MEDIEVAL PHARMACOTHERAPY

CONTINUITY AND CHANGE

Case Studies from Ibn Sīnā and some of his Late Medieval Commentators

by

HELENA M. PAAVILAINEN

BRILL

Medieval Pharmacotherapy—Continuity and Change

Studies in Ancient Medicine

Edited by

John Scarborough

Philip J. van der Eijk
Ann Ellis Hanson

VOLUME 38

Medieval Pharmacotherapy Continuity and Change

Case Studies from Ibn Sīnā and some of his Late Medieval Commentators

by

Helena M. Paavilainen

BRILL

LEIDEN • BOSTON
2009

On the cover: Artemisia vulgaris L. From *Vienna Dioscorides* (Vienna, Österreichische Nationalbibliothek, Cod. med. gr. 1.), an early 6th century copy of *De materia medica* by Dioscorides. Fol. 20, verso.

This book is printed on acid-free paper.

Library of Congress Cataloging-in-Publication Data

Paavilainen, Helena M.
Medieval pharmacotherapy–continuity and change : case studies from Ibn Sina and some of his late Medieval commentators / by Helena M. Paavilainen.
p. ; cm. – (Studies in ancient medicine, ISSN 0925-1421 ; v. 38)
Updated version of author's doctoral thesis–Hebrew University of Jerusalem, 2002.
Includes bibliographical references and index.
ISBN 978-90-04-17119-0 (hardback : alk. paper)
1. Pharmacology–History. 2. Medicine, Medieval. 3. Pharmacopoeias. I. Title. II. Series: Studies in ancient medicine, v. 38. 0925-1421 ; [DNLM: 1. Avicenna, 980-1037. 2. Drug Therapy–history. 3. History, Medieval. 4. Medicine, Arabic–history. W1 ST918K v.38 2009 / WZ 54 P111m 2009]

RM44.P33 2009
615'.1–dc22

2009029999

ISSN 0925-1421
ISBN 978 90 04 17119 0

PRINTED IN THE NETHERLANDS

In memory of my father,
Lauri Paavilainen,

to my mother,
Maija Paavilainen,

and

to my teacher and mentor,
Prof. Samuel Kottek

CONTENTS

ACKNOWLEDGEMENTS

This book is an updated version of my PhD thesis, which was completed in 2003 at the Hebrew University of Jerusalem, Israel. There are so many people to thank for helping me complete both the original PhD thesis and the present work that it is impossible to even begin mentioning them all.

My greatest thanks go to my teacher and former doctoral supervisor who guided the thesis on which this book is based, Prof. Samuel Kottek. Most of what I know about the history of medicine I have learned from him, as well as what it means to be a real scholar and a real teacher—a person for whom the success of his students means as much, and more, than his own. I thank him for letting me follow my own dream, for guiding and supporting me in this for several long years. He continues to be an invaluable source of support and knowledge. No amount of words can adequately express my gratitude.

I gained my earliest impetus for a life in research from my secondary school teachers, Seija and Kalle Viitanen, who opened my eyes to possibilities which I might not have otherwise dared to dream of. I am sincerely grateful to them both. In the same vein, I owe special thanks to Professors Tapani Harviainen and Heikki Palva, for lighting in me the passion for Semitic languages and the medieval period and for teaching me what I needed to know in order to move in to my present field. Also, to Dr. Harry Halén, for freely sharing his unlimited storage of information. I would like to extend to all of them my heartfelt thanks.

I am deeply grateful to Prof. Raimo Hiltunen for his ongoing, self-sacrificing support from the beginning stages of this project until now, and for being the first to believe in its potential, and to Prof. Raphael Mechoulam for his ongoing help and support over the years, and for his crucial advice in the field of pharmacology.

Special thanks are due to my friend, Dr. Sygal Amitai, for suggesting the concept of "heuristic model" in one of our long discussions on the subject, and for her patience during the painful stages of the creative process.

I owe a special debt of gratitude to Prof. John Riddle for his constructive criticism when reading and evaluating my PhD thesis, for encouraging me to publish it, and, even more so, for the example his research has been to me over the past twenty years. Without his writings, I would have walked much more alone. I am also sincerely grateful to Prof. John Scarborough for accepting the manuscript for publication in the Studies in Ancient Medicine series, and for his extremely helpful comments on the text. I am indebted to him also for drawing my attention to several articles related to my research, and for his unselfish sharing of his own, partly unpublished, material and ideas.

I wish to express my thanks to the State of Finland for support that partially enabled me to go on with the research, to the Ministry of Education in Israel for the grant without which I could not have started my PhD studies in Israel, to The Sidney M. Edelstein Center for the History and Philosophy of Science, Technology, and Medicine for the grant which has made possible the appearance of this volume in its reworked form, and to The Joshua and Hannah Leibowitz Foundation for the Promotion of Research in the History of Medicine, with Emphasis on Jewish Contributions, for generously covering the editing expenses.

The rewriting of this book took place while I was a postdoctoral researcher at The Sidney M. Edelstein Center for the History and Philosophy of Science, Technology, and Medicine in Jerusalem. In addition to their generous financial assistance, I am grateful for the ideal working conditions provided by the Center. Above all, my thanks are due to Dr. Tony Travis, whose kind helpfulness has made a real difference. I would also like to acknowledge the valuable help of the following persons and institutions: The Helsinki University Library for their assistance in finding the necessary materials, The National and University Library, Jerusalem, for the friendly and comfortable research environment they provided, the Wellcome Library, London, and especially Nigel Allan, the Curator of the Oriental collection, who enabled me to purchase the microfilms required for this work. I would like to extend special, heartfelt thanks to Hava Nowersztern of the Edelstein Collection for her extreme helpfulness and friendliness—and for being an encouraging friend.

I also owe a particular debt of gratitude to Judith Tonning, who with speed, skill and patience edited considerable parts of the original PhD thesis, to Joy Clark and Audra Ausiejus, who read a recent version of the present work with meticulous care, correcting errors and making many helpful remarks, and to Laura Seton for the final editing of the work with great skill and never-ending patience. Likewise, I wish to thank Patrick Roberts and Hilary Le Cornu for editing parts of the original thesis, and Dr. Yaron Serri for his expert editing of the Arabic terms.

I would also like to express my gratitude to the editors of the series *Studies in Ancient Medicine*, Profs. John Scarborough, Philip J. van der Eijk, Ann Hanson and Nancy Siraisi, for accepting this work for publication, to Drs Irene van Rossum and Caroline van Erp for their continuous help and patience during the period of editing, and to Prof. Emilie Savage-Smith, who with her comments did much to bring the contents of the work to a more up-to-date state.

Special thanks are due to Ms. Elka Tirnover for her kind advice and guidance through the complications of academic life and for saving me from different administrative crises. Without her ever available help, I may never have begun this work. Also, to Mirja Ronning for her help in all the practical aspects of my work and life during the crucial days and nights before submitting my PhD thesis. A friend in need is a friend indeed!

I want to thank my sister, Kaarina Paavilainen, for technical assistance in many critical situations during the project—and for being always there for me when I have needed her, however far apart geographically we may have been from one another.

And last but definitely not least, my deepest gratitude goes to my parents, Maija and Lauri Paavilainen, for their ongoing help, support and love during my whole career and for giving to me from my earliest childhood the love for books and research, and to my grandmother, Eimi Lempinen, for an always listening ear.

Helena Paavilainen
Jerusalem, 28.11.2008

CHAPTER ONE

INTRODUCTION

1.1. *Preliminary Remarks*

The subject of this study is medical drug therapy in medieval times and the interplay of tradition and innovation that characterize its development. In order to appreciate that development, which began with literate Arabic[1] medicine and led to Latin medical scholasticism, we will concentrate on a few diseases[2] and follow their treatment methods, starting from an Arabic medical encyclopedia of the 11th century, proceeding through a number of Arabic and some Latin commentaries, and concluding in the 15th century. In this way we aim to trace both the continuity and the development of the theory and practice of medieval drug therapy, trying to discover any possible patterns that might have influenced the choice of the drugs in therapy, especially why certain drugs were preferred above others. This in turn also demands examining in detail the causes and the manifestations of each of the symptoms/syndromes treated and the possible interconnections between these, the given therapeutic theory and the recommended medicaments, establishing the degree of coherence between the different parts of the system. The scope of the study is limited to literary medicine based on the Galenic tradition, especially its drug therapy; this excludes medical folklore and magic on the one hand, and physiotherapy, venesection, and exercise on the other. The starting point is the assumption that the authors of most of these texts were practicing doctors and therefore combined both the theoretical and the practical knowledge of their time.

In the early chapters we will explore the theoretical background, against which we will then consider the selected diseases and their

[1] Here and in the following the terms "Arab(ic)" and "Latin" are used to denote the language only, with no reference to ethnicity or religion.

[2] Actually symptoms and syndromes. Riddle, 1985b, pp. 43–44. See also p. 47, n. 294, below.

therapy. In the first chapter we will follow the spread of the Greek medical tradition throughout the area of Arab cultural influence to the Latin West and give a short overview of both its theory and practice as found in the texts of the medieval Arab writers. In the second chapter we will look more closely at the particular authors whose texts we shall be discussing; while the third chapter will delineate the methods used. The following three chapters, the main body of the work, then discuss three medical conditions: nosebleed, cough and diabetes, as they appear in the medieval medical literature, especially from the therapeutic point of view. The hypotheses to be tested here are that 1) Medieval disease and therapy descriptions are internally coherent, and, 2) If so, the historical continuity of the use of a drug and its popularity in the therapeutic recommendations of a single medical author correlate both with each other and with other relevant aspects of the medical system, and 3) These correlations occur according to clear patterns, showing that the choice of the drugs was rational. The conclusions drawn about the validity of the hypotheses will be shown in the final chapter.

The transliteration of Arabic words follows the system used by the Library of Congress. In the case of Arabic names, the definite article *al-* has not been capitalized, unless it appears at the beginning of a sentence. Bracketed [ ] material in the translations indicates additions made to the English text for the purpose of intelligibility.

1.2. *Research Material*[3]

In this book we will concentrate on the type of medicine which was practiced by doctors from the highest to the middle level of the professional scale—literate practitioners, from whose ranks arose also the greatest medical authors of the time, especially the encyclopedists.

For material, we have chosen a medieval Arabic medical encyclopedia—Ibn Sīnā's *Kitāb al-Qānūn*—and five of its commentaries. Commentary literature helps in pursuing a given subject matter and following its development over the centuries, while keeping track both of additions to medical lore over time (i.e., new herbs, prescriptions or theories) and

[3] For a more detailed description of the research material, see below in Chapter 3, *Research Material.*

of that which has been omitted from the lore of earlier centuries. Two epitomes (or abstracts) will be discussed, in addition to one commentary on an epitome, one fully-fledged commentary discussing the whole text in detail, and one more glossary-type commentary. Since the epitome genre necessitates drastic condensation, examination of the epitome should clarify which drugs the author really considers to be the most necessary, and possibly, why. The full scholastic commentary genre, on the other hand, offers the author the possibility of adding as many innovations as he wants. By comparing these two versions of the texts, it should be possible to determine which were the core drugs (those used by most doctors) amongst all those in the range of drugs used in the Middle Ages for the treatment of a particular disease.[4]

Ibn Sīnā's (980–1037)[5] great medical encyclopedia *Kitāb al-Qānūn fī al-ṭibb* was studied in the original Arabic version printed in Beirut (Bayrūt [sine anno], reprint of Būlāq 1294 H.) and compared with the Latin translation by Gerard of Cremona (*Liber Canonis Avicenne*, Venetiis, 1505). *K. al-Qānūn* is part of the living medical tradition in the Middle East, and thus we considered it appropriate to use the text actually still in use today.[6]

The commentaries we have used are *Mūjaz al-Qānūn* by Ibn al-Nafīs (d. 1288),[7] *Qānūnja fī al-ṭibb* by al-Jaghmīnī (d. 1344–1345)[8] with its anonymous supracommentary, and the commentaries by Gentile da Foligno (d. 1348)[9] and Jacques Despars (d. 1458)[10] in *Tertius Canonis Avicenne*, Venice, 1505.[11]

---

[4] For examples of core drug collections, see Lev, 2006; Touwaide, 2007, pp. 165–169.

[5] For relevant bibliography on Ibn Sīnā, see p. 67, n. 5, below.

[6] In the *unani* medical tradition. See pp. 75, 98, and n. 65, below.

[7] *Mūjaz fī al-ṭibb*, al-Qāhira, 1997. For relevant bibliography on Ibn al-Nafīs, see p. 75, n. 65, below.

[8] *Qānūnja fī al-ṭibb*, St. Petersburg, 1894. For relevant bibliography on al-Jaghmīnī, see p. 79, n. 89, below.

[9] For relevant bibliography on Gentile da Foligno, see p. 80, n. 98, below.

[10] For relevant bibliography on Jacques Despars, see p. 82, n. 111, below.

[11] *Tertius Canonis Avicenne cum dilucidissimis expositoribus Gentile Fulginate nec non Jacobus de Partibus*. Venice, B. Benalius, [*c.* 1505].

1.3. *Research Method*[12]

The research concentrates on four main questions:

1. *Traditionalism* vs. *Empiricism, Continuity* vs. *Change*[13]

Medical historiography often creates the impression that most early pharmacological writings are the result of mindless copying activity based on excessive reverence for tradition, with no evidence of criticism or possibility for change.[14] On the other hand, research studies conducted by Martin Levey and John Riddle stress, respectively, the unobtrusive character of change in medieval medicine through omissions and additions and rationality as a factor impelling change.[15] However, at this stage we are not asking the question *why* changes occurred but simply *whether they did occur and to what extent*. How much traditional material and how much innovation do the commentaries contain?

2. *The Practical Relationship between Pharmaceutical Theory and Practice*

Here we study first the internal coherence of Ibn Sīnā's description of the causes, symptoms and consequences of a particular syndrome and the general theoretical guidelines for therapy, and then the relationship between his pharmacological theory and his practical therapeutic choice of drugs. Ibn Sīnā's pharmacological theory should dictate the general type of remedy. We will examine whether this was actually the case or whether the choice of drugs was based on a different system in practice.

---

[12] For a more detailed explanation of the aims and methods of the study see below in Chapter 4, *Method of the Study*.

[13] Challenging studies on the issue of tradition and change inside literate traditions are Crisciani, 1990, and Temkin, 1962.

[14] See pp. 89–90, below, and particularly Ullmann, 1970, p. 257; *ibid*., 1978, pp. 103, 106.

[15] See pp. 95–96, below, and Levey and al-Khaledy, 1967, Introduction, *passim*; and Riddle, 1985b, p. 62. A dramatic example of this process is *Kitāb al-Ḥāwī fī al-ṭibb* by al-Rāzī (al-Rāzī, 2000). The book is essentially a collection of notes from earlier authors, with comments of al-Rāzī's own. Tibi sees al-Rāzī's originality and creativity in the way he selected the material from the "vast jumble of information" coming to Baghdad at the first stages of the translation movement when the "official" medical lore had not yet crystallized to a medical discipline. See Tibi, 2006, p. 106.

3. *Other Factors Influencing the Choice of Drugs by Ibn Sīnā and his Followers*
Here we will examine the influence of Ibn Sīnā's drug preferences on the choices of the commentators following him, the possible cause for the need of innovations, and the influence of other factors.

4. *Possible Implications*
Here we will examine the practical conclusions drawn from the relationship of the entire therapeutic system to the objective physical reality.

The diseases—or symptoms—of which the treatments are to be studied are nosebleed, cough and diabetes. Nosebleed is an easy-to-observe symptom, with simple theoretical explanation in *Kitāb al-Qānūn*. Therefore, we chose its treatment as the model through which we will show the details of the method. Cough represents a far more complicated complex of symptoms, the medieval treatment and etiologic understanding of which was not, however, very distant from our present understanding. Diabetes, on the other hand, was understood in medieval medicine in a radically different manner from the way in which we understand it now, thus offering us a realistic example of the challenges connected with medieval pharmacological information. Common to all these symptoms and diseases is the fact that they form unities that can also be understood and treated by modern Western bioscience.

None of the main topics of this book—the continuation of medical prescription tradition from the Arabic to the Latin commentary literature,[16] the internal coherence of the medical system as seen in individual diseases, and the factors influencing the choice of the drugs—have yet been extensively studied.

The method used includes the following steps:

Stage 1. Describing the Disease (causes, symptoms, consequences)
We will describe the disease—or the symptom—as set out in *K. al-Qānūn*, giving its causes, symptoms and possible consequences, together with their interconnections.

---

[16] Arabic prescription literature, on the other hand, has been subject of intensive research during the last decade. See, for example, the groundbreaking studies of Chipman (2005) and Pormann (2004) on the creative transmission of prescriptions from earlier sources, and Kahl's edition, translation and analysis of Arabic hospital dispensatories (2003, 2007).

Stage 2: Describing the Disease's Treatment in Theory
Here we describe the theoretical basis of the drug treatment of a certain disease or symptom, addressing the following questions: What medicinal qualities were recommended, and what qualities did a drug need to have in order to be recommended for therapy of the specific symptom/syndrome?[17] What were the effects the healer sought?[18]

Stage 3: Describing the Practical Treatment
Here we will give the prescriptions and drug recommendations laid out by Ibn Sīnā for the disease in question.

Stage 4: Tallying the Frequency with which Different Drugs Appear in Prescriptions
Here we will count how many times each simple drug appears in the prescriptions, thus concluding which of the simple drugs were Ibn Sīnā's favorites.

Stage 5: Comparing the Simple Drugs and their Qualities According to Book II of K. al-Qānūn
Here we will compare the therapeutic qualities of the simple drugs recommended for a particular disease in Book II of *K. al-Qānūn*, together with the list of therapeutic qualities which Ibn Sīnā gave as necessary for the treatment in his *description of the disease's treatment in theory* (Stage 2). Our intention is to investigate the connection between the choice of drugs and their therapeutic qualities—i.e., to connect theory and practice and to examine how far the theory influenced the practical choice of the drug.

Stage 6: Repeating Stages 1–5 Using the Various Commentaries
Here we describe the same symptoms/syndromes as they appear in the two Arabic commentaries, the Arabic supracommentary and the two Latin commentaries according to Stages 1 through 6. These commentaries are then compared with *K. al-Qānūn*.

Stage 7: Considering Other Rationales behind Ibn Sīnā's Drug Choices
At this point we move from the perspective of a medieval doctor to that of the modern scholar and seek to evaluate other possible reasons behind

17 See also Browner *et al.*, 1988, pp. 683–684.
18 *Ibid.*, p. 686.

the choice of the simple drugs recommended by Ibn Sīnā for the disease in question.

Stage 8: Seeking Correspondence between the Different Variables Connected with the Choice of the Drugs
Here we try to see exactly *how* the factors possibly connected with the choice of drugs influenced this choice, both in *K. al-Qānūn* and in the commentaries, and if they form any regular patterns. The purpose is to find out which criteria are most relevant for the fourth main question addressed here—the possible implications of the research.

Stage 9: Conclusions
Here we will discuss the results of Stages 1–8.

This method has its drawbacks, most of which are connected with the nature of the data. Not all fields have yet been studied, and even those researched have not all been examined to the same depth. The identification of medieval drug names is often dubious. Diagnoses based on ancient descriptions of syndromes are rarely fully conclusive. The descriptions of both therapy and simple drugs by Ibn Sīnā and the commentators are often partial and quite unsystematic. Therefore one of the key concepts of the method is *cumulative evidence*: acknowledging that while the data are not—and cannot be—perfect, the sheer weight of evidence can still validate the results.[19]

---

19 See Riddle, 1985b, pp. xxiv–xxv.

CHAPTER TWO

HISTORICAL BACKGROUND

We will start by describing the historical progress by which the ancient Greek medical tradition reached first the Arabic Middle East and Africa, and then Latin Europe.

2.1. *The Spread of Galenic Medical Tradition from the Greek Cultural Area to the Arabic and the Latin Cultural Areas*

2.1.1. *The Greek Beginnings*[1]

The medieval Arabic and later the Latin medical traditions have their mutual point of origin in ancient Greek medicine, especially in the writings of Galen, Hippocrates and Dioscorides. Part of this tradition may be of much older origin, however, as both the pharmacology[2] and the pathology[3] of these authors show influences from earlier cultures.

The Hippocratic Corpus, a collection of writings attributed to Hippocrates of Cos (mid-5th cent. BCE), was written mainly between 440 and 330 BCE and largely collected together at Alexandria in about 280 BCE.[4] Hippocratic medicine was based on the humoral system, a system that had such explanatory power, and so closely corresponded to the observable physical phenomena, that it survived for more than 2000 years.[5] Its authors saw the human body as a part of nature, subject to the same laws as nature, rejecting any supernatural causes for illness.[6, 7]

---

1 This chapter is based on the following studies: Nutton, 1995; Riddle, 1985b; and Temkin, 1973.

2 For the suggestion of Greek medical folklore having inherited some facets from the ancient Near East, see Burkert, 1984.

3 For the ancient Egyptian idea of superfluities and their putrefaction as a cause of diseases, see Saunders, 1963, p. 32.

4 Nutton, 1995, p. 21; Tibi, 2006, p. 5.

5 Nutton, 1995, p. 25.

6 *Ibid.*, p. 23.

7 For an overview of Hippocratic medicine, see Smith, 1979. On Hippocratic practice,

Among the pharmacological authors, Pedanius Dioscorides[8] (1st cent. CE, Anazarbos)[9] was the most important. Galen considered him a principal source and often quoted him. But Dioscorides also saw himself as a collector and expander of others' work. He used as his basis earlier herbals,[10] and to these he added information collected from people he met during his travels.[11] Much of this latter information was orally transmitted from a much earlier time. In his book *De materia medica*[12] (written *c.* 65 CE), Dioscorides described the appearance of the drugs, where they grew, their effects and uses, and, sometimes, ways of preparing them, but without giving much theory.[13] He supplied only descriptions, not explanations. His repertoire included more than 1000 drugs,[14] with a total of 4,740 medical uses.[15]

The Hippocratic system was taken over by Galen (2nd cent. CE, Pergamum, Alexandria, Rome).[16] Galen based his comprehensive medical system on the humoral theory, systematizing and augmenting it both with

---

see Nutton, 1995, pp. 26–31. John Riddle evaluates the potential efficacy of Hippocratic treatments in Riddle, 1987. On Hippocratic pharmacology, see Stannard, 1961.

[8] On Dioscorides, see Riddle, 1985b; Scarborough and Nutton, 1982; Aufmesser, 2000.

[9] In modern Turkey.

[10] "An herbal may be defined as a series of descriptions of plants (sometimes including animal and mineral substances) regarded as medicinal, accompanied by medical, pharmacological, and scientific data concerning their names, uses, habitat, and related information ... Such herbals have exhibited a basically similar pattern since the Middle Ages and ordinarily satisfy the following four conditions: (I) the arrangement of the descriptions is alphabetical, (II) the alphabetical arrangement is by the common or vernacular name(s) of the plants described, (III) the plants so described are either indigenous or naturalized within the region where that particular herbal is to be used, and (IV) each plant is described singly." Stannard, 1974a, p. 23.

[11] As he himself wrote: "... from accounts on which there has been unanimous agreement and previous examination in each case by the natives [...] ... I shall include traditional as well as related material, so that the account be complete." Beck, 2005, Introduction 5, p. 3 (trans. by L. Beck). Dioscorides usually clearly differentiates between remedies he knows, or has "tested" for himself, and those he has learned by hearsay. Scarborough, 2005a, p. xiv.

[12] Translated several times into modern languages; into German: Berendes, 1902; Aufmesser, 2002; into English: Goodyer, 1934; Beck, 2005.

[13] See, however, Riddle, 1985b, pp. 33–36. On Dioscorides' affinity-based organization of material, see Riddle, 1985b, *passim*; on the importance of taste and smell in his arrangement of the material, see Scarborough, 2005a, pp. xvi–xvii.

[14] Riddle, 1985b, p. xviii; Touwaide, 2005, p. 152.

[15] In comparison, the whole Hippocratic Corpus mentions only 400 medicinal substances (Lev, 2003, p. 18).

[16] On Galen in medieval Arabic medicine, see Walzer, 1960–2002, p. 402 f.; Ullmann, 1970, pp. 35–68; Sezgin, 1970, pp. 68–140.

information from the different medical schools of his times—including the knowledge of his predecessors such as Erasistratus and Herophilus—and with his own observations.[17] In his eyes, progress was rooted in the principles of the ancients; he felt these were still valid and could be used to advance knowledge even further than had been possible in ancient times. The field in which Galen was most famous himself was probably that of anatomical and physiological experimentation, through which he added much to the available body of knowledge; on the other hand, however, he also made serious mistakes, mainly because he considered animal and human anatomy to be wholly comparable.

As a pharmacological writer, Galen was perhaps less critical about the sources of his information than was Dioscorides. He also wrote about fewer drugs. But for him the theoretical background behind the use of the drugs was more important than, for instance, their physical qualities. Galen developed the information found in the earlier models, fitting the drugs into his comprehensive medical system by listing their principal medical effects and by explaining their medicinal qualities.[18]

In addition to his independent research, Galen commented on several of the Hippocratic writings. In doing so, he actually selected from the many differing theories represented in the Hippocratic Corpus the ones that fitted his own concept of Hippocratic theory.[19] Later, Oribasius (4th cent. CE), for example, accepted Galen's interpretation and thereby strengthened it. From that time on, Galen was seen as the best and closest follower of Hippocrates—the author who completed his medical system. Thus the phenomenon of Galenism[20] in medicine was born: Galen's medical system became increasingly the norm, pushing aside other medical theories. This happened not only because of the Hellenistic and Byzantine commentators' and encyclopedists' eager acceptance of it, but also because of its comprehensive nature and its practicality. Using the Galenic system, practically any physical or medical phenomenon could be explained in a logical, rational manner, and new elements—such as new medications—could be easily added. So between the time of Oribasius and the conquest of Alexandria by Arabs in 642 CE, a scholastic form of Galenism was created, which became the norm in the medieval East

[17] About Galen's medical theory, see Siegel, 1968; 1970; and Pennella and Hall, 1973. About his pharmacology see p. 11, n. 18, below.

[18] See Nutton, 1981; Harig, 1966; 1973; 1974; 1976.

[19] See Pormann and Savage-Smith, 2007, pp. 9–10.

[20] For Galenism, see Temkin, 1973.

and then in the West. This did not, however, cause Byzantine medicine to become static: it was solidly based on the thoughts of Galen, but there was a continuous process of choosing and rearranging inside the tradition. While this can be seen especially clearly in pharmacology, where materials of traditional pharmacopoeia were used in new combinations, it is also evident in medical compendia, in which relevant parts of authoritative texts selected by the authors were arranged around their own case studies and personal experience.[21] This tradition was then continued by the Arab medical encyclopedists.

As Galen commented on Hippocrates, so did others after him write commentaries on Galen's books. Part of these commentators added to his work and corrected it while trying to solve the inconsistencies, as well as simplifying and unifying his theory (Galen wrote prolifically, and his writings include contradictions and often lack clarity). In addition, because of its massive length, the work was frequently summarized for use by students or educated laymen studying medicine as part of philosophy. Another popular format was an encyclopedic compilation, in which the practitioner could find the main points made by Galen concerning a certain issue.[22] Here these points were presented all in one place, properly organized and fitted together; here, also, any apparent contradictions were reconciled.[23] In the Middle Ages, it was a continual cause for dispute whether the writings of Galen should be read in the original or in these compilations.[24]

All in all, Galen's position in medicine was already strong and established when the Arab conquest ended and the period of translations began. When Greek medicine spread further via waves of Arab immi-

[21] Scarborough, 1997; 2005b. I am indebted to Prof. Scarborough for his constructive comments on the dynamic character of Byzantine medicine and for the generous gift of his collected articles. For Byzantine medicine, see Temkin, 1962. For Galenism in Byzantine medicine, see Lieber, 1981.

[22] But not only Galen: they also included material from authors predating Galen, especially Dioscorides, Rufus of Ephesus and Soranus of Ephesus (Pormann and Savage-Smith, 2007, p. 10). In fact, these compendia first succeeded "to bring together Dioscorides' descriptive inventory and description of the natural substances of medicines with Galen's theory on the action of medicines." Touwaide, 2007, p. 159.

[23] A good example of these medical encyclopedias is the *Pragmateia* of Paul of Aegina, intended by its author to serve as a medical equivalent of the legal handbooks used by jurists. His intention was not to publish new medical findings of his own, though part of the material is based on his own work, but to present the essentials of medical knowledge in a form convenient to the users. See Pormann, 2004, p. 8.

[24] See Pormann and Savage-Smith, 2007, p. 84.

gration, right from the start Greek medicine meant Galenic medicine accompanied by Aristotelian philosophy.[25]

2.1.2. *The Transfer from Greek to Arabic*[26]

The great movement for the spread of Greek science to the Arabs did not take place in a vacuum. The material conditions that made it possible were created by the early Arab conquests and the ʿAbbāsid revolution.[27] The conquest united for the first time since Alexander the Great the high cultures on both sides of Euphrat and Tigris under one rule, with one *lingua franca* and one legal system. The resulting freedom of movement enabled scholars from different backgrounds to meet and interact fruitfully.[28] The ʿAbbāsid revolution, with the subsequent transfer of the capital to Baghdad, caused a drastic change in the cultural orientations of the empire.[29] The new, already strongly Hellenized, multicultural society was ready to embrace the Greek cultural heritage as one of its common denominators. Together, these two factors paved the way for a translation program of unprecedented scope and importance that soon influenced all spheres of life in the new society. In the field of medicine, the new translations ensured the victory of Galenism for the next 800 years.

During Hellenistic times, the main center for medical teaching was Alexandria, whose school had been famous since antiquity and continued attracting students and teachers.[30] The Alexandrian medical authors adopted Galen's humoral pathology and adapted it to their specific educational and practical needs.[31] The resulting literary output—mostly encyclopedias and commentaries on the Galenic and Hippocratic texts, such as the famous *Summa Alexandriorum*[32]—had a decisive influence on the

25 Temkin, 1973, p. 70.

26 This chapter is based on the following studies: Dols, 1984, pp. 1–10; Gutas, 1998; Lieber, 1981; Nutton, 1981; Pormann and Savage-Smith, 2007. About the transmission of the Greek scientific tradition to the Arabic-speaking people, see also Browne, 1921; Gutas, 1983; 1988; 1994; 2000; Leclerc, 1876; Meyerhof, 1933a; Pines, 1986; Ullmann, 1970; Walzer, 1962.

27 Gutas, 1998, pp. 11–20.

28 *Ibid.*, pp. 15–16. On mobility in the Islamic world, see the description of the travels of Ibn al-Bayṭār, Dietrich, 1991, pp. 21–22; Leclerc, 1876, pp. 225–237.

29 Gutas, 1998, p. 19.

30 Pormann and Savage-Smith, 2007, p. 13.

31 *Ibid.*, p. 15.

32 These abridgments of the Galenic texts introduced Galen to the Arabic translators in light of the syncretic philosophy of Late Antiquity (*Ibid.*, p. 14). On the Arabic translation of *Summa Alexandrinorum*, see Ullmann, 1970, pp. 65–67.

first development of Arabic science. The Alexandrian school survived until the time of the Arab conquest, and was eventually moved to Antioch by Caliph ʿUmar (717–720). The medical curriculum of the school, with its modified Galenism, became the basis of professional medical education in Arab society.[33]

The other center of science in antiquity, Athens, lost much of its scholarly vigor when Justinian closed the Neoplatonic Academy in 529 CE, as a result of which many of the scholars moved to Alexandria.[34] At the same time, further in the East, the Greek learning continued to thrive in the main Eastern Christian communities, among them Edessa, Nisibis and Gondēshāpūr.[35] The region had become a center of considerable scientific activity since the Nestorians, a group of Syriac-speaking Christians with a solid background in Greek learning and science, emigrated there after being expelled from the Byzantine Empire. There they came into contact with the dominant medical traditions of the Fertile Crescent and the surrounding areas—Greek,[36] Persian and Indian,[37]—in a cultural milieu that was already strongly influenced by the Hellenistic culture and Galenic medicine. The first translations of Greek medical texts into Syriac took place in these surroundings.[38]

Thus, when the Arab conquerors came to the Middle East, they found an active and united medical culture completely different from their own.[39] It was based on a formalized and unified concept of Galen's writings—and, through him, those of Hippocrates—and on a clear method by which they could be studied. At first, the newcomers were content to merely let the people they had subjected maintain their style of government and their cultural life, which eased their ability to rule an empire that suddenly had vastly increased in size. Already during

---

[33] Pormann and Savage-Smith, 2007, p. 13.

[34] Cf. Gutas, 2000, p. xi, n. 3; *ibid*., 1994, p. 4943, n. 3.

[35] There existed several other important centers of Greek learning, for example, al-Ḥīra, Ḥarrān and Marw. See Gutas, 1998, p. 14.

[36] Part of the Greek influence in the areas under Sasanian rule dated from the times of Alexander the Great who pursued an active Hellenization policy of his kingdom. See Pormann and Savage-Smith, 2007, p. 16.

[37] Dols, 1984, p. 5.

[38] The technical translation skills of Syriac-speaking Christians and their familiarity with the Greek sciences contributed much for the beginning stages of the Greco-Arabic translation movement, but only relatively few Greek works were actually translated into Syriac before the ʿAbbāsid period. The great wave of Greco-Syriac translations was part of the translation movement inside the ʿAbbāsid society. See Gutas, 1998, p. 22.

[39] On medicine in pre-Islamic Arabia, see Pormann and Savage-Smith, 2007, pp. 6–9; Ullmann, 1970, pp. 15–24.

the Umayyad period (661–750), however, the new rulers used court physicians from Egypt and Syria, and beginning in the 8th century they started to show an active interest in the cultures of the conquered people. Still, there does not seem to have been any systematic and planned scholarly translation project from Greek into Arabic in Umayyad times, merely some accidental responses to practical needs of ruling.[40] Thus it was the early ʿAbbāsid caliphs, especially al-Manṣūr (754–775) and al-Mahdī (775–785) who truly initiated the translation movement. The ʿAbbāsid revolt had been supported by inhabitants of Persia, a multinational, multicultural conglomerate bound together by the pre-Islamic Sasanian culture. The move of the capital from Damascus to Baghdad made it possible—and necessary—for the new dynasty to take steps to ensure their continuing support. For this purpose, an intense translation campaign was started, both to show the continuity of the ʿAbbāsid cause with the Zoroastrian imperial ideology of the Sasanians,[41] and to legitimize through means of political astrology the political and religious domination of the dynasty in Persia.[42] This ideology appealed to all subgroups of the Persian elite—independent of their ethnic or religious identity—causing them to willingly undertake the massive sponsoring of the translation program.[43] The Nestorian Bakhtīshūʿ family established their position as court physicians in Baghdad and, in addition to keeping alive the Sasanian translation culture in the court surroundings, they probably played a part in the spreading of Greek medical ideas in the capital. During Hārūn al-Rashīd's reign, the first Islamic hospital was established in Baghdad,[44] and it obtained its staff from nearby

[40] This in spite of some legendary reports about Greco-Arabic translations during the Umayyad period (Pormann and Savage-Smith, 2007, p. 24).

[41] According to the Zoroastrian view, all knowledge is contained in the texts of Avesta, the Zoroastrian holy book. The destruction of Persia by Alexander the Great led to the loss of this wisdom in its Persian form, but also to its translation to Greek. Thus, for Persians, translation of the Greek texts merely meant recovering the ancient Persian wisdom. See Gutas, 1998, pp. 34–45. I am grateful for Prof. Scarborough for drawing my attention to Gutas' book and to several articles related to this part of the research.

[42] *Ibid.*, pp. 61–69.

[43] Later on, the same Greco-Arabic translation movement was used to support the anti-Byzantine policies of al-Maʾmūn, this time by claiming that the Byzantines had forsaken their Greek intellectual heritage and that it had fallen to the ʿAbbāsids to reserve and protect it. See Gutas, 1998, pp. 84–85.

[44] On the origin and history of Islamic hospitals, see Pormann and Savage-Smith, 2007, pp. 20–21, 96–101.

Gondēshāpūr[45]—again showing a preference for Greek medical tradition. Although the rulers were interested in the practical benefits of the new science especially for the new secretarial class that was to administer the empire[46]—resulting in the placement of the medical,[47] astrological[48] and alchemical[49] texts in the first rank of preferences[50]—the main criteria for choosing what to translate was the availability of texts, and that depended on the cultural trends of Late Antiquity, especially in Alexandria.[51] When the scientists working in Baghdad reached a critical mass, their theoretical needs caused an additional demand for more and better translated texts, both in the applied sciences and in philosophy. Philosophical texts, on the other hand, were both important for the intellectual development of the new religion and suitable for the further development of the theory of medicine. The translation work was financially supported by the Caliphic court and other wealthy patrons.

Overall the Greek tradition, in translation, spread through the Islamic world from the 8th to the 10th centuries and was assimilated into Islamic culture, both at the level of doctors and scientists and at the more populist level of educated laymen. Greek medical heritage had already reached Persia through early translations from Greek to Pahlavi, and through the local Nestorian Christians.[52] The ancient Arab medical folklore had ceased to be an option—not only was it unable to compete with the Greek medical system, it was also burdened with many pagan and magic features that made it less acceptable to many. There existed, however, a certain amount of ambivalence in Islamic society toward Greek medicine, too. To put it simply: if Allāh had sent illness, had the doctor any right—or, indeed, any power—to meddle with the patient? On a more philo-

---

[45] On the movement of physicians from Gondēshāpūr to Baghdad, see Gutas, 1998, p. 118. On the "Myth of Gondēshāpūr," see Pormann and Savage-Smith, 2007, pp. 20–21.

[46] Gutas, 1998, pp. 107–111.

[47] *Ibid.*, p. 118.

[48] On the Sasanid and ʿAbbāsid astrological claims, see *ibid.*, pp. 108–110.

[49] The Arabic word *al-kīmiyāʾ* can apply to chemistry or to alchemy, with no possibility of making a clear distinction between the two (Hill, 1993, p. 76). Alchemy's position among the sciences that brought immediate practical benefit was due both to its use in chemical technology, for example, simulating gold for artistic purposes, and its supposed potential for transmutating baser metals to gold, a procedure which would, if successful, have had great significance on the finances of the state. See Hill, 1993, pp. 77–78.

[50] Gutas, 1994, pp. 4941–4943. See also Goodman, 1992, pp. 216–217, on the Arabic translation of Aristotle's *Poetics*.

[51] Pormann and Savage-Smith, 2007, pp. 28–29.

[52] This process was probably made easier by the partial parallel between Greek and Zoroastrian medical theories (*Ibid.*, pp. 16–17).

sophical level, certain Muslim groups saw in the concept of causality a denial of God's omnipotence—and causality was one of the basic assumptions of Galenic medicine and Greek science in general.[53] These were, however, only transitory ideas, or ideas limited just to a part of the population—and before long even these disputes were conducted only in terms of Greek logic and philosophy.

On the practical level, the potential conflict between the Islamic dietary laws and the *materia medica* of Galenic therapeutic tradition was a more serious issue.[54] A solution acceptable to many was the Prophet's Medicine, *al-ṭibb al-nabawī*.[55] This literary genre developed as a religious counterbalance to the Galenic 'secular' medicine.[56] It was based on the Qurʾān, medical *ḥadīth*s—sayings of the Prophet Muhammad and his companions on issues connected with medicine and health[57]—and Islamic custom.[58] The treatises were mostly written by religious scholars instead of physicians.[59] The content and style of the texts on Prophet's Medicine ranges from simple collections of medical *ḥadīth*s to medical textbooks based essentially on the Galenic theory, with the necessary modifications. The aim of these textbooks was to produce a guide to medical dietary therapy that was medically sound and simultaneously

[53] According to Fancy, this idea has been overgeneralized among the Orientalists. Actually, the theologians who denied causality and had a suspicious attitude towards Greek science and philosophy "comprised only one group amongst the many, diverse theological and scholarly groups, all of whom were vying for the badge of 'orthodoxy.'" Fancy, 2006, p. 15. See also Gutas, 1998, pp. 156–175, on opposition to science in the medieval Islamic society; Goodman, 1992, p. 38; Strohmaier, 1999, pp. 130–134; Fancy, 2006, p. 83, on al-Ghazālī's reaction to Ibn Sīnā's philosophy.

[54] A particularly problematic issue was the question of wine that was an important part of the *materia medica* of the Greek medical tradition. On wine and its position in the medieval Muslim society in general and in medieval medicine, see Waines, 2002b. On pork as forbidden food, see Garcia Sánchez, 2002, p. 282/8. On the avoidance of prescribing wine in pharmacological literature, see Dietrich, 1991, p. 20. On substitutes for wine and other practical solutions to the problem, see Chipman, 2005, p. 30. On transmission of disease (another controversial issue), see Pormann and Savage-Smith, 2007, p. 59.

[55] For a good overview, see Perho, 1995. For primary sources, see Elgood, 1962.

[56] "*Ṭibb al-nabī* can be considered an example of the appropriation of science by Islam: the authors of books on Prophetic medicine accepted that the Galenically trained physician was best fitted to diagnose and cure disease. However, a physician who paid attention only to the body and ignored the soul was not a first-rate doctor." Chipman, 2005, pp. 130–131.

[57] For an opposing view, see Conrad, 1995b, p. 125.

[58] Pormann and Savage-Smith, 2007, p. 72.

[59] Fancy, 2006, pp. 41, 242.

acceptable to pious Muslims.[60] In the end of its assimilation, the Greek medicine, as represented by the new translations, had penetrated, albeit in varying extent, practically all strata of Islamic healthcare.

Most of the earliest translators were Jewish or Christian, bi- or trilingual and proficient in Greek scientific tradition. At this stage there were very few professional translators, but the need for translations and the subsequent financial support and patronage of the elite classes gave the needed impetus for talented individuals to improve their skills.[61] A portion of the translations were made directly from Greek to Arabic; another portion came through an intermediate Syriac version.[62]

One of the most famous translators of the period was Ḥunayn ibn Iṣḥāq (808–873),[63] a Nestorian Christian, who together with his son Iṣḥāq[64] and nephew Ḥubaysh[65] translated medical literature, mostly Galen. As one of the first professional translators,[66] he faced the formidable task of having to practically create a new language, since the Arabic of the conquerors did not have the terminology necessary for expressing scientific and philosophic issues.[67] Therefore the translator had to acquaint himself especially well with the subject matter, both in order to understand the text and to be able to create a new, relevant terminology—possibly using the few existing Arabic terms on the subject.[68]

---

[60] Pormann and Savage-Smith, 2007, p. 71.

[61] Gutas, 1998, pp. 114, 136–137, 139.

[62] In many cases the translator also traveled in search of extant manuscripts in order to collate as good a text as possible for translation, or to correct an existing translation on the basis of a better preserved textual version. See Tibi, 2006, p. 57; Pormann, 2004, pp. 114–115.

[63] Or 877. On Ḥunayn ibn Iṣḥāq, see Ullmann, 1970, pp. 115–119, 205–206; Tibi, 2006, pp. 56–57; Sezgin, 1970, pp. 247–256; Strohmaier, 1960–2002, pp. 578–581. On Ḥunayn's epistle on the Galenic works translated by him, see Bergsträsser, 1925; Rosenthal, 1975.

[64] Ullmann, 1970, pp. 119, 228–229.

[65] *Ibid.*, pp. 119, 265–266.

[66] Other important early translators included al-Kindī (Muslim, *c*. 801–866) and Thābit ibn Qurra (Sabian, 826–901). For al-Kindī, see Ullmann, 1970, pp. 123, 301–302; for Thābit ibn Qurra, see *ibid*., pp. 123–124; Tibi, 2006, pp. 93–94.

[67] In translations from Greek to Arabic, that is, from an Indo-European to a Semitic language, the task was not limited to terminology but included also syntax. See Pormann, 2004, pp. 239–258.

[68] On the development of the Arabic medical and botanical terminology, see the seminal exposition by Pormann (Pormann, 2004, pp. 135–222, 246–247). On the possible influence of lexical choices of the translators on the development of medical theories, see Fancy, 2006, pp. 159–160; 168–178.

The new terminology took some time to be consolidated, as different translators used different solutions to problems they encountered.[69] In some cases an old Arabic word was used but given a new, narrower medical meaning (i.e., substitution). In cases where, for example, a plant could not be identified, a good translator simply transliterated the Greek name of the plant with Arabic letters, in order to give someone else who knew the plant a chance at recognizing it and correcting the translation.[70] A favorite method was to borrow translations from Greek. In other cases, Syrian or Iranian words that had already entered the professional language were used. In the technical field, a basic terminology could be consolidated quite quickly, as the concepts themselves were unambiguous, such as in the case of various pharmacological procedures. In drug nomenclature, however, no uniform way of naming was ever found, especially for plants. For this reason, glossographic literature developed to help the scholars to understand the texts.[71, 72]

An additional problem was finding the most suitable translation technique. Ḥunayn's ideal was translation to natural, fluent Arabic, sentence by sentence,[73] whereas other contemporary translators opted for a more word-by-word solution.[74] The final result of the whole process was, in spite of the difficulties, the development of Arabic to a powerful linguistic tool, capable of expressing clearly complicated philosophical and scientific ideas.[75]

As many translators were doctors themselves, they were often not content only to translate, but they also wrote independent works on the basis of the material which they had translated and, by translating,

[69] In addition, even relatively established terms could change their exact meaning. See Pormann, 2004, p. 140.

[70] According to Tibi, the problem was compounded because Greek sounds were impossible to render into an exact, or even recognizable, equivalent in Arabic (Tibi, 2006, p. 17).

[71] See also pp. 34–35, below. On the confusion created by Arabic script with its frequent omission of diacritic marks, see Tibi, 2006, p. 18; on Syriac glossographic tradition linked to the translation movement, see Pormann, 2004, pp. 15–16.

[72] In some fields, for example in philosophy, the new terms sometimes lacked the exactitude of the corresponding Greek expressions. This lack might, however, instead of preventing the transmission, actually have assisted it. See Strohmaier, 1999, pp. 61–62.

[73] About Ḥunayn's translation method, see Rosenthal, 1975; Pormann, 2004, pp. 114–115. For a differing opinion, see Conrad, 1995b, pp. 106–107. On the co-existence of different translation methods embodied by different complexes of translations, see Gutas, 1998, pp. 142–144.

[74] Pormann and Savage-Smith, 2007, pp. 26–27.

[75] *Ibid.*, pp. 31, 33–34.

had mastered. For example Ḥunayn, in his medical treatises, explained and summarized Greek medicine, making it more understandable to his readers.[76]

The period of translations lasted a couple of hundred years, from the 8th through the 10th century, at the end of which time the Arabs had available most of the books of Galen[77] and Hippocrates (in the Galenized form),[78] together with much philosophy, astronomy, and other fields of study,[79] and there was no demand for new translations. Most disciplines had in the hands of the Arab scholars advanced beyond the stage represented by the translated works, and the patrons were now sponsoring contemporary research.[80]

In short, the medical translators in the Islamic empire had translated all those works by Hippocrates and Galen that were still read in scientific centers during the 7th to 9th centuries—but of course not *all* their writings were included, and part of the writings they possessed had actually been falsely attributed to Galen and Hippocrates. The most salient medical author to be translated was Galen, of whose treatises at least 129 were translated. Dioscorides[81] was translated several times, due to the difficulty of his plant names;[82] and Hellenistic authors such as Oribasius[83] and Paulus Aegineta[84] were also on the list. In addition, there were a great number of not-so-original epitomes and commentaries, which gave the Arabic doctors the needed stimulus to organize Greek medical knowledge into encyclopedias.[85]

---

[76] See e.g. Meyerhof, 1928. Ḥunayn's treatises became models for different genres in several medical subjects (Tibi, 2006, p. 59; Pormann and Savage-Smith, 2007, p. 68; see Ullmann, 1970, pp. 117–119, 205–206, 265). Sometimes the translation included the first synthesis between different concepts expressed with the same terms (see Fancy, 2006, pp. 179–181, 188). On Qusṭā ibn Lūqā as a translator, physician and medical author, see Tibi, 2006, p. 91; as a synthesizer between Plato, Aristotle and Galen, see Fancy, 2006, pp. 183–188.

[77] On Arabic translations of Galen's works, see Ullmann, 1970, pp. 35–68.

[78] On Arabic translations of Hippocrates' works, see *ibid*., pp. 25–35, 50–51, 61–62.

[79] For an extremely useful bibliography on Greek texts translated to Arabic (organized by subject matter), see Gutas, 1998, pp. 193–196.

[80] *Ibid*., p. 152.

[81] On Arabic translations of *Materia Medica*, see Ullmann, 1970, pp. 257–263.

[82] Gutas, 1998, p. 152.

