1) focuses on the unedited *Kitāb quwā l-adwiyah* (*Book on Simple Drugs*) by Ibn al-Tilmidh (b. c.1073), a Christian physician active in the famous ‘Aḡdī hospital in Baghdad, who provides synonyms for simples in Arabic, Syriac, Greek, and Persian. Käs argues that including these terms in multiple languages had a practical aim in the multicultural environment of Baghdad, namely to help physicians cross-check entries on *materia medica* in Syriac works or Arabic translations of Greek works. The Persian terms, on the other hand, might have been helpful to merchants involved in trading ingredients across greater Iran.

Kathleen Walker-Meikle (Chapter 3) deals with the unexplored Latin translation of an Arabic text on animal *materia medica*, the so-called *De sexaginta animalibus* (*On Sixty Animals*). In the Latin text, one finds extensive use of Arabic terminology for the names of the animals themselves and for units of measurements. The Latin term is often found alongside the Arabic term in transliteration (e.g. the Arabic *al-dhi’b*, here *ozib*, is followed by the Latin term *lupo*, thus *De ozib lupo*). Terms for exotic animals were sometimes left untranslated; for example, the cheetah, *al-fahd* in Arabic, is rendered as *alphet* or *alfat* in Latin. These examples are a vivid testimony to the ongoing process of assimilation and naturalisation of foreign terms in the field of pharmacology – in this case, within the Latin tradition – as the result of the intensified transfer of knowledge, especially from the Islamic world.

Maria Mavroudi (Chapter 4) discusses the presence of annotations with Greek plant names in Dioscoridean herbals in Arabic and of Arabic terms, written either in Arabic script or transliterated into Greek characters, in Greek medical manuscripts containing multilingual lexica of pharmacological substances. For example, the Greek terms ‘μῆλα’ and ‘κυδώνια’, written in a fluent eleventh-century hand, are provided in the margins for the Arabic *mālā* (‘apples’) and *qūdhūnīā* (‘quince’) that appear in the main text in Leidensis or. 289, a codex originating in Samarkand in the late eleventh century. On the other hand, one can find Greek transliterations of Arabic terms, such as ‘φαίχισεν’ for *al-fāhisha*, which is given as an equivalent for the Greek ‘καστόριον’ (‘castoreum’) in late Byzantine dictionaries of synonyms. These cases attest to the intense interaction between the Byzantine and Islamicate pharmacological traditions and the progressive familiarisation of contemporary practitioners with foreign terms for *materia medica*.

The use of Greek – for example, ‘τουτίαν’ (*cadmia*) for the Arabic *tūtiyā* – or even Latin loanwords in Greek transliteration is highlighted