[83] On Arabic translations of Oribasius' works, see Ullmann, 1970, pp. 83–84.

[84] On Arabic translations of Paulus Aegineta's works, see *ibid*., pp. 86–87; Pormann, 2004, *passim*.

[85] See Pormann and Savage-Smith, 2007, pp. 84–85.

As already mentioned, the translators—and also the physicians benefiting from their translations—started very soon to write their own treatises in Arabic. This necessitated the assimilation of the translated material; the new texts tended to follow the Greek examples both in content and in presentation.[86] At the same time, the ancient Greek texts became part of Arab culture,[87] with its tradition of revering and preserving the work of the 'Ancients'. This preservation, however, did not exclude the possibility of adding to extant material and, supposedly, omitting from it that which was not considered relevant in the new surroundings where the texts were to be used:[88] the Greek texts were "assimilated, adapted, and finally adopted in the truest sense of the word into Islamic society."[89] In particular, Galen's texts were not completely watertight: they left many opportunities to fill in missing data, which is what the Arab physicians did—especially in the case of the degrees of the medications,[90] which Galen had given only incompletely. Progress lay in guarding the ancient tradition, but also in adding to it knowledge obtained by experience.[91] As al-Rāzī wrote:

> As we are lucky enough to have been born in a later period of time than the authors who wrote about this, we were desirous to set right what they neglected. So we must discuss the subject wisely in order to bring the art every day closer to the aim of perfection, as we were told to do by the excellent Galen.[92]

The collection and organization into medical encyclopedias of all the material inherited from the Greek tradition can be seen as the last stage of

---

[86] At the same time, the assimilation did not necessarily mean uncritical acceptance. See Strohmaier, 1999, pp. 43–56, on Ibn Sīnā's and al-Bīrūnī's correspondence on scientific issues.

[87] As in every textual transmission, the texts influenced the receptive culture, but were simultaneously influenced by it. See, for example, Pormann, 2004, pp. 2–3, 58, 104–105; Pormann and Savage-Smith, 2007, pp. 32–33.

[88] On different methods of quoting and assimilating/incorporating earlier writings, see Pormann, 2004, *passim*. See also Kahl, 2007, p. 6. Fancy opposes strongly the scholarly tendency to consider the Arabic science merely as a repository of the Greek science and not as an independent intellectual endeavor. See Fancy, 2006, pp. 12–13.

[89] Pormann and Savage-Smith, 2007, p. 37.

[90] See pp. 41, 54, 58, below.

[91] Lieber, 1981, p. 182. Cf., however, Chipman, 2005, p. 71. On the idea of progress in the acquisition of knowledge according to the Aristotelian tradition, see Gutas, 1988, p. 219.

[92] *Risāla fī taṭbīq al-fākiha*, trans. by R. Kuhne Brabant (Kuhne Brabant, 2002, p. 321/168, n. 17). For a similar thought, see also Gutas, 1988, p. 210.

assimilation.[93] These extensive books not only contained the combined results of the Greek and the Arabic scholars' scientific work, but they offered them in a style, form, and approach that suited the contemporary audience.[94] With them, the reader could have at hand the whole of medical theory and practice in a form that would make all other medical books unnecessary—at least that was the idea. These encyclopedias combined anatomy, physiology, pathology and therapeutics in an easily understandable and quick-to-use form, showing Arab medicine as a comprehensive whole. They were based almost completely on Galenic theory, but encompassed explanations, systematizations and factual additions of the authors' own (especially in the field of drug therapy), advancing, from a scientific point of view, beyond the level of the translated Greek works.[95] A special feature of these encyclopedias was their strict systematization that classified and defined every phenomenon, making one fixed and symmetrical system out of a maze of possible variants; instead of suggestions about the nature of the body and its functions, the statements in the encyclopedias were factual and could be taken as axioms.[96] The framework was strict, but it allowed new material to be inserted. The originality of the encyclopedias lay in their ability to combine old with new, along with their selection and use of the ancient writings, according to Johnstone.[97] This can be seen very clearly in the prescriptions: although most of the drugs prescribed for a certain illness were traditional, different doctors combined them in different ways.[98] Some great names in this literary genre are al-Ṭabarī (9th cent.)[99] and his *Kitāb Firdaws al-ḥikma*, al-Majūsī (d. *c.* 999),[100] the author of *Kitāb al-Mālikī*,[101] Ibn Sīnā (b. *c.* 980), the author of the famous *Kitāb al-Qānūn fī al-ṭibb*, and al-

---

[93] By the 9th century, about half of the authors quoted, for example, in al-Rāzī's medical encyclopedia *K. al-Ḥāwī fī al-ṭibb*, wrote in Arabic, while the other half was comprised mostly of Greek authors (in translation). Tibi, 2006, p. 179. For a partial list of al-Rāzī's sources, see *ibid.*, pp. 166–167.

[94] Gutas, 1998, p. 153.

[95] *Ibid.*

[96] Dols, 1984, p. 21. On the development of knowledge classification systems from descriptive to normative, see Gutas, 1983, pp. 256–260; *ibid.*, 1988, p. 149.

[97] Johnstone, 1981, pp. 198, 210. On the use of sources and selection of the material by Baghdad doctors, see Tibi, 2006, pp. 178–179.

[98] The same certainly holds true also with the *Aqrābādhīn* literature, manuals for compounding drugs. See Chipman, 2005, pp. 26–57; Pormann, 2004, pp. 308–309.

[99] Information on the dates of his birth and death is controversial. See Ullmann, 1970, pp. 119–122; Sezgin, 1970, pp. 236–246.

[100] Or 994.

[101] Or *Kāmil al-ṣināʿa al-ṭibbiyya* (Ullmann, 1970, p. 140).

Zahrāwī (d. after 1009), best known for the surgical part of his massive encyclopedia *Kitāb al-Taṣrīf li-man ʿajiza ʿan al-taʾlīf*.[102] An interesting counter to the claim that denies the development and experimentation that took place during that age is provided by al-Rāzī (865–*c.* 925), whose encyclopedic work *Kitāb al-Manṣūrī* has been overshadowed by the current fame of his *Kitāb al-Ḥāwī fī al-ṭibb*,[103] which is a storehouse of the author's own experiences and opinions. His case histories[104] and monograph about smallpox and measles are justly famous.

Medical lore did not come only from the Greek tradition, however. Both Persian and Indian knowledge were added to it through translations[105]—perhaps more in the choice of drugs, for example, than on the theoretical side;[106] while the popular medical tradition of Mesopotamia also made a contribution.[107] The doctors learnt from the people among whom they worked.[108] Sanskrit texts had been translated into Syriac until the 8th century in Gondēshāpūr. Ḥunayn ibn Iṣḥāq felt it necessary to learn Persian, in addition to Syriac and Arabic. New drugs, unknown to Dioscorides, came from the Far East; while the medical authors of the Arab West added, as well, the native drugs of the countries in which they were living.[109]

Another genre of writing which is important for our purpose is commentary literature, mentioned above. Earlier, Galen had commented on the Hippocratic writings, and the tradition of commenting in turn on his books had already developed long before the Arab conquest. In fact, his writings were in danger of being rejected in their original form, to be

---

102 Ullmann, 1970, pp. 149–151.

103 See, for example, Ullmann, 1970, pp. 130–132; Álvarez-Millán, 2000.

104 Altogether approximately 1,000. See Álvarez-Millán, 2000, p. 294; Pormann and Savage-Smith, 2007, pp. 115–117.

105 In the case of Indian texts, through translations made via Persian (Gutas, 1998, p. 24; Pormann and Savage-Smith, 2007, pp. 21–22; Tibi, 2006, p. 170). Possibly the best-known example of the use of material from Indian sources is al-Ṭabarī's *Kitāb Firdaws al-ḥikma*, which includes a chapter entitled "Collected from Books of India". Also al-Rāzī quoted them profusely in his *K. al-Ḥāwī fī al-ṭibb*. Some Chinese medical texts were translated to Persian, too, but these stayed of marginal importance, whereas previously unknown Chinese drugs were eagerly welcomed. See Pormann and Savage-Smith, 2007, pp. 21, 36. On Chinese influences on Arabic alchemy, see Hill, 1993, pp. 78–79.

106 Chipman, 2005, p. 7.

107 Levey, 1966, pp. 17–18.

108 Riddle, 1992, p. 87.

109 For an interesting calculation on the origins of the drugs recommended by the 9th century Baghdad scholar al-Kindī, see Levey, 1966, pp. 20–21. On the geographical origin of Ibn al-Tilmīdh's drugs, see Kahl, 2007, pp. 28–29.

read only in summaries. At the same time, the commentaries written on Galen's writings became separated from the original texts and were read on their own.[110] However, there were very good reasons for reading these texts with a commentary instead of in isolation—the books are long, and the theory is fragmented and not always consistent. The commentaries provide rational explanations where the original is unclear, while at the same time they add to the existing knowledge, both through these explanatory additions and through factual ones. They represent both the experience of generations and the attempts of those generations to find their own solutions to problems caused either by the true difficulties of the texts or by translators' misunderstandings.

Some of the greatest developments in medieval Arab medicine took place in pharmacology.[111, 112] Firstly, the number of drug materials available had multiplied considerably since Dioscorides' time. Instead of the more than 1,000 drugs of Dioscorides,[113] Ibn al-Bayṭār (d. 1248), quoting more than 260 different sources,[114] recognized over 2,300 drugs.[115] Hundreds of both simple and compound drugs came from Persian and Indian sources. One of the new drugs was senna, first described by Ibn Māsawayh in the 9th century.[116] To the drugs that came from various literary sources must also be added those used in indigenous medications. One notable document is Ibn Juljul's (Cordoba, 10th cent.) commentary on Dioscorides' plant names and his treatise concerning some 60 drugs which "Dioscorides did not mention".[117] Most of these drugs originated in the Far East or India, although some were local Spanish plants.[118] Another change in medieval Arab medicine was that when drugs were prescribed, precise weights and measures were given more

---

110 Lieber, 1981, p. 170.

111 On the different genres of pharmacological texts, see Levey, 1966, pp. 7–8.

112 On Arabic descriptions of pathological conditions apparently unknown to the Greeks, see Pormann and Savage-Smith, 2007, pp. 55–56.

113 Riddle, 1985b, p. xviii.

114 Dietrich, 1991, p. 19.

115 Pormann and Savage-Smith, 2007, p. 53.

116 Riddle, 1985b, p. 99; Levey, 1966, p. 286; Lev, 2003, pp. 42–43. Also cotton, camphor, musk, myrobalan, and sal ammoniac were introduced to pharmacopeias by Arabic authors (Pormann and Savage-Smith, 2007, p. 120).

117 Supposedly they were unknown to the Greeks. Ibn Juljul's treatise has been studied and translated (Garijo, 1995). For Ibn Juljul's commentary, see Dietrich, 1988. For Ibn al-Bayṭār's commentary on the first four books of *Materia Medica*, see Dietrich, 1991, esp. p. 20.

118 Johnstone, 1981, pp. 201, 206–207. The known uses of the drugs were also expanded. For examples, see Pormann and Savage-Smith, 2007, p. 120.

often than in ancient medicine. An important subject for theoretical discussion was the process of combining drugs, including the question of how one could measure the degree of heat that a certain mixture would have, or conversely, the amounts needed for the mixture to reach a certain level of heat or coldness.[119]

The last great development in Arab medicine was that of a closer relationship between theory and practice.[120] While in Hellenistic medicine, medical theory was often completely divorced from practice, in the Islamic world Galenic theory increasingly came to be represented in a way that could benefit the practicing physician.[121] While at one point medical theory was taught separately from the practice, by the Middle Ages the situation had changed, and the philosopher and practitioner studied together to find solutions to real medical problems.[122] Indeed, theory really does seem to have been applicable to everyday practice. In Ibn Riḍwān's book *Kitāb Dafʿ maḍarr al-abdān bi-arḍ Miṣr* ('On the Prevention of Bodily Ills in Egypt') we see how an Arab physician would have used Galenic theory in his everyday treatment.[123]

2.1.3. *The Transfer from Arabic to Latin*[124]

The next important step in the history of Western medicine was the transfer of the Greek medical tradition from the Arab world and the Arabic language to Europe and the Latin language. When scientific and medical texts written in Arabic quite suddenly became noticed in the Latin West during the second half of the 11th century, intensive translation began.[125] The Arabic writers were seen and appreciated first and foremost as mediators of the ancient Greek medicine, but both their actual translations

[119] See McVaugh, 1975; Gauthier, 1939.

[120] About the relationship of theory and practice in medieval Arabic medicine, see Schipperges, 1959; Riddle, 1974.

[121] Lieber, 1981, pp. 169–170.

[122] *Ibid*., p. 181. For a differing opinion, see Álvarez-Millán, 2000, pp. 295, 300, who considers the practical medicine as seen in the case books separated from the medical theory, and claims that theory played a minor role in modifying the treatment (*ibid*, p. 306).

[123] Dols, 1984, pp. viii–ix.

[124] This chapter is based on the following studies: McVaugh, 1975, 1982–1989; Lieber, 1981; Jacquart, 1990a; Siraisi, 1987; Strayer, 1982–1989; Burnett, 1982–1989; Richler, 1982–1989.

[125] This phenomenon has been explained as due to the rise in Western Europe of a new class of lay teachers with new intellectual needs (Gutas, 1998, p. 4). For a differing opinion, see Glick, 2005b, p. 483.

and their own independent works—based on Greek sources but enriched by personal experience and information from other geographical areas, such as Indian medicine and folklore—were translated with great eagerness.[126] This rapid translation process resulted in the transplanting of Galenism to the West as the principal and indeed only medical system, a position which it held until early modern times.[127] In addition, there was a definite effect on the social status of medicine in medieval society—it became a learned, academic profession with its own corpus of data that even less academic healers were willing to adopt as much as possible.[128]

Admittedly, the Latin West had not been completely cut off from the fruits of ancient Greece: Greek medical theory and practice were adopted by the Romans from the late 3rd century BCE onwards,[129] and certain medical texts, among them some from Galen and from the Hippocratic corpus,[130] had survived the collapse of the Roman empire in Latin translations, often in monasteries. In addition, there were a number of late Roman therapeutic collections.[131] In Carolinian times there even developed a flexible medical collection, embodying theoretical and practical sections which usually included Galen's *Ad Glauconem* and *De sectis*, the *Aphorisms* with an anonymous commentary, and two treatises deriving from Caelius Aurelianus' translation of Soranus.[132, 133]

In the 10th and 11th centuries the study of medicine was also available at the cathedral schools, as an adjunct to the seven liberal arts. This study was based on classical theoretical texts, but actual medical practice was still empirical rather than theory-dominated; it was concerned with sensible dietary regimens, phlebotomy and reputable simple or compound purges and other drugs.[134]

---

[126] Dols, 1984, p. 8.
[127] *Ibid.*, pp. 8–9.
[128] See McVaugh, 1993, p. 2.
[129] Pormann and Savage-Smith, 2007, p. 24.
[130] Dols, 1984, p. viii, n. 3.
[131] McVaugh, 1982–1989, p. 247.
[132] *Ibid.*
[133] The existence of these texts and the world view they presented paved way for the reception of the new translations from Arabic, as no re-thinking of the conceptual system was necessary for their acceptance. See Strohmaier, 1999, p. 143.
[134] McVaugh, 1982–1989, p. 247. Anne Van Arsdall (2007) has shown that the healing culture in Europe during the Early Middle Ages was based on a common body of medicinal plants, of which remedies were prepared in much the same way in Italy, France, England and Scandinavia (Van Arsdall, 2007, p. 205).

The most famous center of learned medicine in Europe before the arrival of the Arab medical tradition was in Salerno in Southern Italy. Already by the 10th century Salerno had a reputation for practical medicine, and during the 11th century Salernian physicians started producing new medical texts. Although based on the earlier Greco-Roman medical literature, they do show signs of renewed interest in medical theory.[135]

The first wave of translations from Arabic into Latin began near Salerno, in the monastery of Monte Cassino, through the translation activities of Constantine the African (d. *c.* 1085), who came from North Africa and was well aware of the difference in the levels of medical knowledge between the East and the West.[136] Perhaps as early as 1065 he began to translate the medical works of Arab and Greek authors into Latin. Many of his translations were texts of Greek authors translated into Arabic, either by Ḥunayn ibn Iṣḥāq or by other ninth-century translators. In addition, he translated books by Arab authors—treatises on diet, fever and urines by Isaac Israeli and the *Pantegni*[137] of al-Majūsī. These latter works had a strong theoretical and philosophical orientation, new to medieval Europe, which influenced strongly Salernian medicine.[138]

The influence of the new Arabic texts came quite late: the earliest writings of twelfth-century Salerno continued the empirical orientation of earlier medieval medicine. Nevertheless, in the early 12th century a new collection of medical translations, the *Articella* or *Ars medicinae*, was formed, including many translations by Constantine the African. This set of texts apparently crystallized around the *Isagoge* of Ḥunayn ibn Iṣḥāq,[139] and around 1150 it included the following texts: (1) the *Isagoge*; (2) Hippocrates' *Aphorisms* and (3) *Prognostics*; (4) Theophilus, *De urinis*; and (5) Philaretus, *De pulsibus*. Subsequently Galen's *Ars medica* and, in the thirteenth century, Hippocrates' *De regimine acutorum* were added to the collection.[140] There was also much independent writing taking place based on the new medical tradition, much of which shows a background

---

135 McVaugh, 1982–1989, pp. 247–248. In fact, Strohmaier points out that even before the translation movement brought the new texts to the European scholars, there existed in Europe a strong general interest towards science, represented, for example, by Hildegard of Bingen (1098–1179). See Strohmaier, 1999, pp. 142–143.

136 Riddle, 1992, p. 118. For an overview of the translation period and its challenges, see Burnett, 1994.

137 *Kāmil al-ṣināʿa al-ṭibbiyya*, also called *Kitāb al-Mālikī*.

138 McVaugh, 1982–1989, p. 248.

139 On the debate over the authorship of the Latin *Isagoge*, see Ullmann, 1970, pp. 117–118.

140 McVaugh, 1975, p. 58; *ibid.*, 1982–1989, p. 248.

in actual teaching. Particularly noteworthy are several early commentaries on a variety of locally authored texts. Altogether, these developments can be seen as steps leading from a practical to a more theoretical orientation.[141] Another innovation was the writing of anatomical texts, which went some way towards filling a complete dearth in that field. Constantine's translation of al-Majūsī's *Pantegni*, with its anatomical chapters, was the first anatomical text in use in Salerno.[142] To this were soon added several others, based on the Arabic examples and deriving their language and methods of discussion from them.[143] In all this new literature one can again see stronger tendencies towards theory, systematization of knowledge (typical for Arab science) and scholasticism.[144]

These trends in Salernian medicine in the 12th century spread to the whole of Europe in the 13th century via another wave of translations of medical works from Arabic, and also from Greek, into Latin.[145] This new wave took place in Sicily[146] and Spain,[147] starting with astronomical, mathematical and philosophical texts,[148] and continued after 1150 with medical ones. In Italy, Burgundio of Pisa (*fl.* 1136–1193) translated Galen's works directly from the Greek. In Spain, the most important translator was Gerard of Cremona (*c.* 1114–1187) at Toledo,[149] who translated more than 20 medical texts, among them *K. al-Qānūn* of Ibn Sīnā and several works by Galen.[150] These became the main sources

141 *Ibid.*

142 Thus, in spite of the fact that Arabic anatomical writings remained quite conservative, deviating but little from their Hellenistic models, they served as a vital source for the European medicine. See Pormann and Savage-Smith, 2007, p. 60.

143 McVaugh, 1982–1989, pp. 248–249.

144 *Ibid.* For the influence of Arabic medicine, see also Schipperges, 1964.

145 Strohmaier, 1999, p. 145. Also into Castilian; see Glick, 2005b, p. 484.

146 Burnett, 2005, p. 486. Among books translated in Sicily was al-Rāzī's *Kitāb al-Ḥāwī fī al-ṭibb*, which was translated to Latin by the Jewish physician Faraj ibn Sālim and printed repeatedly during the 15th and 16th centuries under the title *Continens*. See Tibi, 2006, p. 105.

147 Glick, 2005b, p. 483.

148 Astronomy's great importance lay in the need for the accurate determination of calendaric and / or geographical issues in Judaism, Christianity and Islam alike. Translations of all these three fields of science could be used also for political purposes. See Glick, 2005b, pp. 484–485.

149 Toledo had changed the ownership from Muslims to Christians in year 1085. The temporary proximity of the occupation guaranteed the existence of multilingual individuals as a pool of potential translators or translator teams. See Strohmaier, 1999, pp. 143–144.

150 McVaugh, 1982–1989, p. 249. He also translated texts on natural philosophy (Aristotle and his Greek commentators) and astronomy. Burnett, 2005, p. 486.

of specialized information in medical schools from the mid-13th century onwards, although *Articella* kept its place as a part of the physician's training.[151] Gerald of Cremona's translation of *K. al-Qānūn* was repeatedly published in several printings,[152] either alone or with 13th- to 15th-century commentaries, and remained the official translation despite attempts to not only correct it but to produce a completely new version.[153]

These new translations contributed notably to Western medicine. They transformed it into a rational system with close ties to philosophy, grounded in logical order and able to be methodically investigated. The more specialized Arabic texts, in particular, introduced the West to fields in which Islamic physicians had advanced well beyond Galen—namely surgery, *materia medica*, and theoretical pharmacy.[154] On the other hand, these texts were slow to be introduced to the teaching curriculum, as had been the case for the translations by Constantine the African. For the most part, these texts were introduced only in the 14th century, despite the prior establishment of medical faculties in universities in the 13th century, such as in Paris and Montpellier.[155]

The material to be translated was chosen according to its usefulness, by which criterion it included disciplines such as philosophy, medicine, alchemy[156] and astronomy, but practically excluded poetry and literature.[157] In the field of medicine, the favored writer was Galen, whose medical ideas shaped Western medicine until the 16th century.[158] Even during the Renaissance and later, when Galen's ideas were strongly criticized, they still formed the basis for any discussion, because in medicine it was impossible to express oneself without using his framework and vocabulary.

One can see in these texts both the importance of the *Canon* as a university textbook and the influence of the scholastic commentary

[151] McVaugh, 1975, pp. 58–59.
[152] Siraisi, 1985, p. 20.
[153] For a crushing evaluation of the quality of Gerald of Cremona's translation of *K. al-Qānūn*, see Strohmaier, 1999, p. 144.
[154] McVaugh, 1982–1989, p. 249.
[155] *Ibid.*, pp. 249–250.
[156] Alchemy seems to have been introduced into Europe first through translations from Arabic, starting in the 12th century. See Hill, 1993, pp. 224–225.
[157] There were, however, also other criteria: for example al-Bīrūnī did not have any influence in the Latin West, presumably due to his lack of interest in Neo-Platonic philosophy. See Strohmaier, 1999, p. 43.
[158] Siraisi, 1985, p. 16.

tradition of the 14th and 15th centuries.[159] The book reached, however, its position only at the end of the 13th century, because although it was already well known to some medical writers in the middle of the century, the first Latin commentaries—which serve as evidence that the book was used in academic circles—appeared only towards its end.[160] *Canon* was easy to adapt to university purposes, as its different treatises are quite separate from each other and can be used apart from the others.[161] The other way in which the text was made accessible, in addition to writing explanatory commentaries, was through compilations of excerpts and compendia based on the *Canon*,[162] or by drastic abridgments or rearrangements of its material.[163]

From the late 13th century onwards,[164] the increasing scholasticism of medicine could best be seen in the commentary literature. The authors who wrote the major commentaries of the 14th and 15th centuries were mostly professors in the northern Italian universities, writing on the portions most used in teaching.[165] Nonetheless, new commentaries were still being written during the Renaissance.[166]

As had already happened before in the transition of the Greek medical tradition into Arabic, the translation and the assimilation of the material happened in parallel. In addition to commentaries that clearly show both the wish to make the new material understandable and the quantity of it that had already been assimilated (with the goal of subjecting it to academic discussion), this assimilation can also be seen in new material which was being written in the universities. For example, the University of Montpellier began assimilating the new material in the early 13th century.[167] But the new medicine did not spread only in academic circles; in Aragon, for example, it was eagerly sought by practitioners of many different backgrounds.[168] The fact that the new medicine was text-based

---

159 *Ibid.*, p. 19.

160 *Ibid.*

161 *Ibid.* This in spite of the fact that its Latin translation was extremely difficult to understand. See Strohmaier, 1999, p. 144.

162 Siraisi, 1985, p. 20.

163 *Ibid.*, p. 21.

164 McVaugh, 1975, pp. 60–61.

165 Siraisi, 1985, p. 20.

166 *Ibid.*, 1987, p. 3. About scholastic commentary literature in general, see Lawn, 1963, 1993; Ottosson, 1984.

167 McVaugh, 1975, p. 57.

168 *Ibid.*, 1993, p. 2.

made it possible for a student to hear what the master had to teach, learn the texts available and to feel reasonably sure he had mastered the subject.[169]

On a practical level, translators had to face all the same problems as their earlier counterparts working from Greek into Arabic. Once again, they had to work in languages which belonged to two different language families; Latin was lacking in technical terms and suitable vocabulary, and translation aids were few.[170] In addition, the lack of diacritical marks in the Arabic texts often made it difficult for the translator to choose the right meaning of the word from among several different possibilities.[171] Mostly the translators were not professional linguists, but rather professionals in the field in which they translated; thus, most medical translations were made by physicians.[172] The translator could either be bilingual (soon making Spain and Sicily centers of translation), or he could use an interpreter, in which case the assistant translated the text first to the vernacular and then the translator formulated it in Latin.[173] Another often-used route was to translate texts first from Arabic into Hebrew and then Latinize the Hebrew translations.[174]

The translation theory used by the medieval translators into Latin differed greatly from the style preferred by Ḥunayn ibn Iṣḥāq.[175] In the Latin West, word-by-word translation became the ideal. It was based on the tradition of translation of the Bible by Jerome, who would personally have preferred to use pure, syntactically and idiomatically correct Latin, but felt that to do so would be to take too great a liberty with the biblical text, in which even the word order could be important. From this starting point, the tradition of Jerome spread to take in the complete translation activity, creating a style that was very far from Latin.[176] In practice, many translators, the first among them Constantine the African, wrote in a

[169] Riddle, 1992, p. 135.
[170] Most important of these were the extensive lists of *synonyma*, often in several languages, for the identification of *materia medica* (Burnett, 2005, p. 487).
[171] See Hugo of Santalla in Burnett, 1982–1989, p. 140.
[172] Burnett, 1982–1989, p. 138.
[173] *Ibid.*, 2005, p. 487.
[174] Riddle, 1992, p. 135.
[175] See pp. 18–19, above. Translators to Hebrew had an ideal of translation that was very close to that of Ḥunayn, although many of them also opted for the *ad verbum* style. See Garcia-Ballester *et al.*, 1990, pp. 92–93; Burnett, 2005, pp. 487–488.
[176] Glick, 2005b, p. 483. See also Burnett, 2005, pp. 486–487.

freer adaptation of the text, sometimes even just summarizing it without actually performing what could properly be called "a translation".[177]

Actually the European university concept and the assimilation of the new medical tradition happened at about the same time—in the early 13th century.[178] Universities' medical faculties used the newly translated material (although its acceptance as teaching material was relatively slow), and university professors wrote their commentaries on the new medicine based on their lectures in class. The general scholasticism of contemporary intellectual life thus influenced medicine to become increasingly theory-oriented. At the same time, a growing number of the practitioners in higher positions were university educated, since that was often the entrance requirement for medical guilds. This seems to have led to the 'theorization' of the whole profession.[179, 180]

Of course, not everyone practicing the healing profession was university trained; rather the opposite, although the medicine represented by the universities was the generally accepted ideal. Many successful doctors were trained by apprenticeship. In addition, apothecaries and barbers also gave medical care, despite continuous pressure on the part of the medical doctors not to. Still lower down the order were the unqualified, often part-time practitioners working in the countryside and among the poor.[181] But in all these classes of healers one can see varying extents of the influence of the Greco-Arabic tradition.[182]

The Renaissance marked the end of the unquestioning acceptance of the Arab medical tradition, but not the end of its influence. On a theoretical level, the humanists demanded an end to the Arabization of medicine and a return to the pure Greek ideas, as they could be found in the ancient Greek texts. Some of them even associated Galen with the Arab doctors and wanted to return to pure Hippocratic medicine.[183] In practice, however, the Latin translations of Ibn Sīnā and al-Rāzī, with their medieval Latin commentaries, continued to be read in the universities long after the Renaissance. But something had changed. Although

177 Burnett, 1982–1989, pp. 138–139.
178 McVaugh, 1975, p. 57.
179 Riddle, 1992, pp. 156–157.
180 The question of whether this had a positive or a negative effect on the results of practical therapy must wait until we have shown how efficacious the medicine practiced in accordance with the medical books was.
181 McVaugh, 1982–1989, pp. 253–254.
182 McVaugh, 1993, *passim*.
183 Lieber, 1981, pp. 181–182.

the methods, materials, and concepts used in the 16th century and in the Middle Ages were the same, the intellectual environment in which the material was studied was different. The humanists' criticism had not passed unheeded, and new innovations in anatomy, pharmacology and the conceptualization of disease influenced the students' relationship with the older texts.[184] Thus although some of the study books were the same, the intellectual experience was different.[185] On the other hand, taking into account these differences and adapting the material to them, the medieval teaching material was still pedagogically useful.[186] This is shown, for example, by the fact that at least 60 editions of the complete or partial text of the *Canon* in Latin were printed between 1500 and 1674, and a great quantity of new commentary material was written.[187] Also, between 1526 and 1608 there were several attempts to revise the text or presentation of the *Canon*.[188] But after that time, active interest in the book as a practical teaching resource seems to have diminished. North European Arabists were still making efforts to improve translation, but by then the medical content no longer created the necessary interest for their work to have any practical effect.[189] In any case, the influence both of Ibn Sīnā and of Galen continued to be felt until early modern times; after all, in order to even refute them or to develop a new idea a scholar still had to use their terms and their framework. And reviewing the field of pharmacology, a large number of medications in everyday use nowadays are based on the information collected in Ibn Sīnā's and Galen's books, although they are chemically refined and somewhat unrecognizable.[190]

For our subject there is one specific aspect of the translation movements—both from Greek into Arabic and from Arabic and Greek into Latin—that is important to discuss. With each subsequent language, the geographical area into which the new medicine spread became larger. Originally it included only Greece, Turkey and parts of Italy. After the first translation period, Galenic medicine had spread to the whole of the Middle East as far as the eastern border of Persia, to North Africa, and to Spain and Province, an area including a wide range of climatic zones

184 Siraisi, 1985, pp. 16–17.
185 *Ibid.*, p. 17.
186 *Ibid.*
187 Siraisi, 1987, p. 3.
188 Siraisi, 1985, p. 19.
189 *Ibid.*
190 Holland, 1996b, pp. 1–3.

and a variegated plant life.[191] In addition, parts of the Indian tradition had been incorporated into it. The second translation wave spread this new information to the whole of Europe (and later from there to the Americas and the Far East). Of course the translation itself did not change from one area to another (except in the understanding of the plant names etc.); but as the material was assimilated, the commentators added new medications, explained unknown plant names with those of other similar plants that might—or might not—have a similar effect, and often added local traditions to the accepted corpus of knowledge.[192] The quantity of drugs described had already increased between the Greek and the Arabic texts, from the more than thousand of Dioscorides[193] (written *c.* 65 CE) to 2324 entries in Ibn al-Bayṭār's (d. 1248) pharmacopoeia.[194] Of course not all the drugs were available everywhere,[195] and some were even extinct.[196] At the same time, information about the medical effects of drugs increased.[197]

With the increase of *materia medica*, the confusion about drug names increased. Drug identification had already been a problem in Dioscorides' time.[198] Later on, the translators had to master both the language and the subject matter in order to be able to give accurate translations of the drug names.[199] This was relatively easy in the case of imported spices,

[191] Watson, 2002, pp. 258–259/19–20. To this must be added the effect of the Islamic "agricultural revolution" that brought to the whole Muslim commonwealth a great number of new agricultural crops, many of which had been imported before in small amounts for medicinal purposes, but now became part of the daily diet. *Ibid.*, esp. pp. 262–264/23–25.

[192] See Johnstone, 1981, p. 205.

[193] See pp. 60–61, below.

[194] Pormann and Savage-Smith, 2007, p. 53.

[195] In fact, on the basis of the medical texts found from the Cairo Genizah it seems that only about 120 from among thousands of items appearing in the herbals were in actual use (Chipman, 2005, p. 85). This would agree well with Lev and Amar's assumption, according to which the practical use of *materia medica* was certainly based on the theoretical medical knowledge found in the medical books, but only a limited part of it could be used in a given place at a given time, due to availability and financial constrains. See Lev and Amar, 2008, pp. 21–26.

[196] See Johnstone, 1981, p. 203; Riddle, 1992, p. 101. According to Lev, most of the medicinal substances in use during the Middle Ages and early Ottoman period were of local origin (Lev, 2003, pp. vi, 99–100).

[197] See Stannard, 1974b, 1982.

[198] Concerning the imported drugs, e.g., Dioscorides' *cassia* may have been both various species of the genus *Cassia* and 'cassia' of the genus *Cinnamomum*. Riddle, 1985b, pp. 103–104. See p. 111, n. 134, below.

[199] Johnstone, 1981, p. 200.

roots and barks,[200] but where living plants and their products were concerned the picture could become much more complicated. Plant names are notoriously subject to local variations and to imaginative interpretations of their appearance and characteristics,[201] while regional and climatic differences may affect their strength and action when used medicinally.[202] Therefore, Arab writers insisted on the need to study plants from living specimens, preferably while they were still growing.[203] As the plant names in different languages and in different areas (even when the language was the same) varied considerably, pharmacological literature often included glossaries which gave the synonyms in different languages.[204] Sometimes, when a name seemed impossible to translate, it was simply transcribed for the benefit of a reader who would recognize it, or else it was Arabized through a loan translation.[205] The names of composite medicines were often copied directly from Greek, or were translated word-by-word.[206] The same situation continued when the material was translated into Latin, and the names of local plants mentioned in the commentaries were also added to the vocabulary, which was confusing enough in itself.[207]

But what is this medical system, then, that had and still has such an influence, and that influenced the development of modern medicine so extensively?

---

[200] *Ibid.*, pp. 200–201. On the import of spices, see, for example, Miller, 1969; Goitein, 1966; Lev, 2003, p. 100. On drug trade concerning the substances mentioned in the texts of the Cairo Geniza, see Lev and Amar, 2008, pp. 68–70.

[201] For example, when monk Nicholas was sent from Constantinople to revise the earlier Arabic version of Dioscorides' *Materia Medica*, he had to adapt the terminology to reflect the Hispano-Arabic nomenclature of Muslim Spain. See Pormann and Savage-Smith, 2007, pp. 51, 53.

[202] Johnstone, 1981, p. 201.

[203] *Ibid.*, p. 202.

[204] *Ibid.*, pp. 200–201. On the efforts of medieval botanists to identify the plants in Dioscorides' *Materia Medica*, see Dietrich, 1991, esp. pp. 26–31, where we can see Ibn al-Bayṭār struggling with a text written 1200 years before his time.

[205] Ullmann, 1970, pp. 259–260.

[206] Fellmann, 1986, p. 162.

[207] For a case where neither the translator nor the commentators succeeded in identifying the plant, see *alkakile*, Appendix 18. On the translations of Dioscorides' *Materia Medica* to Latin and European vernaculars, and on its Latin commentaries, see Scarborough, 2005a, pp. xviii–xx.

2.2. *Galenic Medicine*

2.2.1. *Galenic Medicine as a Sociological Phenomenon*[208]

In the preceding chapter we have followed the path of Galenic medicine from its Greek beginnings through the Arabic culture to Latin Europe, from where it spread also to the Americas, its influence reaching far over the Middle Ages. We will describe now its theoretical basis, as it appears in Arabic and—later—Latin medical literature. This theory is based on the medical system of Galen, systematized, complemented and explained by his commentators from Hellenistic times until the end of the Arab Middle Ages. Its world-view is based on Hippocratic tradition and its naturalistic view of health and illness, which accepted only natural elements and forces and excluded the supernatural or spiritual.[209]

In this book we will concentrate on the type of medicine which would have been practiced by doctors from the highest to the middle level of the professional scale—literate practitioners, from whose ranks arose also the greatest medical authors of the time, especially encyclopedists. In this way, we hope to show how the Galenic system created a foundation on which these doctors could base their therapeutic recommendations, and also how herbal tradition was put to use in the therapy—in short, how a learned, practicing doctor would have combined his theoretical knowledge with his observations during his practice.[210]

However, this medical system was only one of the many systems in vogue in different areas of the Islamic empire. Although it was certainly the most prestigious, it did not benefit from any final authority granted to it by social consensus.[211] The medical cadre was not tightly organized, professional care was often too expensive for a substantial proportion of the population, and, moreover, Galenic medicine did not always bring the hoped-for cure.[212] In addition, as already mentioned, there was a cer-

---

[208] This chapter is based on Conrad, 1995b; Pormann and Savage-Smith, 2007.
[209] Dols, 1984, p. viii.
[210] Note the objections by E. Savage-Smith (Savage-Smith, 2000) and C. Álvarez-Millán (Álvarez-Millán, 2000), who claim that the written medical texts do not necessarily reflect medical practice (for a more detailed discussion on the subject, see pp. 91–92, below.) As Lieber points out, literacy was by no means a self-evident requirement for a practitioner (Lieber, 1981, pp. 169–170). On literate medicine, see also Bates, 1995.
[211] See Conrad, 1995b, pp. 128–132. About the life and social position of physicians in the Jewish community in Egypt during the 11th and 12th centuries, see Goitein, 1966, 1967; Meyerhof, 1938.
[212] Dols, 1984, p. 39.

tain ambiguity in the relationship between certain Muslim groups and medicine. This may have increased the general preference for turning to an alternative healing method instead of scientific, causality-based Galenic medicine—or even to the saints.[213] Among these alternative systems were Prophet's Medicine, folk medicine[214] and magic.[215] Astronomy was also often connected with medicine.[216]

On the side of the Galenic doctors there worked a number of local healers, whose treatments were derived mainly from a combination of local traditions and a simplified version of Galenic medicine. The position of these healers was based on their experience rather than on their theoretical learning,[217] and they were the main practitioners of 'magical' medicine, although many of the learned doctors also studied magic under the guise of alchemy.[218]

We will not, however, discuss these forms of 'magical' medicine, but will concentrate instead on the learned, literate medical tradition based on Galen. As the medical profession itself was much less structured than it is today, belonging to the profession actually meant just that: being

---

213 See pp. 16–18, above.

214 On folk medicine with strong magic elements, see the translation by Leibowitz of a treatise attributed to Abraham ibn Ezra (Leibowitz and Marcus, 1984). The compiler explained his decision to write the book emphasizing its therapies as a real alternative to learned medicine: "... since there are many people who cannot buy what they need, and also because qualified healers cannot be found in every place ..." *Ibid.*, p. 127.

215 On the use of amulets and talismans for medical purposes, see Pormann and Savage-Smith, 2007, pp. 145–147.

216 *E.g.* through the idea of choosing the best time for harvesting a certain drug by determining when its power was highest due to the influence of the astral forces connected with it. In the same way, certain days were considered unfavorable for blood-letting. In fact, nearly all astrological manuals had sections dealing with medical prognosis. See Savage-Smith, 1988, p. 250.

217 For the probable acceptance of folk healers' practical experiences into the medical literature, see Thorndike and Benjamin, 1946, p. xxiv; Garcia Sánchez, 2002, p. 278/4. On the critical attitude of the medical establishment towards these healers, see, for example, Pormann and Savage-Smith, 2007, p. 90.

218 On medieval alchemy, see Ullmann, 1972; on alchemy/chemistry as a technical skill, see Hill, 1993, pp. 76–91. The border between magical healing (defined as irrational) and rational healing is very hazy. Some of the medical practices recommended, for example, by Ibn Sīnā and al-Rāzī, such as giving the roasted liver of a rabid dog to a patient bitten by such a dog, sound magical to us. On the other hand, some of the medical qualities of plants that we consider pharmacologically completely reasonable were seen as inexplicable in terms of the contemporary pharmacological theory: they, e.g. peppermint, were acting "on their whole substance" instead of having their effect based on the laws of pharmacology. And even the most ridiculed claim of alchemy, the transmutation of base metals to gold, can be seen as rational on the basis of Aristotelian physics. See Hill, 1993, pp. 77–78.

a medical practitioner with a strong adherence to Galenic principles.[219] This demanded a thorough education in the medical classics,[220] on which the level of professionalism of the practitioner depended.

There were many different types of practitioners in medieval society.[221] At the top of the scale were the court physicians, most of them learned in the Galenic tradition, who often combined their medical tasks at the court with other, non-medical functions.[222] The ordinary practitioners, especially in Latin Europe, were employed only part-time in medicine and gained the rest of their income from some other profession. Pharmacy separated off to form its own profession at an early stage.[223] The story of the professionalization of surgery is fascinating in itself. In general, one may say that the more a healer specialized, the lower was his level in professional society.[224] In addition, a certain genre of medical literature—the self-help books in the style of 'Medicine for the Poor' or 'Traveler's Medicine'[225]—seem to have been intended for people who were not professionally interested in medicine, but just saw it as their duty to take care of the health of their own family, or their village, or themselves, and therefore needed basic practical information on the subject. Separate again is a typical figure found in antiquity and in the Middle Ages—a gentleman of leisure, studying medicine as part of the general knowledge of an educated person, with no intention of ever going into practice.[226] In the Latin West, the university professors of medicine

---

[219] Dols, 1984, p. 24; see also Pormann and Savage-Smith, 2007, pp. 80, 89.

[220] *Ibid*. On different ways of getting a medical education in the medieval Islamic society, see Pormann and Savage-Smith, 2007, pp. 81–83; Lev and Amar, 2008, pp. 9–10.

[221] On the social status of physicians in the Muslim society, see Pormann and Savage-Smith, 2007, pp. 93–96.

[222] E.g. as a political adviser (Ibn Sīnā) or having an additional private practice in the city (Maimonides).

[223] On pharmacist's manual *Minhāj al-dukkān* by a Jewish thirteenth-century practitioner in Egypt, Abū al-Munā al-Kūhīn al-ʿAṭṭār al-Isrāʾīlī, see Chipman, 2002, 2005.

[224] Thus the lower end of the profession might well be represented by empirics specializing, for example, only in the removal of kidney stones.

[225] E.g. Qusṭā ibn Lūqā, *Risāla ilā al-Ḥasan ibn Makhlad fī tadbīr safar al-ḥajj* (ed. and trans. by G. Bos; Bos, 1989) and Ibn al-Jazzār, *Zād al-musāfir* (partially ed. and trans. by G. Bos; Bos, 1997a, 1997b, 2000). The medical compendia sometimes contained a section devoted to regimen for travelers. See Pormann and Savage-Smith, 2007, p. 50.

[226] Dols, 1984, p. 38. To this group belonged e.g. Maimonides, until he became forced to earn his living by actually practicing medicine. Cf. also to ancient literature for landlords (Varro, Columella etc.), advising them how to manage their belongings, including caring for their sick subjects. Also the medico-culinary lore found in cookbooks is aimed at

formed one further type of practitioner. They mostly also had private practices, and many of them wrote commentaries on the classical and the standard Arab medical texts.[227, 228]

2.2.2. *Galenic Medicine: Theory and Practice*

The Galenic system in its 'Arabized' form was a complete entity in itself, covering all the fields of medicine, anatomy, physiology, pathology, therapeutics, psychology, pharmacology, diagnosis, prognosis, physiotherapy, dietetics, surgery, and so on. This one, logical system allowed all biological phenomena to be explained to a sufficient degree of accuracy[229] and was in satisfactory agreement with observable physical phenomena. In addition to that, it allowed for the inclusion of new material, which had only to be fitted into the overall pattern.[230]

The comprehensive nature of the Galenic system can be seen most clearly in the medical encyclopedias. In theory, at least, one of these massive treatises was all a practicing doctor needed, since the same book both gave the theoretical physiological basis for diagnosis and treatment, and recommended a certain course of action for the treatment—including different types of physical therapy (baths, venesection, exercise) and drugs.[231] Using these books, the physician could either rely on the recommended, clearly described and often detailed mode of treatment described in the book; or he could fall back on his own theoretical knowledge and on that basis endeavor to develop a different treatment, while still following the Galenic rules.[232] But if the doctor wanted to go

---

this part of the population. See Waines and Marín, 2002, pp. 305/291, 312/298. For a curriculum for the study of Greek sciences, suggested by Abū Sahl al-Masīḥī, see Gutas, 1988, pp. 150–152.

227 E.g. Gentile da Foligno, Ugo Benzi.

228 Siraisi, 1985, p. 20.

229 Ullmann, 1978, p. 103.

230 This was particularly easy in pharmacology, where all the new drugs could be fitted in according to their secondary, observable qualities, from which the primary qualities could then be derived. In this way any possible conflict between the primary and the secondary qualities would simply not arise. In addition, if there was a real conflict between the necessary conclusions for the primary qualities derived from different secondary qualities of the same drug, there was always the possibility of adding to the description 'additional cold' or 'additional moisture' or some other provision which would make any exceptional behavior on the part of the drug easily explainable. For an example of radical changes inside the framework of Galenic physiology, see Fancy, 2006, p. 239.

231 Johnstone, 1981, p. 204.

232 This, for example, in cases where the prescribed therapy did not agree with the

further and understand the background of these phenomena and their relationship to the universe, then he needed to turn to the books of the philosophers, such as Ibn Sīnā's *Kitāb al-Shifā'* ('The book of healing'), which together with *K. al-Qānūn* gives a thorough picture of the whole universe and the place of man and the human body in it. Ibn Sīnā did not, however, hold that philosophy was necessary for doctors *per se*; instead, they could just accept its conclusions unquestioningly.

2.2.2.1. Physiology[233]

In the Galenic scheme, medicine was composed of the seven naturals, the six non-naturals and the preternaturals. The seven naturals—'*res naturales*'—were "things whose presence is absolutely essential to the existence of the body":[234] those basic building elements without which the human body could not exist and function. The six non-naturals, '*res non naturales*', were "things whose proper administration is essential to the well-being of the body,"[235] and which could change the state of the seven naturals, thus having an influence towards either health or illness. The last group, '*res contra naturam*', were "things which are antipathetic to the body,"[236] or essentially harmful things. Health was seen as depending on the state of the seven 'naturals,' since "... pathology is deduced by the deviation of the naturals from their normal states."[237]

According to Galen, the first group, the seven 'naturals', supplied the foundation of human physiology, anatomy and psychology. It consisted of elements, complexions or temperaments, humors, organs, faculties, functions, and spirits or *pneumata*.[238, 239] Galen held on the Aristotelian idea[240] that all things, including bodies, drugs and also diseases, were

---

patient, or the advice was impossible to follow because of lack of some of the recommended simple drugs.

[233] This chapter is based on the following studies: Dols, 1984; Ullmann, 1978; Siraisi, 1990; Pormann and Savage-Smith, 2007; and Gruner, 1930.

[234] McVaugh, 1975, p. 59.

[235] *Ibid*.; Rather, 1968; Niebyl, 1971; Jarcho, 1970; Dols, 1984, pp. 13–15; Ullmann, 1978, pp. 96–97.

[236] McVaugh, 1975, p. 59.

[237] Ḥunayn ibn Iṣḥāq; quoted by Dols, 1984, p. 14, n. 63.

[238] Dols, 1984, p. 14, n. 63; McVaugh, 1975, p. 59; Ullmann, 1978, pp. 96–97.

[239] According to McVaugh (1975, p. 59) it may include also one's age, color, bearing and/or sex, depending on the school of thought.

[240] For a concise description of Aristotelian physiology, see Fancy, 2006, pp. 158–168.

composed of the four elements (fire, earth, air and water)[241] which embodied the four qualities (hot, cold, dry and moist) as follows: fire was hot and dry; earth was cold and dry; air was hot and moist; and water was cold and moist. Hot and cold were considered active qualities, dry and moist were passive.[242] In medications, at least, the strength of these qualities could be expressed over a range of four degrees, which could be perceived by the senses from the second degree and above. Each of the four qualities had its own effect on the human body.[243] In some cases, the same object could simultaneously contain two opposing qualities which did not cancel each other out.

In the Galenic system, "complexions" were different combinations of these qualities.[244] The different proportions of the qualities in a complexion caused health or illness. But there was also a wide latitude in what was considered to be a normal, or balanced, complexion. Complexions differed in different species, in different individuals within the species, and even in different tissues of the same individual,[245] although it was thought that the closer the complexion was to the ideal balance, the better. External causes, such as climate or season, also had their effects.[246] As there were four qualities in the Galenic scheme, there were nine complexions: 1) the ideal, in which all the qualities were well balanced; 2)–5) in which

---

[241] "The elements are simple bodies. They are the primary components of the human being throughout all its parts, as well as of all other bodies in their varied and diverse forms. The various orders of beings depend for their existence on the intermixture of the elements. Natural philosophy speaks of four elements and no more. The physician must accept this. Two are light, and two are heavy. The lighter elements are Fire and Air; the heavier are Earth and Water." *K. al-Qānūn*, trans. by Gruner, 1930, p. 34.

[242] This makes it impossible for a combination of very hot and very moist to exist: the heat would soon evaporate the moisture, and the combination would change to hot and dry.

[243] For example, heat attracts the materia, while cold congeals the material and clogs the pores.

[244] "Temperament is that quality which results from the mutual interaction and interpassion of the four contrary primary qualities residing within the (imponderable) elements. These elements are so minutely intermingled as each to lie in very intimate relationship to one another. Their opposite powers alternately conquer and become conquered until a state of equilibrium is reached which is uniform throughout the whole. It is this outcome that is called 'the temperament.'" *K. al-Qānūn*, trans. by Gruner, 1930, p. 57.

"Inasmuch as the primary powers in the aforesaid elements are four in number (namely, heat, cold, moisture, dryness), it is evident that the temperaments in bodies undergoing generation and destruction (ana-, kata-bolism) accord with these powers." *Ibid.*, p. 58.

[245] Pennella and Hall, 1973, p. 284. See also Ullmann, 1970, p. 39.

[246] Dols, 1984, p. 12.

one of the qualities hot, cold, dry, or moist predominated; 6) both hot and dry predominating (i.e., choleric); 7) cold and dry predominating (i.e., melancholic); 8) hot and moist predominating (i.e., sanguinary); and 9) cold and moist predominating (i.e., phlegmatic). The last four complexions corresponded to the four elements fire, earth, air and water, respectively.

According to Galenic physiology, when food and drink were digested in the stomach, they were 'cooked'[247] by natural warmth into the four body fluids, i.e., humors. These were "special bodily fluids essential to the physiological functioning of the organism":[248] blood, phlegm, yellow bile and black bile. In the humors, the qualities combined in the following way: blood was hot and moist, phlegm was cold and moist, yellow bile was hot and dry, and black bile was cold and dry.[249] Healthy, or good, humors were assumed to nourish the various organs of the body by being transformed into the actual body substance.[250] Thus they would replace the continuous loss of body substance. The residue of these good humors, 'superfluity', could only seldom be converted into good humor, and would best be evacuated.[251] Since many diseases were interpreted as caused or made worse by superfluities, especially putrefying ones, different evacuations became an important part of therapy.[252] The Galenic scheme recognized still a third group of body fluids, consisting of fluids in transit to the organ which they were intended to nurture but that were still in a state of immaturity, not yet having been influenced by the organ. Maturation of humors was one of the main concepts of Galenic therapy.

Blood, by being hot and moist, was connected in the Galenic system with the sanguineous temperament[253] and with the element air. It should not be confused with the actual fluid found in the veins, which was considered to be a sanguineous mass consisting of a mixture of pure humor blood, with a lesser proportion of the other three humors.[254]

[247] *I.e.* transformed.

[248] Siraisi, 1990, p. 104.

[249] Dols, 1984, p. 11. On the drive for symmetry in the Galenic system, see Pormann and Savage-Smith, 2007, p. 44.

[250] Dols, 1984, p. 10; Gruner, 1930, p. 77.

[251] Gruner, 1930, p. 77.

[252] See pp. 47–48, below.

[253] The temperament in which hot and moist dominate.

[254] Siraisi, 1990, pp. 105–106.

Phlegm, being cold and moist, was connected with a phlegmatic temperament[255] and with the element water. All tissues were postulated to require phlegm as a stored nutrient: if normal blood for some reason did not enter into the member, innate heat[256] transformed the phlegm into blood. In addition, phlegm provided special nutrition for certain tissues and moistened the joints, tissues and organs connected with movement.[257]

Yellow bile, being the hot and dry humor, was associated with a choleric temperament[258] and with the element fire. It was assumed to be formed in the liver and then either move in the body with the blood or be passed on to the gall bladder. It not only helped the blood to nourish some tissues and organs but also to thin the blood so that it could pass through the narrowest channels of the body. The yellow bile that passed through the gall bladder was expected to remove part of the waste material from the body.[259]

Black bile, being cold and dry, was linked with a melancholic temperament[260] and with the element earth. In its normal form it was considered to be the '*faex*', or sediment, of good blood. It originated in the liver and moved from there partially to the blood and partially to the spleen.[261] It was thought to help nourish some members and give the blood stamina, strength, density and consistency.[262] The black bile which traveled to the spleen cleared the body of waste matter, as well as nourishing the spleen.[263]

According to the Galenic theory, the human body then consisted of the four humors: yellow bile, blood, phlegm and black bile.[264] The heart, the liver and the brain were designated "chief organs"; to this list were

---

255 The temperament in which cold and moist dominate.
256 See p. 44, ns. 266–268, below.
257 Gruner, 1930, p. 80. For phlegm, see also Pormann and Savage-Smith, 2007, p. 44.
258 The temperament in which hot and dry predominate.
259 Gruner, 1930, p. 83. For yellow bile, see also Pormann and Savage-Smith, 2007, p. 44.
260 The temperament in which dry and cold predominate. On the connection of black bile with mental disturbances, see, for example, Garbers, 1977; Klibansky *et al*, 1964; Flashar, 1966. Both Ibn Sīnā and Maimonides treated the rulers in whose courts they were employed for melancholy; for Ibn Sīnā, see Goodman, 1992, p. 26; for Maimonides, see Bar-Sela *et al.*, 1964; Leibowitz and Marcus, 1974; Paavilainen, 2007.
261 Gruner, 1930, p. 84.
262 *Ibid.*, pp. 84–85.
263 *Ibid.*, p. 85. For black bile, see also Pormann and Savage-Smith, 2007, p. 44.
264 *Ibid.*, p. 43.

sometimes added the reproductive organs.[265] The heart was assumed to contain innate heat, vital for the preservation of life.[266] Its purpose was to combat the injurious action of extraneous or 'foreign' heat, as well as of extraneous cold. If the innate heat was strong, the natural faculties would be able to work through it, causing digestion and maturation of the humors, so that they would not putrefy and decompose as a result of the action of the extraneous heat.[267]

This innate heat was nourished by the spirits, or *pneumata*.[268] There were three types of these: natural, animal and psychic,[269] and they were connected with the chief organs of the body in the following way: the natural spirit originated in the purest blood found in the liver, from where it was carried by the veins to the organs to give them nourishment. Animal spirit originated in the heart, and was carried to the organs by the arteries. Its task was to nourish the psychic spirit and to regulate the innate heat. The psychic spirit belonged to the ventricles of the brain, and came to the organs through the nerves. It was the carrier of nervous and mental activity and the source of movement and reason.[270]

The spirits supported the corresponding three faculties—natural, animal and psychic[271]—and were the origin of the corresponding functions.[272] Thus, a function was an action resulting from a faculty. The natural faculty was responsible for maintaining growth and reproduction.[273] It had four sub-faculties: the attractive, retentive, transformative and the expulsive.[274] The attractive faculty made it possible for the body to draw to itself the nutriments needed for its preservation.[275] The retentive faculty held the materials during the period when the transformative

---

265 Or spleen. See *ibid*., p. 10.

266 Perho, 1995, p. 45; see Dols, 1984, p. 20. Cooling poisons, such as opium and hemlock, were assumed to exert their harmful effects by extinguish the innate heat (Tibi, 2006, p. 13).

267 Gruner, 1930, p. 270.

268 Perho, 1995, p. 45; Dols, 1984, p. 20; Ullmann, 1978, p. 65. On controversies about the chief organs and the spirits, faculties and functions connected with them, see Fancy, 2006, pp. 168–178.

269 Dols, 1984, p. 20; Siegel, 1968, pp. 104–106, 184–192; Ullmann, 1978, pp. 28, 62–68.

270 Dols, 1984, p. 20.

271 Perho, 1995, p. 45; Dols, 1984, p. 20, n. 98.

272 Gruner, 1930, p. 107.

273 Pormann and Savage-Smith, 2007, p. 45.

274 Gruner, 1930, p. 114.

275 *Ibid*. About natural faculties in Galen's medical system, see Temkin, 1964.

faculty changed them to a suitable temperament, enabling them to become efficacious nutritive substances, i.e., during the digestive process. The transformative faculty also changed the superfluities, i.e., materials that were unsuitable as nutriment, or that were in excess, to a form in which they could be easily discharged from the member—it maturated them by thinning them, thickening them or breaking them down. Finally, the superfluities were to be expelled by the expulsive faculty, either as various excretions from the whole body, or from one member to another.[276] The animal faculty was responsible for respiration and emotions,[277] maintained life in the organs and made it possible for them to accept the other faculties.[278] The psychic faculty enabled perception (both internal and through the senses) and locomotion,[279] which was mediated by the nerves.[280]

The last of the Galenic seven naturals—the functions—originated from the faculties and corresponded to them. Ibn Sīnā discussed them together with the faculties, as the only practical difference between them was that a faculty was the power that makes an activity possible, while a function was the activity itself.[281]

2.2.2.2. Health and Disease[282]

In the Galenic scheme, the human body and its functions were seen as dependent on the existence of the seven naturals. These seven naturals were, for their part, influenced by the six non-naturals, which affected the balance of the primary qualities, thus influencing both the humors and the complexion of the body. Their influence—whether beneficial or detrimental—was seen as continuous and inescapable, as the six non-naturals were environmental factors that no human being could avoid. They included the surrounding air,[283] the motion and resting of the body, sleep and wakefulness, eating and drinking, excretion or retention of

---

276 Gruner, 1930, p. 115.
277 Pormann and Savage-Smith, 2007, p. 45.
278 Siegel, 1970, p. 119.
279 *Ibid.*, pp. 135–136; Pormann and Savage-Smith, 2007, p. 45.
280 Siegel, 1970, p. 141.
281 See Gruner, 1930, p. 107. On the physiological theory of Ibn Sīnā as a remodeling of that of Galen, see Fancy, 2006, pp. 190–203.
282 This chapter is based on Dols, 1984; and Gruner, 1930.
283 Cf. to the Hippocratic treatise "Airs, Waters and Places" (Wasserstein, 1982).

superfluities,[284] and the passions of the soul.[285, 286] In Galenic therapy, since these factors were thought to influence a person's state of health in a very basic way, it was the duty of the physician to advise his client and create for him a regimen which related to all six of these factors and to the individual's temperament and life situation. The right use of these things, both quantitatively and qualitatively, was considered helpful in preserving the seven naturals in their correct condition, which in turn would promote the health of the body. It could also help in restoring a patient's humoral balance back to normalcy, if for some reason it was disturbed. On the other hand, the wrong use of the six non-naturals would change the condition of the body to an unnatural one and cause or prolong disease.[287]

In Galenic therapy, therefore, health and disease were seen as mostly dependent on the balance of the complexion. When a person's complexion was balanced, he was safe from most health problems.[288] On the other hand, absolute balance was considered very rare, at the least, if not impossible to achieve, as complexion varied among different species, between different individuals of the same species, and between different tissues of the same individual.[289] It was also dependent on variables, such as the environment in which the individual lived. These variations had to be taken into account when monitoring the regimen of the individual, as well as when choosing his medication, because the way a drug acts was seen not as absolute but as relative to the individual.[290] If the patient's complexion was to move too far from both the ideal balance and the ideal for that particular individual, the result would be illness, the type of which would depend on which humor was affected.[291] In general, one may say that according to the Galenic system, the best way to preserve the right balance was moderation in everything.[292]

---

[284] To these belong also bathing and coitus because of sweating, loss of heat and energy, etc.

[285] Dols, 1984, p. 14; Ullmann, 1978, p. 97; Pormann and Savage-Smith, 2007, p. 44. On the connection between body and mind and on moral philosophy as a way to happiness, and, consequently, better health, see *ibid*., pp. 48–49.

[286] See p. 40, n. 235, above.

[287] Ullmann, 1978, pp. 97–98.

[288] Excluding accidents and some other special cases.

[289] Pennella and Hall, 1973, p. 284.

[290] Riddle, 1985b, p. 172. See also Kuhne Brabant, 2002, pp. 320–321/167–168, here concerning the effects of fruit on different individuals.

[291] Dols, 1984, p. 11.

[292] *Ibid*., p. 16.

This system defined illness as an abnormal state of the body, a deviation from normality. If we see health as "a state by virtue of which the human body presents that particular temperament and configuration whereby all its functions shall proceed unembarrassed",[293] illness was the opposite. It was thought to be triggered either by a dyscrasia, i.e., a lack of balance in the complexion; or by abnormal composition, i.e., a disorder of configuration or a loss of continuity in the tissues or organs. One bodily disorder, or even one symptom, could also give rise to a second, and at the same time could be a disease in itself.[294]

Complexional illnesses were divided into two groups: 1) those only caused by quantitative aberrations; and 2) those having in addition a qualitative problem in any of the humors. Examples of a quantitative aberration would be too much of any humor, too much of the dominant quality or qualities;[295] or a plethora, in which the relationships between the humors were in principle the right ones but the humors themselves were altogether too abundant.[296] The humor and quality that were superabundant would determine the type of disease.[297] Treatment consisted of either evacuation of the offending humor or attempting to change it to another.[298] Qualitative changes in the humors could be caused by the influence of 'extraneous heat', which would cause the change called putrefaction.[299, 300] This change was believed to occur in cases when the innate heat was too weak to protect the humors from the effects of the extraneous heat. A normal humor could also be mixed with another humor in the wrong way, causing the original humor to change to an abnormal type, as in the case when phlegm is mixed with normal blood.[301] Appropriate therapy for this would be to first anticipate the problem and then to evacuate the bodily superfluities before they were able to putrefy; or,

---

[293] Gruner, 1930, p. 160.
[294] Actually the 'diseases' of antiquity and the Middle Ages were rather single symptoms or clusters of symptoms. Our concept of disease as based on a causal factor could not have been conceived yet. See Riddle, 1985b, pp. 43–44; on the other hand, for a differentiation made by Ibn Sīnā amongst signs, symptoms, causes, and real diseases, see Gruner, 1930, pp. 159–160.
[295] Gruner, 1930, p. 63.
[296] Dols, 1984, p. 12.
[297] *Ibid.*, p. 11.
[298] See Leibowitz and Marcus, 1974, p. 47, l. 1.
[299] The idea of putrefaction may have been borrowed from the ancient Egyptian idea of the superfluities and their putrefaction. See Saunders, 1963, p. 32.
[300] Gruner, 1930, p. 270; Dols, 1984, p. 12.
[301] Gruner, 1930, p. 80.

if the physician could not act quickly enough, to remove the putrefying superfluities. This could be done by means of purges, external medications, gymnastics, bathing, coition[302] or venesection.[303]

Examples of a disorder of configuration would be intestinal hernia, as a case of displacement from the proper anatomical position, and congenital absence of a finger, as a case of 'error in number'.[304]

"Loss of continuity" would take place mostly within a tissue, such as in the case of a wound.[305] In the Galenic cure for loss of continuity, it can be seen how the six non-naturals were thought to act even on this kind of problem: an ulcer (a specific case of loss of continuity) would heal quickly if the temperament of the member was balanced—if not, healing would probably be slow. Therefore, manipulating the humoral balance was seen as helpful even in this type of case.

2.2.2.3. Therapeutics[306]

Therapy in the Galenic system was based mainly on balancing the complexion and on removal of harmful materials.[307] At the same time, however, both the diseased part of the body and the part that was actually causing the disease could be treated. Balancing the complexion was largely achieved through the method of *contraria contrariis curantur*, "opposites are cured by opposites,"[308] correcting the imbalance in the complexion by giving the patient things opposed to it. For example, if the patient's complexion was slightly too cold, it would be treated by mildly warming medication. Elimination was necessary only if the humor causing the problem was not only present in the wrong amount, but was also qualitatively unhealthy.[309] This could be done by purging, by using diuretics, or by venesection and cupping; while other possible options would include activities such as sweating in a bath or exercising.[310]

---

302 Dols, 1984, p. 12.

303 On venesection and cupping, see Pormann and Savage-Smith, 2007, p. 121.

304 Gruner, 1930, p. 162.

305 *Ibid*., pp. 163–164.

306 This chapter is based on Ullmann, 1978, pp. 103–106; Dols, 1984, pp. 10–16; Klein-Franke, 1982; Johnstone, 1981; Harig, 1973, pp. 64–81; *ibid*., 1974; Gruner, 1930; Stannard, 1961; Chipman, 2005.

307 Gruner, 1930, pp. 469–470.

308 See Stannard, 1961, p. 516.

309 Gruner, 1930, p. 469.

310 See Dols, 1984, p. 12; Pormann and Savage-Smith, 2007, pp. 43–44.

This was the theoretical basis of the treatment, which can be seen as treating the actual first causes of the disease on the assumption that if the underlying causes could be healed, the visible disease would disappear naturally.[311] In practice, however, therapy was performed also on the level of the symptoms, in order to alleviate the suffering of the patient until the balancing of the complexion reached an adequate level. This was mainly achieved by medication, especially through the secondary and tertiary qualities of drugs.[312, 313]

In order to treat a disease, the physician needed first to be able to make the diagnosis. In an ideal case, the medieval physician knew his patient well, being his 'family doctor', and could quickly discern in him any variance from his normal state. In all cases, the doctor's prescribed method would have been to personally check the observable signs and symptoms[314] at the patient's bedside, in addition to questioning the patient about his feeling and about how the situation had developed. Besides this, if possible, the doctor would talk to the patient's family. He would also check the patient's pulse at the wrist and examine the color, smell and consistency of his urine (as well as his stools, possibly). In many cases, however, the physician did not even get to see the patient but received only a description of the disease.[315] Whatever the case might be, the doctor was assumed to be able to give a prognosis, i.e., predict the development of the illness, and start impacting it with treatment.[316] In acute diseases, especially, his ability to predict the critical days was important—i.e., the days in which there would be a change in the progress of the disease, either for good or for ill.

---

311 See Siegel, 1970, p. 184.

312 See p. 39, above; for the therapies intended for the primary causes and for the symptoms, see nosebleed, pp. 134–137; cough, pp. 231–234; and diabetes, pp. 289–291. See also Stannard, 1961, p. 517.

313 "Agents which alleviate pain. There are three groups of agents which alleviate pain: (1) Some contrary to the cause of pain—which removes the cause. Ex.: anethum, linseed, made into a poultice and applied over the painful place. (2) Any agent which counteracts the acrimony of the humours, or soothes, induces sleep, or dulls or soothes the sensitive faculties and lessens their activity. Ex.: inebriants, milk, oil, aqua dulcis, etc. (3) An agent which cools/freezes and dulls the sensation in the painful part. Ex.: all narcotics and sleep-inducing drugs. The first of the three is the most certain." *K. al-Qānūn*, trans. by Gruner, 1930, p. 252.

314 On the difference between signs and symptoms according to Ibn Sīnā, see Gruner, 1930, pp. 159–160.

315 See Conrad, 1995b, pp. 132–133, and Meyerhof, 1935b, especially cases 15 and 23.

316 Riddle, 1985b, p. 10.

Prophylactic care represented a most important part of therapy. A person could do much to preserve his own health by acting moderately with respect to the six non-naturals; it was the task of the family physician to show him the right way to go about this, suitable to his complexion and his way of life.[317] Preventive medicine was to be preferred over the curative kind,[318] for the simple reason that, at least in antiquity and the Middle Ages, it was easier to prevent than to heal.[319]

In practice, these theoretical therapy guidelines were traditionally applied through three treatment methods: 1) diet; 2) medication; 3) surgery.[320] We will not discuss surgery here, in spite of the Arabs' great contribution to its development.[321] Ideally, these treatments were used in order of necessity, as listed above, physicians being advised to treat by diet as much as possible before moving to the more drastic, powerful and potentially dangerous drug therapy.[322, 323]

The diet or 'regimen' of medieval medicine included much more than recommendations about food: it controlled the use of all the six non-naturals, which in practice meant the person's entire lifestyle. It was the doctor's task to observe his patient and to prescribe for him an individual regimen, specially tailored to his needs and his complexion.[324] This was as important for preserving health as for assisting Nature in the healing process. In most cases, a diet would have attacked the underlying causes of the disease. Therefore, the doctor was supposed to give advice as to a suitable area and climate for a patient to live in; what kind of water or wine he should drink; what materials his clothes should be made of and when they should be worn;[325] how to exercise—when and how much; and when and how much to engage in sexual activity.[326] Regarding food and drink,

---

317 Dols, 1984, p. 16.
318 *Ibid.*, p. viii.
319 *Ibid.*, p. 72; see Edelstein, 1967.
320 Ullmann, 1978, p. 103.
321 On medieval surgery, see Ullmann, 1970; Spink and Lewis, 1973; Pormann and Savage-Smith, 2007, pp. 61–65; Savage-Smith, 2000; the last two cast doubt on surgery's importance in the actual medical practice.
322 Ullmann, 1978, p. 99. These methods could also overlap: see, for example, Waines and Marín, 2002, on medicinal food recipes and special foods for convalescents in medieval Arabic culinary manuals.
323 The same principle can be seen in Arabic ophthalmologic manuals that instructed the physician to begin with drug therapy and progress to surgery only if that failed. See Pormann and Savage-Smith, 2007, p. 67.
324 Dols, 1984, p. 16; Garcia Sánchez, 2002, p. 278/4.
325 This influences the body temperature. Ullmann, 1978, p. 101.
326 Stannard, 1961, p. 516; McVaugh, 1993, p. 18.

the advice included not only what to eat, but how much and when;[327] what the ingredients should be; how it was to be prepared; and how animals to be eaten were to be fed.[328] The advice, especially for respected persons with a leisurely lifestyle, could be very detailed.[329]

Drugs were used if the regimen proved to be insufficient. In theory they would be used in a similar way to the regimen: in order to correct the imbalance of the complexion by the *contraria contrariis*.[330] In practice, however, the secondary and tertiary qualities of drugs[331] also greatly affected the theoretical choice of a particular drug for use in therapy. These qualities were assumed to influence the symptoms of the disease rather than affecting the underlying causes, as the regimen was supposed to do.

In medical encyclopedias, drugs generally appear in two main subdivisions: the use of simple medications and the use of compound medications.[332] In the section for simple drugs in Ibn Sīnā's *Kitāb al-Qānūn*, the following information is given: 1) the name of the simple drug (usually in Arabic); 2) its physical appearance and varieties of choice; 3) its primary qualities and their grades; 4) its general medical qualities; 5) its special effect on each part of the human body; 6) its possible poisonous or antidotal qualities; 7) possible substitute drugs.[333] Of course, all this information was not given about each and every drug. Some of them were so well known as not to need any detailed description; some of them came from far afield, rendering a description of their habitat unnecessary; and not all had medicinal qualities in all the fields mentioned, or any antidotal use, or a known (or required) substitute drug. For some drugs the information given seems very scanty, whereas for others the description

---

327 In general terms, Arab dietetics could be considered as the knowledge of equilibrium, of moderation in food consumption. Within its basic concepts certain rules existed of an obligatory character: the first is *iʿtidāl*, "symmetry" or a bodily-spiritual balance. To this concept was joined that of *muwāfiq*, that is, what was "most suitable" for each situation. From the combined concepts originated *ṣiḥḥa*, "soundness" or "health". See Garcia Sánchez, 2002, p. 277/3.

328 See Leibowitz and Marcus, 1974, pp. 28–29.

329 For an example, see Leibowitz and Marcus, 1974; Bar-Sela *et al.*, 1964; and Muntner, 1957.

330 Dols, 1984, p. 15.

331 See pp. 53, 55, below.

332 Ullmann, 1978, p. 103.

333 Substitute drugs were used if the prescribed item was unavailable, either due to its geographic origin or its price. "*Quid pro quo*," lists of drugs substitutes, gave in a terse form the drug to be substituted and the different options the physician / pharmacist had. See Chipman, 2005, p. 86; for three examples of this genre, see Levey, 1971.

takes up more than a page. It is clear that some of the drugs were much less known than others (and perhaps also less important). In the section for compound drugs, the names of the drugs are given (if they have any), then their therapeutic usage, and finally the method of preparing and administering them.[334]

But when one looks at the lists of the simple drugs in medical encyclopedias, it becomes clear that they include many items that actually belong to the field of nutrition. Most of them seem to have some medicinal qualities in addition to their nutritional ones. The border between food and medication seemed to be shifting.[335] The original Galenic solution was that the drug would change the temperament of the body, while food would increase its substance.[336] According to another explanation, drugs were substances which altered the four qualities, while nutriments were considered neutral in this respect.[337] Stannard solved the problem in a pragmatic way:

> If an item is administered to a sick person with a curative aim, regardless of its mode of administration and the nature of the complaint, it is, *ipso facto*, a drug … But by virtue of the fact that these plants also form part of the normal diet, the viewpoint of the dietician is never wholly absent in Hippocratic discussions about simples.[338]

Al-Majūsī's elegant theoretical solution leaves little to be desired, and through it we may see again the systematization of Galenic medicine that took place in the Arab Middle Ages. According to al-Majūsī, edible material could be divided into four categories:

1. Remedies in the absolute sense, which are the materials that the body at first changes but that then change the body and transform it into their temperament, i.e., they change the qualities of the humors of the body and thus the complexion;

334 Johnstone, 1981, p. 203. On preparing the drugs, see Fellmann, 1986; on the technology for industrial distillation of rose water, see Hill, 1993, pp. 85–87.

335 Stannard, 1987, pp. 10–11. This can be seen particularly well in the Arabic cookbooks of the ʿAbbāsid period, written for members of the ruling class. The genre borders on the manuals for dietetics, as part of the purpose in both is to give advice on the right life-style in an urban luxury-loving consumerist society. See Garcia Sánchez, 2002, esp. p. 277/3. The cookery manuals also contain recipes that are expressly intended for the sick; see Waines and Marín, 2002. For a good example of a food item used for medical purposes, see Waines and Marín, 2002, pp. 310–313/296–299. On the medical effects of fruit, see Kuhne Brabant, 2002.

336 Ullmann, 1978, p. 100.

337 Leibowitz and Marcus, 1974, p. 55, ll. 5–8.

338 Stannard, 1961, pp. 511–512.

2. deadly poisons, which are those materials that change the body and gain power over it, without the body being able to resist them;
3. remedial food materials, which are those that at first change the body until it gains power over them and transforms them into its own nature (lettuce, ptisan, onions and garlic, for example, belong to this group);
4. finally, the (pure) foods—those which the body changes and incorporates in itself.[339, 340]

The choice of medication was based on its qualities. These qualities were of three kinds: 1) the primary qualities, which were the complexions of the drugs (for example cold-moist, cold-dry);[341] 2) the secondary qualities which resulted from them, and which had a general or overall effect (i.e., similar in all parts of the body), such as softening, blocking, or pain-killing; 3) the tertiary qualities, which exercised their effect through the secondary qualities by means of the primary ones, but these effects were limited to a certain location in the body (for example diuretics, or drugs to dissolve gallstones).[342] These qualities were discerned only from experience,[343] and their action was not thought to be the same for everybody; the complexion of the patient was seen as having an influence on the effect of the drug on the patient, as would the severity of the qualities of the disease that the drug was fighting.[344] Recommendations for therapy were made on the basis of the qualities of the drugs. These, likewise, were to be based on experience: a drug quality could give some guidance on its potential use for a particular therapeutic application, but this was not always reliable.[345] There was another factor the doctor was obliged to consider, as well, when selecting the right medication, in

339 Ullmann, 1978, p. 100; see Gruner, 1930, p. 218.

340 A special case here is the turning of a drug into an item of nutrition by the habituation of the body, as described by Maimonides (Leibowitz and Marcus, 1974, p. 24). Thus, the difference does exist, but it is in many cases not very important: dietetics always form a part of the therapy, even in texts describing drug therapy, while on the other hand, as items of nutrition, and since drugs both have the same primary qualities of cold, hot, dry and moist, and also the secondary and tertiary qualities, they can be at least partly used and prescribed in the same way and for the same needs, in spite of their differing modes of action in their relationship to the human body. See Dols, 1984, p. 11.

341 On the role of describing a drug's potency in terms of the four primary qualities, see Langermann, 2003.

342 Ullmann, 1978, pp. 104–106; Harig, 1973.

343 Riddle, 1985b, p. 172.

344 *Ibid.*, pp. 172–173.

345 *Ibid.*, pp. 32, 35–36, 173; see also Touwaide, 2007, p. 163, for a practical example.

addition to the drug qualities. In principle the right way to proceed would be to try to fight the causes of the illness—but sometimes this method would act so slowly that there would be a health risk, for example when the patient was in continuous pain. On the other hand, treatment that removed the symptoms without combating the cause might be harmful as well—because it was likely to weaken the patient, for example. Thus, the doctor needed to consider each case separately and on its own merits.[346]

The primary qualities—hot, cold, moist and dry—were postulated to always appear in pairs of an active (hot, cold) quality combined with a passive (moist, dry) quality. In theory there could be nine such combinations,[347] although in practice the combination hot-moist, in which there would be great heat, could not last very long but would turn to hot-dry. These qualities were believed to directly influence the complexion of the body, changing its primary qualities and thus its complexion and, in effective therapy, attacking the causes of the disease.

In choosing a medication that was intended to act through its primary qualities, the 'force' of the medicine to be chosen would have been an additional factor: not all hot-dry medications were hot and dry to the same degree. To define the strength of the qualities of different drugs in a practical way, Galen divided them into four levels or degrees, which could be deduced via sensory perception:[348] 1) the first degree showed only an almost imperceptible effect, discernable only by 'rational and logical demonstration', i.e., by derivation from other phenomena;[349] 2) the second degree showed a definite effect that could easily be perceived by the senses;[350] 3) the third degree showed a strong effect;[351] and 4) the fourth degree was so strong that it corroded or mortified the member.[352] In addition, there was the temperate situation between hot and cold or between dry and moist, which did not have any effect on the senses.[353, 354]

---

[346] Gruner, 1930, pp. 527–528.
[347] Cf. p. 30, above.
[348] See Ullmann, 1978, p. 106; Harig, 1974.
[349] Ibn Sīnā suggests that it can be perceived also by repeated applications, or using a larger dose (Gruner, 1930, p. 217).
[350] According to Ibn Sīnā, it does not, however, perceptibly interfere with the functions of the body (*ibid.*).
[351] According to Ibn Sīnā, it interferes with the functions of the body, but not to the degree of causing breakdown or death of tissue (*ibid.*).
[352] According to Ibn Sīnā, it causes destruction or death of tissue, as poisons do (*ibid.*).
[353] See Harig, 1976; McVaugh, 1975, p. 61.
[354] The system of degrees caused considerable discussion in the Middle Ages. Among the issues were the problems of defining the point of temperance and the justifying of

Secondary qualities were derived from primary qualities. They could be recognized by the effect they had on the body,[355] while at the same time they could be intellectually derived from the primary qualities, at least theoretically.[356] Their effect would be general, meaning it would be the same in all parts of the body. Ibn Sīnā mentions in his listing of the secondary qualities the examples of numbing, dissolving and cauterizing.[357] In practice, these and the tertiary qualities were mostly used for combating the symptoms of the disease, not its complexional causes.

The tertiary qualities were exercised by drugs through the secondary qualities by means of the primary ones. Their effects were seen as being limited to a certain location, and they could also be recognized by their effects on the body.[358] Ibn Sīnā lists the following examples in Book II of *K. al-Qānūn*: diuretics, purging medicines and diaphoretics.[359]

In addition to these three types of medicinal qualities, there was a fourth one, which was not seen as arising from the primary qualities: drugs 'acting by their whole substance' in a way that cannot be explained by any of their constituent qualities. This is the '*khāṣṣa*',[360] an 'unknown cause of a known effect,'[361] or, as Maimonides expresses it, in these cases the drugs would "act through specific properties, by which I mean their specific form which is the whole of their essence", so that it would be impossible to explain their effects "through their particulars alone."[362] The effects of these qualities were in themselves by no means strange or unexpected: they were—at least in most cases—the same secondary and tertiary qualities, with the difference that there was no physiological basis in the primary qualities for their action. Two good examples of this are peppermint, used for its blood-stopping quality in nosebleed, and donkey's excrement used for the same purpose.[363] These drug qualities could be found and verified only by experience, as there was no way they

---

the four-degree division instead of a division to, for example, 12 degrees, subdividing the degrees into beginning, middle and end parts. See McVaugh, 1975, p. 62.

355 Ullmann, 1978, p. 106.

356 See *ibid*., p. 105.

357 *K. al-Qānūn*, vol. 1, pp. 232–235.

358 Ullmann, 1978, p. 106.

359 *K. al-Qānūn*, Vol. 1, pp. 232, 235–236.

360 Translated here and in the following "special property."

361 *khāṣṣa, khāṣṣiya*; Lane, 1886–1893, Vol. 2, p. 747.

362 Leibowitz and Marcus, 1974, p. 24.

363 See p. 37, n. 218, above.

could be derived from theory.[364] However, these drugs were by no means considered 'magical', as they acted through natural forces that simply were unknown. According to al-Rāzī, while we cannot always understand Nature, it would be dangerous to deny the existence of phenomena we do not understand, because then we run the risk of losing their benefits.[365] This particular phenomenon will arise again later when compound drugs are discussed.[366]

There were also drugs that, while they were not considered to have any strictly medicinal effect, were used rather as additives in mixtures, as a base,[367] or as correctives or excipients. Some of them ensured that a drug had the proper consistency; others helped to overcome some undesirable quality in the rest of the drug mixture, e.g. taste; and still others were cosmetic in their use, for example guaranteeing that an ointment would have a pleasant smell.[368] These drugs did not need such clearly defined medicinal qualities as the others.

In therapy, the ideal was to start with diet and foods, then continue to simple drugs, and only then to progress to the more sophisticated compound drugs. A treatment of diet and foods was considered to be gentler than treating with potentially dangerous medicines.[369] This course of action was made possible first and foremost by the fact that many primary foodstuffs also had known medicinal qualities.[370]

There were several reasons for using compound drugs.[371] In all of them, it was of the greatest importance to bear in mind the compatibility and interrelation of the ingredients.[372]

---

[364] ʿAlī ibn Sahl Rabban al-Ṭabarī (mid-9th century): "Everything has a power (*quwwa*) that one can find out according to its taste. It has also a specific property (*khāṣṣa*), whose reason and deeper basis one can decide only empirically; because the specific properties are hidden in the drugs, like for example the property of the magnet, by which iron is drawn to it." *K. Firdaws al-ḥikma*, p. 356; German trans. in Ullmann, 1972, p. 397.

[365] Al-Rāzī, *K. Khawāṣṣ al-ashyāʾ*, via Ullmann, 1972, p. 407.

[366] See pp. 57–58, below.

[367] See Stannard, 1961, p. 505; Riddle, 1985b, p. 142.

[368] Stannard, 1961, p. 506.

[369] Ullmann, 1978, p. 99. See Kahl, 2007, p. 217, Prescription #122, for an example of the understanding of the potential dangers of medication (the drug in question is a purgative): "An *iṭrīfal* which rids the stomach and the adjacent (organs) as well as the head from phlegm and black bile; it is safe (to be used even) by a pregnant woman who is breast-feeding."

[370] See pp. 52–53, above; p. 117, below. See Stannard, 1987, p. 10. On the classification of different foodstuffs according to their nutritional and medicinal characteristics in Andalusian sources, see Garcia Sánchez, 2002, pp. 278–279/4–5.

[371] Levey, 1973, p. 38.

[372] Johnstone, 1981, p. 208.

Frequently, the purpose of an ingredient in a drug mixture was to counteract the side effects of other ingredients.[373] Other drugs were used to help optimize the effect of the principal ingredient in a mixture via synergetic activity.[374]

One specific problem arose in the compounding of drugs. When Dioscorides mixed ingredients, he did not consider that the result would amount to more than the sum of the constituents—theoretically or from the point of view of medicinal qualities.[375] But in the Middle Ages, the compounded drug was considered to have two separate effects. One of them, as in Dioscorides' thinking, was the combination of the individual effects of the ingredients. The second was that in the actual combination of the simple components, new and complex effects could arise.[376] In the first case, the problem was then in determining, for example, what the net effect of mixed cold and hot drugs on the body would be. Would all the components have an effect, or would only the dominant component be effective?[377] Al-Kindī thought that the qualities of a medicine remained separate in it, so that in a temperate medicine the ingredients only counteracted each other's effect.[378] In the second case, the effects of the new compound, acquired in fermentation, simply could not be known without experiment or observation. In these cases the new qualities were as independent of the qualities of the ingredients as the "special property" of

[373] Riddle, 1985b, pp. 66, 173. For lists of drugs that should be combined to avoid potential side effects, see, for example, al-Rāzī, *Kitāb Manāfiʿ al-aghdhiya wa-ḍafʿ maḍārriha* (al-Rāzī, 1888). Other pharmacological texts, such as Ibn Buṭlān's *Taqwīm al-ṣiḥḥah* (Elkhadem, 1990), Ibn Falaquera's *Ṣori ha-guf* (Amar, 2004) and al-Anṭākī's *Tadhkira* (al-Anṭākī, 1937) contain this information in the end of the relevant plant description. On eliminating the side effects of the different food items in cookery, see Waines, 1989, p. 23.

[374] "Note, too, that when changing the quality of a temperament, it is often necessary to reinforce it by admixing with the remedy something of contrary quality. Thus we give vinegar with medicines which are hot towards a given member, because then their virtues can penetrate into the member; we give saffron with cardiac infrigidants, because saffron carries such remedies to the heart . . . Oftentimes it happens that a medicine which produces a very marked change of temperament does not have a lasting effect; this is because it is so tenuous that its action does not pass on to completion. In this case we must admit with it something which will render it less tenuous and more stable, even though one risks the production of a contrary effect. Thus, we mix wax with balsam, and so on. The one remedy is thereby preserved long enough to ensure its proper action being accomplished." *K. al-Qānūn*, trans. by Gruner, 1930, p. 472.

[375] Riddle, 1985b, p. 146.

[376] Sylla, 1971, p. 16.

[377] *Ibid.*, p. 17.

[378] *Ibid.*, p. 18. See also Gauthier, 1939.

the simple drugs was independent of their primary qualities.[379] For this reason it was considered safer to use tried and well-known compound medications than to create new ones.[380] On the other hand, the traditional system of Arab medicine, including the work of Ibn Sīnā in *Kitāb al-Qānūn*, stressed the immutability of the qualities of the simples, even in a mixture.

Another problem connected with the first type of mixture was the measurement of the necessary amounts of different types of drugs in order to reach the required degree of the desired drug quality. As the idea of 'quantity of quality' could not be used—because of the Aristotelian ideas that a quality could not exist without being inherent in a subject, and a given individual quality could not migrate from one subject to another—there was no basis for considering different distributions of the same or equal quantities of quality into greater or lesser extensions. Hence there was no physical basis for the use of 'quantity of quality'.[381, 382]

When allocating names for compound drugs, the Greek drug names were taken as a model. Most usually, the name of the compound drug incorporated either its most important ingredient or the indication for its use. Sometimes, its geographic origin was also used. At other times, the drug's name was intended to add to its renown, either by praising its efficacy or by naming it after a famous doctor.[383] Some of the compound drugs became so well known, and were so much like simple medicines in their use, that they were included in the section for simple drugs in the pharmacopoeias, along with their medicinal primary, secondary and tertiary qualities.[384]

We have shown the different categories of qualities that a simple or a compound drug might have. But how could it be known which drug had which qualities, and how strongly? Galen insisted that the primary qualities could be deduced via the perceptions of the senses.[385] But the decisive factor when determining the qualities of a drug was its

---

[379] See pp. 55–56, above.

[380] See Chipman, 2005, pp. 73–74.

[381] Sylla, 1971, pp. 10–11. For a complete discussion about the subject, see Sylla, 1971.

[382] On iatromathematics, see Gauthier, 1939; McVaugh, 1975; and Klein-Franke's (1984) translation of Ibn al-Ṣalt's book on astrological medicine.

[383] Fellmann, 1986, p. 162; see, for example, Kahl, 2007, p. 217, title of Prescription #123: *Maʿjūn al-najāḥ li-aṣḥāb al-mālīkhūlīyā*, "The *happy end* electuary for those who suffer from melancholia."

[384] See, for example, *rāmik* in *K. al-Qānūn*, Vol. 1, p. 430.

[385] See p. 54, above, about the degrees and how to distinguish between them.

effect on the human body.[386] A physician could get some hints from the taste and the smell of the drug, but its true qualities could, according to Dioscorides, be seen only by 'testing', that is, by experience gained from trials on patients.[387] Al-Majūsī developed this idea of testing: he formulated six criteria for testing both the primary qualities and the effects of a medication.[388] Accordingly, the main method for getting to know a drug and its action seems to have been experimentation and active observation. However, Ullmann expresses doubts as to whether al-Majūsī ever checked the degrees of any primary quality of a plant, or whether he simply continued copying from his sources.[389] Whatever the case, the amounts of especially primary qualities of drugs and their degrees increased remarkably since the time of the Greeks. By the Arab Middle Ages, nearly all simple drugs were provided with them.[390]

In the medical traditions of antiquity, it was very unusual to prescribe the recommended dosages of a drug. Dioscorides considered experience as the most necessary guideline in deciding the dosage, as there were so many variables connected with the plants themselves, the patients and the strength of the disease.[391] In the case of weaker medications, a little bit too much or too little would not make any difference. On the other hand, if the medicine was so potent as to be potentially dangerous, he gave the recommended amounts. Adult and child dosages were not differentiated,[392] but in some cases different dosages were given according to the different purposes for which they were used.[393] A drug's quality was a qualitative distinction, not a quantitative one, and as such,

---

386 Ullmann, 1978, p. 106.

387 Riddle, 1985b, p. 38; see also pp. 171–172.

388 Ullmann, 1978, p. 104.

389 *Ibid*., p. 106.

390 On the importance of describing a drug's potency in terms of the four primary qualities, see Langermann, 2003.

391 Already the Hippocratic author describes these variables in his *Epidemics* as follows: "We know the characteristics of drugs, from what ones come what kinds of things (sic). For they are not equally good, but different characteristics are good in different circumstances. In different places, medicinal drugs are gathered earlier or later; also the preparations differ, such as drying, crushing, boiling and so on (I pass over most things); and how much for each person and in what diseases and when in the disease, in relation to age, appearance, regimen, what kind of season, what season and how it is developing, and the like." (Smith, 1994, *via* Tibi, 2006, p. 6).

392 This is interesting in the light of the fact that medical compendia often contained entire sections devoted to regimens for infants and for the elderly, including their diet. See Pormann and Savage-Smith, 2007, p. 50.

393 Riddle, 1985b, pp. 68–69.

doubling it did not mean that doubling the dosage would therefore make the drug's action twice as effective. Also, the action of any specific quality was not seen as absolute, but relative to the individual and his complexion.[394] Therefore, exact drug quantities were difficult to give.

In medieval medicine, both Arab and Latin, the prescription of drugs using exact weights and measures was much more common.[395] Things were complicated, though, by the fact that there existed many different systems of measurement used in different areas.[396] On the other hand, it was also common to simply list drugs that would be beneficial for a certain ailment, without mentioning which ones should be mixed together or how much of them should be used. One can see many of the same simple drugs for the same disease appearing in the medical formulas of different authors, but combined in different ways.[397]

The methods of applying any particular drug varied greatly. It could be eaten, either as a decoction or in the form of different pills, pastilles, syrups or even candies. It could be locally applied as a poultice or a salve, but also massaged on the body as an ointment, mixed in the bath water, or used as a fumigation. Or it could be inhaled, or taken as an enema. The same plants were used in many different ways, even for the treatment of the same disease. In many cases the application method was not expressly laid out, but was left to the experience of the practitioner and the knowledge he had learned by word of mouth.[398]

In the Middle Ages, the number of drugs in the medical pharmacopoeias had increased considerably.[399] Hundreds of names of both simple and compound drugs were added from Persian and Indian sources,[400] while Syriac, Greek and Andalusian plant names were also prominent.[401] Additionally, new drugs came from the Far East and from the local flora

[394] *Ibid.*, p. 172.
[395] Leibowitz and Marcus, 1974, p. 53, ll. 9–10; see also Riddle, 1992, p. 136.
[396] See the tabular comparison (Chipman, 2005, pp. 97–100) of the weights and measures in three medieval primary sources and three secondary sources. No two lists are similar.
[397] For examples of authors modifying existing prescriptions, see Chipman, 2005, pp. 26–57.
[398] Stannard, 1987, p. 12; Van Arsdall, 2007, pp. 200–203. For the whole subject of drug forms, see Fellmann, 1986. Comparisons between pharmaceutical authors show that there are great differences in the amount of advice they give on drug preparation. Most of them, however, expect their readers to possess a considerable amount of background information. See Chipman, 2005, pp. 26–57.
[399] See p. 24, above.
[400] Dols, 1984, pp. 15–16.
[401] Johnstone, 1981, p. 201.

of the suddenly enlarged Islamic empire.[402] These drugs were taken from the vegetable, the mineral and the animal kingdoms.[403] The minerals were worked on using different chemical procedures, but their number was still restricted, possibly because of a technical inability to obtain water-soluble salts of those minerals which are usually found in combination with other insoluble or inert materials.[404, 405]

The rapid increase in the number of drugs led to the rise of pharmacology as a separate profession.[406] This development took place, at least in the cities of the ʿAbbāsid empire, by the ninth century.[407] The pharmacist sold the drugs, and then they were compounded either by him or by the physician. The major hospitals had pharmacists on their staff, pharmacies on the premises, and they gave pharmacological instruction.[408] The pharmacist, however, did not necessarily collect his own drugs; even the local drugs could be either collected by others or, in the Latin West, might also be grown in the medical garden of the monastery.[409] The new developments in chemistry made the distillation of essential oils from plants, as well as the preparation of organic and inorganic acids and alkalis, a commercial-scale industry.[410]

And of course, not all drugs sold in the market were of adequate quality. Even in cases where no fraud was suspected, many indigenous species were considered to be inferior to the products of the Near East.[411] Beyond that, there were clear cases of adulteration of drugs. Dioscorides

---

402 *Ibid*., p. 207.

403 On the use of animal products in ancient and medieval medicine, see Lev, 2003, pp. 9–17; on the use of minerals, *ibid*., pp. 18–26. On the proportional relations between the numbers of plants, animal products and minerals used as remedies both during different historical periods and in modern herbalism, see *ibid*., pp. 9–10, 18, 27–28, 99, 117–118, 125; Kahl, 2007, pp. 28–29.

404 Stannard, 1961, p. 507. On medieval chemical procedures and preparation of organic and inorganic acids, see Hill, 1993, pp. 88–91.

405 For drugs in Latin Europe, see Thorndike and Benjamin, 1946, pp. xxiii–xxiv; Talbot, 1978.

406 On pharmacy as a profession and on the social position of pharmacists in Mamluk Egypt, see Leigh Chipman's outstanding study (Chipman, 2005). On types of pharmacy professionals in the medieval Jewish community of Fusṭāṭ, see Lev and Amar, 2008, pp. 12–16.

407 Chipman, 2005, p. 71.

408 Dols, 1984, p. 16; Chipman, 2005, pp. 139–146; see also Pormann and Savage-Smith, 2007, pp. 99–100.

409 See Talbot, 1978; D'Aronco, 2007.

410 Hill, 1993, pp. 83–89.

411 Stannard, 1987, p. 14.

had already given specific tests to detect such fraud,[412] and Ibn Sīnā, for example, continued along those lines.

2.2.2.4. Galenic Medicine in the *Kitāb al-Qānūn* of Ibn Sīnā

If we now look at the medical encyclopedias and try to see how this information was presented in them on a practical level (using as an example the *Kitāb al-Qānūn* of Ibn Sīnā), we will notice that all the theoretical background we have worked through was given at the beginning of Book I, or, for pharmacology, at the beginning of Book II. The simple drugs were given in Book II, and the compound drugs in Book V. This leaves Books III and IV to cover pathology and therapy. These books follow exactly the same pattern. Book III records the diseases of all the different body parts, from head to toe, while Book IV covers more general diseases affecting the whole body—such as fevers and the like—and gives advice connected with beauty care, antidotes and other general subjects. As far as diseases are concerned, each chapter begins with a description of the anatomy and physiology of the part discussed, continuing with the different diseases typical of it. For each individual disease, the discussion begins with its definition. After that come its causes, symptoms and possible consequences. Lastly come theoretical suggestions for treatment, with practical prescriptions. In theory one can thus follow the disease from its onset to its treatment: causes → symptoms → therapeutic recommendations → practical prescriptions. But did theory—etiologic, pathological or therapeutic—influence the practice as seen in the prescriptions?[413] All we can say at this stage is that there is a possibility of such and an appearance of coherence; now the task is to see whether that possibility was followed up.[414] This we will do in the following chapter, especially as it concerns the connection between a secondary or tertiary quality and the therapeutic choices.

> A drug that is mollifying or softening, for instance, will often be used as a digestive aid, but not always. The action is sometimes confined to external use as a topical applicant, because ingestion would be harmful.[415]

---

[412] Riddle, 1985b, p. 75.
[413] C. Álvarez-Millán and E. Savage-Smith claim that written sources do not necessarily reflect the practice, either. See p. 36, n. 210, above, and pp. 90–91, below.
[414] See Dols, 1984, pp. viii–ix.
[415] Riddle, 1985b, pp. 34–35.

It is possible to explain a statement such as this, as was done earlier, as something that could be known only by experiment—that the drug qualities gave only a hint about how a certain drug might be used in a certain therapeutic situation. There may have been a closer relationship than that, however. More research needs to be done on the relationship between drug properties and specific medicinal action in ancient medicine.[416]

[416] *Ibid.*, pp. 32, 34–36.

CHAPTER THREE

RESEARCH MATERIAL

When we focus on a limited issue using limited material, we can see more clearly the changes in therapy which took place. Such is the case when we use a medieval Arab medical encyclopedia—Ibn Sīnā's *Kitāb al-Qānūn*—and five of its commentaries to take a closer look at the relationship between the causes of an illness, its symptoms, theoretical therapeutic recommendations and practical prescriptions. In essence, we are using limited material that discusses the same issues from the same starting point to examine the changes took place in therapy and the possible reasons why they happened. Commentary literature helps a particular subject matter to be pursued, making it possible to follow its development over the centuries—including both the additions and the omissions. It may also be possible to understand better whether the choosing of the drugs was guided by theory or by practical experience. Two epitomes (or abstracts) will be discussed, one commentary on an epitome, one fully-fledged commentary discussing the whole text in detail, and one more glossary-type commentary. Since the epitome genre made drastic condensation necessary, the epitome should clearly reveal which drugs the author really considered to be the most necessary, and possibly why. The full scholastic commentary genre, on the other hand, offered the author the possibility of adding as many innovations as he wanted. By comparing these two versions of the texts, it should be possible to appreciate the core of the drug range used in the Middle Ages for the treatment of a particular disease. A comparison can then be made with modern pharmacology, in order to see whether these core drugs were more efficacious than the remainder of the drugs used for the treatment, or what might have been the reasons for choosing them.[1]

[1] See Riddle, 1992, pp. 89–90, 163.

As already mentioned above,[2] the present study is based mainly upon Ibn Sīnā's (980–1037) great medical encyclopedia *Kitāb al-Qānūn fī al-ṭibb*. We use the version printed in Beirut (Bayrūt [sine anno,] repr. of Būlāq 1294 H.), and compare it with the Latin translation by Gerard of Cremona (*Liber Canonis Avicenne*, Venetiis, 1505), but without studying the manuscripts. *K. al-Qānūn* is part of the living medical tradition in the Middle East, and thus we consider it appropriate to use the text actually still in use today.

The commentaries we have used are *Mūjaz al-Qānūn* by Ibn al-Nafīs (d. 1288), *Qānūnja fī al-ṭibb* by al-Jaghmīnī (d. 1344–1345) with its anonymous supracommentary, and the commentaries by Gentile da Foligno (d. 1348) and Jacques Despars (d. 1458) in *Tertius Canonis Avicenne*, Venice, 1505. Each of them represents medicine and medicinal substances of a different period and geographical area.

Commentary and epitome literature was nothing new in the Middle Ages. Already Galen had commented on the Hippocratic corpus and on Plato.[3] We have chosen this genre as it seems to provide a good route for following the development of a specific topic, keeping close enough to the subject, but in a way that does allow changes. By following this literature, we can perhaps observe the core of theory and practice that the doctors of the past saw as the most relevant. We can also evaluate the innovations—but not only them. For, as Riddle says while writing on Dioscorides' massive work:

> Why would innovation be so highly cherished in a medical guide to drugs? Accuracy, not innovation, is the most desirable quality sought ... The best medical authorities, then and now, are searched and researched for critical evaluations of their reports, which are then combined with personal observations and experimental results. The additive is a contribution to knowledge. So it was with Dioscorides. [...] All the indications point to his work being a critical synthesis of previous scholarship, and this he performed well.[4]

---

[2] See pp. 2–3, above.
[3] Siegel, p. 22.
[4] Riddle, 1985b, pp. 18–19.

3.1. *Ibn Sīnā and his* Kitāb al-Qānūn[5]

The basis of this study is the *Kitāb al-Qānūn fī al-ṭibb*[6] of Ibn Sīnā (Avicenna). Abū ʿAlī al-Ḥusayn b. ʿAbd Allāh b. Sīnā was born in 370/980[7] in Afshana near Bukhārā. His native language was Persian. He received his first education at Bukhārā, but already at the age of fourteen his extraordinary intelligence and memory allowed him to overtake his teachers and continue studies on his own.[8] As a result of his reputation of brilliance, Ibn Sīnā was commissioned as a physician in the service of the Sultan Nūḥ ibn Manṣūr when he was still only sixteen.[9] At eighteen he had mastered the Aristotelian curriculum of all the then-known sciences.[10]

Ibn Sīnā's training through life experience was at least equivalent to his development resulting from intellectual speculation. At the age of

---

[5] This chapter is based on Siraisi, 1987; Goichon, 1960–2002; Strohmaier, 1999; Gutas, 1988, Ullmann, 1970; Goodman, 1992, pp. 1–48; and D'Alverny, 1957. See also Ullmann, 1970, pp. 152–156, 333–337; Anawati, 1950; Mahdavi, 1954; Ergin, 1956; Brockelmann, 1937–1942; Afnan, 1958; Shah, 1958; Gabrieli, 1923; and the early lists of Ibn Sīnā's works collected and rationalized by Gohlman (1974); Gutas, 1982–2008, pp. 67–68.

Ibn Sīnā's autobiography (completed by his student al-Jurjānī) is a remarkable contemporary source, but due to the very nature of the genre it has to be read with a critical mind (see Gutas, 1988, pp. 194–198). Critical edition and translation: Gohlman, 1974 (review by Ullmann, 1975). Other translations Kraus, 1932; Arberry, 1951. For excellent, detailed analyses of the document, see Gutas, 1988; Strohmaier, 1999; Goodman, 1992, pp. 1–48. Gutas sees the autobiography rather as a statement of Ibn Sīnā's philosophical position: "The autobiography is written from the perspective of a philosopher who does not belong by training to any school of thought and is therefore not beholden to defending it blindly, who established truth through his independent verification (*ḥads*) and found that for the most part this truth is contained in the philosophical sciences as classified and transmitted in the Aristotelian tradition, and who is therefore in a position both to teach this more accurate version of truth—or revised Aristotelian philosophy—and to judge the attainment in philosophy of others." (Gutas, 1982–2008, p. 68).

[6] See pp. 2–3, above.

[7] According to his Autobiography. His exact birth date is, however, not sure (Gutas, 1988, p. 81, esp. n. 2; Strohmaier, 1999, pp. 11, 41–42; Gutas, 1982–2008, p. 69).

[8] Gutas, 1998, p. 157. On the question of Ibn Sīnā's teachers in medicine *vs.* autodidactism, see Gutas, 1988, pp. 27 (n. 8), 149–150, 196; Goodman, 1992, pp. 13–14; Strohmaier, 1999, p. 22; Ullmann, 1970, p. 152; Gutas, 1982–2008, p. 69. On his practical learning in medicine, see Goodman, 1992, pp. 13–14; Strohmaier, 1999, p. 22.

[9] As a result, he gained also access to the royal library and its rare collection of scientific books. Gutas, 1988, pp. 28–29, 83–84, 157; Goodman, 1992, p. 16; see also Strohmaier, 1999, p. 68.

[10] For a succinct summary of Ibn Sīnā's education and teachers based on his autobiography, see Gutas, 1988, pp. 152–154. On his studies on different scientific subjects, see Goodman, 1992, pp. 11–16; Strohmaier, 1999, pp. 21–26, 97–98.

twenty-one he wrote his first comprehensive philosophical work.[11] The following year he took an administrative post in order to earn his living. Ibn Sīnā's sound judgment was swiftly appreciated also on political affairs.[12] He was a minister several times, but due to political problems was also obliged to go into hiding on several occasions, supporting himself by performing medical consultations.[13] Finally, he lived for fourteen years in relative peace at the court of Isfahān, and eventually died at Hamadān during an expedition of the prince ʿAlāʾ al-Dawla, in 428/1037.

Ibn Sīnā's fame rests mainly on his literary activity as a physician[14] and a philosopher.[15] By synthesizing Galenism and Aristotelianism, in medicine,[16] and Aristotelianism and Neoplatonism,[17] in philosophy and natural sciences, he in fact created a new paradigm, Avicennism. Ibn Sīnā's work encompassed all the sciences of his time: natural history,[18] logic,[19] physics,[20] chemistry,[21] astronomy,[22] mathematics,[23] music[24] and metaphysics.[25] He discussed most of these in his great scientific and philosophic encyclopedia *Kitāb al-Shifāʾ*, 'Book of Healing [of the Soul]',[26] in which one finds a summary of his views concerning both the body and the soul, while his great medical encyclopedia *Kitāb al-Qānūn*

---

[11] Goodman, 1992, p. 18; Gutas, 1988, pp. 87–88; Strohmaier, 1999, pp. 27–28.

[12] By education, Ibn Sīnā was a Hanafite jurist. See Strohmaier, 1999, pp. 21, 67; Goodman, 1992, p. 12.

[13] For an in-depth description of the turbulent political and religious situation of Persia during Ibn Sīnā's lifetime, see Goodman, 1992, pp. 1–12, 19–32, 38–44; Strohmaier, 1999, pp. 17–21, 28–40.

[14] Pormann and Savage-Smith (2007, pp. 117–118) question the extent of Ibn Sīnā's practical experience as a physician.

[15] For chronology of Ibn Sīnā's main philosophical works, see Gutas, 1988, p. 145. For a succinct analysis of some of them, see *ibid*., pp. 79–145.

[16] See Strohmaier, 1999, pp. 117–119; Fancy, 2006, pp. 189–190; Musallam, 1982–2008.

[17] On medieval Arabic Neoplatonism, see Strohmaier, 1999, pp. 58–62; on Ibn Sīnā's relationship to Aristotelianism, see Strohmaier, 1999, pp. 45–56, 160; Gutas, 1988, pp. 5, 237, 286–289; Goodman, 1992, pp. vii–ix; on *falsafa*, see Fancy, 2006, p. 42.

[18] See Strohmaier, 1999, pp. 105–106; Musallam, 1982–2008.

[19] See Abed, 1982–2008. On Ibn Sīnā's use of rules of logic as a way to medical diagnosis, see Goodman, 1992, p. 179.

[20] See Strohmaier, 1999, pp. 45–51.

[21] See Saliba, 1982–2008, pp. 90–92.

[22] See Strohmaier, 1999, pp. 38–39, 57–58, 98–99.

[23] See Saliba, 1982–2008, pp. 88–90, 92.

[24] Strohmaier, 1999, pp. 102–103; Wright, 1982–2008.

[25] See Marmura, 1982–2008.

[26] For detailed discussion, see Goodman, 1992, pp. 28–32, 135–138; Gutas, 1988, pp. 101–104.

fī al-ṭibb, 'Canon of Medicine',[27] (begun 1012 in Jurjān,[28] completed 1023 in Hamadān)[29] is a separate work. Ibn Sīnā's other main writings are *Kitāb al-najāt* ('The Book of Salvation')[30] and the great philosophical-mystical opus *Kitāb al-ishārāt wa-l-tanbīhāt* ('The Book of Remarks and Admonitions').[31] Besides *K. al-Qānūn*, his most popular medical writings include *al-Urjūza fī al-ṭibb* ('Poem on Medicine')[32] that explains in poetic form the main principles of medicine, and *al-Adwiya al-qalbiyya* ('Heart Drugs').[33] Ibn Sīnā also excelled in the fields of poetry and language. Altogether, his literary output totaled nearly 200 treatises.[34]

However, even when writing as a medical author, Ibn Sīnā was at the same time also a philosopher, representing the philosopher-physician of the Galenic ideal.[35] *K. al-Qānūn* appears to have formed a more consciously coherent whole than the philosophical works. It is divided into five books, as follows:[36]

> Book I: Generalities concerning medicine as a profession, the human body, sickness and health, general treatment and therapeutics. This book is the most important one from the point of view of the theory of medicine, describing the entire Galenic system as it was understood in Arabic medicine.[37]
>
> Book II: *Materia medica* and the pharmacology of remedies, and the rules for experimentation in medicine. At the beginning of the book is a general list of the possible qualities of the drugs, as well as a list of the possible therapeutic indications for every drug, categorized according to which organ is ailing. Most of the book consists of a list of simple drugs, discussing approximately 760 items of *materia medica*.[38] The physical appearance of

[27] See Goodman, 1992, pp. 32–36.
[28] On the southeast coast of the Caspian Sea.
[29] Goodman, 1992, p. 28.
[30] For contents of *K. al-Najāt*, see Goodman, 1992, p. 32; Gutas, 1988, p. 112.
[31] See Goodman, 1992, pp. 41–42.
[32] Strohmaier, 1999, p. 116; Pormann and Savage-Smith, 2007, p. 68; Ullmann, 1970, pp. 154–155.
[33] Ullmann, 1970, pp. 155–156.
[34] Goichon, 1960–2002, pp. 941–944. According to Gutas, the number is smaller, due to the many spurious writings ascribed to him, but exceeds one hundred works (Gutas, 1988, p. 79).
[35] Lieber, 1981, pp. 180–181. See Fancy, 2006, p. 21, who demands that the question be discussed also inside an Islamic socio-religio-intellectual context.
[36] For an analysis of the contents of the books, see also Goodman, 1992, pp. 33–35; Pormann and Savage-Smith, 2007, p. 70; Ullmann, 1970, pp. 153–154; Strohmaier, 1999, pp. 114–115.
[37] Translations by Gruner, 1930; Shah, 1966.
[38] Goodman, 1992, p. 36. Or 800 items: Strohmaier, 1999, p. 115.

> each simple plant drug is first described in a way which makes it possible to differentiate it from other, similar-looking plants, and the best varieties of the plant are given. Then follow the Galenic grades of the drug, a list of its general qualities, its special effect on each part of the human body—listed according to the different organs or types of disease—and the drug's possible poisonous or antidotal qualities. Finally, a list of possible substitute drugs is given. Not every drug, however, is treated in full.
>
> Book III: Specific pathology, studied organ by organ, or rather according to the physiological systems from head to foot.[39]
>
> Book IV: Illnesses that are not connected with any specific part of the body, but rather affect the entire system; the famous treatise on fevers; a discussion of signs, symptoms, diagnostics and prognostics in general; minor surgery, tumors, wounds and fractures; bites;[40] poisons; cosmetics.
>
> Book V: Pharmacopoeia of compound drugs, listed first according to the symptom to be treated and then according to the type of the medicine. In the second part are given first the suitable indications for the drug, and then the ingredients and method of preparation.[41]

K. al-Qānūn presents in a logical form the basic ideas of Arabic medical theory and covers all areas of medicine; Ibn Sīnā aimed at creating an organic whole which would make other medical books unnecessary. That kind of claim was common in Arab medical books, but in the case of *K. al-Qānūn* it was definitely justified. Moreover, the chemical and physical principles enumerated in *K. al-Shifāʾ* can be used to complement *K. al-Qānūn*.[42] In Book I of *K. al-Qānūn*, Ibn Sīnā distinguished his subject both from the natural sciences and from philosophy, not denying the importance of those disciplines in regard to medicine, but considering them to be separate sciences, a profound knowledge of which was not an absolute necessity for the physician since he could rely on the experts for any necessary information without learning all about the subject for himself.[43] *K. al-Shifāʾ*, together with *K. al-ishārāt wa-l-tanbīhāt*, seems to have been intended to provide that necessary information (although Ibn Sīnā did not quote these books in *K. al-Qānūn*, nor in any other of his works).

---

[39] de Koning, 1903; Hirschberg and Lippert, 1902.

[40] For a detailed analysis of the section on snake bites, see Ullmann, 1970, pp. 333–336.

[41] Translation by Sontheimer (1845). The pharmacopoeias in general did not have a set order for preparations that would have been comparable to the head-to-toe arrangement of illnesses. Ibn Sīnā may have opted on his two-part division in order to compensate for this lack. See Chipman, 2005, p. 23, n. 1.

[42] See Strohmaier, 1999, p. 35.

[43] Musallam, 1982–2008.

K. al-Qānūn maintained its authority in Europe as well, at least till the 18th century. It had already been translated into both Latin and Hebrew[44] by the 12th century, and it continued to be retranslated, printed and commented upon until the 17th century.[45] The work served as the basis of medical teaching in European universities from the 12th to the 16th century and remained a part of the curriculum until the 17th century. Even when the Renaissance saw a generally negative attitude towards Arabic medical writers, *K. al-Qānūn* continued to be read in translation, as it was still pedagogically useful. It contained the basics of classical medical lore (much of which was still accepted by doctors) in a more compact and logical form than the original writings of Galen and Hippocrates. Its influence, moreover, was not restricted to teaching. Even the opponents of Arabic medicine during the Renaissance had to use its terms and concepts as the basis for their own thinking—even if only to disagree with them.[46] The direct effect of *K. al-Qānūn* on Western medicine ceased only in the 19th century, and its indirect influence can still be felt today—for example in our choice of drugs, many of which are at least indirectly based on the tradition transmitted to us through Book II of *K. al-Qānūn*.

The works of the master began to be translated in Toledo under the direction of Dominico Gundisalvo. The most prominent translators were the Jewish Avicennian philosopher Abraham ibn Daud, or Avendeuth, and Gerard of Cremona. In the Sicilian school much attention was paid to Ibn Sīnā, who was translated by Michael Scot. This process of translation continued throughout the Middle Ages and lasted into the 16th century, with Andrea Alpago. As a result, much but not all of *Kitāb al-Shifā'*[47]—as well as *K. al-Najāt*, the Autobiography, *K. al-Qānūn*, and various smaller works—appeared in Latin; but none of the 'Eastern Philosophy', or such late texts as *K. al-Ishārāt wa-l-tanbīhāt*, reached the West.[48] *K. al-*

[44] Incidentally, Ibn Sīnā's Latin name, Avicenna, seems to be the result of an earlier transliteration of the name into Hebrew, where it would have been "Aven Zina" or something similar (Strohmaier, 1999, p. 135).

[45] See Ullmann, 1970, p. 154.

[46] For example, Leonardo da Vinci rejected Ibn Sīnā's anatomy but, for want of any other vocabulary, he used the Arabic terms; Harvey, when proving his theory concerning the circulation of blood, was nevertheless obliged to refute that of Ibn Sīnā. See Goichon, 1960–2002, p. 945.

[47] Translated by Dominico Gundisalvo and Abraham ibn Daud, Michael Scotus and Adelard of Bath (Strohmaier, 1999, pp. 144–145).

[48] Nasr, 1982–1989, p. 306. On the modern controversy on the "Eastern Philosophy" of Ibn Sīnā, see Goodman, 1992, pp. 39–40; Gutas, 1988, pp. 115–130; *ibid.*, 1982–2008,

Qānūn was translated in its entirety between 1150 and 1187 by Gerard of Cremona, and 87 translations of it were made in all, most of them only partial. The majority were translated into Latin, but several Hebrew translations were also made in Spain, Italy and the south of France.[49] The medical translations are not as good as those of the philosophical works; some words transcribed into Arabic from Greek were not understood or identified, and some Arabic technical terms were more or less transcribed into Latin, but remain incomprehensible.

K. al-Qānūn formed the basis of teaching at all the universities in Europe. It appears in the oldest known syllabus of teaching given to the School of Medicine at Montpellier—a bull of Clement V dating from 1309—and in all subsequent ones until 1557. Ten years later Galen was preferred to Ibn Sīnā, but the latter continued to be taught until the 17th century. In the last thirty years of the fifteenth century the work went through fifteen editions in Latin and one in Hebrew.[50] The editing of the Arabic text, at Rome in 1593, demonstrates the esteem in which he was still held at that time. In the West several physicians even learned Arabic so as to be better able to study Ibn Sīnā's works.

The Renaissance brought a violent reaction against the *Canon*; Leonardo da Vinci rejected Ibn Sīnā's anatomy, but, for want of a better vocabulary, used its Arabic terms. Paracelsus burned the *Canon* at Basel. Harvey dealt Ibn Sīnā a severe blow by publishing his discovery of blood circulation in 1628. But on the other hand, even in Renaissance Europe many preferred the works of al-Rāzī and Ibn Sīnā, which were still being printed in Latin—in spite of the appearance in 1525 of the first edition of Galen's collected works in Greek, seen by some as the liberation of Galen from the barbarians.[51] Ibn Sīnā's works essentially represented the various compromise solutions in medicine which had been devised over the centuries by Christians, Muslims and Jews and which were constantly being revised in the light of new knowledge and experience. As such, Ibn Sīnā was valued as representing not only old, preserved knowledge but new innovations as well.[52]

The evidence of Renaissance interest in Avicenna's medical writings—between 1500 and 1674 at least six editions of the complete or partial text

pp. 80–82; Strohmaier, 1999, 89–94.

[49] See Strohmaier, 1999, p. 137.

[50] Goodman, 1992, p. 33.

[51] Lieber, 1981, p. 181; see Temkin, 1973, pp. 126–127.

[52] Lieber, 1981, p. 182.

of the *Canon* in Latin were printed, and a substantial body of new commentaries was composed—seems, however, to call for a new evaluation of the subject. The more closely one looks at the written output of Renaissance medicine, the more difficult becomes the distinction between 'conservative' and 'progressive' areas.[53]

In content, the Latin editions of the *Canon* published after 1500 fall into six categories.[54] These are:

1. The complete text in the translation produced in the circle of Gerard of Cremona before 1187, without commentary and with no recent 'modernization' of text or apparatus;
2. One or more of the five books into which the *Canon* is divided, accompanied by a Latin commentary written between the 13th and the 15th centuries;
3. The complete *Canon*, or a major portion of it, with textual revisions and apparatus contributed by late 15th- or 16th-century medical scholars;
4. One or more of the short sections of the work used as university textbooks, either alone or in compilations of brief texts;
5. Compendia or collections of maxims based on the *Canon*; and finally,
6. Retranslations of portions of the work.[55]

Broadly speaking, these publications may be divided into three chronological groups, each marked by a different distribution of the various kinds of content just indicated. However, the identification of these groups should not be allowed to hide neither the extent of overlapping between them nor the existence of elements of continuity throughout all three. With one exception, the first group of 22 editions published between 1500 and 1525 essentially perpetuates approaches to and presentations of the *Canon* that had developed between the 13th and 15th centuries, most notably perhaps in the schools of northern Italy but also in other Western university centers.

Finally, a small group of nine editions was published between 1609 and 1674. They included efforts by northern European Arabists to provide a better Latin text of the *Canon*, and they were in some respects more far-reaching than any earlier endeavors of the kind. However, by the time

[53] Siraisi, 1987, p. 3; see Strohmaier, 1999, pp. 155–156.
[54] The following description is based on Siraisi, 1985.
[55] Siraisi, 1985, p. 18.

these works appeared, neither the medical content of the *Canon* nor a pedagogical and investigative methodology based on the exposition of ancient scientific authorities aroused much further interest. Parts of the Latin *Canon* indeed survived in various Italian university curricula until well into the 18th century; but although this survival was not entirely nominal, it was at any rate insufficient to stimulate demand for fresh Latin editions after the late 17th century.[56] The rapid sequence of editions in the first chronological group, like the appearance of the 14 incunabular Latin editions that preceded them, reflects the important place accorded to the *Canon* in medical teaching in the West since the 13th century. Many of these editions also demonstrate a high level of attachment to a major tradition of scholastic commentary that had developed in the 14th and 15th centuries.

Although the *Canon* in its 12th-century Latin translation was well known to some Latin medical writers and natural philosophers before the mid-13th century,[57] the earliest Latin commentaries on parts of the work—probably indicating their use as the topic of academic lectures or discussion—appear to date from the late 1200s. In addition, various compilations of excerpts from, or compendia based on the *Canon* were circulated: no doubt chiefly among teachers and students, but perhaps also to some extent among literate practitioners.[58]

The authors who in the 14th and 15th centuries produced major commentaries on the portions of the *Canon* commonly used in teaching were mostly professors in the northern Italian universities, including some of the most distinguished medical masters of their age—men such as Gentile da Foligno (d. 1348), Giacomo da Forli (d. 1414), and Ugo Benzi (d. 1439), whose accomplishments were a source of considerable regional and professional pride.[59]

If the goal of those responsible for the editions of such commentaries seems to have been to surround the *Canon* with the fullest possible scholastic commentary, others in the early years of the century followed another practice that also had earlier antecedents: they sought to make Ibn Sīnā's medical thinking accessible by means of drastic abbreviations or rearrangements of the Latin text.[60]

---

[56] *Ibid.*, pp. 18–19.
[57] See Strohmaier, 1999, pp. 146–148.
[58] Siraisi, 1985, pp. 19–20.
[59] *Ibid.*, p. 20.
[60] *Ibid.*, p. 21.

The impact of *K. al-Qānūn* on medical practice in the Arab cultural sphere has been enormous. All Arab medical authors from the 13th to the 17th century depended on Ibn Sīnā's work,[61] even when they disagreed with some of his theories,[62] corrected him, or added to his teachings. Various parts of *K. al-Qānūn* were commented on or abridged.[63] In fact, the direct influence of the medical tradition of *K. al-Qānūn* never completely disappeared. The old medical books, foremost among them *K. al-Qānūn*, were still being printed in the Middle East and the Indian subcontinent during the 18th century for practical needs; and the '*unani*' medical tradition still follows and further develops the practical treatments of *K. al-Qānūn*.[64]

3.2. *Ibn al-Nafīs*[65]

ʿAlāʾ al-Dīn Abū al-ʿAlāʾ ʿAlī b. Abī al-Ḥaram al-Kurashī al-Dimashqī, called Ibn al-Nafīs, was born in or near Damascus, probably in the village of al-Kurashiyya. He studied medicine there under al-Dakhwār (d. 628/1230). Besides medicine, Ibn al-Nafīs studied Islamic law, grammar and logic/philosophy.[66] At an unknown date he moved to Cairo,[67] where he was given the important post of Chief Physician of Egypt[68] and

[61] On the circulation of *K. al-Qānūn* from the East through the Arab world, see Strohmaier, 1999, pp. 125–126.

[62] In fact, the reaction in the Muslim Spain towards *K. al-Qānūn* could be very negative; see Pormann and Savage-Smith, 2007, pp. 70–71, on Ibn Zuhr's attitude towards the book. Tzwi Langermann (2003) suggests the existence of an Andalusian project aimed at producing Western alternatives to the syntheses arriving from the Islamic East. In medicine, this would have included *K. al-Qānūn* and would explain the coolness of its reception in the West. Also the lack of a relevant study tradition slowed its success. See Strohmaier, 1999, p. 126.

[63] See Ullmann, 1970, p. 154; Pormann and Savage-Smith, 2007, p. 71.

[64] See Conrad, 1995b, p. 138, and p. 98; p. 98, n. 65, below.

[65] This chapter is based on the following studies: Ullmann, 1970, pp. 172–176, 213; Meyerhof, 1935b; Iskandar, 1967; Fancy, 2006. For the life and writings of Ibn al-Nafīs see also Iskandar, 1970–1990; Meyerhof and Schacht, 1968; Meyerhof and Schacht, 1960–2002. Oddly enough, no extant contemporary sources mention him. See Fancy, 2006, pp. 44–45.

[66] For the preference of the later bibliographers for the word 'logic' (*manṭiq*) instead of 'philosophy' (*falsafa*) in their effort to remodel Ibn al-Nafīs' image to one better fitting to the "ideal Muslim physician," see *ibid.*, pp. 53–54.

[67] Both Damascus and Cairo were during Ibn al-Nafīs' lifetime intellectual centers of the Islamic world, where rival intellectual and religious groups co-existed in close proximity (*Ibid.*, p. 37; Chipman, 2005, p. 15).

[68] This claim appears first in later bibliographical sources. See Fancy, 2006, p. 45;

may have become the personal physician to Sultan Baybars I,[69] working presumably also at the Manṣūrī hospital.[70] Ibn al-Nafīs trained a number of pupils, of whom the best known was Ibn al-Quff. He died in 1287/1288 in Cairo.

The literary activity of Ibn al-Nafīs was important and extensive.[71] As a physician and a jurist of the Shāfiʿī school, he combined in his person the two competing intellectual streams of his time, the philosophically oriented Greek sciences and the traditionalist religious sciences.[72] Much of his original work is the result of the synthesis between the two.[73] Ibn al-Nafīs was mainly a commentator, but one of independent mind and very extensive knowledge. He is said to have written most of his works from memory,[74] which seems to be confirmed by the fact that as a rule they contain, in so far as they are not commentaries, very few references to earlier works. Although he was exalted by his admirers as a second Avicenna,[75] he seems to have been a learned theorist rather than a practical physician. Nevertheless, the range and depth of his general knowledge are impressive. Ibn al-Nafīs' main writings are: (1) *Kitāb al-Shāmil fī al-ṭibb*, an uncompleted encyclopedia of medicine, (2) *Kitāb al-Muhadhdhab fī al-kuḥl*, a comprehensive record of the whole contemporary knowledge of the Arabs in ophthalmology, containing also original ideas by Ibn al-Nafīs,[76] (3) *Mūjaz al-Qānūn*,[77] an extract

---

also, *ibid.*, pp. 52–53, where she casts doubt on the title as a possible later fabrication of traditionalist scholars.

[69] Meyerhof and Schacht, 1968, pp. 18–19; for a more skeptic view, see Fancy, 2006, pp. 44–45.

[70] On the Manṣūrī hospital, see Chipman, 2005, pp. 141–143; Pormann and Savage-Smith, 2007, p. 99.

[71] According to Zaydan (1991, pp. 80–82; quoted via Fancy, 2006, p. 205, n. 147), the total number of his known works is 37, part of which are no longer extant.

[72] Fancy, 2006, pp. 43–44.

[73] On the transformation of Ibn Sīnā's physiology by Ibn al-Nafīs, see *ibid.*, pp. 204–239.

[74] This would have added to his status among the traditionalists (*ibid.*, p. 55).

[75] On the appreciation of Ibn al-Nafīs in the traditional Muslim circles and among the proponents of Prophet's Medicine, see Pormann and Savage-Smith, 2007, p. 74; Fancy, 2006, pp. 51–53, 242–256. On his solution for the seeming contradiction between revelation and reason, and the consequences of this solution to his physiology, see *ibid.*, pp. 76–241.

[76] Savage-Smith, 1980, p. 127. For the first detailed study of the treatise, see Savage-Smith, 1980; for earlier comments on it, see Meyerhof [and Schacht], 1960–2002, pp. 897–898; Meyerhof and Schacht, 1968; Ullmann, 1970, p. 213.

[77] *Kitāb al-Mūjaz*, "The Epitome", or *al- Mūjaz fī al-ṭibb*, "The Epitome of Medicine", or *Mūjaz al-Qānūn*, "Epitome of *K. al-Qānūn*". See Iskandar, 1967.

from all parts of *K. al-Qānūn* of Ibn Sīnā with the exception of the sections on anatomy and physiology; it is a concise manual of the whole of medicine, (4) his medical commentary on the *Aphorisms* (*Kitāb al-Fuṣūl*) of Hippocrates, the most widely disseminated of all his medical commentaries (he also wrote commentaries on Hippocrates' *Prognostics*, *Epidemics*, and *De natura hominis*), (5) his commentary on the *Masāʾil fī al-ṭibb* of Ḥunayn ibn Iṣḥāq,[78] and (6) his extensive commentary, *Sharḥ al-Qānūn*, 'Commentary on *K. al-Qānūn*', on the *K. al-Qānūn* of Ibn Sīnā, which exists in numerous manuscripts. It was the first complete commentary on the book, and was considered by the physicians to be the one reference work which threw light on all the obscurities of *K. al-Qānūn*. In it Ibn al-Nafīs strove to improve the arrangement of the subject matter and, in particular, to collect the passages relating to anatomy from the first three sections of *K. al-Qānūn* and to comment on them in a separate section, which was often copied as an independent book, *Sharḥ al-Tashrīḥ*, 'Commentary on Anatomy'. In this section, he set out his theory of the pulmonary transit of blood.[79] In addition Ibn al-Nafīs also wrote a philosophical allegory, *Risāla Fāḍil ibn Nāṭiq*, on the connection between reason and revelation.[80]

The most important achievement of Ibn al-Nafīs in the field of medicine was his theory of the pulmonary transit of the blood, with which he boldly contradicted the accepted ideas of Galen and of Ibn Sīnā.[81] This remarkable theory, perhaps because of its unorthodox character, was almost completely ignored by the later Arab medical authors.[82] More

---

[78] Meyerhof [and Schacht], 1960–2002, p. 898.

[79] *Ibid*., pp. 897–898; Iskandar, 1967, p. 40. For a good bibliography on the subject, see Savage-Smith, 1980, p. 127. Ibn al-Nafīs' commentary on the fifth section of *K. al-Qānūn* was translated into Latin by the Renaissance physician and scholar Andrea Alpago and was posthumously printed in Venice in 1547. See d'Alverny, 1955, pp. 195 f.

[80] On *Fāḍil ibn Nāṭiq*, see Fancy, 2006, pp. 86–122.

[81] See Meyerhof, 1934, 1935a; Pormann and Savage-Smith, 2007, pp. 45–48. Fancy has argued convincingly that this theory was just the corollary of a whole new system of physiology (including an entirely new theory of generation, along with a new theory of pulsation and the pulmonary transit of blood) developed by Ibn al-Nafīs in order to solve the problem of the immortality of individual souls. See Fancy, 2006, esp. pp. 157–241. See also Strohmaier, 1999, pp. 118–119, on the position of the heart in Ibn Sīnā's physiology.

[82] Excepting only an anonymous commentator of *K. al-Qānūn*—who agrees with it—and an otherwise unknown al-Fāḍil al-Baghdādī in his commentary on the *Qānūnja*. This last is an extract from the *K. al-Qānūn* by Maḥmūd b. Muḥammad al-Jaghmīnī (see below in p. 79), who made it his goal to refute Ibn al-Nafīs' criticisms of Ibn Sīnā. See Iskandar, 1967, pp. 52–53. The popular comparison between Ibn al-Nafīs' theory and

influential for the future may have been his position as a conciliator between the Greek medical tradition and the traditional Muslim scholarship that made him, instead of the religiously more suspect Ibn Sīnā, the spearhead of medicine in the religious circles and helped in making the Greek medicine more acceptable in them.[83]

This study deals especially with *Mūjaz al-Qānūn*.[84] *Mūjaz al-Qānūn* is an abridgement of *K. al-Qānūn* of Ibn Sīnā, presenting its contents in an easy-to-use form. Its first *Fann*, also entitled *al-Kulliyyāt*, contains 'Principles of Theory and Practice on Medicine'. The second *Fann* is a study of '*Materia Medica* and Foods' followed by 'Compound Drugs', or 'Pharmacopoeia'. The third *Fann* deals with 'Diseases specific to each Organ, their Causes, Symptoms, and Treatments', and the last *Fann* is on 'Diseases which are not specific to certain Organs', such as fevers, swellings, and an account of poisons. *Mūjaz al-Qānūn* does not deal with anatomy in any of its four sections. The book was particularly useful for the practitioner, and among the works of Ibn al-Nafīs it has met with the greatest success in the Oriental medical world. Its popularity especially in the traditionalist circles and among the proponents of Prophet's Medicine was increased by Ibn al-Nafīs' reputation as a pious Muslim.[85] His texts gave the reader a systematic, concise review of Ibn Sīnā's physiology in an easy and theologically safe form.[86] *Mūjaz al-Qānūn* exists in numerous manuscripts; was printed or lithographed a number of times; it was the subject of a series of commentaries and glossaries,[87] the most reputed of which, by Nafīs b. ʿIwāḍ al-Kirmānī (completed 841/1437), was lithographed in India for the last time as recently as 1328/1910; and it was also translated into Turkish and into Hebrew.[88]

William Harvey's discovery of blood circulation belongs to the realm of 'scientific myths.' On the difference between Ibn al-Nafīs' and Harvey's concepts, see Pormann and Savage-Smith, 2007, pp. 47–48.

[83] See Fancy, 2006, pp. 48–57; 242–243. On Ibn al-Nafīs' stance to wine as a medical substance forbidden for Muslims, see *ibid*., p. 49; on other scholars' opinions and the position of wine in medieval Muslim culture in general, see Waines, 2002b.

[84] See p. 3, n. 7; p. 76, n. 77. Fancy casts doubt on Ibn al-Nafīs' authorship of *Mūjaz al-Qānūn*. For her detailed arguments, see Fancy, 2006, pp. 244–253.

[85] *Ibid*., pp. 242–243.

[86] *Ibid*., p. 253.

[87] Pormann and Savage-Smith, 2007, p. 71.

[88] Meyerhof [and Schacht], 1960–2002, p. 898; Iskandar, 1967, pp. 52–53; Pormann and Savage-Smith, 2007, p. 71.

3.3. *Al-Jaghmīnī*[89]

Maḥmūd b. Muḥammad b. ʿUmar al-Jaghmīnī, a well-known Arab astronomer, was born in Jaghmīn, a small town in Khwārizm. The dates of his birth and death are not precisely established, but it is very probable that he died in 745/1344–1345.[90] Of his works, those preserved are: (1) *al-Mulakhkhaṣ fī al-hay'a* ('Epitome of Astronomy'), which was very widely known and was frequently commented upon;[91] (2) *Qiwā al-kawākib wa-ḍaʿfuhā* ('The Strong and Weak Influences of the Constellations'); (3) *Qānūnja* ('The Little Canon'),[92] a medical work, an extract from the *K. al-Qānūn* of Ibn Sīnā, which has appeared in several lithographed editions. Al-Jaghmīnī claimed to have selected its subject matter from ancient works on medicine, but a perusal of this book shows that he merely relied on *K. al-Qānūn*. ʿAlī b. Kamāl al-Dīn Maḥmūd al-Astarābādhī al-Makkī, one of the commentators on *Qānūnja*, wrote:

> The author endeavored to praise his epitome by saying: "I selected its subject matter from books of ancient writers such as Hippocrates, Galen and Ḥunayn." But it is quite clear that this book of his is derived from *K. al-Qānūn* …[93]

As this little book was very popular, and at the same time very concise, it was widely commented upon, for example by Ḥusayn b. Muḥammad b. ʿAlī Astarābādhī, the author of the well-known commentary *Sharḥ Qānūnja*,[94] and by Muḥammad b. Muḥammad al-Ṭabīb al-Miṣrī, who claimed to have written the first commentary on *Qānūnja*.[95, 96]

---

89 This chapter is based on the following studies: Brockelmann, 1898–1902, Vol. I, p. 473; Vol. II, p. 213; *ibid*., 1937–1942, Supplement, Vol. I, pp. 826, 865; Sarton, 1927–1947, Vol. 3, pp. 699–700; Suter [and Vernet,] 1960–2002, p. 378.

90 Cf. Suter, 1899, p. 539.

91 Notably by Qāḍī Zādē al-Rūmī, al-Jurjānī, and many others. German translation by Rudloff and Hochheim (1893). On the Hebrew translation of the text, see Vajda, 1959.

92 See p. 3, n. 8, above.

93 Iskandar, 1967, p. 56.

94 *Ibid*., pp. 56–57.

95 *Ibid*., pp. 57–58.

96 See Brockelmann, 1898–1902, Vol. I, p. 473; Vol. II, p. 213; *ibid*., 1937–1942, Supplement, Vol. I, pp. 826, 865 (this author makes al-Jaghmīnī two authors of the same name: the first, d. 618/1221, is said to be the author of no. 1 above and of two arithmetical treatises; the second, a physician, d. 745/1344, of no. 3 above); Sarton, 1927–1947, Vol. 3, pp. 699–700; Suter [and Vernet,] 1960–2002, p. 378.

3.4. *Supracommentary on* Qānūnja

Concerning the author of the supracommentary written in the margins of the text of *Qānūnja* in the St. Petersburg printing of 1894,[97] no information is to be found. The commentary is considerably longer than the original, explaining and expanding one by one the different questions raised by the terseness of *Qānūnja*. It was clearly assumed to be read only with *Qānūnja*—the text of the commentary often simply continues from the original in a way that would make it unintelligible if read separately. The commentary is written mostly in Arabic, but in a few places the Arabic comment is translated also into Persian.

3.5. *Gentile da Foligno*[98]

Gentile da Foligno was born in Foligno during the second half of the 13th century, probably *c.* 1280–1290.[99] He seems to have studied medicine in Bologna University sometime before 1303 under Taddeo Alderotti, and then until 1315 in Padua under Pietro d'Abano.[100] He obtained his PhD in medicine in Bologna. The reconstruction of Gentile's academic career is particularly difficult, since no comprehensive description of it exists. He started it probably in Bologna, at an uncertain date, then moved to Sienna, where he has been documented in 1322 and where he stayed until 1324. Then he moved to Perugia where he stayed, teaching medicine, from 1325—according to many—until his death in 1348. But during those 20 years Gentile's teaching there was not continuous, as he was invited to teach in Padua by Ubertino da Carrara—whose personal physician he was—and according to some sources he stayed there until 1345, only then returning to Perugia. He appears however, in the year 1339 on the lists of the University of Perugia. He died in Perugia[101] in 1348, killed by the Black Plague.

Gentile was the author of several tractates: *Questiones et Tractatus extravagantes*;[102] *De complexione, proportione et dosi medicinarum; Consilium de temporibus partus; De statu hominum; in Aegidium de pulsibus;*

[97] From now on, *Supracommentary*.
[98] This chapter is based mainly on Sarton, 1927–1947, and Chandelier, 2005.
[99] Chandelier, 2005, p. 185.
[100] Also Dino del Garbo seems to have been his teacher (*ibid.*, p. 185).
[101] Or in Foligno.
[102] Chandelier, 2005, p. 186.

De lepra; De febribus; De balneis; De divisione librorum Galeni; Tractatus de reductione medicinarum; Regimen preservativum; and a massive commentary on most of the *Canon* of Ibn Sīnā.[103] His work was widely used, and indeed stayed in use until the 17th century.[104] Gentile's interest in the practice of medicine can be seen in his *consilia*, prescriptions made for specific patients and compiled posthumously.[105] He wrote about 90 such *consilia*, such as '*Tractatus de pestilentia*' (1348) to doctors from Genova and Pisa, and several scholastic commentaries to Hippocrates, Galen, Ibn Māsawayh, Ibn Sīnā, Gilles de Corbeil and other authorities.[106]

Among Gentile's works we will discuss his commentary on the *Canon* of Ibn Sīnā, which appeared with the Gerard of Cremona translation of the *Canon* in 1505 in Venice. This edition includes the third and fourth books of the *Canon* along with the commentaries by Gentile da Foligno and Jacques Despars, supplemented for parts of Book IV with those of Dinus Florentinus (probably Dino del Garbo, d. 1327), and Giovanni Matteo Ferrari da Grado (d. 1472)—all in three large folio volumes.[107] Perhaps because he was apparently the only author to have written commentaries on all five books, Gentile da Foligno's expositions seem to have been especially favored by the *Canon*'s early 16th-century editors. However, Gentile probably did not in fact quite accomplish the monumental task of commenting on the entire *Canon*, since his exposition of Book III is apparently incomplete.[108] In any case, in addition to the above-mentioned publication, his commentary has also been printed in, for example, the five great Junta press volumes, where all the main Latin commentators on the *Canon* are collected together.[109] Gentile's commentary is a compilation of all medieval scholastic science, combining references to Greek and Arabic authorities such as Galen, Hippocrates, Ibn Sīnā, al-Rāzī, and Ibn Rushd with those to the works of his contemporaries and with his own clinical experience. It was widely read in the sixteenth century, though its complexity drew criticism from the opponents of scholastic medicine.[110]

---

[103] Sarton, 1927–1947.

[104] More than one hundred fifty manuscripts of his works have been preserved, and numerous editions were published between 1473 and 1606 (Chandelier, 2005, p. 186).

[105] *Consilia* literature flourished at the end of the fourteenth century and throughout the fifteenth century (*ibid.*).

[106] Lauer, 1980–1998, p. 1247; Chandelier, 2005, p. 186.

[107] Siraisi, 1985, p. 20.

[108] *Ibid.*

[109] *Ibid.*

[110] Chandelier, 2005, p. 186.

3.6. *Jacques Despars*[111]

Jacques Despars,[112] a Flemish doctor, was born *c.* 1380 in Tournai. He studied medicine in Paris and Montpellier. In 1410 he became a licentiate in medicine, and worked as *magister regens* between 1411 and 1419. He spent the ensuing years in Tournai, Cambrai, Bruges and Audenarde and in 1450 returned finally to Paris, where he died in 1458.

Despars was a much-appreciated doctor, employed by the nobility, and was personal physician to Philip the Good. He acted also as a consulting doctor in the hospitals in Bruges and Audenarde and seems to have been connected with special hospitals, such as the leprosy hospital in Tournai. At the same time his organizational and diplomatic skills were highly valued.

Of Despars' literary works, the best known was his commentary on the *Canon* of Ibn Sīnā, on which he worked for more than 20 years (1432–1453) in Tournai and Cambrai. It comprised 15 volumes and included an enormous amount of traditional knowledge, synthesizing Greek and Arabic authorities with the addition of his own clinical expertise.[113] The commentary covers Books I and III and Book IV, *Fen* 1.[114] It contains—as was traditional—some scholastic questions, but they are restricted to the exposition of the theoretical outlines of Book I and to the general definition of fever in Book IV. The portions devoted to the description of diseases and their treatment have no scholastic questions and are very close to the genre of the *practica*.[115] This commentary has been copied often; it became known and used in other universities (for example in Leipzig), and was in print—either complete or in part—from 1498 onwards. Also printed were Despars' work *Summula per alphabetum super plurimis remediis ex Mesuo*[116] and his glossaries to Alexander of Tralles, as well as the longer and shorter versions of his *Tractatus super*

[111] This chapter is based mainly on the following studies: Wickersheimer, 1936, pp. 326–327; Jacquart, 1980; Schalick, 2005.

[112] Or Jacques Desparts, Jacobus de Partibus.

[113] Among the sources he quoted were Galen, Hippocrates, Aristotle, Alexander of Tralles (on whose work he also commented), Avenzoar (Ibn Zuhr), Averroes (Ibn Rushd), Mesue (Ibn Māsawayh), Rhazes (al-Rāzī), and Serapion (Ibn Sarābiyūn). See Schalick, 2005, p. 151.

[114] Jacquart, 1990b, p. 141, n. 6.

[115] *Ibid.*, p. 142. For other practice-oriented texts, see the regimens of health written for Michel and Guillaume Bernard and a *consilium* on epilepsy (Schalick, 2005, p. 151).

[116] A pharmaceutical study of prescriptions from the work of Ibn Māsawayh. It was added to printed editions of the *Articella* in the sixteenth century. See *ibid.*, p. 151.

uno aphorismo Hippocratis (i.e., '*Tabula*').[117] In addition, some of his prescription collections have survived in quotations. In general, Despars can be said to have been striving for practical usefulness. His main interest was in *materia medica*, but he did not disdain case studies.[118]

In this study we will be discussing Despars' commentary on the *Canon* of Ibn Sīnā, which appeared, along with the Gerard of Cremona translation of *Canon*, in Venice in 1505. The commentary is quite comprehensive. Despars did not leave one piece of Ibn Sīnā's advice without comment; he repeated most of his text, explained it, gave new plant identifications, discussed theoretical questions and added much new material, especially to the practical therapy section.

[117] The treatise comments on the humoral effect of a variety of simple and compound medicines (*ibid.*)

[118] Keil, 1980–1998; Jacquart, 1980.

CHAPTER FOUR

METHOD OF THE STUDY

This study discusses medieval pharmacology from both an historical and a therapeutic point of view. It concentrates on medieval Arabic pharmacotherapy and its development through an examination of Ibn Sīnā's medical encyclopedia *Kitāb al-Qānūn fī al-ṭibb*, together with three Arabic and two Latin commentaries on it. For historians of science this encyclopedia provides an interesting combination of sophisticated scientific theory and practice based on empirical knowledge achieved through observation. To pharmacologists it offers an almost endless number of potentially useful clues for the development of new drugs. In fact, increasing interest is currently being shown in using older medical literature as a source for drug research.[1]

We concentrate on four main questions:

1. *Traditionalism* vs. *Empiricism, Continuity* vs. *Change*
How much has pharmacotherapy really changed through the years, in both its theory and practice? Medical historiography often creates the impression that most of early pharmacological writings were the result of mindless copying activity, with no evidence of investigation or criticism.[2] On the other hand, research conducted by John Riddle stresses the influence of repeated observations, which the practical use of the drugs in question implies, begging the following question: Would our forefathers have gone on using the same treatment and the same drugs if they had no effect whatsoever?[3] Still more importantly, if their medical tradition included both drugs that had objective positive effect against a certain disease and those which were indifferent, would they not have drawn some conclusions about the results? However, we are not asking the question here of *why* changes would have occurred but simply *whether*

[1] Holland, 1994, 1996a, 1996b; Riddle, 1985a, 1996; Van Arsdall, 1996; Sehgal *et al.*, 1994.
[2] See Ullmann, 1978, esp. pp. 22–26, 76–85.
[3] Riddle, 1992, pp. vii–viii.

they did occur and to what extent. How much traditional material and how many innovations do the commentaries contain?

2. *The Practical Relationship between Pharmaceutical Theory and Practice*

Here we study the relationship between Ibn Sīnā's pharmacological theory and his practical therapeutic choice of drugs, and the workability of his therapeutic theory. Ibn Sīnā's pharmacological theory should have dictated the general type of remedy—for example, that a 'hot' headache should be treated with cooling and cleansing drugs.[4] We will examine whether this was actually the case or whether the choice of drugs was based on a different system in practice.

3. *The Relationship between the Entire Therapeutic System of Ibn Sīnā and his Followers and Objective Physical Reality*

Here we will examine the relationship of the entire therapeutic system to the objective physical reality. In other words, did it work? We start by evaluating the therapeutic efficacy of the drugs used, basing the evaluation on the results of modern pharmacological research.[5] Following this, we shall examine the relationship of Ibn Sīnā's theory to physical reality. Ibn Sīnā's therapeutic theory was clearly not an accurate description of nature—which, considering the limited means of observation available to him, is hardly surprising. What we wish to establish is whether it was capable of informing a choice of objectively efficacious drugs for therapy.

4. *On the Basis of Questions 1.-3., Can we Develop a Heuristic Method for Preclinical Screening of Possible Leads for Modern Drug Development?*

This kind of method might be based either on simple historical continuity and/or the innovations made during the centuries (Question 1) or on the workability of Ibn Sīnā's pharmacological theory (Question 2). The latter would allow us to predict which of the drugs suggested by him possessed the greatest probability of being objectively efficacious against the disease in question. A successful procedure should be able to predict with reasonable accuracy the efficacy of each of these simples in the treatment of a specific disease, thus making it a useful tool for prelaboratory pharmacological research and helping to focus research along

[4] See Riddle, 1985b, pp. 35–36.

[5] See pp. 116–124, below.

the most promising lines. It is important to stress that in this part of the study we are not necessarily searching for truth—an impossible task given that so many details in the study must be left open—but for a pragmatic solution, an approximation to the truth that will work sufficiently well for practical purposes.

The development method is intended to be used only in the framework of Arabic, Hebrew and Latin medieval medical literature, although it may be possible to use some variation of it in other medical traditions following an initial evaluation of their general efficacy.

None of the main topics of this book—the continuation of medical prescription tradition from the Arabic to the Latin commentary literature, the assumed internal coherence of the medical system as seen in individual diseases, and the factors influencing the choice of the drugs—have yet been extensively studied. This kind of research demands an interdisciplinary attitude which comes close to ethnopharmacology, combining linguistics (the material has not been translated to modern languages and the drug nomenclature in particular is extremely confused) and pharmacology. Some scholars claim that this attitude goes against the methods used by the history of medicine as a historical discipline. Yet surely it is historically important to know if a given therapy was efficacious or not. If it was, it could have had an effect on demographic history, and if it was not, the fact that it still continued to be used demands a socio-historical explanation. In either case, we see this research not as an historical research with some medical tendencies but as a combination of historical and medical studies, in which case it is definitely appropriate to use the methods of both disciplines.[6]

The diseases—or symptoms—for which we will study the treatments are nosebleed, cough and diabetes. Nosebleed is an easy-to-observe symptom. One can determine quickly and accurately if the treatment has helped or not. Moreover, the therapeutic theory behind nosebleed in *Kitāb al-Qānūn* was quite simple. Therefore we chose its treatment as the model through which we will show the details of the method. The cough is an example of a far more complicated complex of symptoms, the treatment and etiologic understanding of which is not, however, very distant from our understanding of it. Since the subject has also been well researched in modern pharmacology, we have ample material for

---

[6] See pp. 99–100, below.

comparison. The third disease, diabetes, represents an illness which was understood in medieval medicine in a radically different manner from the way in which we understand it now; formerly it was considered a disease of the kidneys, essentially a urinary problem. It will be interesting to see the relationship between medieval therapy and modern pharmacological understanding, as well as between the medieval medical theory (which in this case does not correspond to physical facts as we understand them) and this theory's ability in assisting in the choice of valid drugs for therapy (if this is indeed the case). Common to all these symptoms and diseases is the fact that they can all be treated with modern Western medicine. Their medieval treatments are thus easier to evaluate in a way which makes it possible to obtain a relatively accurate picture of the possibilities and accuracy of the method designated as the fourth main question (see pp. 86–87).

This study focuses on the theory and practice of the scholarly medical system as it appears in medieval Arabic medical literature. The local medical traditions of that time—i.e., folk medicine—are excluded. The question of the magic element in Arabic medical literature cannot be dealt with in the framework of this work. In general, all drugs occurring in the prescriptions for the treatment of the diseases studied are considered to be of equal importance, with no relation to their possible magical connotations.[7] The sociological side of the medical profession is not relevant for this study, as we have strictly limited it to the field of the use of drugs in the literate medicine. The philosophical system and the world view behind the medical system are likewise discussed only when relevant to the therapeutic system itself. Finally, we concentrate on drug therapy, leaving aside, with only short explanations, physical therapies such as venesection, physical exercise, and baths, which were used alongside the drug treatment. The recommended diet will be included because the dietetic elements of the treatment may have had medical effects comparable to the effects of the drugs, either because of the greater amounts ingested or the physiological resemblance of the food to a drug.[8]

[7] See the methodological recommendation by Van Arsdall, 2007, pp. 196–197. In any case, Ibn Sīnā, at least, did not accept magic as part of medicine. Astrology, on the other hand, had in his eyes a place in medical considerations—after all, no one could deny the effect of the moon on ebb and flow, and so the planetary phenomena could be expected to have an effect on human bodies, too. See Strohmaier, 1999, pp. 99–100.

[8] After all, this difference is often fluctuating. See above, pp. 52–53. See also Etkin, 1979b, p. 423; *ibid*., 1988, p. 34.

4.1. *The Efficacy of Medieval Medicine*

Most of the studies evaluating historical drug therapies from the perspective of the history of medicine were written in the 19th century when the question was still seen as medically relevant. Among these studies, the research of R. von Groth[9] is especially worth noting. Later followed a long period during which systematic studies of this sort were less popular, exceptions being the studies by Max Meyerhof[10] and side remarks on the medical effects of the drugs by several authors.

Modern answers to the question of the efficacy of older medical traditions differ greatly. Thanks to John Riddle, birth regulation through contraceptives and abortifacients has become a well-studied field of ancient and medieval medicine. From the earliest times both the concept of and the practical means for contraceptives and abortifacients seem to have existed. Plato, for example, discussed which abortifacients used by midwives were effective. Musonius[11] also saw contraceptives as a reason for low fertility.[12] The Talmud, Tosefta and Midrash so regularly mention abortions and 'root potions' as causing sterility that their use must have been quite widespread.[13] The ancient Greek medical authors preferred early abortion over late-term abortion for health reasons.[14] Catholic sources both understood the possibility of contraception and strongly discouraged it.[15] This brief survey indicates that people in ancient and medieval times considered their own medical tradition as valid at least in this one important field.[16]

Of the modern humanistic opinions proposed, Manfred Ullmann's is quite typical. Ullmann presents medieval Arabic pharmacology as a huge block of copied writings and compilations of very little originality and independence.[17] In his eyes, the detailed Galenic theory of grades is a lifeless theory: the Arabs neither tested the therapeutic effects of the drugs they inherited from Galen nor those of the drugs coming from the Indian or eastern tradition but rather trusted in the information obtained

---

[9] von Groth, 1889.
[10] See Bibliography, below.
[11] 1st cent. CE.
[12] Riddle, 1992, pp. 18–19.
[13] *Ibid.*, p. 19.
[14] *Ibid.*, p. 23.
[15] Noonan, 1966; via Riddle, 1992, p. 17.
[16] See also Riddle, 1985a, 1996, 1997.
[17] Ullmann, 1970, p. 257; *ibid.*, 1978, p. 103.

from folklore or from Indian doctors.[18] Examples of the lycanthropy tradition—a type of melancholy which caused the patient to seek solitude and to howl in the night as a wolf—and Greek snake lists, the Greek names of which were no longer recognized, are used to demonstrate that such cases were merely copied and recopied in the Arabic medical books.[19, 20]

For his part, Michael Dols claims that the physicians of medieval society possessed little more technical expertise or skill than that of an educated layman. This argument does not invalidate medieval medical skills so much as depreciating those of professional practitioners.[21]

Concerning medieval Latin medicine, Nancy Siraisi has expressed doubt in a quite similar vein with regard both to the progressive accumulation of scientific knowledge and the possibility of evaluating the practical side of medieval medicine in general. She does not deny the benefits of the treatment but stresses instead their psychological effect and the fact that they fulfilled the sociological demands of the society (with the presupposition that from a medical point of view these demands were not very high).[22] This line is also taken by Michael McVaugh, who sees the

[18] *Ibid.*, 1978, p. 106.

[19] *Ibid.*, p. 26.

[20] This criticism should perhaps be modified. The wisdom of other medical traditions —that of Indian doctors, for example—could have been considered as adequately proven by them and thus no longer in need of additional proof. Lycanthropy and the snake lists remind one of how the treatment of smallpox is addressed in modern medical books: although the disease is practically won, it is not yet safe to let its symptoms be totally forgotten. Cf. also to Tibi, 2006, pp. 172–173.

[21] Dols, 1984, pp. 38–39.

[22] "In particular, I have tried to illuminate some of the ways in which the demand for medical care, the nature of expectations as to its results, and a shared system of medical beliefs common to practitioners and patients provided support for medicine, medical learning, and the medical profession. The medicine described in this book offered little protection against most of the factors causing human morbidity and mortality. In this respect, of course, late medieval therapies were no different from those of most other periods of history. But the ability of established forms of medical organization, knowledge, and practice to survive—despite some contemporary criticism—the crisis of the great plague epidemic of the mid-fourteenth century, and to flourish thereafter, is surely evidence that on the whole medicine adequately fulfilled contemporary expectations." Siraisi, 1990, p. x.

"In short, except for the recommendation of cautery, Peter the Venerable was probably better off in the hands of his medical advisers, near and far, than left to his own devices. His experiences illustrate several ways in which medicine in the Greco-Islamic tradition could help patients. Its practitioners decoded and named collections of symptoms and placed them in the context of a logically satisfying, general explanation of ill health. Taught to esteem prognosis, some of them evidently developed genuine prognostic skill belief in medical expertise as a crucial factor in influencing the patients' behavior in a fashion very similar to modern times.[23, 24]

Emilie Savage-Smith and Cristina Álvarez-Millán's intriguing studies represent a still more radical position concerning the practical value of medieval medical texts. As a result of their recognition of a gap between the way therapeutic measures are described in medieval physicians' case studies and the therapeutic recommendations given in their more formal writings, the researchers have reached the conclusion that the two systems were in most cases quite separate. Álvarez-Millán's conclusions are based on the fact that, in comparison to the rich material of the textbooks both in terms of diseases recognized and treated and the therapeutic choices, the case books show a much more limited repertoire of either. Furthermore, even in cases where the same medical problem is treated, it is done in a manner different from the guidelines in the textbooks. Savage-Smith considers the lack of development in the descriptions of

---

(Peter did lose his voice as the *medici* predicted he would, although presumably not for the reasons they adduced), and their practical experience enabled them to select medications and procedures that were simultaneously justifiable in terms of medical theory and usually innocuous or in some instances actually helpful in reducing discomfort. But although a severe bronchial infection in a man of nearly 60 years is not trivial, and although loss of voice is a serious matter for someone whose occupation calls for public speaking, Peter's recovery after a few months shows that his complaint was self-limiting and not life threatening. No means existed whereby medicine could alter the course of acute, life-threatening, or serious chronic disease." *Ibid*., p. 118.

"Obviously, in attempting to evaluate medieval and early Renaissance therapeutic knowledge and techniques, the measure cannot be that of physical effectiveness; nor can one expect to find either progressive accumulation of scientific knowledge or sustained and systematic endeavors to test and modify theory by experience. In these respects, neither the greatly enlarged body of knowledge received at the beginning of the period nor the experience of plague brought any improvements, or much change. Nonetheless, during this period the branch of medical knowledge known as *practica* (dealing with particulars of disease and treatment) underwent one important development; it became the focus of serious intellectual attention at major centers of learning." *Ibid*., p. 152.

[23] McVaugh, 1993, p. 3.

[24] This argument cannot, however, be used to prove that the people's expectations of medicine were non-existent. This can be seen both from the attitude of the upper classes of society towards pain—and, seeing al-Rāzī's patient descriptions, also of the lower classes—and from Ibn Sīnā's advice for the choice of remedies in different situations: the doctor has often to choose whether to give the patient a pain-killer—which will weaken him/her—or to treat the cause of the disease, taking the risk that the pain will become unbearable. See Gruner, 1930, p. 528; Pormann and Savage-Smith, 2007, p. 50. Already Galen considered alleviating pain as a goal in itself, if there was no chance of attacking its cause (Siegel, 1970, p. 184). Interestingly, in discussing amputations, the Arabic surgical texts do not mention analgesic or soporific medicines, though they definitely did exist. See Savage-Smith, 2000, p. 316.

surgical operations[25] and lack of positive evidence for their performance as a proof of their belonging to the realm of theory only, and quotes the sources as mentioning part of these techniques as unknown in contemporary use. As a result, the researchers seem to consider medical theory and the descriptions of complicated surgical procedures, respectively, as of minor importance in guiding the therapeutic decisions. The written texts were learned exercises meant to elevate the professional status of the physician, or, in the best of cases, thought experiments intended to find suggestions for a therapy that was, however, never tried (and presumably could not have been performed, considering the general level of contemporary surgery).[26] These studies are of critical importance to our work, because, if the theoretical texts were not used in practice, it is not to be expected that they could develop in a therapeutically relevant way.

Jerry Stannard took a slightly more positive stand by suggesting that the centuries-old tradition of some of the plants used for therapeutics indicated a true efficacy—one which is confirmed by modern pharmacological studies. At the same time he considered the majority of the drugs either to be ineffective or so mildly effective that modern drugs have

---

[25] *Ibid.*, pp. 310, 314.

[26] *Ibid.*, especially pp. 305–306: "In conclusion, it appears that Rāzī depended upon medical writings not for the improvement of his craft, but for the raising of his own professional status, and perhaps for the better organization of his teaching. Moreover, it is clear that Rāzī's clinical accounts depict medicine and disease in a very different manner from that of the theoretical treatises. The extent to which theory modified the overall intuitive spontaneity of Rāzī's treatments is difficult to assess, but it appears to have played a relatively minor role. What is certain, however, is that the analysis of case histories enables new questions to be raised, old problems to be reformulated, and theoretical writings to be interpreted from new standpoints." Savage-Smith finds in the textbooks strong enough evidence about the actual performance of some surgical operations. Her argument, however, suffers somewhat from circularity: "Another procedure for removing growths was the tonsillectomy—described in antiquity, but in the Arabic literature displaying continued practice and sophistication in instrumentation. [...] Such procedures were quite within the surgical capabilities of the day." (*Ibid.*, p. 315) For a potential response to Álvarez-Millán's argument, see Lev and Amar, 2008, pp. 21–26: the practical inventory of *materia medica* was smaller than the theoretical inventory, but both were based upon the books owned by the physicians. Compare also to Touwaide, 2007, p. 165, where he shows that the recipes in the Hippocratic collection used extensively only under 15% of the total *materia medica* mentioned in them. Savage-Smith's claim might need to be tempered by taking into consideration the basic principle of Arabic medicine mentioned above (p. 50): surgery is the last resort, only if diet and drug therapy do not help. Considering the inherent danger and discomfort of the surgical operation, one could expect a patient consider well before he would opt for it, if other choices existed. On the subject, see also Pormann and Savage-Smith, 2007, pp. 61–65, 119.

rightly supplanted them.[27] Modern pharmacology also clearly shows that several of the drugs assumed for centuries to have had a certain effect probably were ineffective—for example, lettuce as an anodyne.[28, 29]

On the other end of the scale is the above-mentioned work of von Groth, who studied the medications of the Hippocratic collection from a practical perspective on the basis of the pharmacological knowledge of his day. Von Groth saw this research as a valuable task which other researchers had not undertaken in a sufficiently comprehensive fashion.[30]

A generation later, as a part of a new wave of interest in older medical traditions and their inventions, John Scarborough spoke about "time-tested drugs". He sees the age of a drug as strong proof of its efficacy, as "our forefathers were anything but fools", but prefers to consider the plant drugs as wholes in which the chemical parts considered by modern laboratories as "impurities" may have an important role to play.[31] John Noonan, basing his claims on legal and religious sources, agrees that early contraceptives must have had some effect because of their continuity in historical records, without, however, bringing any proof of his position.[32]

Wolfgang Jöchle took a step further in this direction by proving through modern pharmacological literature that the abortifacient drugs mentioned by Dioscorides really were effective. In his research he concluded that the efficacy rate was 56 %, which must be considered too low, as his translation was deficient and the pharmaceutical comparison basis too narrow. Jöchle's work clearly shows that advice for birth control was based on pharmacological facts.[33] Leigh Chipman's evaluation of the remedies proposed for respiratory problems by a practicing thirteenth-century Egyptian pharmacist also points to the same direction, albeit with the warning not to draw final conclusions on the effect of compounded drugs from the analysis of simple drugs included in them.[34] Keith Hopkins likewise admits the possibility of efficacious contraceptives in antiquity, both as mechanical blockers of the mouth of cervix

---

27 Stannard, 1987, p. 15.
28 Stannard, 1961, p. 502; Fluckiger and Hanbury, 1874, p. 357.
29 Here we should realize that the current availability of more efficient drugs does not diminish the objective—although weaker—effect of the more ancient ones.
30 von Groth, 1889, p. 72.
31 Scarborough, 1987b, p. 3.
32 Noonan, 1966; via Riddle, 1992, p. 17.
33 Jöchle, 1974.
34 Chipman, 2002, esp. p. 157.

and as chemical spermicides. However, he regards vaginal suppositories as the only means which might have been effective.[35] In this he is joined by Danielle Gourevitch.[36] Both deny the possible efficacy of oral contraceptives. Norman Himes, on the other hand, claims that vaginal suppositories—while possibly being effective—were the property of the medical learned men and had no influence on the population.[37]

Opinions are also very much divided among modern scientists and medical researchers regarding the evaluation of ancient and medieval medical traditions. Arthur K. Shapiro asserts that ancient medications could only work through the placebo effect.[38] Henry W. Dowling is only slightly more positive in his claim that "Less than two dozen effective drugs were known before the year 1700."[39] Notwithstanding his implicit assumption of the actual drugs used, J. Worth Estes argues that patients' clear trust in the medical establishment can be understood in light of the fact that most of the patients treated by the colonial American doctors would have recovered even without any medical treatment.[40] Charles E. Rosenberg sides with McVaugh and Siraisi[41] with respect to common expectations: according to Rosenberg, circa 1800, patients and physicians shared common beliefs about how the body and drugs worked—a circumstance which helped the doctors maintain their patients' trust.[42]

The main new trend is the willingness—already evident in Jöchle—to try to compare older traditions with the results of modern pharmacology and to collect different ancient written traditions for their possible practical value. One result of this new openness is the fact that the use of written sources is now deemed acceptable in the field of ethnopharmacology,[43] which once referred exclusively to sources surveyed through field

---

35 Hopkins, 1965–1966, pp. 135, 150; via Riddle, 1992, pp. 7, 17.
36 Gourevitch, 1984, pp. 198–199; via Riddle, 1992, pp. 7, 17.
37 Himes, 1936, p. 100; via Riddle, 1992, p. 16.
38 Shapiro, 1959, pp. 298–301.
39 Dowling, 1973, p. 14; via Riddle, 1985b, p. xxii.
40 Estes, 1979, p. 131; via Riddle, 1985b, pp. xxi–xxii.
41 See pp. 90–91, above.
42 Rosenberg, 1977, p. 491; via Riddle, 1985b, p. xxi. The argument concerns the medical situation in America at the beginning of the nineteenth century.
43 Etkin defines ethnopharmacology as follows: "Ethnopharmacology, broadly, constitutes the study of plant, mineral, and animal substances used to affect health, the prefix 'ethno-' designating preventive and therapeutic modalities other than Western biomedicine. To the extent that most medicinal substances are of plant origin, ethnopharmacology is closely allied with medical ethnobotany, but it is more appropriately viewed as a multidisciplinary study that encompasses Western botanical and ethnotaxonomic classifications, assessments of how plants are perceived and used in varied sociocultural

work.[44] This trend regards prescientific medicines "as endless sources for the research of new drugs and new therapies,"[45] despite the possibility that both the plants used as drugs and human pathology have changed during the centuries. Because of that, basing research on the empirical use of a plant in the past might be misleading in some cases.[46] In this context, Anderson stresses the importance of testing as opposed to blind acceptance of therapeutic methods simply because they are time-tested.[47] While recommending the chemical analysis of plants used in indigenous medicine, as performed by Ortiz de Montellano in connection with ancient Aztec medicine,[48] for example, Anderson opposes the complete acceptance of these results, given that questions about the amount of the chemical contained in the dose are usually not addressed.

Some powerful examples of this new trend are *Prospecting for Drugs in Ancient and Medieval European Texts: A Scientific Approach*, edited by Bart K. Holland,[49] which discusses all aspects of drug-lead research based on ancient texts, John Riddle's seminal studies on Dioscorides' drugs, ancient contraceptives and cancer medications, which have opened up new fields of inquiry, and Anne Van Arsdall's bold insight on the continuity of medieval medicine to modern-day botanical medicine.[50] Riddle's research has succeeded in proving that the drugs used in ancient

---

contexts, constituent analyses and investigations of pharmacologic activities, and examinations of the physiologic or clinical impact of plant use on human health." Etkin, 1988, p. 23.

[44] See footnotes in Scarborough 1987b.

[45] Scarpa, 1981, p. 318. See also Farnsworth, 1984.

[46] Scarpa, 1981, p. 319; Buenz, 2007.

[47] As examples he mentions, on the one hand, the continuous use of bloodletting for hundreds of years in spite of its lack of positive results in most cases, and, on the other hand, the claiming of placebo effect to traditional medicine without checking whether it really has even that effect. See Anderson, 1992, pp. 1–2. See also p. 101, n. 82, below, on the potential dangers of folk therapies.

[48] Ortiz de Montellano, 1975; Davidson and Ortiz de Montellano, 1983; Browner *et al.*, 1988. See also Tibi, 2006, especially pp. 180–181, on the descriptions of the effects of opium in historical and modern sources.

[49] See p. 85, n. 1, above.

[50] "A fascination with the magical and superstitious aspects of medieval medicine, which actually make up quite a small part of the surviving texts, has helped shape an erroneous image of a system that is essentially botanical medicine as still practiced both as ethnobotany and by more scientific modern herbalists. It is a system of healing that has been in place and active since the beginning of written time. Records of one era in this long-lived system are in the medieval medical texts, all of them derived in part from classical works. Written witnesses of the system continue to this day." Van Arsdall, 2007, p. 195.

medical traditions were in many cases effective and that both ancient and medieval medicine were strongly tied to experience and rationality.[51] The key word here is cumulative evidence: in light of the great inherent danger of misinterpretation, it is often very difficult to prove that a certain item of information is true. However, when all the details of the general impression lead in the same direction, the likelihood of each one of them being right is considerable.[52]

Riddle's comparison of Dioscorides' drugs with modern pharmacology effectively demonstrates that a considerable amount of his usage was accurate—certainly a far greater percentage than can be ascribed to coincidence. Of course, not all plants used for a certain purpose were therapeutic: part of them could be excipients, etc.[53] When discussing contraceptives, Riddle not only bases his claim of their efficacy on the results of pharmacological research but also on the fact that the efficacy of the contraceptives is easy to evaluate—"full-time pregnancies are not psychosomatic."[54] Such a view stands in opposition to the attitude which treats all herbal treatments from antiquity and Middle Ages as ineffective without actually engaging in any research into them. In his study into cancer treatments, Riddle begins with modern herbal knowledge and compares it to the ancient sources, on the assumption that if this comparison brings tangible results other plants given in the sources may also prove valid as a starting point for screening tests.[55]

The increasing amount of theoretical studies on the efficacy of ancient medicine has in the last years finally led to pharmacological studies based on historical material. Eric Buenz (2004, 2005, 2006) solves the problems posed by the unwieldiness of the material by using bioinformatics data-mining systems. By comparing the data from the historical sources with the results of Western bioscience, he focuses the research on natural products with the highest potential of yielding new lead compounds for novel pharmaceuticals. Moussaieff *et al.* (2005) examine the pharmacological activity of "Jerusalem Balsam," a mixture of several plant resins. According to them, research on medicinal plant mixtures should not be neglected in spite of its special challenges, as these mixtures have a central role in many medical traditions.

---

51 See also Van Arsdall, 2007.
52 See Riddle, 1985b, pp. xxiv–xxv.
53 See *ibid.*, pp. 42, 46–47.
54 *Ibid.*, p. 62; *ibid.*, 1992, pp. vii, 32.
55 *Ibid.*, 1985a, pp. 323–324.

The most important question in the whole issue of evaluating drugs is: what is effective treatment? Is it a treatment that satisfies the social needs of the patient and his surroundings? Or is it a complete, physical, perfect cure? In this study we will use Skoler's/Anderson's definition: "the ability of some form of traditional healing to change the natural history of a disease for the better."[56] This gives us the latitude of including a drug that improves the patient's condition without actually healing him—after all, no one would imagine removing acetylsalicylic acid from pharmacy shops because it does not heal headaches but merely alleviates the symptoms. At the same time, it maintains contact with the disease, thus ensuring that a concrete, physical—rather than emotional—change for the better has occurred. Thus, for example, although wine may cheer the patient, it does not meet the criterion of efficacy unless it directly affects the patient's medical state.

The basic presupposition behind this research is that while medieval Arabic and Latin medicine was not necessarily objectively efficacious in terms of a complete healing, it produced an objective physical effect which brought about an improvement in the patient's physical state as connected with the disease.[57]

This presupposition is based on the following points:

1. A substantial tradition. Arabic medicine was based on a written tradition already more than 1000 years old at the time of its writing, beginning with the medical writings of classical Greece, to which was added the folkloristic and protoscientific knowledge of the peoples subjugated by or involved in commerce with the Arabs. This tradition was rich and necessarily tried by experience. In partial opposition to some scholars in the field,[58] we believe that there was effective criticism of less successful methods of treatment—perhaps not in an explicit manner but rather in the way in which later compilers chose the more effective drugs and treatments and quietly discarded the others.[59] This manner will hopefully be partly clarified in this study.

[56] Skoler, 1984.
[57] See Kudlien, 1973. Concerning medical efficacy, see pp. 99–101, 116–124, below.
[58] E.g., Ullmann, 1978. See esp. pp. 22–26, 76–85.
[59] Levey and al-Khaledy, 1967, Introduction, *passim*; see Riddle, 1985b, p. 62.

2. The practical experience of the doctors. The doctors often described cases they themselves treated, along with the results.[60] Al-Rāzī's description of his case studies and his independent solutions, comments and treatments in his *Kitāb al-Ḥāwī fī al-ṭibb* are perhaps the most striking example of this, but even the more traditional pharmacopoeias frequently contain at least some of the author's own prescriptions.[61]
3. Contemporary standing. Arabic medicine enjoyed an excellent reputation in medieval Europe.[62]
4. Efficaciousness. It is now known that many of the remedies were actually effective;[63] some of them—or drugs derived from them—are still being used in modern Western medicine.[64] A medical school of '*unani*' medicine exists to this day in the Middle East and India, whose doctors still base their treatments at least partly on Ibn Sīnā's *Kitāb al-Qānūn*.[65] Nevertheless, the theory upon which this practice rested was usually far removed from that of modern Western medicine.[66]

---

[60] For a differing opinion, see p. 36, n. 210, above. On the value of case histories as representing the actual practice, see Álvarez-Millán, 2000. Also the biographical data of physicians often contains information on some of their more famous cases: for example, Ibn Sīnā's patients included rulers with melancholy and colic (Goodman, 1992, pp. 26–28).

[61] Cf. to the *scholia* literature in the Latin West. According to al-Jurjānī, notes on some of Ibn Sīnā's own clinical experiences were lost before they could be incorporated into *K. al-Qānūn*. See Goodman, 1992, pp. 32–33; Pormann and Savage-Smith, 2007, pp. 117–118; Strohmaier, 1999, p. 116.

[62] See Woodings, 1971; Watt, 1972; Dolev, 1996.

[63] For additional evaluations of the effect of ancient and medieval drugs, see Voigts and Hudson, 1992; Stannard, 1999a, 1999b; D'Aronco and Cameron. 1998; Holland, 1996a; 1996b; and the pharmacological research by Buenz *et al.*, 2006, and Moussaieff *et al.*, 2005.

[64] See Riddle 1985b, pp. 58, 330; Holland, 1996b, pp. 1–3.

[65] This is rather circumstantial evidence, as the '*unani*' medicine has mostly not been scientifically evaluated either. The term *unani* comes from the Arabic word *yūnānī*, 'Greek'. This medical system was (to a certain extent correctly) understood to be Greek, transmitted through the Arabs. See Siddiqi, 1968; Leslie, 1976; Conrad, 1995b, p. 138; Pormann and Savage-Smith, 2007, pp. 162, 173–177.

[66] Part of this medical theory complex has survived till today in the framework of traditional and folk medicine in the Middle East and in the Muslim areas of Asia and Africa (Lev, 2003, p. 1). For example, *Minhāj al-dukkān* of Abū al-Munā al-Kūhīn al-ʿAṭṭār al-Isrāʾīlī (written c. 1260) continued to be used at least until the 1960s (Levey, 1966, p. 98). See also Pormann and Savage-Smith, 2007, pp. 175–176.

4.2. *Suggested Methodology*

Why is the question of efficacy of the medieval drug therapy being asked at all?

1. It is first of all of historic importance. If we reach the conclusion that medieval medical authors compiled a huge corpus of completely worthless material (objectively considered) and continued to use it, or even used both more and less efficacious treatments for the same disease with the same frequency, with no critical choice, we need to be able to explain why they would do so and how we reached our conclusion.[67] At the same time, the efficacy of medicine is a historically interesting question *per se*,[68] given its potential to change demographic history, for example—not to speak of the development of the tradition and its inner rationality (causes → symptoms → therapeutic theory → therapeutic practice).[69]
2. The possible practical benefits of this kind of question should not be ignored. Although we are aware of the objections sometimes voiced against seeking practical benefits from the study of the history of medicine, we cannot agree with them. If older medical traditions are sufficiently close to objective reality for us to be able to benefit from them, we definitely should do so.[70] In addition to finding new leads

[67] The medical effect of the therapies recommended has also bearing on the historical question about the relationship of theoretical medicine as it appears in the textbooks to the medical practice. See p. 36, n. 210, above. If the drugs mentioned in the casebooks of the physicians were more often efficacious in the treatment of a given medical problem than were the drugs recommended in the theoretical textbooks, the evidence supports the assumption that the therapeutic practice developed independently of the written theoretical advice. On the other hand, if the drugs from the casebooks and those from the textbooks show about the same level of efficacy, or if the *materia medica* of the textbooks actually would have helped the patient better, the relationship between these two types of therapeutic texts needs to be reconsidered.

[68] As Kahl writes in the introduction to his translation of a 12th century Arabic dispensatory: "… no pharmacodynamic investigations are being carried out with regard to historical bodies of medicinal drugs—we have no idea whether these drugs actually did what they were supposed to do, and therefore even the most circumspect translations of relevant historical texts can be accused of being hypothetical." Kahl, 2007, p. 4.

[69] See Riddle, 1985b, xxii; Anderson, 1992: "As we attempt to give an anthropological perspective to traditional healing, it makes a difference in our overall interpretation of cultural dynamics whether or not a given treatment exerts a beneficial effect upon the natural course of the disease. As medical anthropologists, it should be our business wherever possible to include in our documentation of ethnomedicine some measure of benefit as assessed in biomedical terms." Anderson, 1992, pp. 13–14.

[70] As John Riddle writes: "No longer should the historian be satisfied merely with

> for pharmacological research,[71] historical studies of drug therapy can point the way to safe, cheap and well-evaluated plant drugs in geographical areas where Western medicine is not a valid option.[72] An important field of research could be alternative medications in cases where the disease factors have become resistant to synthetic drugs[73] or in cases of drug allergy.

Objections can be made to our use of the Western academic medical tradition, or 'Western bioscience,' as the evaluation determinant for efficacy.[74] Western bioscience is itself culturally bound and carries the additional burden of having often been considered as actually preventing research into rich, variegated native cultural traditions by confining them to categories not natural to them.[75] Bioscience has also displayed little appreciation for the empirical value of folk therapies or for the ability of non-Western medical systems to identify health problems not recognized by its own system.[76] It does have, however, one strong benefit: in spite of the fact that it is culturally bound and thus limited, it fulfills the criteria of replicability—one of the main principles of science.[77] In bioscience, knowledge is accumulated through a set of standardized, precise, and replicable methods and procedures. The result is a corpus of empirically-based understandings regarding the structure of human organs and biological systems, their normal and abnormal functioning, and the mechanisms of specific diseases. It also offers a set of standardizing measures and techniques with which to compare human physiological processes across ethnomedical systems.[78] In addition, if one thinks of ethnographic

finding and translating medical texts. We must seek to learn what they knew and to understand how they organized and applied their experiences. In the process we shall learn more about the Middle Ages, gain a greater understanding about modern science, and perhaps make a contribution both to medieval studies and to modern science." Riddle, 2007, p. 17.

[71] Riddle, 1985a, pp. 323–324, 330; Heinrich *et al.*, 1992a, p. 65.

[72] See Heinrich *et al.*, 1992a; p. 70, Scarpa, 1981, p. 324; Waller, 1993.

[73] Etkin, 1979b, p. 408, concerning malaria.

[74] Henceforward, this tradition will be referred to as "Western bioscience" in the sense used by Browner *et al.*, 1988, p. 682: "... the empirical study of the human body using the standardized concepts, measures, and techniques that are generally accepted in biology and medicine in Western society." Although weak as a definition ["generally accepted" is a very unclear term], it bears pragmatic worth.

[75] Browner *et al.*, 1988, p. 682. See also Fancy, 2006, p. 24.

[76] Goodwin and Goodwin, 1984; via Browner *et al.*, 1988, p. 683.

[77] Browner *et al.*, 1988, p. 698.

[78] *Ibid.*, pp. 682–683.

data collection and analysis as a two-step process, it becomes clear that emic data can be collected without necessarily resorting to a distortive etic model.[79]

Another problem exists in using Western bioscience for evaluation: Not all fields have yet been studied, and even those which have been researched have not all been examined in the same depth. This means that in most cases, when looking at a particular plant in relation to a given medical problem, all we can determine is either that the plant has been deemed efficacious or that it has not been studied at all. In addition, there remain controversial issues.[80]

What kind of method is useful in working with historical material?[81] The work can profitably be divided into two stages. The first stage is an emic one, in which the researcher steps inside the world of the medieval doctor, following the reasoning in the medical books logically, as an insider, and describing the results from an insider's point of view. In the second stage he returns to the modern world and compares the results garnered in stage one with the results of Western bioscience, in order to see how congruent they are and in which ways. The amount of congruency perceived makes it possible for him to turn back to stage one armed with the knowledge of the level of accuracy and success he can assume to achieve for his results. (Medieval doctors were very aware of the fact that they could not succeed every time—but they also knew in which areas they would have more and where they would have less success!)[82]

It seems that the use of ethnopharmacological methods would not seem to be impossible in either stage—as long as the researcher takes into account that he cannot interview the people and that his corpus is limited to the literature at hand—a fact which creates not only methodological problems but also very simple ones connected, for example, with

---

[79] *Ibid.*, p. 683. The use of the terms 'emic' and 'etic' here is based on Pike, 1967, where *etic* refers to a trained observer's perception of the uninterpreted 'raw' data, and *emic* to how that data is interpreted by an 'insider' to the system.

[80] See Browner *et al.*, 1988, pp. 686, 688–689.

[81] The following methodological articles of critical importance were published only after the method used in the present study had been established. On methods for assessing the efficacy of drugs recommended in medieval medical texts, Riddle, 2007; on applying ethnopharmacological methods and bioinformatics data-mining systems on historical material, Buenz, 2004 and 2005; and on estimating the relative cultural importance of a specific ethnopharmacological claim, Heinrich, 2000; Treyvaud Amiguet *et al.*, 2005.

[82] However, concerning the possible lack of safety of the drugs used in folk medicine and the possibility of serious mistakes, see Baer and Ackerman, 1988.

plant identification. Ortiz de Montellano has already initiated this path of inquiry with his seminal study *Aztec Medicine, Health, and Nutrition*.[83] However, a great part of earlier ethnopharmacological research is somewhat disappointing. It mostly satisfies itself with merely describing the pharmacopoeia of an ethnic group or studying it clinically using parameters irrelevant to the drug's actual use among the group. The approach outlined above would surely lead to more results than the mere blind collection and evaluation of plants, as the drugs included in a medical repertoire of an ethnic group can be assumed to have more medical effects than those excluded, despite necessarily being quite a meager collection.[84] The increased interest in the practical evaluation of pre-modern drugs seems, happily enough, to be connected with the new tendency in ethnopharmacology to evaluate drugs in reference to their actual local use. The latter makes it possible to pinpoint the possible effects of the drugs in question much more clearly and provides substantial benefits from local knowledge and experience. The newer approach in ethnopharmacology combines the methods of pharmacology and medicine with a traditional anthropological outlook which takes into consideration, for example, the categories used by the ethnic group itself. The following studies show some of the methodological options offered by this amalgam: Browner (1985),[85] Browner *et al.* (1988)[86] and Heinrich *et al.* (1992a,[87] 1992b[88]).[89]

Browner *et al.* discusses the criteria for selecting herbal remedies using cross-cultural methods which make it possible to evaluate the treatments both from the emic and the etic point of view.

Browner *et al.*'s method is as follows:[90]

1. Identification of the phenomenon in emic terms, such as, for example, determination of the characteristics of a folk-illness syndrome or the reasons given for the use of a particular cluster of herbs for specific symptoms or diseases.
2. Determination of the extent to which the phenomenon described can be understood in terms of modern bioscientific concepts and

[83] Ortiz de Montellano, 1990.
[84] Heinrich *et al.*, 1992a, pp. 63–64.
[85] Browner, 1985.
[86] Browner *et al.*, 1988.
[87] Heinrich *et al.*, 1992a.
[88] Heinrich *et al.*, 1992b.
[89] See also Etkin, 1979a, 1988, and the studies mentioned in p. 101, n. 81, above.
[90] Browner *et al.*, 1988, pp. 683–684.

methods. If, for instance, bearers of a particular culture report that a remedy is efficacious because it causes itching or bleeding, the etic assessment will determine whether or not this remedy has chemical constituents capable of evoking the said effect.

3. Identification of areas of convergence and divergence between the phenomenon and modern bioscientific theory. This procedure differs from the preceding one in that it employs bioscientific concepts and explanations not in order to examine phenomena in their own terms but to see if they are consistent with modern bioscientific theory. In addition, the validity of the remedy is estimated both according to modern pharmacological literature and by an assessment of its ethnographic distribution.

In practice, our assessment of the empirical validity of herbal medicines follows the set of procedures given by Ortiz de Montellano and Browner (1985):

1. Obtain an accurate botanical identification.
2. Search the chemical literature for the plant's known chemical constituents.
3. Search the pharmacological literature to determine the known physiological effects of either the crude plant, related species, or isolated chemical compounds which the plant is known to contain.
4. Compare the medicinal effects known to bioscience with the effects users in the study-community are seeking in order to assess their congruence and the nature of disagreements when they occur.[91]

While this set of procedures does not provide an exclusive basis for evaluating herbal medicines, it allows us to discover the extent to which their active effects conform to bioscientific standards (as currently defined).[92] On the basis of this, a four-level confidence evaluation system has been developed on the basis of Ortiz de Montellano's study (1981):

> Level 1: Plants for which reports of parallel usage in populations among whom diffusion is unlikely suggest that chemical activity exists.

[91] Ortiz de Montellano and Browner (1985), however, concentrate on the immediate effects: for example, when the purpose is to cause a nosebleed in order to cure a headache, their question is whether the treatment really would cause a nosebleed, whereas we ask whether it would help in a headache, with no connection to the mechanism through which this might happen.

[92] Browner *et al.*, 1988, p. 686.

> Level 2: Plants which satisfy the requirements for Level 1 and in addition contain isolated compounds or extracts that have shown the purported activity in either *in vivo* or *in vitro* tests.
>
> Level 3: Plants which satisfy the requirements for Level 2 and, in addition, for which a plausible biochemical mechanism exists whereby the plant constituents may exert the indicated physiological action.
>
> Level 4: Plants which fulfill the requirements for Level 3 and for which the compounds in question have been clinically tested or are commonly used in biomedicine.[93]

Limiting the focus to the plants' pharmacological effects is in no way intended to minimize their broader symbolic significance.[94] After studying the native medical tradition from the perspective of ethnopharmacology, Heinrich *et al.* (1992b) proceeded to evaluate the most promising part of the data in the laboratory in accordance with modern pharmacological theory. Their method is as follows:[95]

1. Initial ethnobotanic study to document the medical flora.
2. Preliminary ethnopharmacological evaluation using published phytochemical and pharmacological information on the plants to select those plants which will progress to step 3.
3. Parasitological and microbiological screening of the plants.
4. Phytochemical investigation of the most active plants.
5. Further pharmacological and toxicological evaluation.

Heinrich *et al.* (1992b) thus extend their reach into the area of practical pharmacology, their objectives clearly focusing on the side of applied pharmacology.

The preliminary ethnopharmacological evaluation (Item 2) is based on the following criteria, giving four levels of validity:

0. If no information whatsoever supports the use, the plant is presumably inactive.
1. A plant (or a closely related species of the same genus,) which is used in geographically or temporally distinct areas in the treatment of similar illnesses, is assigned to Level One if no further phytochemical or pharmacological information validates its popular usage. Use

[93] *Ibid.*
[94] Cf. Browner 1985; Browner *et al.*, 1988, p. 687.
[95] Heinrich *et al.*, 1992b, p. 81.

in other areas presumably increases the likelihood that the plant is active against this illness. This is the lowest level of validity.

2. If in addition to the ethnobotanic data, phytochemical or pharmacological information also validates its use, the plant is assigned to Level Two. Plants in this category are presumed to exert a physiological action on the patient and are more likely to be effective remedies than those in Level One.
3. If both ethnobotanical and phytochemical/pharmacological information supports the folk use, the plant is ranked as possessing the highest degree of confidence. Plants assigned to this level are very likely to be efficacious remedies.[96]

Heinrich *et al.* (1992a) also suggest that the frequency of use of a plant can be used as an indicator of its popularity. They therefore consider information on plants frequently cited by the informants as ethnographically more valid than information on plants which is infrequently cited. They divide plants into three groups according to the frequency of citations of medicinal use by informants:

> Ethnographic Validity Level (A): Plants which are known to a large number of informants and which are also known to at least three healers. Ethnographic Validity Level (B): Plants known to several informants and to one or two healers. Ethnographic Validity Level (C): Plants which are known only to two informants and which are not known to the healers.[97]

Plants with high ethnographic validity should be accorded a higher phytochemical and pharmacological investigative value than those with a low ethnographic validity.[98]

We have based our own rating system[99] on these different rating methods—especially on Heinrich's system,[100] which we apply to the commentaries—and on the emic—etic assessment of Browner's method. We will, however, ignore Heinrich's assessment of different ethnopharmacological validity levels[101] as problematic.[102]

---

[96] Heinrich *et al.*, 1992a, p. 65.

[97] *Ibid.*

[98] *Ibid.* For an additional evaluation method with slightly different criteria, see Russo, 1992, p. 197.

[99] See pp. 116–126, below.

[100] Heinrich *et al.*, 1992a, p. 65.

[101] *Ibid.*

[102] See pp. 118–119, below: the mere existence of a potentially efficient chemical in the plant does not guarantee that it possesses the necessary medicinal properties. On the other hand, the fact that modern medicine does not use a plant should not be considered significant as long as research demonstrates that it has the desired effect.

Our method, the purpose of which is to provide an answer to the four questions asked at the beginning of Chapter 4,[103] is meant to be replicable and easily applied to any other material in the same cultural sphere.[104] In theory it could also be used to study other medical traditions, allowing a preliminary evaluation of their therapeutic efficacy which, if sufficiently positive, may further lead to the application of the heuristic method for the benefit of modern drug research. It is important to remember, however, that this study is based on cumulative evidence. As we will see later, most of the details—beginning with plant identification and different variants of the texts—are uncertain, giving only a tentative validity to the results. Nevertheless, while our method cannot validate the accuracy of any detail in anything more than in an approximate level, the comprehensive picture which emerges from applying it will clearly demonstrate a general level of accuracy and of the probability that every detail is indeed accurate.[105]

The method includes the following steps:

Stage 1: Describing the Disease (causes, symptoms, consequences)
We will use emic terms in describing the disease—or the symptom—as set out in *Kitāb al-Qānūn*, giving its causes, symptoms and possible consequences, together with their interconnections.[106] This information appears primarily in the first chapter written about a certain disease in *K. al-Qānūn*, beginning with the disease's definition and continuing through its different causes, types and, possibly, its long-term effects as well. Some additional information can also be gleaned from the chapter about therapy for the specific disease/symptom in question.

Yet we face a considerable problem in trying to identify the disease in question. First of all, 'diseases' in antiquity and in the Middle Ages were either combinations of symptoms or lone, isolated symptoms.[107]

---

[103] Questions concerning: 1. Traditionalism *vs*. empiricism, continuity *vs*. change; 2. The practical relationship between pharmaceutical theory and practice; 3. The relationship between the entire therapeutic system of Ibn Sīnā and his followers and objective physical reality; 4. On the basis of questions 1.-3., can we develop a heuristic method for preclinical screening of possible leads for modern drug development? For details, see pp. 85–87, above.

[104] See Browner *et al*., 1988, p. 688.

[105] See Riddle, 1985b, pp. xxiv–xxv.

[106] See Browner *et al*., 1988, pp. 683–684.

[107] "The fact that the old Arab physicians did not always distinguish as sharply as the moderns do between a sign or a symptom on the one hand and the underlying disease

For example, while Dioscorides recorded individual remedies for coughs, chest discomfort, headaches, clogged nasal passages, stopped sinuses, and sore throats, he had nothing for a 'cold' as a unit. Although any of the symptoms could have been applied to a cold, some could also be applied to pleurisy, pneumonia, emphysema, and angina pectoris.[108] "The symptoms are nearly impossible to match precisely with our disorders."[109] Even today, symptoms and combinations of symptoms vary among cultures and even among social classes within the same culture.[110] Since the understanding of a disease was based on its visible symptoms,[111] this formed the criterion for the grouping of different symptoms—rather than on the underlying cause as we understand it. A modern disease may therefore appear under several ancient categories, while one ancient disease category may include diseases which are now defined as quite disparate.[112] Medieval medicine typically categorized diseases according to the temperament causing them: there was "cough caused by heat" and "cough caused by cold", and also "jaundice caused by yellow bile" and "jaundice caused by black bile"—each type having a separate treatment. On the other hand, we could apply Etkin's objections against the claim that ethnopharmacological research can only be conducted on simple, easily identified diseases, on the basis that ethnic groups possess the ability to efficaciously treat symptom clusters which do not necessarily present themselves as one disease. One does not necessarily need to be able to define a disease accurately in order to be able to treat it.[113]

In addition to the basic problem of identifying the symptom or symptoms using the terms of modern diseases, a further problem also arises: the names of the symptoms that are not clear. We have attempted to deal with problems of identification by choosing relatively well-known

---

on the other hand, is not a mistake in reasoning but inherent in the holistic system of humoralism; it also means, of course, that any data based on current medical criteria will necessarily comprise a number of ambiguous cases." Kahl, 2007, p. 30, n. 68. For a list of complaints in al-Rāzī's *Kitāb al-tajārib*, see Álvarez-Millán, 2000, pp. 297–300; for a proportional analysis of different complaints in Ibn al-Tilmīdh's *Al-Aqrābādhīn*, see Kahl, 2007, pp. 30–31.

[108] Riddle, 1985b, pp. 43–44.

[109] *Ibid.*, p. 49. See also Álvarez-Millán, 2000, p. 295.

[110] Foster and Anderson, 1978, pp. 156–157 and *passim*; via Riddle, 1985b, pp. 41–42.

[111] There was no other way to observe the internal functioning of the human body and almost no methods of quantifying data. See Pormann and Savage-Smith, 2007, p. 42; see also Ullmann, 1970, pp. 175–176.

[112] See Riddle, 1985b, p. 44; *ibid.*, 2007, p. 7; Beck, 2005, p. xxvi.

[113] Etkin, 1979b, pp. 409–410.

and easily identifiable diseases/symptoms—not because we assume that medieval doctors lacked either the understanding or the diagnostic ability to handle more complicated diseases, but because we are uncertain about *our* ability to identify anything more complicated.[114] The identification does not need to be complete. Although one can assume with considerable conviction that a portion of the cases included in these medieval descriptions would not be included according to modern classification,[115] most cases *would* be included. We are also striving for cumulative evidence—not for the impossible goal of perfection.

Stage 2: Describing the Disease's Treatment in Theory

Here we describe the theoretical basis of the drug treatment of a certain disease or symptom, answering the following three questions: Which medicinal qualities are recommended? Which qualities should a drug have in order to be recommended for therapy of the specific disease/symptom?[116] What are the effects the drug users in the study community seek?[117] This information is mostly given in the beginning of the chapter about the treatment of the disease/symptom in question, after the description of the disease and before the listing of specific drugs and prescriptions for it. Some of the information can also be found as part of the specific advice for treatment. We have based our study only on those medicinal qualities that are mentioned in the drug therapy sections and not on those in the physical therapy section, since in the physical therapy section the same words found in the drug therapy sections may be used in a more concrete sense.[118]

One of the main problems here is vocabulary, for although most of the drug qualities are defined in the beginning of Book II of *K. al-Qānūn*, some of the qualities are not explained anywhere in a way that would ease the task of finding a corresponding modern term. A second problem is that a drug's qualities often were included in other qualities. For example, astringent drugs were by definition cold and dry, because it was believed that coldness and dryness made them astringent. Should coldness and dryness then be added to the qualities sought for, or not?

[114] See Riddle, 2007, pp. 4–5.
[115] This also because in the medieval situation, as in the modern cases which the traditional healers treat, a complex of health problems are coexperienced; Nichter, 1992b, pp. 224, 226.
[116] See also Browner *et al.*, 1988, pp. 683–684.
[117] *Ibid.*, p. 686.
[118] Of course, in the Middle Ages this differentiation would not have been made.

In this research we have decided not to include any of these implicit qualities, except if they are specifically mentioned by Ibn Sīnā in the description of the therapy. Also, if the drugs which were considered good for a specific disease/symptom were also seen as being strengthening, say, for the liver, would 'strengthening' alone be also a desirable quality? Here we have decided not to include this kind of wider definition. This decision was taken in order to keep the description of the therapy as near as possible to that of Ibn Sīnā, and in order to avoid an excess of our own interpretations.

Stage 3: Describing the Practical Treatment

Here we will give the prescriptions and drug recommendations laid out by Ibn Sīnā for the disease in question, including the amounts of the ingredients, doses, and way of preparing and applying the drug, if available. Compound drugs given only by name but without a prescription will not be analyzed further, as any of several different versions might have been intended.[119] We will also mention the physical therapies (venesection, baths) in brief, without going into details. Dietary recommendations are also given, together with definitions and/or prescriptions for special foods mentioned by name. In this field we primarily follow Lane and Dozy's dictionaries. These discussions are presented in the second chapter about each specific disease, following the description of the theoretical part of the therapy, where both simple drugs and compound prescriptions effective for the disease/symptom in question are given.[120]

The main problem in discussing therapy in practice is identification of the plants. The exact identification of the plants is frequently rendered difficult by the authors' lack of definition, by changes in the attribution of a particular name, or, conversely, by the existence of a number of synonyms for the same object. Moreover, the suggested applications are often so varied and contradictory that it is difficult to decide on the exact identification of the realia.[121] Sometimes a certain plant has vanished, making

---

[119] An exception is made only in cases where the name of a simple drug appears in the name of the compound drug, in which case we will discuss the plant in question, but nothing else. See p. 58, above.

[120] The usual form of these prescriptions is discussed in Kahl, 1994, pp. 6–7; *ibid*., 2007, pp. 27–28. See also Tibi, 2006, pp. 32–33, 46, 51, 108; Chipman, 2005, p. 19; for early medieval Latin prescriptions, Riddle, 2007, p. 7; for prescriptions from the Cairo Geniza, Lev and Amar, 2008, pp. 43–48.

[121] Leibowitz and Marcus, 1974, p. 215. See also Lev and Amar, 2008, p. 30: "The medieval classification system (systematics) was different from our scientific classification. The medieval system tended to classify plants and animals in larger groups accord-

it impossible to know whether the author meant another, similar plant or whether he was preserving information which, while not of value to himself, he wished to preserve for further generations or for a reader who was familiar with a suitable *quid pro quo*.[122] In theory, in identifying an ancient plant one should first try to find a description of the plant.[123] Then one should use the methods of modern phytogeography. Has the plant ever been recorded as occurring in the area where the text was written? This is not, of course, a particularly reliable method, since the fact that no information is available about a certain plant does not prove that it never existed.[124] The third criterion is iconography, and the fourth, philology. Later glossaries and dictionaries can also be helpful in providing later or more common synonyms for the plant name.[125] The last criterion is provided by comparative pharmacognosy. By comparing the physiological action of chemically-recognized ingredients obtained from an accurately identified plant with ancient descriptions of a plant and its therapeutic uses, a provisional identification may be corroborated.[126] We have dealt with the problem practically by using the results of earlier, well-based scholarship as seen in appropriate literature—in the case of Arabic drug names, the in-depth studies of Lev (2003);[127] Lev and Amar (2008); Dietrich (1991); Schmucker (1969);[128] Levey (1966); and, especially in case of animal products and compound drugs, Renaud and Colin (1934), with the purpose of avoiding "the reinvention of the wheel." As comparison material, Dubler (1953), Kahl (2003, 2007) and Beck (2005) have been useful.[129]

---

ing to external morphological characters, with no consideration of genetic proximity or anatomical similarity as is the case today. Therefore, the existence of a collective (general) name for a group of several similar species was common."

122 See Riddle, 1992, p. 101, for *laser*.

123 Stannard, 1961, p. 499.

124 *Ibid.*, p. 500.

125 *Ibid.*, p. 501.

126 *Ibid.*, p. 502.

127 The study, as well as the following one by Lev and Amar (2008) combines a solid knowledge of Middle East botany with textual analysis, philology, comparisons with historical and medical sources from adjacent regions, botanical dictionaries, modern encyclopedias for the life sciences and medicine and practical fieldwork on present-day uses of traditional medicinal materials.

128 Bonn, 1969. This study covers also most of the earlier research, e.g., by Meyerhof, 1940; Meyerhof and Sobhy, 1932; see also Meyerhof, 1979.

129 Among valuable additional sources also Sadek, 1983, deserves a special mention. I am grateful to Prof. John Riddle for drawing my attention to both Dubler's and Sadek's research.

In the prescriptions we give the names of the plants in English, without providing an overly-detailed definition. Ibn Sīnā was not familiar with the Linnean system, and the accuracy of his drug definitions corresponds approximately to that of the vernacular names employed in European languages. Using a more detailed identification system would create the impression that Ibn Sīnā was much more accurate than he actually was.[130] However, in the list of plant identifications[131] we give the plant identifications according to the modern binominal identification of the Linnean system as collected from the literary sources. If several possibilities exist, we either give all of them or those that are clearly relevant. Often there is no way of reaching one clear-cut definition,[132] as either Ibn Sīnā himself included under his plant name two or three similar plants or we were not able to understand precisely which plant he intended.[133] In addition, several plant species or subspecies were frequently known by the same designation for the simple reason that there was no reason to differentiate them: they belonged to the same family and had similar medical effects.[134]

Names of animals and animal products are in general better defined than plant names.[135]

Stage 4: Tallying the Frequency with which Different Drugs Appear in Prescriptions

Here we will count how many times each simple drug appears in prescriptions—i.e., which are Ibn Sīnā's preferred simple drugs. If the same simple drug appears for some reason in the same prescription twice, it is counted only once, as in most cases he was referring to two variants of the same drug, as in the case of rose juice and rose syrup.

---

[130] See Riddle, 1985b, pp. xxv–xxvi.

[131] Appendixes 2, 11, 24, 32, 40, 48.

[132] See, for example, Riddle's discussion on Dioscorides' *cassia*, where he assumes that Dioscorides himself was confused about the identity of the plant, since both the *Cassia* and the *Cinnamon* genera have quite similar effects on the body. Riddle, 1985b, pp. 103–104. See p. 34, n. 198, above.

[133] See Riddle, 1985b, pp. xxv–xxvi.

[134] *Ibid.*, 1992, p. 136; for an example, see Beck, 2005, p. 51, n. 91. In case of a plant that had more than one name (for example turnip: *shaljam* and *lift*) it is impossible to know if the author meant by both of them the same variety or two different varieties. The same holds for Arabic names that can refer to two different, but related, plants (for example *qunnabiṭ*: cauliflower / broccoli). See Waines, 1989, p. 23.

[135] Stannard, 1961, pp. 504–505.

A problem is created here by inclusion of compound medications. As we mentioned above,[136] we will not look for prescriptions for compound drugs. On the one hand, since many variations of these drugs existed, we cannot know with certainty which version Ibn Sīnā would have used nor which version the would-be user of the prescription—the doctor—would have recommended. On the other hand, this type of compound drug usually contained a large number of ingredients—some having fifty or even nearer to a hundred of them. They were also multi-purpose drugs—that is, a drug was not specifically intended for only one particular disease/symptom. Including these kinds of drugs in all their details would cause confusion, with the result of losing among the myriad of ingredients those simple drugs which were relevant for the treatment of the given specific disease. We would also lose the focus on "a specific drug for a specific disease", which is characteristic of this research.[137] We deal with this problem by ignoring all compound remedies which have a generic name.[138] These remedies were often named after some famous doctor of antiquity, the assumed inventor of the drug, or other well-known person;[139] others were given names attesting to their claims of efficacy in healing.[140] We also ignore compounds the names of which were derived from their main indication.[141] On the other hand, if the name included a special ingredient, we will count that as an appearance of the plant, as it demonstrates that the simple drug was indeed included in the medication and may even be taken to mean that the drug was either its main ingredient or the most important one.[142]

In discussing simple plant drugs, no account will be made of the specific part of the plant used unless it had its own separate name—such as the pomegranate flower (*jullanār*), which is discussed separately from pomegranate (*rummān*), the description of which in Book II of *K. al-Qānūn* includes also the tree and its bark. This procedure is adopted for several reasons.

1. Al-Bīrūnī (973–1048, in Khwārizm/Ghazna) in his pharmacological work *Kitāb al-Ṣaydana* explained that different parts of the same

[136] See p. 109, above.
[137] See pp. 106–111; see also p. 102.
[138] On names of compound drugs, see Kahl, 2007, p. 27, n. 58, and p. 32.
[139] Fellmann, 1986, p. 162.
[140] For ex. *maʿjūn al-najāḥ* = "electuary of success"; *ibid.*, p. 162.
[141] For ex. *ḥabb al-suʿāl*; see *ibid.*
[142] *Ibid.*

plant could be used as substitutes for one another if need be; in these cases a greater dosage of a weaker part would be used, because in most cases they would possess the same basic effects.[143]

2. Even in comparing Books II and III of *K. al-Qānūn*, one can see that in different places Ibn Sīnā recommended different parts of the same plant for use against a specific disease/symptom.[144] This seems to support the conclusion reached by al-Bīrūnī, allowing such simplification in our own dealing with the different plant parts.
3. Modern pharmacological literature indicates that plants frequently possess the same basic constituents in all or most of their parts, differing only in amount.[145]
4. This way of treating the problem simplifies our study in a very positive way, since Ibn Sīnā does not always give the exact part of the plant recommended for use. In this way the general picture becomes clearer. In connection with our fourth goal—a heuristic method for finding new leads in pharmacological research—this kind of simplification does not cause a problem: the evidence is after all cumulative, and the simpler we can keep the system, the more optimal the relation between accuracy and ease of use.

Other, less serious problems connected with tallying the frequency of occurrences will be dealt with in the contexts in which they arise.

Stage 5: Comparing the Simple Drugs and their Qualities According to Book II of K. al-Qānūn

Here we will compare the therapeutic qualities of the simple drugs recommended for a particular disease in Book II of *K. al-Qānūn*, together with the list of therapeutic qualities which Ibn Sīnā gave as necessary for the treatment in his *description of the disease's treatment in theory* (Stage 2). The intention is to investigate the connection between the choice of drugs and their therapeutic qualities—i.e., to connect theory and practice and to examine how far theory influenced practical choice of drug. First of all, we shall designate which qualities given by Ibn Sīnā as relevant for the therapy are found most frequently in the drugs—i.e., which

143 Said, 1973, al-Bīrūnī's Introduction.

144 For example, in Book IV of *K. al-Qānūn*, the peel of pomegranate is mentioned in a prescription for whitlow; in the pharmacological description of pomegranate in Book II of *K. al-Qānūn* the part recommended against whitlow is, however, the seed. See *K. al-Qānūn*, Vol. 1, p. 431; Vol. 3, pp. 306–307.

145 See also Tibi, 2006, p. 2, concerning opium poppy.

of the qualities are in practice the most relevant ones. Subsequently, we shall compare the frequency of appearance of a certain drug with the number of its therapeutic qualities according to Ibn Sīnā's list, with the goal of discovering whether a connection exists between the number of qualities a drug possesses and the frequency of its appearances in the prescriptions. This will perhaps tell us why certain drugs were chosen and others not.

The same problem that occurs in Stage 2 also arises here: if a quality was included in another quality—such as 'cold' and 'dry' being included in 'astringency'—should we mark the plant as having not only the astringent but also the cold and dry qualities, if the last-mentioned are not given in the description of the plant in Book II? The answer is again negative. We start from the assumption that if the coldness and the dryness had been sufficiently remarkable they would have been mentioned in the description. Acting in the reverse direction would also cause too much confusion. Although this situation sometimes is caused simply by Ibn Sīnā's inconsistency, here again our research is saved by the cumulative evidence, which will correct this kind of inexactitude. If two synonymous words were used in different descriptions, they will be counted as one (for example, *mujaffif* and *muyabbis*, both meaning 'drying').

In the drug descriptions in Book II of *K. al-Qānūn*, Ibn Sīnā sometimes stated that a particular drug possessed the same qualities as another drug.[146] In cases like this we shall ignore the remark, since it is impossible to ascertain exactly which qualities both plants share. Moreover, if a quality was sufficiently prominent it generally occurred at least once in the description.

We may assume that even in the case of the most preferred qualities, the medical action sought did not always derive from this quality. Other causes may also have been involved, while Ibn Sīnā's inconsistency may likewise have played a part.[147]

Some of the simple drugs recommended by Ibn Sīnā do not appear in the pharmacopoeia of Book II of *K. al-Qānūn*. These drugs are marked in the table with the words "no information". Although we could have checked these drugs from other medieval pharmacopoeias, we decided not to do so in order not to confuse the situation. In many cases, descriptions are also either completely lacking or are described in great brevity, reflecting the fact that not all drugs were known to the same degree, and

[146] See Riddle, 1985b, p. 33.
[147] See *ibid.*, pp. 35–36.

only a few were studied from all relevant perspectives. In these cases, once again we must trust the cumulative evidence.[148]

Stage 6: Repeating Stages 1–5 Using the Various Commentaries
Here we describe the same diseases/symptoms in the two Arabic commentaries, the Arabic supracommentary and the two Latin commentaries according to Stages 1 to 5. These commentaries are then compared with *Kitāb al-Qānūn*. Worth mentioning are the following three procedures:

1. At Stage 3: *Describing the Practical Treatment*, the identification of the Latin plant names is conducted on the basis of the following glossaries: Daems, 1967, 1993; André, 1956, 1985; Glare, 1982; Liddell and Scott, 1940; Berendes, 1902; Dragendorff, 1898; Schelenz, 1965; Hort, 1961; Riddle, 1987; Dubler, 1953; Wimmer, 1964; Niermeyer, 1954–1976; Beck, 2005; and Berthelot, 1893. As a medieval synonym list, Rufinus' *Herbarium*[149] was used to confirm the results. In addition, the historical information of Battaglia's Italian dictionary[150] was used when necessary. Although the results given by these different handbooks were sometimes greatly variegated in their details, since they usually gave one or a few clear core identifications, we chose as identifications those on which two or more sources agreed. In addition, in cases where the plant name appeared also in the Latin translation of the Arabic text of *Kitāb al-Qānūn* we used also the Arabic synonym and its identification. In those cases where the Latin names translated from Arabic could not be translated at all with the help of the glossaries (for example, when they were transcripts), we used the Arabic identifications.
2. At Stage 4: *Tallying the Frequency with which Different Drugs Appear in Prescriptions*, with regard to the Latin plant names, when they can be identified approximately in the same way as the Arabic ones, no problem exists. If for some reason they cannot, both are to be considered separately. Such occurrences primarily occur in connection with transcription errors and different versions.[151] Since

[148] See *ibid.*, pp. 135–136.
[149] Thorndike and Benjamin, 1946.
[150] Battaglia, 1961–2000.
[151] For example, Arabic *ḥulba* 'fenugreek' which has been translated to Latin as if it would have been *ḥalīb* 'newly milked milk'. See p. 297, Prescription #20, below. The Arabic words *sawsan* and *sūs* are also easily confused, see p. 513, Prescription #14.

doubts exist regarding plant identifications and the errors between the original and the translation are perceptible, we once again have to trust the cumulative evidence for the final results.

3. At Stage 5: *Comparing the Simple Drugs and their Qualities According to Book II of* K. al-Qānūn, only the qualities found in *K. al-Qānūn* are used in the comparison, and only those plants found in the Latin commentaries which also appear in the Arabic text of *K. al-Qānūn* are compared. This is due to the impossibility of trying to identify all the new Latin plant names with the corresponding Arabic ones. It is also due to our decision to use only Ibn Sīnā's pharmacological descriptions in Book II of *K. al-Qānūn* without any commentary material in this stage of the work. The only commentary of the five discussed here which also contains a pharmacopoeia is Ibn al-Nafīs' *Mūjaz al-Qānūn*—and its descriptions are even fewer and briefer than those of *K. al-Qānūn*.

Stage 7: Evaluating the Efficacy of Simple Plant Drugs in Light of Modern Pharmacology

At this point we move from the emic perspective of a medieval doctor to that of the modern pharmacologist and seek to evaluate the potential efficacy of the simple drugs recommended by Ibn Sīnā for the disease in question. Both simple drugs appearing alone and those appearing as a part of prescriptions are included. On the other hand, in order to keep the research as simple as possible we only discuss plant drugs. In comparison to research done on plant drugs, modern pharmacology has done far fewer studies on animal products and minerals. Therefore, our research excludes animal products and minerals, as their inclusion might compromise the accuracy of results without making any positive contribution.[152] A further restriction lies in the fact that we will not consider compound drugs appearing under a generic name.[153] An exception is made only in cases where the name of a simple drug appears in the name of the compound drug, in which case we will discuss the plant in question, but nothing else. Plants or plant products that are too general to be defined in terms of their genus, e.g. "cotton-like substance from (other) plants"[154]

[152] Concerning the potential inefficacy of animal-based drugs, see Stannard, 1961, pp. 504–505 (who is not necessarily correct since insufficient research exists on which to base this claim; see, however, McDaniel, 1948).

[153] See p. 109 and p. 109, n. 119, above.

[154] See p. 150, Prescription #42, below.

are excluded from the evaluation. We will make no distinction between drugs and food, as the border between them in medieval medicine is indistinct,[155] and as the foods may well have medical effects.[156] (Sometimes, of course, the recommended foods would simply have helped in a disease worsened or even caused by malnutrition.)[157]

Here we have to rely on the plant identifications made earlier in the study.[158] If a plant name has more than one possible identification, we will study them all. If even one of the possible identifications has been proven effective for the given disease, we will consider the plant to be effective. With respect to Latin plant names, in most cases their identification approximates that of the respective Arabic plant name. If for some reason this is not the case both will be considered separately. Such circumstances most frequently derive from errors in the script or from the existence of different versions.[159] Since plant identifications are by no means absolutely sure and the errors between original and translation can normally be perceived, our confidence in the final results once again rests on cumulative evidence. With regard to the differences in different versions, the study is based on the printed versions of the texts, which have also been used in practice. Possible errors will also hopefully be counteracted by the cumulative evidence.

We will study all plants of the same main generic type (*Salix*, for example) without considering separately the species of the plant recommended (for example, *Salix alba*). The reason for this is two-fold: (1) Accurate plant identifications of species are in most cases not possible, and it is very difficult to decide when a plant belongs to a certain species or not. (2) In many cases, only one or two species of a plant genus have been studied in depth, the rest being passed over with a few sparse remarks. As most plant species of the same genus have similar but non-identical phytochemistries,[160] it is more useful to assume that if one species of the plant was used for a certain disease and if that plant is known to contain a chemical compound effective against the disease, another variety of the plant recommended for the disease would also

[155] See p. 88, n. 8, above.
[156] Etkin, 1979a, p. 398.
[157] On the concepts of nutritional value and digestibility of different foodstuffs in Arabic dietetic literature, see Garcia Sánchez, 2002, p. 279/5.
[158] See Stage 3, pp. 109–111, above.
[159] See p. 115, n. 151, above.
[160] See Riddle, 1992, p. 33. However, see also Freire et al., 2006; Viljoen et al., 2005, on the possible influences of genetic variation on the medicinal properties of the plants.

possess that chemical compound. While this constitutes an assumption, it is evident that when several assumptions all point in the same direction and are confirmed by other results of the research, they may become cumulative evidence.[161] This also applies to the changes which the plants may have undergone over thousands of years. Although their chemistry may not be exactly the same, a rough chemical proximity remains.[162] The same applies to different parts of the same plant. In many cases they contain at least partly the same chemical constituents. Moreover, in most cases we cannot be absolutely sure which part of the plant would have been used.[163]

Evaluation is performed on the basis of modern pharmaceutical literature, in particular the following handbooks: *Hagers Handbuch der pharmazeutischen Praxis*;[164] H.A. Hoppe, *Drogenkunde*[165] und *Taschenbuch der Drogenkunde*;[166] R. Hiltunen and Y. Holm, *Luonnonlääkkeet*;[167] P. Alanko, M.-L. Huovinen, K. Kanerva *et al.* (eds.), *Suomen terveyskasvit*;[168] A. Pitkänen, H. Hietala, U. Elo, O. Simonen *et al.*, *Terveyttä luonnosta*;[169] W. Tang and G. Eisenbrand, *Chinese Drugs of Plant Origin: Chemistry, Pharmacology, and Use in Traditional and Modern Medicine*;[170] and J.M. Watt and M.G. Breyer-Brandwijk, *The Medicinal and Poisonous Plants of Southern and Eastern Africa*;[171] and with the online databases MEDLINE and IPA (International Pharmaceutical Abstracts). Whereas the databases show the newest developments, the handbooks give a better general picture of decades of research. As a rule we will consider as effective only plants for which a report of efficacy has been given for a specific quality or for a specific symptom/disease. This excludes plants that contain a chemical compound which might explain the efficacy of the plant for the given medical problem, in spite of a very gen-

---

[161] A case where this assumption is proven is the *Mentha* family, most of whose plants can be used for the same purposes due to their phytochemical similarity. See Riddle, 1992, pp. 79–80.
[162] *Ibid.*, 1985b, p. 41; but see also Buenz, 2007.
[163] See pp. 112–113, above; see Riddle, 1992, p. 48.
[164] List and Horhammer, 1969–1979; von Bruchhausen *et al.*, 1990–2000.
[165] Hoppe, 1975–1987.
[166] Hoppe, 1981.
[167] Hiltunen and Holm, 1994.
[168] Alanko *et al.*, 1982.
[169] Pitkänen *et al.*, 1996.
[170] Tang and Eisenbrand, 1992.
[171] Watt and Breyer-Brandwijk, 1962.

eral use of the chemical compounds in evaluating a plant drug.[172] This is because in addition to the fact that the chemical compound exists in the plant, we would also need to know both how much there is of it, how large the given dose is, and how much would be needed.[173] The amounts of the various chemicals would depend on many factors, including climate, soil, altitude, harvesting and storing methods, and even the time of the day.[174] Not only are we ignorant to a large extent of the exact subclass of the plant used, but Ibn Sīnā himself seldom provided precise amounts and dosages. In addition, the effect of the whole plant drug is quite often different than that of any of its parts[175] due both to the inert material it contains and to the synergistic effect of the different chemical compounds it contains. Taking the existence of any constituent in the drug as a proof of its effect would therefore be very unreliable.[176] As in modern medicine, the amount needed for therapy necessarily fluctuated from patient to patient, depending for example on the patient's size. Here, too, we still need some basic guidelines—rubrics which are not usually found in research discussing the chemical constituents of plant drugs and their potential medical effects.[177] Of course these considerations also affect the potential effectiveness of the plants as a whole. If the amount of the needed chemical—whatever it is—fluctuates, the effectiveness of the plant also fluctuates. This is something we must simply accept. While the pharmacists' practical experience might have helped them choose the right time/dosage relationship when mixing the drug,[178] we need to remember that we are seeking cumulative evidence. The fact that treatments were not 100 % efficacious does not invalidate them completely. They can still point us in the right direction.[179]

---

[172] Anderson, 1992, p. 4. For studies using the existence of the chemical compounds as a criterion in the evaluating of the drug, see Etkin, 1979b; Popp *et al.*, 1968; Malcolm and Sofowora, 1969; Spencer *et al.*, 1947; Ortiz de Montellano and Browner, 1985; Browner *et al.*, 1988.

[173] Riddle, 2007, pp. 9–10.

[174] *Ibid.*, 1985b, pp. xxiv–xxv; Scarborough, 1987b, p. 3; Gil et al., 2002; Kothari et al., 2004; Orav et al., 2004; Agnihotri et al., 2005; Shunying et al., 2005.

[175] E.g., opium and morphine.

[176] Scarborough, 1987b, p. 3; Riddle, 1985b, p. 41; see Scarpa, 1981, p. 319.

[177] Anderson, 1992, p. 4.

[178] An intriguing article by Van Arsdall (2007) suggests the use of living traditions of healing as a source for an insight into how older medical texts might be interpreted. This method, although without the strength of scientific or historical proof, might be particularly helpful as a heuristic tool in fields where much of the background knowledge needed for understanding the texts was gained through apprenticeship.

[179] Riddle, 1985b, pp. xxiv–xxv.

Evaluating the effect of a plant based on modern research also serves as an indication of our current state of knowledge of these plants.[180] In practice, this means that because some plants have been sparsely studied we can suppose that the number of efficacious plant drugs in the medical system to be evaluated will be greater than the results will show. It certainly cannot be smaller. An additional problem here is that even well-studied plants have not usually been studied systematically, taking into account all their possible uses. Consequently, information on the effects of plants is sporadic and inconsistent. There is reason to believe at the very least that little studied plants used for similar purposes in different, traditionally unconnected areas may have an effect regarding the disease which Western bioscience has not recognized.[181]

A fundamental difference between medieval and modern drug usage is that whereas medieval medicine either used drugs as whole or extracted a chemical compound from them (essential oil, for example), modern medicine uses active principles—mostly extracted chemicals—which, although often based on plants, do not contain more than one chemical compound out of the whole.[182]

A serious problem in evaluating the efficacy of medieval drugs in relation to a certain disease/symptom is how to define efficacy. As Anderson states: "... measures of the clinical effectiveness of traditional forms of healing have nowhere been firmly established in biomedical terms ..."[183] We use his definition of efficacy: "... the ability of some form of traditional healing to change the natural history of a disease for the better."[184] This of course does not mean a complete healing. After all, most of us use acetyl salicylic acid derivatives for headaches, not expecting to be cured, but fully expecting the pain to end—at which point we are satisfied. However, we count a drug as causing improvement only if the improvement is truly connected with the problematic medical situation.[185] The

[180] Ortiz de Montellano and Browner, 1985, p. 62; Heinrich *et al.*, 1992a, p. 65; see Browner *et al.*, 1988, p. 686; Riddle, 1985b, pp. xxii–xxiii.

[181] Browner *et al.*, 1988, p. 686.

[182] Scarborough, 1987b, p. 3; see Scarpa, 1981, p. 324.

[183] Anderson, 1992, p. 1.

[184] *Ibid.*, p. 4.

[185] If the patient feels better after drinking wine, for example—although nothing else has changed and he is in as much pain as before—we do not count this as therapeutic efficacy towards the given disease, although the wine possesses its own therapeutic effect which, while not helping the patient to fight the disease, may help him to cope with it by giving him comfort and rest.

improvement does not mean a continuous, absolute, 100 % success rate, given the presence of too many variables in every treatment: "Furthermore, in the modern world we are conditioned to think of an 'effective' drug as one that is 100 percent effective, whereas in natural-product drugs such is seldom the case."[186]

The improvement can, of course, come through different mechanisms, as we can see in Dioscorides' remedies for gout: one of them—willow—was anti-inflammatory, while another was a 'true' cure breaking the gout cycle (asphodelus).[187] The choice of the most useful parameters for evaluating efficacy is therefore very important. For two reasons, we have tried to choose only the most relevant ones: in order to avoid a situation wherein the results turn out to be irrelevant (since every drug possesses at least some medical effect), and in order to be able to differentiate the best drugs. Thus, for example, we demand from diabetes drugs either a hypoglycemic or an antidiabetic effect, without including positive effects in the treatment of cholesterolemia or in preventing the side effects of diabetes, like diabetic nephropathy. If we accepted every criterion for a more positive outcome in the case, all the drugs recommended for treatment would be ranked as efficient and we would miss identifying those drugs which have a direct effect on the disease amongst all those others in the plethora of drugs which strengthen the patient, prevent side effects, lessen the pain, etc.

In many cases, some of the drugs in a given prescription[188] were adjuvants, intended to improve the taste of the medication, to give it a proper consistency or a pleasant smell, to act as vehicles for the active constituents, or to assist in their transport through the skin as the compound drug was massaged on the body, etc.[189] Quite often, oil or wine were used for extracting the relevant part—for example, when aromatic oil was extracted from a plant. Sometimes a drug may also have had a synergistic effect with other drugs without having any effect alone, and sometimes it was used[190] in order to counter the side effects of other medicaments.[191] The same drug could have been an adjuvant or corrective in one case and a relevant part of treatment in another, depending on the disease for

186 Riddle, 1992, p. 38.
187 *Ibid.*, 1985b, pp. 46–47.
188 More seldom in the lists for simple drugs.
189 See Stannard, 1961, pp. 505–507.
190 According to the medieval theory.
191 Riddle, 1985b, p. 66.

which the drug was used. Thus we cannot automatically assume that any given drug was only an adjuvant but need to study all plant drugs on the same basis and according to the same method.

At this level of research, we will ignore the placebo effect, since all plant drugs can have it.[192] Indeed, there is no need to discuss the psychological effects of plant drugs, given that we are presently considering the physical effects of separate simple drugs. If and when the placebo effect did occur, it did not depend on the objective properties of the plants (at least not directly), being closely connected with the question of magic.[193] Here we simply ignore any psychological effect: whether the plant seems to have had magic connotations is quite irrelevant, as long as it was used for a treatment of a certain disease. In addition, the fact that a plant was used for the treatment, albeit magically, may hint to its possible true efficaciousness.[194] Furthermore, other types of magic where plants were not used are naturally excluded from this part of the study, as we are concentrating only on plants.

We will also ignore the amounts of drugs in the prescription and their dose, as our incomplete knowledge of too many factors makes any kind of meaningful discussion of the amounts impossible. We do not always know the exact size of the medieval measures, especially when these varied according to time and place.[195] Nor do we know the amount of the efficacious chemical in a given plant, or even necessarily what that efficacious chemical (or chemicals) is, as the chemical constituents of a plant vary depending on the circumstances.[196] Furthermore, we often do not know the proper dosage required to obtain an effect (especially when we can additionally assume that the amount also depended on the method of administering the drug). In the manner typical of antiquity, Ibn Sīnā only seldom provided amounts.[197] The logic behind this practice seems to correspond to that exhibited by Dioscorides: in cases of ordinary, mild medicines, experience told the doctor how much of the plant to recommend, taking into consideration the physical character of the patient, the

---

[192] *Ibid.*, 2007, p. 6.

[193] A strong reaction caused by a plant drug might increase its plausibility in the eyes of the patient.

[194] We follow here Van Arsdall, 2007, pp. 196–197: "… to assume that no part of the remedy is superstition or magic, but instead first to assume that it might have a practical reason for being included …".

[195] See Chipman, 2005, pp. 97–100; Fellmann, 1986, p. 172; Ullmann, 1970, p. 371. For a practical example on problems connected with measuring, see Riddle, 2007, p. 10.

[196] See pp. 118–119, above.

[197] See Riddle, 1985b, pp. 67–68.

severity of the disease, and the quality of the drugs. Only in the case of dangerous medicines were the maximum amounts important.[198] Considering all these variables, we have decided to simply ignore the amounts and consider every plant mentioned in an equal way.

What about the effects of mixing different medicines? This procedure may have had unexpected effects, which were either synergistic or lessened the effect of the medication. There may also have been completely unconnected effects.[199] A number of the simple drugs are in any case mentioned alone, in lists of useful drugs. This means either that they were to be used alone, or that they could be mixed in any combination.[200] In this case, we can ignore the problem and consider these drugs as supposedly effective—at least as long as they were used alone. On the other hand, when one follows the treatment of any disease through history, one can see that while the core of the collection of recommended simple drugs remains consistent throughout history, the combinations in which they appear do change.[201] It therefore appears that the choice of simple drug was frequently as important as the combination. Here, however, we have to be careful, since these conclusions are based on the presupposition that the prescriptions were actually tried and found useful—or at least not found to have any strange effects on a compound. Given that our working method deals only with simple drugs and not with combinations, we have to take the risk that some of the drugs used beneficially alone were directly harmful in a particular combination and that some drugs were useful in combination but not alone. Although the first case would not affect our results, seeing that we are only working with simple drugs, the second would merely impair the results—constituting a 'safer' mistake than that of claiming overly optimistic results.

The effect of drug preparation approximates the previous question. How did the medical effects of the plant change when it was prepared, for example, by boiling? What was the effect of heating or fermentation on the chemical compounds in it? And how did the chemicals interact if a compound drug was, for example, heated? The method of extraction can also be decisive in determining efficacy. Some compounds dissolve

---

198 *Ibid.*, pp. 68–69.

199 According to both modern and medieval theories. See also Chipman, 2002, p. 157.

200 At least according to Ibn Sīnā. See, however, Chipman, 2002, p. 142: "It is interesting to note certain recurrent combinations of plants in the recipes [for cough in *Minhāj al-dukkān*]. The significance of this is unclear, especially as many of the combinations are of different kinds of mucilages."

201 See, for example, Chapter 5.2.5.2.

in water, others in alcohol or oil.[202] We have ignored these questions for the same reasons as above: we have to take the risk of trusting the cumulative evidence. Not only is it true that not all chemicals change during preparation, but it is also possible that a given drug was actually an invention of the author, as yet untested. Whatever would happen to the drug after its preparation is irrelevant to our research, as we are studying simple drugs in their unprepared state. If some changes were to happen, this would not affect our method or its results.

A final question raises the issue of the method of application of the drug: what about drugs that were applied in some other way than orally? We have decided to treat every plant drug in the same way independently of the way in which they were applied, both because of the development of non-oral applications of drugs also in modern medicine[203] and because the same drugs were applied via different methods, according to different texts.

Stage 8: Seeking Correspondence between the Efficacy of a Drug and its Use via Comparison of Several Variables

Here we try to see if a factor exists which would correspond positively to the therapeutic efficacy of the efficient plants for the given disease/symptom (efficient according to Western bioscience)—either the frequency of usage in a certain text or its continuous appearance in the commentaries.[204]

1. Relationship between the Preferred Drugs of Ibn Sīnā and their Medical Efficacy
   Here we try to see if a positive correlation exists between those drugs most preferred by Ibn Sīnā and those drugs deemed efficient according to Western bioscience in the treatment of the specific disease.

[202] Riddle, 1985b, p. 41. See also Sorensen and Katsiotis, 2000; Tam *et al.*, 2006.

[203] See Riddle, 1992, p. 36.

[204] Compare Heinrich *et al.*, 1992a, p. 65; Heinrich, 2000; Treyvaud Amiguet *et al.*, 2005, where the setting is modern ethnopharmacology and the popularity of the plant among the informants; Russo, 1992, p. 197; Riddle, 1992, pp. 89–90; Scarborough, 1987b. See Chapters 5.4, 6.3, and 7.3, below. Another interesting question is raised by Álvarez-Millán's assumption (Álvarez-Millán, 2000; see pp. 91–92, above) that recorded case studies most probably do reflect the medical practice, whereas the learned textbook tradition does not. How should we in that case relate to the evidence, if we indeed see in the system both internal coherence (see Stages 1–5) and medical efficacy?

2. Relationship between the Preferred Drugs of the Commentators and their Medical Efficacy
   Here we try to see if there is a positive correlation between those drugs which are most preferred by any of the commentators and those drugs found to be efficient according to Western bioscience in the treatment of the specific disease. We take also into account the amount of drugs recommended—i.e., number of appearances is not the only decisive factor, but the percentage which the amount of appearances represents among all the plants recommended by the same author is also considered. In the case of Jacques Despars, the fact that he virtually repeated all the information given by Ibn Sīnā means that we must attempt to examine only his own additions. A further issue to be considered is that of synonyms. Gentile da Foligno's text especially contains many cases where a certain plant is mentioned only in order to help its identification. These synonyms are not counted as appearances, because they do not actually show the interest of the commentator in recommending the drug, only his wish to help the reader understand the original text. These two remarks[205] apply to the rest of Stage 8.
3. Relationship between the Continuous Popularity of a Drug and its Medical Efficacy
   Here we try to see whether a positive correlation exists between those drugs which appear in the greatest number of texts—i.e., those drugs most preferred by the commentators as a group—and those drugs which Western bioscience deems efficient in the treatment of the specific disease. This shows historical continuity in the use of a drug. Here we must remember that not all diseases appear in all the commentaries (for example, diabetes does not appear in *Qānūnja* and its supracommentary).
4. Relationship between the Status of the Drug as an Innovation and its Medical Efficacy
   Here we try to see whether a positive correlation exists between innovations of the commentators not appearing in *Kitāb al-Qānūn* and those drugs which Western bioscience deems efficient in the treatment of the specific disease. In this case it would be the innovation and not the time-tested drug which would be more efficacious.

[205] About Jacques Despars and the synonyms.

5. Relationship between the Number of Recommended Qualities[206] in a Drug and its Medical Efficacy
   Here we try to see whether a positive correlation exists between the most preferred drugs ethnographically—i.e., which drugs possess most of the qualities recommended by Ibn Sīnā—and those drugs which Western bioscience deems efficient in the treatment of the specific disease. This would demonstrate to what extent the qualities in the drugs were actually determined by practical experience—i.e., how closely medieval drug theory actually approximated observable medical results and how workable it is.

These comparisons should be able to show us which criteria are most relevant as heuristic tools in fulfilling Goal 4, creating a heuristic method for seeking leads in modern drug research.

Stage 9: Conclusions
Here we will discuss the results of Stages 1–8.

In the following chapter we will use this method to analyze the therapy used for nosebleed.

[206] *I.e.*, pharmacological effects of drugs that Ibn Sīnā mentions as necessary for the treatment of a symptom/syndrome.

CHAPTER FIVE

NOSEBLEED[1]

In this chapter, the example of nosebleed will be used to illustrate in detail the method that we will employ through the rest of the study.[2]

Nosebleed, epistaxis, was chosen as the example case for the method because of its relative simplicity with regard to the amount of drugs used in the treatment and in respect to the description of the theoretical basis of the treatment. Nosebleed seems to be a good symptom to begin this kind of evaluative study of the efficacy of the drugs used and the rationality of the drug therapy in medieval Arabic and Latin medicine in general, because the effectiveness of the treatment can be assessed satisfactorily and, in most cases, instantaneously. In comparison to many feverish diseases, or, as an extreme case, to the bite of a rabid dog,[3] the results of treating nosebleed both can and must be seen quite immediately. In addition, although most cases of nosebleed can be treated effectively by means other than drugs, such as physical intervention (in the form of pressure, etc.), the ailment does require some kind of intervention, that is, it does not usually heal spontaneously. Therefore, nosebleed provides an excellent tool for determining the rationality of medieval Arabic and Latin drug therapy, as any successful treatment of this ailment would manifest observable results.

We will here shortly describe nosebleed from the point of view of modern medicine. Its therapy will be discussed later in Chapter 5.4, *Relationship between the Medical Efficacy of Drugs and their Popularity*.

The upper part of the nose consists of bone and the lower part of cartilage. Inside is a hollow cavity (the nasal cavity) divided into two passages by the nasal septum, which extends from the nostrils to the

[1] Translations of the Arabic and Latin quotations in chapter 5 and the related tables are the author's, if not otherwise indicated. Bracketed [ ] material in the translation indicates additions made to the English text for the purpose of intelligibility.

[2] See pp. 106–126, above.

[3] In rabies, the incubation period varies in humans from 10 days to more than a year, averaging 30 to 50 days. *The Merck Manual of Diagnostics and Therapy*, Sec. 13, Ch. 162, Viral Diseases. *http://www.merck.com/pubs/mmanual/section13/chapter162/162d.htm*.

back of the throat. Lining the nasal cavity is a mucous membrane with many blood vessels.[4]

Nosebleeds (epistaxis) have a variety of causes. Most often, the blood comes from Kiesselbach's area, which is located in the front part of the nasal septum and contains many blood vessels. The main cause of nosebleed is injury, incurred by anything from picking one's nose to nose fracture. In the latter case, the exact location of the fracture and the bleeding can be hard to find, as the mucous membrane and other soft tissues swell quickly. An increased tendency for nosebleeds is caused by localized infections, mainly vestibulitis and sinusitis. Vestibulitis, infection of the nasal vestibule (the area just inside the opening of each nostril), produces crusts around the nostrils. Nosebleeds occur as the crusts detach. In sinusitis the bleeding can also occur deeper in the nostril. Dryness of the mucous membranes makes their capillaries more prone to breakage. This can be caused, for example, by dry weather or dryness of the mucosa, which is related to the aging process. Narrowing of the arteries (arteriosclerosis) and high blood pressure affect the blood vessels internally, making them too small to handle the amount of blood inside. In addition, arteriosclerosis makes the vessels non-elastic, and therefore more fragile. In these cases, the source of bleeding is likely to be further back in the nose, where bleeding is more difficult to stop. Lastly, the cause can be one of a number of disorders that cause a tendency to bleed. While these disorders do not trigger the bleeding (it is usually triggered by a rupture of the vessel), they greatly complicate the task of making it stop. Among these disorders are aplastic anemia, leukemia, low platelet count (thrombocytopenia), liver disease, hereditary blood disorders such as hemophilia, and hereditary hemorrhagic telangiectasia.[5]

5.1. *Nosebleed in* Kitāb al-Qānūn

5.1.1. *General Presentation*[6]

Nosebleed, *al-ruʿāf*, is discussed in *K. al-Qānūn*, Book III, "Localised diseases from the head to the extremities of the body", *Fann* 5, "About the

[4] *The Merck Manual of Medical Information—Home Edition*. Sec. 19. Ear, Nose, and Throat Disorders. Ch. 213, Disorders of the Nose and Sinuses. *http://www.merck.com/pubs/mmanual_home/sec19/213.htm*.

[5] *Ibid*.

[6] See Stage 1, pp. 106–108, above.

states of the nose", *Maqāla* 1, "About the [sense of] smell and its damages, and the fluxations". In addition to the "Chapter about the nosebleed",[7] which is the fourth one in the *Maqāla* (situated between a "Chapter about damages of the [sense of] smell" and a "Chapter about common cold and catarrh"), the *Maqāla* also contains chapters about the anatomy of the nose and about how to introduce medications for the nose. *Maqāla* 2, concerned with diseases of the nose, discusses other ailments such as wounds and ulcers in the nose, sneezing, dryness and fracture of the nose. The *Fann* concerned with nosebleed spans three pages in the Būlāq (1294 H) version; it describes the different types of symptoms, gives its etiology and, based on the etiology, discusses both the prognosis and the necessity or the possible detriment of the treatment, the latter applying to cases where nosebleed is connected either with plethora or with a crisis of a disease. The rest of the text describes possible treatments and a suitable diet for those with a tendency to nosebleed. Finally, prescriptions for actually causing a nosebleed (as was sometimes deemed necessary) are given. This area of treatment, however, lies outside our field of interest, and so we will leave it undiscussed.

The term *al-ruʿāf* comes from the root *rʿf*, meaning 'to drip, bleed,' which also provides the word *marʿūf*, 'having tendency to nosebleed' or 'having nosebleed.'[8] Ibn Sīnā does not define the word, but assumes his readers to understand it without comments. Later, the Latin translator is forced to, or chooses to use the more explanatory term *fluxus sanguis ex naribus*. In *K. al-Qānūn*, *al-ruʿāf* simply means flow of blood from the nose, whatever its cause. Ibn Sīnā seems to have considered it a symptom rather than a specific illness, because he mentioned it both as a result of a bodily tendency and as a crisis in some diseases. In other words, he saw nosebleed as an integral or at least possible part of different diseases or syndrome complexes.

5.1.2. *Nosebleed: Causes*[9]

We will start by discussing the causes, symptoms, and consequences of nosebleed. This will help us to better understand some of Ibn Sīnā's therapeutic decisions.

---

[7] *K. al-Qānūn*, Vol. 2, pp. 163–166.

[8] Lane, 1886–1893, p. 1107.

[9] See Stage 1, pp. 106–108, above. In the following chapters, I have numbered the items for clarity's sake. Unless otherwise indicated, the numbers do not appear in the

Ibn Sīnā lists four main causes of nosebleed:

1. Predominance of the blood rising strongly,[10] causing a nosebleed that gets stirred up to a strong stream.[11]
2. Ruptures of the network of blood vessels in the brain.[12]
3. Ascending hot vapors.[13]
4. Predisposition of the body and its biliousness: especially yellow-bilious, thin-blooded (i.e. choleric) persons and those whose blood is bitter are predisposed to nosebleed.[14]

In addition, Ibn Sīnā hinted that a plethora of blood was a cause of nosebleed.[15]

According to him, nosebleed can also follow the following bodily states:[16]

1. headache
2. burning sensation[17]
3. acute illness
4. a fall or a blow

Nosebleed could also constitute the crisis point of acute illnesses such as smallpox, measles and the like.[18] "From nosebleed and its states one obtains information about the state of acute diseases and their crises."[19]

---

original. Comments to Ibn Sīnā's description of nosebleed and its treatment in the footnotes in Chapters 5.1.2, 5.1.3, 5.1.4, 5.1.5.1 and 5.1.5.2 are my interpretation based on the medieval medical theory as it appears in *K. al-Qānūn*.

[10] Or, according to different diacritical points, boiling strongly: *'aliya* vs. *ghalā*. The Latin translation of Gerard of Cremona gives 'boiling' instead of 'rising.'

[11] It seems that this is the same as the "boiling of intense heat" that Ibn Sīnā describes later, in the chapter on treatment, as a cause of difficult nosebleed.

[12] These ruptures could occur either in the veins or in the arteries, as could be seen from the differing symptoms. Later, in the chapter on treatment, Ibn Sīnā also gives "eruption of the arteries" as a cause of difficult nosebleed. Supposedly, the question also concerns the arteries of the brain, as both this and "rupture of the network of the veins and arteries of the brain" were considered very difficult.

[13] They could supposedly reach the brain and cause a rupture of blood vessels there.

[14] Bitterness [= biliousness] of the blood would make a person prone to nosebleed, as it would thin the blood so that it could pass through narrower channels. See p. 43, n. 259, above.

[15] Also the concept "prevailing blood," mentioned by Ibn Sīnā as a cause, may be categorized here.

[16] Ibn Sīnā does not, however, consider them as direct causes for nosebleed.

[17] Or: inflammation (Ar. *iltihāb*).

[18] In these cases, while it could not accurately be said to be caused by these illnesses, its development would certainly be affected by their progress.

[19] *K. al-Qānūn*, Vol. 2, p. 164.

Depending on the different causes, Ibn Sīnā saw nosebleed as either critical[20] or spontaneous.[21]

5.1.3. *Nosebleed: Symptoms*[22]

In Ibn Sīnā's writings, nosebleed was seen as a symptom rather than a syndrome (although Ibn Sīnā did not differentiate between these two concepts). However, it could assume various forms, which differed from each other in the following aspects:

1. Form of bleeding: Sometimes the blood flows in drops; other times as a strong stream.
2. Frequency of bleeding: Sometimes the bleeding is periodical; other times it occurs in one gush.
3. Strength of bleeding: Sometimes the bleeding is light and easy to treat, while other times it is strong and piercing.
4. Place of eruption: Sometimes the arteries burst; other times the veins. Blood flow from the arteries is thinner, redder and hotter than flow from the veins.
5. Place of bleeding: The blood may exit from either one or both of the nostrils.

Ibn Sīnā claimed that a blood loss from spontaneously occurring nosebleed could reach 4 *raṭl*s,[23] but later on in the text he wrote that a person can survive even the loss of 20 or 25 *raṭl*s of blood.[24]

According to him, nosebleed could be preceded by the following signs:

1. The patient would see flashes of light (especially following headache).
2. The patient would see flashes of white, red and yellow streaks (especially following headache).
3. Other symptoms, for which he refers to the section of *K. al-Qānūn* on acute diseases and their crises.

---

[20] I.e. constituting the crisis of an illness.
[21] I.e. caused by an 'unnatural' reason (see pp. 40, 45–46, above).
[22] See Stage 1, pp. 106–108, above.
[23] *K. al-Qānūn*, Vol. 2, p. 164. The weight of a *raṭl* varies depending on the time and the geographic area where it is used. Hinz suggests the weight of 437,5 g (Hinz, 1970, p. 28 ff.).
[24] *K. al-Qānūn*, Vol. 2, p. 165.

5.1.4. *Nosebleed: Consequences*[25]

Ibn Sīnā held the opinion that nosebleed could be beneficial or harmful, depending on the patient's temperament and other diseases and on the strength of the blood flow. In all cases, it could have unfavorable effects, of which he mentioned four:

1. Loss of blood.[26]
2. Signs of the corruption of brain functions.[27]
3. Decline of strength.[28]
4. Fainting.[29]

Ibn Sīnā ascribed to nosebleed, if it was not excessive, the following useful effects, particularly if the patient suffered from hot/acute[30] illnesses and internal apostemas:

1. Lightness of head rather than repletion.[31]
2. Moderation of color rather than strong redness.[32]
3. Normalization of the external appearance after swollenness.[33]

He considered it particularly beneficial in the following conditions:

1. Hot/acute[34] illnesses.
2. Illnesses with internal sanguinary or choleric apostemas: in descending order, nosebleed would be beneficial for the treatment of

[25] See Stage 1, pp. 106–108, above.
[26] This would have been the cause of all subsequent negative consequences. The problem seems to have been two-fold: the immediate loss of blood caused by the bleeding and a resulting long-term diminution of the body's blood resources.
[27] Apparently Ibn Sīnā saw this as the most important effect, as he mentioned it first of all. It was presumably caused by a decrease of blood in the brain, affected either by the rupture of a vein or artery in the network of the brain's blood vessels or by the outpouring of blood from vessels in the nose, causing quick depletion of blood from the whole head.
[28] Presumably caused by the loss of the powers that would have exited with the blood.
[29] Presumably caused by the decrease of blood in the brain, where it supplies the brain with powers and spirits necessary for normal life.
[30] It is unclear here if the Arabic text is written *ḥārr* = 'hot' or *ḥādd* = 'acute, sharp'.
[31] Possibly by causing a decrease of superfluous blood in the head.
[32] When superfluous blood caused the patient's face to appear excessively red (for example in hot/acute illnesses and internal apostemas), nosebleed was assumed to balance this excess.
[33] Swollenness was assumed to signal a need for removal of extra blood, i.e., the existence of a plethora of blood.
[34] See p. 132, n. 30, above.

sanguinary or choleric apostemas in the brain, in the liver, in the diaphragm, and in the lungs.[35]
3. It would benefit moderately yellow-bilious (i.e., choleric), thin-blooded persons.[36]
4. As was already mentioned,[37] nosebleed is also a frequent crisis[38] in many acute illnesses, especially in smallpox, measles and similar diseases.

On the other hand, he warned about the following harmful consequences of excessive nosebleed:

1. Change of the patient's facial color, depending on the temperament: choleric patients' faces would assume an abnormal yellow color, phlegmatic ones a dull grey, and melancholic ones a swarthy yellow.[39]
2. Blackening.
3. Extreme emaciation.[40]
4. Coldness of extremities.
5. Diseases of weakness of the liver and the like, even if the blood flow was stopped.
6. Dropsy and the like, even if the blood flow was stopped.
7. Death: according to Ibn Sīnā, a human being can survive a loss of up to twenty or even twenty-five *raṭl*s of blood, but a loss exceeding this amount would cause death.[41]

A special case of negative consequences caused by nosebleed was the descent of blood to the stomach of the patient, where it would swell

---

[35] Thus, Ibn Sīnā claimed that it would be more beneficial in cases of pleurisy, which is a hot apostema in the diaphragm, than in peripleumonia, which is a hot apostema in the lungs.

[36] Their blood was by definition hot and sharp. The removal of some blood would lessen the amount of heat remaining inside the veins, which was thought to be one of the causes of nosebleed. See p. 130, above.

[37] See p. 130, above.

[38] Announcing the turning point of the course of the disease either towards healing or towards death.

[39] Presumably, as the blood in the body decreased, its red color would no longer be strong enough to mask the color of the dominant humor in the person's body, and the latter would begin to determine the patient's skin color. Thus, the change of color was not seen so much an aesthetical problem as an indication of a serious imbalance of the bodily humors.

[40] Or: weakness (Ar. *dhubūl*).

[41] Cf. p. 131, above.

the stomach, weaken the pulse and cause unconsciousness. This kind of consequence was not necessarily caused by excessive nosebleed only, but any quantity of blood that flowed through the throat to the stomach.

According to Ibn Sīnā, the loss of blood caused by nosebleed primarily harmed patients in whom phlegm or black bile predominated, while causing less harm to those in whom yellow bile predominated.[42]

5.1.5. *Nosebleed: Treatment*

In Ibn Sīnā's text, drug therapy has a theoretical and a practical aspect, the former relating to the theory informing the therapy, especially the drug qualities recommended for the treatment, and the latter referring to the actual drug therapy. In addition to drug therapy, Ibn Sīnā used various physical non-drug therapies like venesection and different bathings.[43]

5.1.5.1. Treatment, Theory[44]

The first question concerning the treatment of different types of nosebleed was whether or not to treat. This had to be decided especially in cases of critical nosebleed (nosebleed signaling a crisis) and nosebleed which, by occurring spontaneously, resembled critical nosebleed. As Ibn Sīnā considered these in themselves often as beneficial, he did not recommend treating them before a decline of strength was perceived; if they were excessive, however, the bleeding was to be stopped. On the other hand, cases of nosebleed caused by ruptures of the network of veins and the arteries of the brain were according to him usually not treatable.[45] All other types of nosebleed were to be treated with remedies designed to stop it.

Ibn Sīnā recommended that remedies for stopping nosebleed have one or more of the following qualities:

---

[42] Presumably this difference was related to the loss of heat caused by the loss of blood. As phlegm and black bile were themselves classified as cold, the loss of heat would make this coldness excessive, while persons in whom hot yellow bile dominated could supposedly even benefit from its decrease.

[43] With no herbs or other medicinal substances added to the bathing water.

[44] See Stage 2, pp. 108–109, above.

[45] Therefore, any therapeutic attempt would have been unreasonable or at least non-efficacious.

1. Very astringent.[46]
2. Very cooling, very thickening and very congealing (at the same time).[47]
3. Strongly adhesive.[48]
4. Sharp and caustic.[49]
5. Remedies with a special property.[50]
6. Remedies combining two or three of the qualities in this list.
7. Acting to stop the nosebleed immediately.[51]
8. Later, Ibn Sīnā added anesthetizing remedies in his advice for liniments and dressings, which he advised should be made of cold, astringent and anesthetizing medicines mixed with cooling and astringent juices.[52]

---

[46] Astringent drugs were assumed to draw together the particles of the tissue, thickening the tissue on which they operated and blocking the channels there. In this way they also clotted bleedings. Their effect was seen as local, acting on the surface of the member. Astringent drugs acted through dryness.

[47] These drugs acted on the blood, making it less fluid and so less able to escape from the veins or the arteries. Cooling drugs were generally thought to have a coagulating effect. In addition, as the cause of nosebleed was seen as often being connected with heat, especially heat of the blood, cooling drugs would attack the cause of the problem. Theoretically, these drugs would have both a general effect on the blood and a local effect if applied externally. Thickening drugs thickened the blood, i.e. made it more viscid, thus having the same effect as congealing ones. (This thickening effect would actually often have been achieved through congealing; see *K. al-Qānūn*, Vol. 1, p. 234.)

[48] Adhesive drugs were used for local therapy. The intention, as with astringent drugs, was to clog the channels through which the blood exited; however, whereas astringent drugs were assumed to move the particles of the surface together and thus build an obstruction from the material of the body, adhering drugs were dry drugs with a little adhesive moisture. They would cleave to any openings in veins or arteries from which blood was flowing, blocking the openings and stopping the flow. In this way, the adhesive drugs would be used externally as a dressing.

[49] Sharp and caustic drugs were thought to have nearly the same effect as the adhesive ones, with a difference of degree rather than quality. They would burn the skin or the inner mucosa, drying and hardening it, so that the material of the skin became a scab blocking the flow of blood. Ibn Sīnā warned the reader to use these drugs with caution, because sometimes when the scab they caused would detach, it would cause worse harm than the initial wound.

[50] These were drugs that acted counter to the expected effect of mixing the four main qualities (hot, cold, moist, dry). The physician would choose a remedy of which the special property was one that Ibn Sīnā recommended for stopping nosebleed. For special properties, see pp. 55–56, above.

[51] It is to be supposed that behind this quality, too, lay the other medical qualities mentioned here.

[52] One of the primary qualities of anesthetizing remedies was extreme cold (Galenic 4th degree), and therefore they had a cooling, thickening effect on the blood, both when used internally and when used externally, as in this case. (Internally used they would also

When nosebleed was diagnostized to have been caused by bodily tendencies and biliousness, it was of first importance to change the quality of the blood and, thereby, the quality of the patient's temperament. This was done by persistently evacuating the bile from the patient and regulating the blood with suitable food and drinks.

The main treatment recommended by Ibn Sīnā for strong nosebleed was venesection from the cephalic vein[53] or the shoulder vein on the back side until the patient fainted.[54] There is no special mention of any other treatment for blood itself. However, in treatments recommended for dropwise or paroxysmal bleeding, Ibn Sīnā suggested gradual venesection, and, after removal of a sufficient amount of blood, thickening of the blood with cooling remedies and with remedies that would make it viscous, despite the fact that they would not cool the blood.

In addition to the actual drug therapy, Ibn Sīnā recommended different food and drinks as suitable for persons with a tendency to nosebleed. He especially emphasized chicken brains, which empiricists[55] recommended both as excellent food for those who are predisposed to nosebleed on account of bitterness in their blood, and as an excellent remedy for those who had nosebleed as a result of a fall or a blow. Notable here is

---

deal with one of the possible primary causes of nosebleed, that is, heat, especially that of the blood.)

[53] *Qīfāl* = veine céphalique (Meyerhof, 1933b, p. 173). The cephalic vein, *al-qīfāl*, "runs the length of the arm and is visible along the outer edges of the biceps; it was the favoured location for phlebotomy to cure headaches and nosebleeds—hence its name 'cephalic' or head vein." Pormann and Savage-Smith, 2007, p. 118, n. 15.

[54] See Ch. 5.1.5.2, below.

[55] *al-mujarribīn*. There is some controversy on the definition of the term *mujarrab* ("tried," "tested"). According to Ullmann, it is a cover name for superstitious drugs belonging actually to the realm of magical and folkloristic cures (Ullmann, 1970, pp. 311–313). Álvarez-Millán (2000), on the other hand, considers al-Rāzī's *Kitāb al-tajārib* as a case book reflecting his actual practice as a physician. Langermann explains *tajriba* in the following way: "*Tajriba* denotes conclusions drawn from repeated observation, specifically between an effect and its purported cause, even when no demonstrative argument, other than the purported connection between cause and effect that has been "experienced", justifies those conclusions. *Tajriba* is not induction, at least in the technical sense that *istiqrā'* is employed. As Ibn Sīnā explains, induction applies to inferences drawn from particulars that mandate a conclusion that applies to a universal. For example, noting that humans, horses and oxen, are long-lived and have but little gall, one may induce the general proposition, "All long-lived animals have little gall." *Tajriba*, by contrast, does not yield universals, but rather isolated facts; for example, one concludes from the repeated effect of, say, scammony on the human body that it is a purgative. Medicine had to rely upon *tajriba* to some extent since many medicinal preparations were experienced to be efficacious, even though their cause could not be formally demonstrated." Langermann, 2005, p. 296. See also Savage-Smith, 1988, p. 253.

the strict differentiation between food and remedy, and at the same time, the use of the same substance as both. They were supposed to be eaten in great amounts and be used successively several times.

Ibn Sīnā offered a separate discussion on wine. On the one hand, he thought it should be avoided, as it would have the harmful effect of stirring the blood, while on the other hand, its strengthening quality might be beneficial if the nosebleed had reached a level at which it caused a decline of the patient's strength. Thus, he advised that it was to be used only in situations where a strengthening drug was needed, and then only when diluted with water.

When discussing food and drink suitable for the patient with nosebleed, Ibn Sīnā also mentioned qualities that should be avoided. Thus, because of their cutting and rarefying qualities, sour things would sometimes harm those with a tendency for nosebleed.[56] Also, he warned about stirring the blood by drinking wine.

Ibn Sīnā devoted a separate discussion to the treatment of blood descending to the stomach. He instructed that this descent should be prevented as much as possible, for example by holding cold water in the patient's mouth. If blood had descended to the stomach, the patient was to be induced to vomit as soon as the descent was perceived. If the blood had already reached the stomach and was therefore too low to be vomited easily, the patient was to be given an enema to expel it quickly, so that it would not remain long in the stomach.

Table 5.1 in Appendix 1 shows the medical qualities recommended by Ibn Sīnā for nosebleed, with code letters to be used later on in the study.[57]

5.1.5.2. Physical Therapies

Physical therapies such as venesection, baths, exercise, etc. are not part of the subject and would demand a research of their own; therefore, we will not discuss them in detail but only mention them cursorily. An exception are medicated baths and massages.

The main types of physical therapy used by Ibn Sīnā in the treatment of nosebleed were venesection, cupping, binding the extremities, and external application of cold water. Local tamponade as a physical measure

---

[56] "*Mulaṭṭif* (refining): Applied to the quality which makes any matter more rarefied, as for example hyssop." Young, 1961, p. 70.

[57] In Chapters 5.1.5.4, 5.2.5.1, 5.2.5.3, 5.3.5.1 and 5.3.5.3, below.

was not included, as the effect of all tamponades recommended by Ibn Sīnā clearly depended on their ingredients and not on the pressure caused by applying them.[58]

Ibn Sīnā recommended venesection as the most effective way of stopping nosebleed. The patient was bled restrictedly, preferably until he fainted. In nosebleed caused by boiling of blood with intense heat or eruption of the arteries, both venesection and cupping were to be used. Sometimes blood was to be extracted by venesection until fainting, either from the cephalic vein[59] or from the shoulder vein that is on the back side. According to Ibn Sīnā, this prevented the blood from ascending to the head, and thus, when it lead to fainting, it would alleviate the bleeding immediately. On the other hand, if the bleeding was not strong, but dropwise or paroxysmal, the venesection was to be administered gradually, in successive stages; when it reached the sufficient amount, the patient was to be treated with remedies that would thicken and cool the blood, along with remedies that would make the blood viscous even without cooling it.

Ibn Sīnā did not recommend cupping glasses as a sole remedy if the blood was very hot or gushing strongly, since they would not have a strong enough affect to keep the blood from rising to the head. If, however, venesection was first used to diminish the heat of the blood or the strength of its flow, cupping glasses could then be used. The cupping glasses were to be attached over the area of the liver if the nosebleed was from the right nostril, over the spleen if it was from the left, and on both if it was from both sides.

An additional therapy was the binding of the patient's extremities, including the ears and even the testicles or, in the case of women, the breasts.[60]

Cooling the patient's head by pouring cold water on it was seen as implicitly beneficial, but Ibn Sīnā warned that this treatment was not to be overdone, as sometimes it would coagulate the blood and congeal it in the membranes of the brain. The patient was to bathe in cold water (i.e. water cooled with ice) until his limbs would turn green; alternatively, his head was to be plastered with slaked lime or lime dissolved in vinegar and

---

[58] On tampons, see Fellmann, 1986, pp. 194–195.

[59] See p. 136, n. 53, above.

[60] Ibn Sīnā does not explain the theory behind this therapy, but according to the commentators the intention is to cause pain, which then would draw the blood to the hurting place, away from the nostrils.

ice-cooled water was to be poured over it. The simplest way of cooling the patient's head was having him hold cold, icy water in his mouth.

5.1.5.3. Treatment, Practice[61]

Simple Drugs and Prescriptions

We will now discuss the drug therapy recommended by Ibn Sīnā. In order to simplify the handling of the material, we have divided the therapy into 53 prescriptions. However, this division is not exact. As we can see, while the first five prescriptions are simply lists of drugs that have similar qualities, there are also later cases[62] that cannot be divided with precision because they contain simple drugs listed one after the other which can be understood either as all belonging to the same prescription or as functioning separately. For the practical purpose of evaluating a therapy,[63] this division is secondary, as it does not generally affect the amount of appearances of a certain drug in the prescriptions.[64] Also, it was quite common in medieval medical texts to prescribe similar drugs in different combinations, so that in most cases the simple drug seems to be vital factor, while the combinations are relatively arbitrary or based, e.g., on one drug correcting the side effect of another. However, this is a field that we cannot confidently assess at our present level of knowledge, especially because of the following: when we see a prescription containing several ingredients which have the same theoretical base of use, we cannot exclude the possibility of synergism, or the possibility that combining two drugs that should not have been mixed would cause a negative reaction.[65] In any case, a right understanding of the prescription complexes—which ingredients belong together and how they should be prepared[66]—would have been much more relevant for the medieval physicians than for the purposes of our research.

When choosing between two possibilities with seemingly equal validity, we have followed the division used in the Latin translation by Gerard of Cremona as it appears in *Liber Canonis Avicenne* (Venetiis, 1505).

---

[61] See Stage 3, pp. 109–111, above.
[62] See e.g. Prescriptions #23 and #28, pp. 145–146, below.
[63] See Ch. 4.2, Stage 7, pp. 116–124, above.
[64] See Ch. 5.1.5.3, below.
[65] About 'tried formulas' for compound medications, and the theory of mixtures, see pp. 56–58, above.
[66] See Chipman, 2002.

We have also added, as footnotes, the differences between the Arabic text of *Kitāb al-Qānūn fī al-ṭibb* (Bayrūt [sine anno,] repr. of Būlāq 1294 H) and this Latin translation. In these footnotes, 'the Latin text' refers to Gerard of Cremona's version as it is presented in Venetiis 1505 text, 'the Arabic text' to the Būlāq 1294 version. We will discuss these differences in greater detail in Chapter 5.3.5.2, where we will present Ibn Sīnā's Arabic prescriptions and their Latin translation along with the Latin commentaries. However, for the sake of clarity and maximal accuracy in the presentation of Ibn Sīnā's therapy, we will mention them already here.

Amounts of drugs and dosages mentioned in the prescriptions are omitted for reasons mentioned in Chapter 4.2, *Suggested Methodology*.[67]

An asterisk after a list of ingredients denotes the method of application of the drug. Drug names connected with 'OR' are alternative choices for the same prescription.

Simple Drug Categories

In describing the treatment of nosebleed, Ibn Sīnā listed the following simple drugs, grouped as below, which presumably could be used either alone or in conjunction with others:[68]

Prescription #1

Astringent Remedies

Examples:

juice of salsify
acacia
pomegranate flower
rose[69]
lentil
gallnut
juice of leaves of buckthorn
juice of leaves of pear
juice of leaves of quince
knotgrass

[67] Stage 7, *Evaluating the Efficacy of Simple Plant Drugs in Light of Modern Pharmacology*, pp. 116–124, above.
[68] *K. al-Qānūn*, Vol. 2, pp. 164–166.
[69] Rose is missing from the Latin text.

Prescription #2

Cooling Remedies

Examples:

opium
camphor
henbane seed[70]
gypsum[71]
seed and juice of lettuce
willow
water of unripe dates of date palm[72]
plantain
saltwort

(all of the above were not to be boiled.)[73]

Prescription #3

Adhesive Remedies

Examples:

mill dust
frankincense powder

Prescription #4

Caustic Remedies

Examples:

the vitriols[74]
yellow vitriol

Ibn Sīnā warned that caustic remedies had to be used with caution, as sometimes they would cause a scab to form which, if it detached, could cause a worse condition than the initial one.

---

[70] In the Latin text 'henbane seed' is translated as *semen iusquiami albi*, 'seed of white henbane'.
[71] Gypsum is missing from the Latin text.
[72] In the Latin text 'unripe dates of date palm' is translated as *aqua foliorum palme*, 'leaves of palm.'
[73] The ingredients were left uncooked supposedly to increase the cooling effect, although according to the theory boiled and indeed externally hot drugs can still have a cooling effect.
[74] In the Arabic text 'vitriols' is plural, in Latin singular. See Appendix 17, Prescription #4, p. 386, below, for Despars' explanation.

Prescription #5

Remedies with a Special Property

Examples:

excrement of donkey
water of basil
water of mint

Compound Prescriptions

Ibn Sīnā gave the following prescriptions for the treatment of nosebleed. Prescriptions #6–42 are given for treatment of a light nosebleed.

Prescription #6

water of unripe dates of date palm[75]
acacia
camphor
*snuff

These were to be dripped continuously into the patient's nose.

Prescription #7

juice of unripe dates[76]
juice of salsify
camphor
*snuff

Prescription #8

water of unripe dates[77]
leek juice
*snuff

Prescription #9

bitter salt water

This was to be dripped into the patient's nose.

---

[75] The Arabic *mā' al-balaḥ al-nakhl*, 'water of unripe dates of date palm,' is translated in Latin *aqua florum palme*, 'water of palm flowers.'

[76] Again, Arabic *'uṣāra al-balaḥ*, 'juice of unripe dates,' is translated with Latin *aqua florum palme*, 'water of palm flowers'. Note also that 1) 'palm' is not mentioned in Arabic, 2) that the Arabic word *'uṣāra*, 'juice,' is translated with *aqua*, 'water'.

[77] Here Arabic *mā' al-balaḥ*, 'water of unripe dates,' is translated simply *aqua florum*, 'water of flowers.' The omission can be explained by Prescriptions #7 and #8 actually belonging to the same sentence.

Prescription #10

water of coriander

Prescription #11

juice of saltwort
(in its unboiled state)

Prescription #12

cucumber water
camphor

Prescription #13

juice of basil
camphor

Prescription #14

juice of plantain
terra sigillata
camphor[78]

Prescription #15

juice of knotgrass
[*terra sigillata*]
[camphor][79]

Prescription #16

juice of the fresh excrement of donkey

(According to Ibn Sīnā, this prescription is one of the most potent ones in the list.)

---

[78] Here the Latin text says ‘or camphor’ instead of the Arabic ‘and camphor’, dividing Prescription #14 into two prescriptions.

[79] *Terra sigillata* and camphor are mentioned in Prescription #14, of which Prescription #15 is a variant, but not explicitly in Prescription #15.

Prescription #17

To be used if the physician perceived abundance of blood:

verdigris
sesame oil/vinegar[80]

Verdigris was to be dissolved in the sesame oil/vinegar. The medicine was to be dripped into the nose bit by bit.

Prescription #18

If the physician perceived abundance of blood:

powder of the pomegranate flower
water of plantain
*snuff

The powder of the pomegranate flower was to be pounded to a fine powder with the water of plantain.

Prescription #19

If the physician perceived abundance of blood:

water
opium

Opium was to be mixed[81] with the water.

Prescription #20

ink
vitriol
*tampon

A tampon was to be taken and soaked in ink. Vitriol would be sprinkled on it until it would completely thicken.[82] It was to be inserted into the nose.[83]

[80] The main body of the Arabic text of the Būlāq 1294 H version gives here *ḥall*, 'sesame oil,' but a marginal remark corrects it to *khall*, 'vinegar'. The Latin text, and also Despars in his commentary, follow the correction with 'vinegar,' and 'wine vinegar,' respectively.
[81] In the Latin text 'dissolved.'
[82] The Arabic 'thickens' is translated *commisceantur*, 'is mixed'.
[83] Concerning tampons, see Ch. 5.1.5.2, pp. 137–138, above.

Prescription #21

juice of nettle leaves
yellow vitriol
fur of hares
excrement of donkey, dry and moist[84]
juice of leek
frankincense
*tampon

A tampon was to be made out of the above mixture.

Prescription #22

burned Indian lycium
water of basil
*tampon

A tampon was to be made out of the above ingredients.

Prescription #23

mill dust
powder of frankincense
aloe
vinegar
egg-white
*tampon

A tampon was to be made out of the above ingredients.

Prescription #24

vitriol
burned paper
bark of frankincense
water of basil
*tampon

A tampon was to be made out of the above ingredients.

[84] In Arabic the excrement should be "dry and moist" (presumably using both types at the same time), in Latin "dry or moist".

Prescription #25

rose water[85]
yellow vitriol
aloe

A tampon was to be moistened in rose water and then immersed in yellow vitriol and aloe.

Prescription #26

water of leek
powdered mint

A tampon was to be made of[86] the water of leek, sprinkled with powdered mint.

Prescription #27

sponge
melted pitch
vinegar

A tampon was to be made of sponge and melted pitch and then immersed in vinegar.

Prescription #28

mandrake OR cobweb
yellow vitriol
vitriol
verdigris

A tampon was to be made out of the above ingredients.[87]

Prescription #29

fluffy fur of hare
frankincense
aloe
egg-white

A tampon was to be made of fluffy fur of hare immersed in frankincense and aloe which had been kneaded with egg-white.

---

[85] On the technology for industrial distillation of rose water, see Hill, 1993, pp. 85–87.

[86] According to the Arabic, the tampon was *made* of the water of leek, whereas the Latin says it was *immersed* in the water of the leek, which would be more reasonable from a practical point of view.

[87] The Latin text seems to divide the ingredients into 2 prescriptions, mandrake alone

Prescription #30

burned vitriol
opium
vinegar

A tampon was to be made of burned vitriol and opium combined in vinegar.[88]

Prescription #31

burned egg-shells
ink
gallnuts

A tampon was to be made of burned egg-shells that were mixed with ink and gallnuts.

Prescription #32

burned Indian lycium
*inhalation

Prescription #33

burned frogs
*inhalation

These were sprinkled in the nose.

Prescription #34

mill dust OR clay of white clay pottery[89]/clay of white pepper cress[90, 91] OR lime
*inhalation

---

and cobweb + yellow vitriol + vitriol + verdigris together. This division would be possible also in Arabic. For our purposes, the question is not relevant.

[88] In the Latin translation the vitriol and the opium were not only put together in vinegar, but also ground with it.

[89] = porcelain.

Prescription #35

frankincense barks
paper
vitriol
*inhalation

This was blown into the nose.

Prescription #36

To stop the nosebleed immediately:

bark of the platanus tree[92]
clay
*inhalation

The bark of the platanus tree was dried and powdered, then put in new clay jugs.[93] If there was pottery clay in them, it was better. The top of the jug was corked and the jug itself was placed in the shadows until the mixture dried. The mixture would then be powdered, when needed, to the likeness of fine dust,[94] and blown into the nose. It would stop the nosebleed immediately.

Prescription #37

egg-shells pulverized
*inhalation

92 The Arabic 'bark of the platanus tree' is translated in Latin as *cortices fructus aldulb*, 'peels of the fruit of platanus'. It seems the Latin translator does not personally know the tree in his own surroundings, as he uses the Arabic name transliterated, *aldulb*.

93 On the recommendations for use of *new* earthenware pots, see Marín, 2002, pp. 292/4–293/5, although the reason for the recommendation here may be different than in the usual cooking recipes.

94 The Arabic 'fine dust' is translated poetically in Latin: *atomi qui apparent in radio solis*.

Prescription #38

lemongrass[95]
flowers of dog-rose[96]
rose seed
clove
myrrh
gallnuts
musk
camphor
*inhalation

The mixture was to be inhaled into the nose on successive days.

Prescription #39

juice of the leaves of willow
juice of leaves of grapevine
juice of leaves of myrtle
rose water
*liniment

All the ingredients, after being cooled, were attached to the forehead with a linen cloth.

Prescription #40

Likewise, liniments and dressings were made of all the known cold, astringent and anesthetizing remedies mixed with the cooling, astringent juices, such as:

juice of the twigs of willow
buckthorn
cut-off twigs of grapevine
leaves of pear
leaves of quince
leaves of knotgrass
*liniments
*dressings

Prescription #41

fresh excrement of donkey
*inhalation[97]

---

[95] The Arabic *qaṣab al-dharīra*, 'lemongrass,' is translated to Latin as *calami aromatici*. See Appendixes 2 and 18 for identifications of these plants.
[96] The Arabic *nuwwār nisrīn*, 'flowers of dog-rose,' is translated to Latin as *seminis lilij*, 'lily seeds.' See Appendixes 2 and 18 for identifications of these plants.
[97] I.e., a remedy to be smelled.

Prescription #42

tops of reed
tips of brooms
cotton[98] of papyrus
cotton-like substance from other plants[99]

Tampons[100] [for the nose] were filled with these.[101]

Prescriptions #43–47 were given for treatment of cases of nosebleed which were more difficult than those for which the above prescriptions were given. These more difficult cases would occur because of boiling of intense heat[102] or rupture of the arteries:

Prescription #43

To be used after sufficient venesection, in order to thicken the blood with remedies which would cool it and with remedies which make it viscous it even though they do not cool it, like

jujubes

Prescription #44

slaked lime[103] OR lime dissolved in vinegar

The patient's head was to be plastered with these. Then water cooled with ice was poured over his head until he lost all sensation.[104]

Prescription #45

(Ibn Sīnā considered this very potent.)

verdigris
*tampon

Prescription #46

water of basil
camphor

---

[98] Literally, 'cotton'. Actually, a cotton-like substance is intended.

[99] The "cotton-like substance from other plants" is a paraphrase, the actual text is "or the cotton of the rest of what originates from the plants".

[100] Fillings.

[101] The Latin translation differs strongly from the Arabic original: *C. Sed impletiones*[b] *ita sunt. Impletur enim cum capite canne: aut cum capitibus palmarum siluestrium. C. Et* ***distillat*** *cum coto papyri: aut cum coto reliquorum que egrediuntur ex plantis.*

[102] In the Latin text: *propter feruorem & caliditatem vehementem*.

[103] Arabic *jiṣṣ mayyīt* is translated into Latin *gypso infuso aqua* = 'slaked lime.'

[104] Or: it calms down (Ar. *takhaddara*).

Prescription #47

pure mummy[105]
This was to be made into snuff and inhaled.[106]

Medicinal Foods

Ibn Sīnā recommended the following medicinal foods as treatment for those experiencing nosebleed or having a tendency to do so:

Prescription #48

lentil soup, eaten with
sumac OR vinegar OR juice of unripe grapes[107]

Prescription #49

fresh cheese

Prescription #50

milk from different animals
The milk would be boiled until it thickened.

Prescription #51

boiled eggs.[108]

Boiled eggs were recommended for the patient predisposed to nosebleed specifically because of the bitterness of his blood, despite the fact that acidic foods were assumed to sometimes harm those with a tendency for nosebleed because of these foods' cutting and rarefying qualities.

---

105 In the Latin translation *mumia pura ex aqua*.
106 The Prescriptions #45-#47 could also be understood as one prescription.
107 'Juice of unripe grapes' may also be understood as an independent prescription in the Latin translation.
108 The Latin text adds to this the words *cum succo acetose*, 'with the juice of dock,' which would be suitable, especially because of the following remark about sour things being potentially harmful.

Prescription #52

Chicken brains

Ibn Sīnā ascribed this therapy to "a group of empiricists."[109] Chicken brains appeared here in two therapeutic categories: On the one hand, they were counted among the best foods for those with a tendency to nosebleed while on the other hand they were one of the best remedies for patients suffering from nosebleed as a result of a fall or a blow.[110] They were to be eaten in great amounts and on several successive occasions.

Prescription #53

Wine[111]

Ibn Sīnā considered wine as useful inasmuch as it was supposed to strengthen, while it was harmful inasmuch as it stirred the blood.[112] Therefore, if one needed to use it for strengthening, it was to be diluted a little [with water]. And if it was not needed for strengthening, and if the nosebleed had not reached the stage where the patient's strength was declining, then the patient was not to be given wine to drink.

As we can see, most of the prescriptions recommended by Ibn Sīnā against nosebleed were quite simple. Most had only a few ingredients, and preparation instructions were often omitted, or they were very simple, connected more with certain drug types than with the ingredients in question. Exceptions would be Prescriptions #2 and #11, where the ingredients were not to be boiled, probably so as not to spoil their cooling effect, and Prescription #36 which gives a complicated description of a clearly traditional drug.

Most of the prescriptions are intended to be used locally in the nose, some externally on the head (Prescriptions #39, #40, #44), and only Prescriptions #43 (jujubes) and #52 (chicken brains) were to be used internally, in addition to recommended food. Likewise, amounts of simple drugs were only seldom mentioned. These would probably not matter much, as most of the drugs were used locally. Therefore, the dangers associated with them were not great, and it was easy to see their effect quickly and add any necessary amounts. In mixtures, however, the relationship between different amounts might have had some effect.

---

109 On empiricists, see p. 136, n. 55, above.

110 On the relationship between food items and drugs, see pp. 52–53, above.

111 On the general problem with wine and different ways of solving it, see p. 17, n. 54, p. 78, n. 83, above.

112 Or: makes [the blood] boil (Ar. *yahīju al-dam*). The Latin *excitat sanguinem* seems to support the translation 'stirs the blood.'

Simple Drugs Used

Identifications of simple drugs that appear in the prescriptions are given in Appendix 2, Table 5.2, in alphabetical order according to the English names used above.[113] For sources on which the identifications are based, see p. 110, above. Only the primary identifications are considered.

The English names are not intended to be accurate but simply to convey a general idea of the plant's identity in order to simplify discussion and make the study more readable.

Table 5.3 in Appendix 3 shows the frequency with which these simple drugs were used in the above prescriptions. We will make use of this information later, when examining the relationship between the medical or pharmacological qualities of a drug and its prevalence in Ibn Sīnā's prescriptions, as well as the relationship between a given drug's frequency of use and its medical effect as seen in modern pharmacognosy.[114] At present, however, we will only examine the prevalence of each drug in Ibn Sīnā's prescriptions.

As we can see from Table 5.3, Ibn Sīnā's preferred drug was camphor, mentioned eight times. Next were frankincense, vinegar and vitriol with six appearances, basil and egg with five appearances, and unripe dates, excrement of donkey, rose and yellow vitriol with four appearances. Altogether, the text on this disease contains 144 citations of a drug. This means that even the most frequently mentioned drug, camphor, comprises only 5.6 % of the total citations. On the other hand, if we consider that an individual drug does not usually appear twice in the same prescription (which of course limits the likelihood of a single drug appearing multiple times in the whole text, however popular it was) and count instead the number of prescriptions containing camphor, we arrive at 15 %, and for basil 9 %. Of course, this way of counting is not wholly accurate, owing to the inconclusiveness of our prescription division;[115] however, it gives a general impression of the popularity of the various drugs. Another indication of the importance of these 10 most frequently mentioned drugs (15 % of the total number of drugs) is the fact that they comprise a total of 36 % of all citations of drugs. On the other hand, 32 of the drugs, or 48 % of the total amount, appear only once, making their

[113] See Stage 3, pp. 109–111, and Stage 4, pp. 111–113, above. For general problems concerning the identification of Arabic drug names, see pp. 19, 34, 117, above.

[114] See Chapters 5.1.5.4, 5.2.5.2, 5.3.5.2 and 5.3.5.3, below.

[115] See pp. 139–140, above, on problems in determining if simple drugs belong to the same prescription or not.

part of the total amount of appearances 22 %. Thus we can see that a clear core group of Ibn Sīnā's preferred drugs for nosebleed distinguishes quite easily from the rest. We will later discuss possible reasons for his choices: the theoretical background of the drugs, their objective medical efficacy (evaluated according to modern Western standards), or both.

5.1.5.4. Relationship between the Drugs Recommended for Treatment of Nosebleed and their Therapeutic Qualities[116]

The final step in testing the coherence of Ibn Sīnā's therapeutic system is to check whether specific drugs were in fact chosen for use in a treatment because they possessed the medical qualities on which the therapy was based. As a tentative hypothesis, we assume that the drugs possessing the greatest number of qualities Ibn Sīnā mentions as helpful against nosebleed should appear in the prescriptions for it most often. If this hypothesis proves to be false, the secondary and correcting hypothesis is that only the most important qualities were needed for the desired medical effect, either only one of them or as many as possible, again correlating with the number of appearances of the drugs in prescriptions. The qualities we are studying here are those mentioned by Ibn Sīnā as therapeutic against nosebleed.[117] Our purpose is to pick out those qualities most important for practice (if there is indeed a connection between the qualities and the choice of drugs), and to answer the question we asked in the beginning of the study: what are the effects the drug users in the study community sought?[118] We will examine, first of all, which of the qualities given by Ibn Sīnā as relevant for the therapy are most frequently found in drugs used for nosebleed, i.e. which of the qualities were, in practice, the most relevant ones. After that, we will compare the frequency of appearance of a given drug with its amount of therapeutic qualities that are mentioned in Ibn Sīnā's list and see if there is any connection between the number of qualities a drug possesses and the frequency with which it appears in the prescriptions. This will perhaps tell us why certain drugs were chosen when others were not.

We added to the qualities given in Chapter 5.1.5.1, *Treatment, Theory*,[119] the following basic idea for the continuation of the study:

[116] See Stage 5, pp. 113–115, above.
[117] See Ch. 5.1.5.1, pp. 134–137, above.
[118] Browner *et al*., 1988, p. 686.
[119] See Appendix 10.

DD = acting to stop nosebleed, remedies
DDa = acting to stop bleeding
DDb = against nosebleed

We then compared this list with the descriptions of the plants in Book II of *K. al-Qānūn* in order to see in how far each met expectations. The results are presented in Appendix 4, Table 5.4. *Medical Qualities in Ibn Sīnā's Drugs for Nosebleed*. In this comparison, we always chose according to the stricter criteria: for example, if a drug was seen as cooling, it was counted only as a cooling drug in general (code HH), not as a drug that cooled the blood (code II).[120] When terms used in the drug description in Book II of *K. al-Qānūn* were synonymous with any of the terms on our list, they were considered as the same. However, when the description in Book II of *K. al-Qānūn* listed a more specific quality for the plant than required for our purposes (for example 'cooling the liver,' when we needed only 'cooling'), we considered it as fulfilling the conditions, since that which is cooling for the liver also cools in general (though the opposite does not hold). By contrast, when two terms were seemingly synonyms, but clearly described two different concepts, they were considered separately.

The next step was to try to combine these qualities in different ways to see what could have been their relevant common feature. Sometimes these combinations are self-evident (combining 'cool' and 'cooling,' etc.). Partial combinations can also be quite revealing, as they involve a kind of classification, involving simply considering which qualities could belong together in a "cluster". The same quality can belong simultaneously to several clusters. In many cases, we simply tried to see things from inside the system. As a further step, we took the liberty of adding to this part of the study some qualities that Ibn Sīnā mentioned only in the drug descriptions of Book II of *K. al-Qānūn*, not in his therapy descriptions, but which were so clearly connected with the treatment of a particular illness in the eyes of Ibn Sīnā's contemporaries that they cannot be ignored (e.g. referring to methods of 'stopping the bleeding' while discussing medications for the nosebleed). (Of course we will miss other qualities, which would have been similarly obvious to them but which we do not recognize as relevant. This, however, can hardly be avoided, as the danger of drawing too far-fetched assumptions is too serious if we do otherwise.)[121]

---

120 Its cooling effect might, of course, have been expected to influence the blood, too, but unless this is especially stated, we cannot be sure of it.

121 See Ch. 4.2, Stage 5, pp. 113–115, above.

As in the whole study, we ignored information about which part of the plant was used in the prescriptions or, alternatively, in the description of the drug.[122]

We may assume that even in the case of the most preferred qualities, the desired medical effect did not always follow from that quality. Different qualities had to be combined in specific proportions, and there may have been other causes involved—or, again, this may be attributed to Ibn Sīnā's inconsistency.[123]

A portion of the simple drugs recommended by Ibn Sīnā do not appear in the pharmacopoeia of Book II of *K. al-Qānūn*. These drugs are excluded from Table 5.4. We could have checked these drugs in other medieval pharmacopoeias, but decided not to do so, since it would confuse the situation. Also, in many cases the available descriptions are incomplete and very short, as not all drugs were known in the same depth, and only a few were studied from all relevant angles. In these cases, we have to trust in the cumulative evidence.[124]

Here, some of the plant drugs that were earlier lumped together are treated separately, as they have separate descriptions in Book II of *K. al-Qānūn*. These are gypsum and quicklime.

Out of the 62 drugs examined, we reached the results given in Appendix 5, Tables 5.5a and 5.5b, concerning the frequency of the different therapeutic qualities they contain.

Table 5.5c in Appendix 5 shows these qualities divided tentatively into clusters. We were determined that these groupings would not be forced: if two qualities did not clearly overlap, either completely or by the inclusion of one in the other, we deemed it better not to combine them in the same cluster.

It is notable that there is a clear correlation between a given set of Ibn Sīnā's preferred qualities and his choice of drugs. Forty-eight percent of any of the simple drugs recommended by him are astringent, 16% are adhesive, and 16% are connected with coldness, being either cold themselves, cooling in general or cooling the blood. Additionally, the

[122] See pp. 112–113, above.
[123] See Riddle, 1985b, pp. 35–36.
[124] See *ibid*., pp. 135–136.

group of added qualities connected with generally stopping nosebleed or any other bleeding is represented by 66 % of the drugs.

Why were these four qualities the most popular? We may not find an answer to this question, but let us examine how this kind of drug could have helped with the problem of nosebleed.[125]

1. Astringent: Astringent drugs were assumed to bring together the components to which they were applied, thickening the tissue on which they operated and blocking the channels there. In this way they would also clog bleeding. Their effect was thought to be only local, acting on the surface of the organ. Astringent drugs acted through dryness.[126]
2. Adhesive drugs: This kind of drug was used for local therapy. The intention, as with astringent drugs, was to clog the channels through which the blood exited; however, whereas astringent drugs were thought to move the particles of the tissue together and thus build up stoppage from the material of the body, adhesive drugs were dry drugs containing some adhesive moisture with which they would cleave to the openings in the veins and arteries, blocking them and stopping the flow of blood.[127]
3. Cooling drugs: Described as very cooling, very thickening and very congealing (at the same time). These drugs were supposed to act on the blood, making it less fluid and so less able to escape from the veins or the arteries. Cooling drugs were generally thought to have a coagulating effect.[128] Thickening drugs presumably thickened the blood, i.e. made it more viscid, thus having a similar effect as congealing ones.[129] In addition, as the cause of nosebleed was often assumed to be connected with heat, especially heat of the blood, cooling drugs also dealt with the cause of the problem. In theory, these drugs had both a general effect on the blood and a local effect if applied externally.

From the above we can draw the following conclusion:

---

125 I have numbered the items for clarity's sake. The following comments to Ibn Sīnā's description of drugs suitable for the treatment of nosebleed are my interpretation based on the medieval medical theory as it appears in *K. al-Qānūn*.

126 See *K. al-Qānūn*, Vol. 1, p. 235.

127 *Ibid*.

128 *Ibid*., p. 234.

129 This thickening effect is, in fact, often achieved through congealing. *Ibid*.

The drugs belonging to the first two quality types have a local effect, which was desirable in order to block the bleeding with no special consideration for its cause, i.e., they belong to the category of symptomatic therapies. Cooling and congealing drugs, on the other hand, acted both to congeal the blood locally and to diminish the excess of ebullition in the blood causing the nosebleed, thus being both symptomatic and prophylactic therapeutic agents.

The next step is to discuss the relationship between Ibn Sīnā's use of drugs and their qualities: Is there a correlation, for example, between the frequency in which a certain drug is mentioned in prescriptions and the fact that it has several suitable qualities? Is there a certain preferred quality which made Ibn Sīnā choose drugs that possess it more often? The results should show either that the frequency of the use of a drug and its qualities were closely connected or that there was no connection. The material is presented in Table 5.6a, *The Connection between Ibn Sīnā's Frequency of Use of Drugs for Nosebleed and their Qualities*, in Appendix 6, followed by Tables 5.6b and 5.6c, which show the degree of this connection.

In Table 5.6a we separate some of the plant drugs that were earlier counted together (gypsum and quicklime), as they have separate descriptions in the Book II of *K. al-Qānūn*.

We see that out of 62 cases, camphor, the preferred drug, appears 8 times. The greatest amount of qualities appearing in one drug is five. Camphor seems to be exceptional, as it clearly is Ibn Sīnā's preferred drug, but it has only one quality, "stopping nosebleed", which would explain its prevalent usage. On the other hand, 70 % of Ibn Sīnā's 10 favorite drugs (15 % of the total amount of drugs he recommended against nosebleed, each mentioned at least 4 times) have at least 2 qualities suitable for the therapy; what is more, even out of his top twenty (30 % of the total amount of drugs, each mentioned at least 3 times), 70 % have at least 2 suitable qualities. Comparing these percentages with the corresponding percentage of the total of drugs recommended against nosebleed (50 %) or in drugs that appear only once (38 %), it is obvious that the number of suitable qualities in a drug correlates directly with its prevalence in Ibn Sīnā's prescriptions.

One further fact to be mentioned is the exceptional way in which the importance of astringent drugs seemed to guide Ibn Sīnā's decisions. Forty-eight percent of all drugs, and 70 % of Ibn Sīnā's twenty preferred drugs, have this quality. (This latter phenomenon cannot be explained solely by the higher amount of qualities in these 20 drugs in general.)

Thus, it appears that the answer to the question posed earlier about the correlation between therapeutic theory and practice must be answered positively. It is impossible to determine the direction of the correlation or influence, i.e. to assess whether drug qualities determined the choice of the drugs or whether these qualities were ascribed to drugs after they were chosen for such therapies. But it is obvious that there is a correlation and that this correlation of the pathology of nosebleed, its causes and manifestations, with the therapeutic recommendations (though again it is impossible to say what was created on the basis of what), asserts the coherence of the whole picture drawn by Ibn Sīnā. Our subsequent questions concern (1) the use and development of this legacy by Arabic commentators and the extent to which they based their decisions on Ibn Sīnā's theory or preference of certain drugs,[130] and (2) the connection between drug qualities and preferred drugs, discussed here in conjunction with the medicinal effects of these drugs as seen from a modern viewpoint.[131]

5.2. *Nosebleed in the Arabic Commentaries*

5.2.1. *General Description*

The Arabic commentaries we are going to discuss here are Ibn al-Nafīs' *Mūjaz al-Qānūn*, al-Jaghmīnī's *Qānūnja fī al-ṭibb* and its anonymous supracommentary. All are abridgements of *K. al-Qānūn*. As is typical in the abridgement genre, the exposition is shorter than that of *K. al-Qānūn* and therefore contains much less material. The purpose is to abbreviate the content and choose that which is relevant, not to offer a comprehensive explanation of the whole text. Therefore, in these texts we should assume to find only that material which the authors considered truly relevant.[132]

Our questions concerning these abridgements are as follows:

1. Do they still convey a coherent picture of the symptom complex?
2. Do they essentially reproduce Ibn Sīnā's thoughts, albeit in a shortened form, or do they create, either by additions or by omissions, a new picture?

---

[130] Ch. 5.2, and especially Ch. 5.2.5.2, below.
[131] Ch. 5.4, below, and Appendix 22.
[132] See Touwaide, 2007, p. 168.

3. What might have been the cause for changes made in the material, i.e. were they connected with questions about the validity of Ibn Sīnā's thinking, either in theory or in practice, or with other reasons?

It is in itself remarkable that all these commentaries considered nosebleed as worthy of inclusion, since they omitted several other diseases and symptoms.[133]

5.2.2. *Causes of Nosebleed in the Arabic Commentaries*[134]

From now on, causes, symptoms and consequences of nosebleed will appear in tabular form, and will only be analyzed briefly in the body of the text. The reason for that is that although they are not immediately relevant to our research topic—drug therapy—they are interesting and can, in some cases, throw light on changes in therapeutic choices, both theoretical and practical. For causes of nosebleed, the reader is referred to Appendix 7, Table 5.7.

Ibn al-Nafīs
According to Ibn al-Nafīs:[135]

1. Nosebleed can be of the critical type,[136] which should not be stopped except when it is excessive. Here, Ibn al-Nafīs' theory corresponds to Ibn Sīnā's.
2. It can also be caused by a strong plethora of blood which lacerates the veins. Ibn al-Nafīs recommended this type to be stopped only after it has achieved the purpose of eliminating the plethora, manifested in a decrease of swelling, of redness of the face and of a feeling of heaviness. It is interesting that this decrease is mentioned in *K. al-Qānūn* in the context of nosebleed occurring in acute

[133] For example, diabetes.
[134] See Stage 1, pp. 106–108, and Stage 6, pp. 115–116, above.
[135] *Mūjaz al-Qānūn*, pp. 166–167. The physiological system described in *Mūjaz al-Qānūn* differs sharply from the rest of Ibn al-Nafīs' medical writings, *Mūjaz al-Qānūn* being the closes to Ibn Sīnā's theoretical framework. For the sake of brevity, we concentrate here only on the theories represented by *Mūjaz al-Qānūn* with no additional comparisons. For a thorough discussion on the disparity between this commentary and the rest of Ibn al-Nafīs' literary output, see Fancy, 2006, pp. 244–253. Her thesis contains also an excellent description of Ibn al-Nafīs' "new physiology"; see Fancy, 2006, *passim*.
[136] For causes of nosebleed by Ibn Sīnā, see pp. 129–131, above.

illnesses and illnesses with internal apostemas, especially sanguinary and choleric ones. At the same time, strong plethora is only mentioned by Ibn Sīnā in connection with the therapy for nosebleed in which there is a strong plethora, with no connection to laceration or bursting of veins, the cause of which is nowhere explained. Thus, the two causes for nosebleed are not in themselves innovative, but their combination is.

3. The most dangerous type of nosebleed is caused by an eruption of the veins of the network and the arteries.[137] Ibn al-Nafīs states as its most usual causes a blow, a fall or excess of ebullition. It may also be preceded by excruciating headaches and a burning and smarting sensation. This closely follows Ibn Sīnā's model, except for excess of ebullition (presumably of blood), which Ibn Sīnā does not connect to the eruption of the veins and arteries. The smarting sensation preceding nosebleed is an innovation by Ibn al-Nafīs, unless it is connected with the acute diseases preceding nosebleed in Ibn Sīnā. It is also his only innovation concerning the causes of nosebleed. As is common for the theoretical parts of an epitome, Ibn al-Nafīs' critical and innovative faculties are manifest mainly in his decisions on what to include and what to leave out.
4. The most important omission by Ibn al-Nafīs seems to be any comment on yellow bile, such as biliousness of the body or bitterness of the blood, which is of great importance in Ibn Sīnā's scheme. Thinness of blood, connected with biliousness, is likewise omitted. However, Ibn al-Nafīs agrees about heat as a potential cause in reference to the ebullition of blood.
5. Another important omission is any comment on whether a patient's body may have a predisposition to nosebleed.

Other changes are either minor or represent subclasses of the major causes for nosebleed.

Al-Jaghmīnī and the Supracommentary

Al-Jaghmīnī does not give any causal explanation for nosebleed. He is mainly interested in the therapy, the recommendations for which he mentions without giving any specific causes for his decisions. This is in accordance with the character of *Qānūnja*, notable for its brevity.

[137] Of the brain.

The anonymously-authored supracommentary to *Qānūnja* amply fills the lack of theory in the original, adhering closely to *K. al-Qānūn*, while at the same time making quite different choices from Ibn al-Nafīs:

1. The supracommentary differentiates between nosebleed occurring during a crisis and non-critical nosebleed.
2. Beneficial cases of nosebleed, which should not be stopped, are those caused either by the crises of hot, acute diseases or by the predominance of blood and its thinness. These causes fit Ibn Sīnā's scheme, although the latter two do not appear together in *K. al-Qānūn*.
3. Non-critical nosebleed can be caused by a predominance of bile in the blood, the sharpness of which causes the bleeding. This blood is thin because of the overpowering effect of absolute consuming heat on it. Sharpness of blood as a cause for nosebleed is an innovation by the supracommentary, although the idea already exists in Ibn Sīnā's remarks on the proneness of thin-blooded, choleric persons to nosebleed (notice the repetition of the idea of thinness of blood here) and on the predominance of bitterness in the blood as a cause for nosebleed. The supracommentary discusses heat in a slightly different context than Ibn Sīnā, and does not mention the boiling.
4. Implicitly, the reason for nosebleed can also be a plethora of blood, in accordance with both Ibn Sīnā and Ibn al-Nafīs.
5. The most malignant type of nosebleed is caused, for example, by a laceration and rupture of the veins of the network of blood vessels in the brain. The causes for this damage are not listed. This agrees with Ibn Sīnā, who additionally mentions the arteries.
6. Nosebleed can also be caused by a general tendency for it (*al-marʿūf*). This idea is familiar from Ibn Sīnā, although the supracommentary does not specify what kinds of person would have such a tendency.
7. The disagreement between Ibn al-Nafīs and the supracommentary on the possible causes for nosebleed is remarkable. The only causes upon which they agree are the effect of heat, the concept of critical nosebleed, rupture of the veins of the network of veins and arteries (presumably in the brain), and plethora, which, however, is mentioned only implicitly in the supracommentary. Overall, Ibn al-Nafīs' conceptualization of nosebleed differs greatly from that given by the author of the supracommentary.

8. The supracommentary adds a remarkable amount of theory to *Qānūnja*, but compared to *K. al-Qānūn*, it is still a short epitome, adding only one new cause for nosebleed while omitting many others.
9. The most remarkable omission of the supracommentary is any comment on the rupture of arteries. The supracommentary speaks only about veins. This is surprising, as the author of the supracommentary presumably had approximately the same understanding of the anatomy of the brain as Ibn Sīnā.

The supracommentary also omits all the reasons given by Ibn Sīnā for the laceration and rupture of the network of veins, namely a blow and a fall, as well as preceding headaches and burning sensation, which would not exactly be causes but are in any case connected with the beginning of nosebleed. Furthermore, these reasons are not given in any other context either.

Other changes are either minor or represent subclasses of the major causes for nosebleed.

5.2.3. *Symptoms of Nosebleed in the Arabic Commentaries*[138]

With regard to symptoms of nosebleed, the differences between the commentaries lie not in the actual symptoms described (as nosebleed is in itself a symptom rather than a disease), but in the descriptions of the bleeding, to be found in Appendix 8, Table 5.8.

Ibn al-Nafīs

Ibn al-Nafīs enumerates the following possible characteristics of different types of nosebleed:[139]

1. It can be excessive, possibly leading to a decline of strength. It is remarkable that this excess is mentioned in connection with critical nosebleed, which is in itself by definition beneficial. In this, Ibn al-Nafīs follows Ibn Sīnā, who also discusses excessive bleeding in his description of nosebleed connected with crisis. It seems clear that neither intends to claim that excessive bleeding occurs only in critical nosebleed. Instead, it seems that it is more relevant to explain the dangers of an excessive loss of blood here than elsewhere, as this

[138] See Stage 1, pp. 106–108, and Stage 6, pp. 115–116, above.
[139] *Mūjaz al-Qānūn*, pp. 166–167.

kind of nosebleed should according to Ibn Sīnā not be treated at all, but left to run its course. The only (but important) exception given by him is an excess of bleeding leading to decline of the patient's strength.

2. In Ibn al-Nafīs' system, there are two types of nosebleed, distinguished by the type of blood vessels involved: venal and arterial. In the arterial type the blood is piercing,[140] thin and reddish-colored. Here, Ibn al-Nafīs' division is the same as Ibn Sīnā's, but his description of the arterial blood is different: he omits the fact that arterial bleeding is hotter than venal, and replaces this quality with the piercing[141] quality, which is an innovation.

All in all, Ibn al-Nafīs omits most of Ibn Sīnā's description of nosebleed. Most of the items he omits are differentiations between its different types. He also omits the description of flashes of light and of white, yellow and red streaks that the patient would see, especially following headache.

Al-Jaghmīnī and the Supracommentary

Al-Jaghmīnī does not describe nosebleed at all, but immediately begins with therapy, clearly assuming that the readers know the subject.

The characteristics of nosebleed given by the supracommentary are the following:

1. Nosebleed can exceed all tolerable limits, so that decline of strength is feared. Again, excessive nosebleed is explained in connection with critical nosebleed, as in the writings of Ibn Sīnā and Ibn al-Nafīs.
2. Nosebleed can pour forth from the outermost points of the veins. An interesting point here is that the supracommentary does not mention arteries as a possible location of the bleeding. Ibn Sīnā considers venal bleeding difficult to treat, and only mentions it is as a bleeding from the network of veins and arteries in the brain; the supracommentary, by contrast, extols it as beneficial to the patient, following the ideas of Ibn al-Nafīs, who also saw the laceration of veins caused by a strong plethora as helpful.
3. The supracommentary lists gradual bleeding (which Ibn Sīnā also mentions) as a symptom of nosebleed caused by the predominance of bile in the blood (and, consequently, by the sharpness of the

[140] Or: quick (Ar. *ḥāfiz*).
[141] Or: quick (Ar. *ḥāfiz*).

blood). The other cause of this symptom is a marked thinness of blood, affected by the overpowering effect of unlimited, consuming heat on it. Ibn Sīnā also mentions thinness of blood, but does so in the context of arterial bleeding, not of nosebleed caused by the predominance of bile in the blood. Thus, while the concepts are Ibn Sīnā's, the supracommentary uses them in a different context. Also, it omits the counterpart of gradual bleeding in *K. al-Qānūn*, namely a strong flow of blood in a constant stream.

In general, the supracommentary omits many of the details that Ibn Sīnā gives, particularly (as does Ibn al-Nafīs also) most distinctions between different types of nosebleed. Even when the author of the supracommentary mentions one of two types being compared, he omits the other type, and thus loses Ibn Sīnā's symmetry. Furthermore, he omits (as does Ibn al-Nafīs) the description of flashes of light or of white, yellow and red streaks that the patient would see, especially after headaches. As he does not mention bleeding from the arteries at all, he also leaves out the distinction between venal and arterial bleeding.

Ibn al-Nafīs' descriptions of nosebleed and those found in the supracommentary share only two characteristics: the possibility of venal bleeding and that of excessive bleeding. The remainder of Ibn al-Nafīs' therapeutic decisions are dominated by the acceptance of arterial bleeding, while those of the supracommentary are notable for the concept of nosebleed caused by predominance of bile in the blood (a causality not mentioned at all by Ibn al-Nafīs).

5.2.4. *Consequences of Nosebleed in the Arabic Commentaries*[142]

In comparison to Ibn Sīnā's list of consequences of nosebleed, the Arabic commentaries suggest very few consequences and offer no innovations. Ibn al-Nafīs mentions more consequences than do the others, while (in the anti-theoretical stance typical of al-Jaghmīnī) *Qānūnja* does not give any, but leaves it to the supracommentary to supply the theory, again following *K. al-Qānūn*. These consequences listed below can be examined in Tables 5.9a and 5.9b, Appendix 9.

1. The consequence of nosebleed on which both Ibn al-Nafīs and the supracommentary agree is the decline of strength caused by excessive bleeding.

[142] See Stage 1, pp. 106–108, and Stage 6, pp. 115–116, above.

2. The other consequences of nosebleed listed by Ibn al-Nafīs concern improvements which show that the patient has benefited from the reduction of blood. According to Ibn al-Nafīs, in such cases the nosebleed is caused by a strong plethora that lacerates the veins. It should be stopped only when (1) the swelling recedes and the patient's (external) appearance normalizes, (2) the excessive red color of the patient's skin disappears and the skin assumes a natural color, and (3) the heaviness that the patient has felt ends.[143] Ibn Sīnā, on the other hand, claims that this kind of nosebleed is usually a result of acute illnesses or of internal apostemas, especially sanguinary and choleric ones in the brain, liver, diaphragm or lungs, and specifies the location of the heaviness (the patient's head), rather than mentioning only heaviness in general.

In general, Ibn al-Nafīs omits most of the consequences of nosebleed that Ibn Sīnā lists, in particular most of the negative ones. He also omits problems relating to blood running into the stomach. This choice is interesting, as Ibn Sīnā apparently regarded the omitted material as a relevant part of prophylactics and therapy.

In addition to the above-mentioned decline of strength, the supracommentary lists only two larger categories of consequences: laudable nosebleed, which is beneficial to the patient and should not be stopped unless there is actual danger, and lethal nosebleed, caused for example by lacerations in and rupture of the veins of the network of vessels. These two categories already appear in the description of *K. al-Qānūn*.

The supracommentary also omits the subject of blood flowing into the stomach.

5.2.5. *Treatment of Nosebleed in the Arabic Commentaries*

5.2.5.1. Treatment, Theory, in the Arabic Commentaries[144]

Among the Arabic commentaries, only Ibn al-Nafīs provides a detailed theory for treatment. The supracommentary deals with the issue surprisingly scantily. On the other hand, there is at least some connection to theory in *Qānūnja*, which is in itself surprising. We will compare these

---

143 I.e., Ibn al-Nafīs does not give a specific amount of loss of blood as a limit, nor does he recommend not to let the bleeding continue.

144 See Stage 2, pp. 108–109, and Stage 6, pp. 115–116, above.

commentaries in Table 5.10, *Medical Qualities Recommended for Nosebleed by the Arabic Commentators*, in Appendix 10.

Ibn al-Nafīs

The first question here, as in *K. al-Qānūn*, is whether or not to treat nosebleed. Ibn al-Nafīs solves the problem in quite the same way as Ibn Sīnā: nosebleed arising at the crisis of another disease should be treated only when it is excessive and there is fear of a decline in strength; nosebleed caused by a plethora of blood should be treated only when it is clear that the patient has already benefited enough from the decrease of blood. In both cases, the nosebleed should be treated simply by "stopping the bleeding," without further definition. Ibn al-Nafīs also warns that nosebleed caused by a rupture in the veins and arteries of the network of vessels is difficult to treat.[145]

Ibn al-Nafīs recommends that drugs for the treatment of nosebleed should have one or more of the following qualities:

1. Astringent[146]
2. Adhesive[147]
3. Caustic[148]
4. Cooling and Congealing[149]
5. Possessing a Special Property[150]

When we analyze Ibn al-Nafīs' therapy guidelines on the basis of the general principles of physiology and pharmacology in *K. al-Qānūn*, it becomes clear that drugs that have any of the first three qualities would have been expected to block the bleeding locally without consideration for its cause; in other words, they are symptomatic therapies. Cooling and congealing drugs, by contrast, were probably supposed to both congeal the blood locally and reduce the excess of boiling in the blood that was postulated to cause the nosebleed; thus, they would have acted as both symptomatic and prophylactic therapeutic agents.

---

145 Ibn Sīnā actually considers it untreatable, although he also gives advice for its treatment, see Prescriptions #43–47, pp. 150–151, above.

146 See p. 135, n. 46; pp. 156–157, above.

147 See p. 135, n. 48; pp. 156–157, above.

148 Ibn al-Nafīs does not warn about the danger of using caustic drugs. See p. 135, n. 49, above.

149 See p. 135, n. 47, pp. 156–158, above.

150 See p. 135, n. 50, above.

In the category of cooling drug treatments, Ibn al-Nafīs specifies a separate therapy for nosebleed from the right nostril.[151] As the right nostril was held to be connected with the liver, the cupping glasses were to be attached to the liver.[152] The liver was also to be cooled with medications. As heat would normally be considered as more effective in attracting blood to the liver, the cooling of the liver must have been intended to also cause the cooling of blood flowing out of that organ. This is an innovation by Ibn al-Nafīs, for although it would fit well into Ibn Sīnā's scheme, it is not specifically mentioned there. On the other hand, Ibn al-Nafīs' description of nosebleed and its causes does not mention a cause that necessitates cooling the liver any more than does *K. al-Qānūn*. Ibn al-Nafīs also recommends the cooling of blood as a means to stop the nosebleed, albeit only by venesection, not by drugs.

Ibn al-Nafīs does not give any food recommendations (perhaps some of the medications in the example lists could be used as food, but this is not specially mentioned).

There is no chapter about causing a nosebleed as a therapeutic means.

Altogether, we can see that the choices and omissions of therapeutic qualities in Ibn al-Nafīs' recommendations are logically connected with his description of the causes of nosebleed. One of the two main categories of qualities that Ibn al-Nafīs omits are remedies thickening the blood, making it viscous, or modifying it by evacuating the bile—in other words, drugs that counteract the effect of too much yellow bile in the blood. As Ibn al-Nafīs, in contrast to Ibn Sīnā, does not mention this cause of nosebleed, it is logical that he does not specify a therapy counteracting it. At the same time, the omission suggests that the authors did not simply copy their predecessors uncritically, but kept their own theories in mind when they selected details.[153]

---

[151] Nosebleed from the left nostril was to be treated with cupping glasses attached to the spleen, due to the assumed connection between the left nostril and the spleen, but no special drug therapy was recommended.

[152] Presumably in order to draw the blood in that direction and not let it flow towards the nose.

[153] This may hold true in connection with other considerations, too. As Ibn al-Nafīs did take into account the danger of the decline of the patient's strength in case of excessive bleeding, he could theoretically have recommended wine to counteract this, as Ibn Sīnā did. As an observant Muslim, Ibn al-Nafīs, however, would have endeavored to avoid any therapeutic recommendations that would have contradicted the Islamic law. See Fancy, 2006, p. 49.

The second main category omitted is that of drugs intended for the removal of blood from the stomach. Again, as Ibn al-Nafīs does not discuss this subject, the omission is logical.

Two of the other omitted qualities belong to the category of "cold remedies" and "anesthetizing remedies," a category that is otherwise well represented. The final omissions, sharp and strengthening medications, are relatively marginal even in the description found in *K. al-Qānūn*.

Al-Jaghmīnī and the Supracommentary

Even here, al-Jaghmīnī avoids any theoretical approach; however, he cursorily explains some of his therapies in a way that permits a few conclusions. First, he recommends daubing the liver with sandalwood and rose water cooled with ice (the same medications that Ibn al-Nafīs uses for the cooling of the liver). The intention might have been to cool the liver, as first suggested by Ibn al-Nafīs (see above). Secondly, he recommends pouring rose water cooled with ice over the head. The intention might have been to cool the head.[154]

In addition to drugs, al-Jaghmīnī prescribes food therapy for the patient. This might be based on the wish to alleviate the underlying causes of bleeding, especially a bodily tendency towards nosebleed.

The supracommentary adds little theory to the *Qānūnja*, compared with its relatively rich additions of theoretical material to the descriptions of the causes of nosebleed. The author of the supracommentary agrees that nosebleed should not be stopped if it is beneficial—e.g. when it results from hot, acute diseases, an excess of blood, thinness of blood or the pouring forth of blood from the ends of the veins—unless it is excessive and a decline of strength is feared. In this case, the supracommentary recommends stopping the nosebleed, but does not specify the kind of drugs suitable for this. The recommendation to inhale cold water suggests that the supracommentary, too, includes coldness among the qualities recommended. However, the only mention of a specific quality occurs in reference to some astringent drinks that should be mixed with wine and administered to patients with a tendency to nosebleed, when their strength declines.[155]

---

[154] In case the nosebleed was caused by an eruption of blood from veins of the network of the brain.

[155] It is interesting that these drinks are apparently really intended for drinking, not for local use. This, however, is not certain. Cf. with p. 124, above.

The supracommentary recommends certain foods as good for those suffering from nosebleeds. This again suggests the possibility that the foods are intended to counter the underlying causes and the tendency to nosebleed rather than to alleviate the symptoms.

It is difficult to decide why the supracommentary gives such a rich description of the causes of nosebleed, while it has no interest in explaining how to treat these causes. We apparently have to accept the author's lack of interest in the theory of the therapy and try to see later if he seems to favor any particular theoretical approach in his choice of drugs even without specifically expressing it in words.

None of the commentaries supply a method for causing nosebleed.

5.2.5.2. Treatment, Practice, in the Arabic Commentaries[156]

Simple Drugs and Prescriptions used by Ibn al-Nafīs

Ibn al-Nafīs gives nine prescriptions for the treatment of nosebleed.[157, 158]

In order to simplify the handling of the material, we have divided the therapy into five categories of simple drugs and four prescriptions. It is important to remember the same qualifications we noted when studying Ibn Sīnā's prescriptions:

1. The division lines between the different prescriptions are sometimes unclear.
2. The five categories of simple drugs are lists of ingredients whose effect on nosebleed depends on the same quality, and from among which the physician can choose whatever is available.[159]

Simple Drug Categories

In describing the treatment of nosebleed, Ibn al-Nafīs listed the following simple drugs, grouped as below, which could be used either alone or in conjunction with others:[160]

---

[156] See Stage 3, pp. 109–111, and Stage 6, pp. 115–116, above.

[157] For methodological details the reader is referred to Ch. 5.1.5.3, above. In order to simplify the handling of the material, we have divided the therapy into nine prescriptions and numbered them.

[158] An asterisk after the list of ingredients gives the method of application of the drug. The drug names connected with 'OR' are alternative choices for the same prescription.

[159] See pp. 139–142, above.

[160] *K. al-Qānūn*, Vol. 2, pp. 164–166.

Prescription #1

Astringent Remedies

Examples:

acacia
pomegranate flower
lentil
gallnut

Prescription #2

Cooling, Congealing Remedies

Examples:

opium
henbane
camphor
juice of lettuce
juice of plantain

Prescription #3

Adhesive Remedies

Examples:

mill dust
flour of frankincense

Prescription #4

Caustic Remedies

Example:

vitriol

Prescription #5

Remedies with a Special Property[161]

Examples:

juice of the excrement of donkey
cobweb
water of basil
mint

[161] Arabic *fāʿila bi-l-khāṣṣiya*.

Prescriptions
Ibn al-Nafīs gave the following prescriptions for the treatment of nosebleed.

Prescription #6

cobweb
ink
mill dust
*tampon[162]

The tampon was made of cobweb. It was immersed in ink and then sprinkled with mill dust. It was inserted into the nose.

Prescription #7

opium
mill dust
pomegranate flower
gallnut
juice of excrement of donkey
cobweb
*tampon

The other ingredients were kneaded with the juice of excrement of donkey and mixed with cobweb. The tampon was inserted into the nose.

Prescription #8

water of rose
sandalwood
camphor

The forehead was smeared with these elements.

Prescription #9

If the bleeding is from the right [nostril]. Cools the liver.
water of rose
sandalwood

The ingredients were placed on the patient's abdomen, over the area of the liver. (In addition, cupping glasses were used over the liver.)

As we can see, most of these prescriptions are short and simple. It is interesting to note the changes made to Ibn Sīnā's ideas:

---

[162] Arabic *fatīla*, see p. 138, n. 58, above.

1. Ibn al-Nafīs adds cobweb to the list of drugs with a special property, which Ibn Sīnā mentions only in a different context.
2. Otherwise, the lists are very similar to those of Ibn Sīnā, only abridged.
3. Ibn al-Nafīs' prescriptions usually contain the same elements as Ibn Sīnā's, but are combined in very different ways. Ibn al-Nafīs takes familiar materials and creates new prescriptions with them.[163] This seems to prove our earlier hypothesis[164] that in most cases, the particular combination of ingredients in the prescription matters less than the ingredients themselves, that is, the right use of the simple drugs.[165] At the same time, it is obvious that the ingredients do matter: while Ibn al-Nafīs' prescriptions omit many drugs that Ibn Sīnā included, the former includes only one new drug, sandalwood. Furthermore, several ingredients listed by Ibn Sīnā are mentioned in Ibn al-Nafīs' prescriptions several times.
4. Prescription #9 is innovative in its application. If the bleeding is from the right nostril, the medication is put on the area of the liver in order to cool it. This therapy was clearly intended to counteract what was seen as the deeper cause of the problem—an undue hotness of the liver that indirectly caused bleeding in the nose.
5. In contrast to Ibn Sīnā's more variegated choice of therapeutic forms, Ibn al-Nafīs used only tampons and compresses on the forehead and liver.

Simple Drugs Used by Ibn al-Nafīs[166]

For simple drugs used by Ibn al-Nafīs, see Appendix 11, Table 5.11, for the drug identifications.

Sandalwood is the sole simple drug which appears in Ibn al-Nafīs' writings but not in Ibn Sīnā's. Sandalwood appears in two prescriptions, neither of them to be used in the nose.

Next, we count the number of appearances of the different drugs in the prescriptions (Table 5.12 in Appendix 12). This is done in order to

---

[163] Cf. to Chipman, 2005, pp. 26–57, where it becomes clear that even prescriptions that are copied from older texts are mostly changed in their new surroundings. See Pormann, 2004, *passim*, and Kahl, 2007, pp. 5–6, on different ways of quoting and incorporating material from earlier sources.

[164] See p. 139, above.

[165] For exceptions from the point of view of the medieval theory, see pp. 57–58, above.

[166] See Stages 3 and 4, pp. 109–113, and Stage 6, pp. 115–116, above.

determine Ibn al-Nafīs' preferred drugs for nosebleed and later compare them both with the core drugs of Ibn Sīnā's drug collection and with the qualities recommended by Ibn Sīnā for the treatment of nosebleed. In this way, we can determine whether Ibn al-Nafīs' medical system, causes, manifestations, theoretical therapy and practical drug therapy for nosebleed form a coherent system. Later on, we will also see which of the drugs appear in the prescriptions of several of the commentaries, thus determining popularity not only in one medical author's work, but across several generations.

There are 19 simple drugs that Ibn al-Nafīs recommends for nosebleed. Altogether, they are mentioned 30 times, the most preferred drugs appearing in 3 prescriptions. These are cobweb and mill dust, both belonging to the list of adhesive drugs (as was mentioned, cobweb is not found in the list of adhesive drugs in *K. al-Qānūn*). These two simple drugs constitute 20 % of all citations. Camphor, excrement of donkey, gallnut, opium, pomegranate flower, rose and sandalwood each appear twice. Of these, sandalwood is an innovation by Ibn al-Nafīs. These nine core drugs amount to 67 % of all citations.

Comparing the list of Ibn al-Nafīs' core drugs to Ibn Sīnā's 10 preferred drugs (which constitute 36 % of all appearances of simple drugs in Ibn Sīnā's writings), we find that camphor (Ibn Sīnā's most preferred drug, which appears 8 times), donkey excrement and rose appear in both lists. Mill dust, gallnut and opium also appear often in Ibn Sīnā's lists but are not among his "top ten," and cobweb is mentioned only once.

Prescriptions Used by al-Jaghmīnī[167]

In *Qānūnja*, al-Jaghmīnī concentrates on practical therapy, omitting practically everything else. Even here, his advice is very terse. There are six prescriptions, all of them short and all lacking theoretical explanations.

Prescription #1

For nosebleed:

potion of juice of unripe grapes

[167] See Stage 3, pp. 109–111, and Stage 6, pp. 115–116, above. In order to simplify the handling of the material, we have divided the therapy into six prescriptions and numbered them.

Prescription #2

For nosebleed:[168]

rhubarb
rose water

Prescription #3

For nosebleed:

sandalwood
rose water

The rose water is cooled with ice. The mixture is smeared on the liver.

Prescription #4

For nosebleed:

rose water

The rose water is cooled with ice. It is poured on the head.

Prescription #5

For nosebleed:

water of plantain
camphor

The mixture is injected into the patient's nose.

Prescription #6

For nosebleed, food:

muzawwara [made] of lentils[169]

Al-Jaghmīnī did not even list simple drugs that have a desirable quality, as Ibn Sīnā and Ibn al-Nafīs did. His list includes suitable foods, local medications for the nose, cold rose water poured on the head, and a local treatment for the liver. Like Ibn al-Nafīs in a similar treatment,[170]

---

168 This prescription may also be part of Prescription #1.

169 A lentil dish. *muzawwara*, was usually simple vegetarian dishes intended either for Christian lent food or for the home treatment of minor illnesses. In the latter case, they were administered according to the basics of Galenic therapeutics, in particular *contraria contrariis curantur*, that is, correcting the imbalance in the complexion by giving the patient things opposed to it. On *muzawwara* dishes and their position in the therapeutic dietetics of the Middle Ages, see Waines and Marín, 2002.

170 See Ibn al-Nafīs' Prescription #9, p. 172, above.

al-Jaghmīnī clearly intended that the liver treatment cool the liver, whose heat was believed to cause bleeding in the nose, but did not specifically mention the cause of bleeding or the nostril from which the blood came. Possibly, by the time of al-Jaghmīnī these factors had already lost their importance.

Al-Jaghmīnī's Prescriptions #3 and #4 are reminiscent of Ibn al-Nafīs' Prescriptions #8 and #9: rose water is used similarly in both, and both al-Jaghmīnī's Prescription #3 and Ibn al-Nafīs' Prescription #9 contain sandalwood in this context. Also, al-Jaghmīnī's Prescription #5 corresponds closely to Ibn Sīnā's Prescription #14, although it omits the *terra sigillata*, and al-Jaghmīnī's Prescription #6, a lentil dish, corresponds to Ibn Sīnā's list of medicinal foods, although in simplified form. Thus, we can see that both in the structure and in the mixture of drugs in his prescriptions, al-Jaghmīnī follows both Ibn Sīnā and Ibn al-Nafīs more closely than Ibn al-Nafīs follows Ibn Sīnā. On the other hand, al-Jaghmīnī omits most of the medications used by Ibn Sīnā, and in addition uses both sandalwood (from Ibn al-Nafīs' list) and rhubarb (his own innovation), thus adding to the pool of therapeutic possibilities.

Prescriptions in the Supracommentary[171]

The supracommentary lists four prescriptions, each of which is longer than al-Jaghmīnī's prescriptions.[172] It is to be supposed that al-Jaghmīnī's original would have been used alongside the commentary, as often both the theoretical comments and the prescriptions would have been unintelligible without it.[173]

Prescription #1

For nosebleed:

cold water
vinegar
*inhalation

The cold water is mixed with vinegar. It is used as an inhalation.

[171] In order to simplify the handling of the material, we have divided the therapy into four prescriptions and numbered them.

[172] Asterisk after the list of ingredients gives the way of application of the drug. The drug names connected with 'OR' are alternative choices for the same prescription.

[173] As an example, see Prescription #3.

Prescription #2

When the bleeding exceeds all bounds, and the patient is not benefited by Prescription #1 and the tight binding of the members:[174]

linen cloth
vinegar
aloes
frankincense

Aloes and frankincense are pulverized finely, and a tampon of linen cloth is stained with them after having been immersed in vinegar. It is inserted in the nose.

Prescription #3[175]

[lentils = *muzawwarat al-ʿadas*]
sumac OR vinegar OR pomegranate seeds OR barberry

Lentils are boiled with one of the other above-mentioned ingredients.

Prescription #4

For the patient having a nosebleed, at the time of the decline of strength:

wine
astringent potions

We see that two of the four prescriptions concern nutrition, while the other two are local treatments for the bleeding. The first is unique as a simple-to-use drug. Prescription #2 corresponds closely to Ibn Sīnā's Prescription #23, though it omits mill dust and egg white. In the supracommentary's Prescription #3, where a lentil dish is not mentioned but tacitly assumed, sumac and vinegar are taken from Ibn Sīnā, while pomegranate seeds and barberry are not (in any case, they are the supracommentary's own innovations). The supracommentary's fourth prescription, wine and astringent drinks, is an interesting combination of two ideas by Ibn Sīnā: astringent drinks (which, according to Ibn Sīnā, should be used externally),[176] and wine, which Ibn Sīnā did not encourage but only allowed in the case of true need during a decline of strength, as does the supracommentary. The difference is that while Ibn Sīnā considered this drug therapy peripheral, the author of supracommentary seemed to regard it as central, since he included it in his short exposition.

---

[174] See above, p. 138.
[175] Additions to a lentil dish mentioned by al-Jaghmīnī (listed here in brackets). See al-Jaghmīnī's Prescription #6, p. 175, above.
[176] See Ibn Sīnā's Prescription #40, p. 149, above.

Thus, it appears that the supracommentary to *Qānūnja* neither repeats *Qānūnja*'s ideas nor takes anything from Ibn al-Nafīs, but closely follows *K. al-Qānūn*, though of course omitting most of the material. In proportion to the small amount of drugs used, it adds a remarkable number of innovations to the therapy pool.

Simple Drugs Used by al-Jaghmīnī and the Supracommentary[177]
For the identifications of simple drugs used by al-Jaghmīnī and the supracommentary, see Appendix 11, Table 5.11.

Simple Drugs Used by al-Jaghmīnī (in addition to those already mentioned by Ibn Sīnā)
Of the drugs mentioned in Appendix 2, *al-māward* is an abridged form of *māʾ al-ward*, "rose water". Thus, it is not a real innovation, but only a synonym for a well-known drug already used by Ibn Sīnā for nosebleed. Likewise, sandalwood is already used by Ibn al-Nafīs. Rhubarb, however, is a true innovation, as even the *Rheum* family does not appear in the drug lists of the texts discussed so far.

Simple Drugs Used by Supracommentary (in addition to those already mentioned by Ibn Sīnā)
Both the barberry family and the pomegranate family are already mentioned by Ibn Sīnā as being efficacious for nosebleed. However, barberry itself is not listed by either Ibn Sīnā or any commentary. As for pomegranate, Ibn Sīnā lists its flower as being efficacious for nosebleed, but since the flower and the other parts of the tree are called by different names and are discussed separately in Book II of *K. al-Qānūn*, we shall consider it an innovation.[178]

Amounts of Simple Drugs Used by al-Jaghmīnī
Again, we have tallied the number of appearances of each simple drug in the prescriptions in order to determine the author's preferred drugs for this medical problem and compare the results both with Ibn Sīnā's preferred drugs and with the drug qualities recommended by Ibn Sīnā for therapy. In this way, we hope to determine the crucial factors in al-Jaghmīnī's decision to choose or favor a certain simple. These frequencies are shown in Table 5.13a, Appendix 13.

---

[177] See Stages 3 and 4, pp. 109–113, and Stage 6, pp. 115–116, above.
[178] See pp. 112–113, above.

This list gives a simple picture: al-Jaghmīnī mentions each of his seven simples only once, except rose, which appears in three prescriptions and thus amounts to 33 % of all appearances. This simple, therefore, constitutes al-Jaghmīnī's core drug group. Rose is also a favorite of Ibn Sīnā (having four appearances) and Ibn al-Nafīs (having two appearances).

Amounts of Simple Drugs Used by the Supracommentary
See Table 5.13b, Appendix 13.

The supracommentary closely resembles *Qānūnja*, except that it favors vinegar, which is mentioned three times. Vinegar is not recommended at all by the other commentaries, but it is one of Ibn Sīnā's preferred drugs (having six appearances). It is remarkable that there are no simples that appear both in *Qānūnja* and the supracommentary, which suggests that the goal of the supracommentary was essentially to supplement details missing in *Qānūnja* and not to merely repeat its contents. The only drug that possibly appears in both is a lentil dish, which although not mentioned in the supracommentary is referred to in a way that makes it clear that it would have been recommended.

Comparison between K. al-Qānūn *and the Commentaries*[179]
Now we shall compare the drugs mentioned in *K. al-Qānūn* and all three commentaries to determine which drugs appear in more than one source and whether, upon examination, a core group of drugs emerges for the treatment of nosebleed in our Arabic sources in general. In Table 5.14, Appendix 14, the preferred drugs of all authors (those appearing four or more times in Ibn Sīnā and more than once in the commentaries)[180] are marked with bold numbers for the sake of clarification.

Comments:

1. One drug, lentil, appears in all four texts (that is, in *K. al-Qānūn* and all three Arabic commentaries) if we consider it to be present by implication in the supracommentary, even if it is not referred to directly.[181] Four drugs appear in three texts (that is, in *K. al-Qānūn* and two commentaries), namely camphor, frankincense, plantain and rose, all of which are also mentioned by Ibn al-Nafīs. Frankincense is mentioned by the supracommentary, the others by al-Jaghmīnī. Nineteen simples appear in two texts: thirteen times in *K.*

[179] See Stage 5, pp. 113–115, and Stage 6, pp. 115–116, above.
[180] See Chapters 5.1.5.3 and 5.2.5.2, above.
[181] See Prescription #3 of the Supracommentary, p. 177, above.

al-Qānūn and Ibn al-Nafīs' commentary, once in *K. al-Qānūn* and *Qānūnja*, and four times in *K. al-Qānūn* and the supracommentary. In addition, sandalwood appears in Ibn al-Nafīs' commentary and *Qānūnja*, but not in Ibn Sīnā. The remaining 43 simples appear only once: 43 of them appear in *K. al-Qānūn* but not in any commentary; one appears in *Qānūnja* and two in the supracommentary. Thus, there are two core groups: the first consists of five drugs (constituting 7% of the total number of drugs) and includes only those drugs that appear in *K. al-Qānūn* and in two or three of the commentaries; the second includes all drugs that appear at least twice in the four texts we are studying, and contains twenty-four members (36% of the total number of the drugs).

2. If we compare the number of appearances of Ibn Sīnā's preferred drugs with their appearances in the commentaries, we get the following results:
   a. Three of Ibn Sīnā's "top ten" drugs[182] are also among the commentators' top five (camphor, frankincense and rose); seven of his top ten are among the commentators' top twenty-four (in addition to the above, these are basil, excrement of donkey, vinegar and vitriol). Only unripe dates, eggs and yellow vitriol do not appear outside *K. al-Qānūn*. Thus, we conclude that the popularity of a drug in *K. al-Qānūn* definitely influences its popularity (or at least inclusion) for the commentators.
   b. Of Ibn Sīnā's ten most preferred drugs, only three belong to Ibn al-Nafīs' core group of nine simple drugs: camphor, rose and excrement of donkey.
   c. Rose is also al-Jaghmīnī's most preferred drug.
   d. Vinegar, the supracommentary's most preferred drug, is also Ibn Sīnā's favorite. Thus, four of Ibn Sīnā's most preferred plants are also most preferred by at least one of the commentators.
   e. Lentil, although it arguably appears in most commentaries, is not a popular drug in any of them; it is used by all, but only once or twice.
   f. Those drugs that constitute innovations clearly had not become part of the core group: only one of them is mentioned

[182] See pp. 153–154, above.

twice by an author or used by two commentators. In both cases, the drug is sandalwood.

3. Our final conclusion is that there is a clear connection between the popularity of a drug in *K. al-Qānūn* and its appearances in the commentaries. However, this connection did not strongly influence the frequency with which it was used by each single commentator; it only warranted its inclusion.

5.2.5.3. Relationship between the Choice of Simple Drugs and their Qualities

We have already shown that Ibn Sīnā's drug preferences influenced the choices of his commentators. Now, we must determine the connection between the appearance of the drugs in the commentaries and the drugs' medical qualities as given in Book II of *K. al-Qānūn*. As was done in Chapter 5.1.5.4, *Relationship between the Drugs Recommended for Treatment and their Therapeutic Qualities*, which investigated the connection between the frequency and qualities of a drug in Ibn Sīnā's text, we will compare the most popular drugs with the drugs having the greatest number of medical qualities to see whether there is any connection, using only the drug qualities recommended by Ibn Sīnā. This will show whether the commentators were aware and interested in the theory behind Ibn Sīnā's pharmaceutical choices. The material is presented in Table 5.15a, *Medical Qualities in the Arabic Commentators' Drugs for Nosebleed*, in Appendix 15, followed by Tables 5.15b and 5.15c showing the degree of this connection.

Looking at the group of drugs that appear in three or more texts, we must first note[183] a definite preference for drugs that have medical qualities. If we look at simple drugs which appear in at least two texts, the picture becomes somewhat unclear: it is difficult to determine a clear difference between the percentage of drugs that have at least two suitable medical qualities (58 %) and the percentage of all drugs appearing in any text that have at least two suitable qualities (48 %). However, if we compare these amounts to the number of drugs that appear only once in any text, we notice that drugs that have no or only one medical quality constitute 57 % of the total, while these drugs constitute only 42 % of all drugs that appear at least twice. This points to a slight tendency to prefer drugs with more qualities, which confirms the assumption that the

[183] In Table 5.15b.

guiding principle is the wish to follow Ibn Sīnā's preferences rather than a bent towards theoretical thinking (although these two are, of course, difficult to separate, since Ibn Sīnā's preferred drugs have considerably more medical qualities than the rest).[184]

However, there is yet another possible type of comparison: comparing the amount of qualities in simples chosen by the commentaries with the amount of qualities in the whole sample of 66 simples (i.e. all the drugs mentioned for therapy of nosebleed). Table 5.15c shows the following:

1. Ibn Sīnā's drugs approximate the whole sample, since (with the exception of the four innovations made by the commentaries) they essentially constitute the same list.
2. Ibn al-Nafīs seems to prefer drugs with suitable qualities: drugs with two or three qualities exceed the average, drugs with one or no qualities are correspondingly less. The difference amounts to around 10 %; thus, it is not strong, but indicates a certain trend.
3. Al-Jaghmīnī does not seem to pay special attention to qualities: half of his drugs have few qualities, half of them many. However, he does not seem to pay attention to medicinal qualities needed for therapy either, since he does not describe them in his commentary.
4. In contrast to al-Jaghmīnī, the author of the supracommentary seems to prefer drugs with suitable qualities: of all texts, he lists most of these. Peculiarly, while this is so, he mentions only the minimum of recommendations for suitable qualities, namely two.

Of course, we must remember that the sample in both the *Qānūnja* and the supracommentary is so small that we cannot draw far-reaching conclusions.

Thus, we can summarize that the drugs which the commentators included tended to have a higher number of suitable medical qualities than those they omitted, and that the commentators tended to choose the medically stronger drugs, although this tendency is not marked. It is, of course, impossible to determine how far this tendency was influenced by the fact that Ibn Sīnā's preferred drugs had a higher number of suitable medical qualities than the average; in other words, it is difficult to know whether the amount of qualities or Ibn Sīnā's example determined the choices. In any case, the choices generally correspond to the qualities; therefore, the medical picture that the commentaries give can be

[184] See Ch. 5.1.5.4, especially pp. 158–159, above.

considered both congruent with Ibn Sīnā's medical theory and internally congruent.

Our next steps are to similarly study the Latin commentaries to *K. al-Qānūn* and to compare the results of this chapter with the objective effect of the drugs. Based on which qualities that a simple drug had could one best predict the drug's effectiveness for the given medical condition? Is this effectiveness connected with the number of suitable medical qualities in the drug, or with its popularity among the commentators, or with both? Or was there something else? Perhaps all prediction is impossible. We will investigate this in the last chapter about nosebleed, Chapter 5.4, *Relationship between the Medical Efficacy of Drugs and their Popularity*, after we have examined the Latin commentators and accumulated additional material, which will allow a more informed judgment.

5.3. *Nosebleed in the Latin Commentaries*

5.3.1. *General Description*[185]

Next we will study nosebleed in the last two commentaries on *Kitāb al-Qānūn*, those of Gentile da Foligno and Jacques Despars. These are very different from the Arabic commentaries discussed so far, for several reasons:

1. The Latin commentaries were not meant to abbreviate but to explain the text. Clearly, this was more necessary in the Latin than in the Arabic commentaries, as the Latin commentaries were translated from Arabic (not always with perfect success) and parts of them were obscured considerably in the process. Furthermore, the cultural background of the Latin commentators was further removed from Ibn Sīnā than that of the Arab commentators. As a result, and since there was no need for briefness, Jacques Despars repeated practically the entire text of Ibn Sīnā, and elaborated on most of the issues. Gentile is much briefer, as his commentary intends to explain the problematic parts rather than offering a running commentary on the whole subject; however, when he is very interested in a subject, he can be verbose to a degree that the Arabic commentaries' propensity for terseness prevents.

---

[185] See Stage 1, pp. 106–108, and Stage 6, pp. 115–116, above.

2. The Latin commentators had to explain the text more extensively because of the difference between the geographical area of the authors and that of the readers. Even within the Arab-writing world, confusion reigned about the exact meaning of simple drug names, especially plants, because of the wide distances between locales and differing dialects. When medicinal information spread northwards, the situation became even more confusing, as the plants recommended and described by Ibn Sīnā often did not exist for example in Paris, where Jacques Despars studied. Therefore, the commentators tried both to explain difficult drug names that one encountered in the text (often in Latin transcription of the Arabic names) and to find possible substitute drugs to be used if the foreign ingredient could not be recognized or obtained. Partly, the ample additions made by the Latin commentators, especially in the field of *materia medica* and prescriptions, can be explained by this need for alternatives, although partly, of course, it issued from the mere wish to spread information obtained somewhere else, simply because it existed.
3. Part of the theory had simply changed, and some phenomena were explained differently because of the development of the understanding of, for example, the humoral theory.
4. The Latin commentators adhered much more closely to the original text than the Arabic commentators. This may also be due to the literary genre represented: the Arabic commentaries were intended to convey the main ideas of Ibn Sīnā's in a short form, in a small book that would be easy to learn and carry, whereas the Latin commentators actually included the whole text of *Kitāb al-Qānūn* within their text and wrote *about* it, having the original text at hand all the time. It may be that for this reason they also clung closer to the original concerning the structure of prescriptions, which in the Arabic commentaries was so far removed from Ibn Sīnā's original that with the possible exception of the supracommentary it was impossible to see what could have been the original of any prescription mentioned in the commentaries—the ingredients were the same, but they were combined in a way that differed completely from Ibn Sīnā's prescriptions. Instead, in the Latin commentaries we can both follow the prescription that the commentary explains and elaborates on, while at the same time we can differentiate between the commentators' own prescriptions and ideas and their own comments on the original. That gives the commentaries a

> completely different flavor, a different faithfulness to the original, in which one can see that the authors really had the text with them when they were commenting it, a fact that very often is not the case with any of the Arabic commentaries. The latter were often written from memory after the author had memorized the book to be commented on, with the aim of creating more of a broad synthesis than a detailed explanation.

As a result of this fidelity to the original sources, we can assume that in the texts of the Latin commentaries, rather than innovating by omitting content from Ibn Sīnā's material, the commentators had more of a tendency to add the local drugs, to incorporate material they learned during their study and to add their own personal innovations.

Nosebleed is covered quite extensively by both Gentile da Foligno and Jacques Despars. The text is written around, above and under Ibn Sīnā's original in a Latin translation. Gentile da Foligno's remarks, found on the upper part of the page, are attached to the text as footnotes, and their reference texts are marked with uppercase letters on the page on which the remark is situated. Not always logical, they are often only short remarks that require referencing the original text in order to be understood. Jacques Despars' commentary on the lower part of the page, on the other hand, can be read independently of the original, as he usually quotes the line he is explaining and writes an exposition of it; similarly, when commenting on the prescriptions, he includes the whole prescription as written by Ibn Sīnā and then adds his own material and comments.

Now let's consider the specific case of nosebleed. We see that its name, translated in Latin as *fluxus sanguinis narium*, "flow of blood from the nostrils," is self-explanatory, needing no particular comment. It is actually a paraphrase of the specific Arabic term that does not appear in the Latin text at all. Both Gentile da Foligno and Despars start their discussion with a lengthy theoretical overview of the causes of nosebleed. We will also start our discussion at this juncture, in an effort to determine which of the causes mentioned by Ibn Sīnā the Latin commentators chose for their own expositions and what kind of additions they made. The procedure, from our point of view, is the same as with the Arabic commentaries: First, we will survey the causes, manifestations and results of nosebleed, seeing the possible connections between these, that is, the logical coherence of the system. Next we will proceed to the therapeutic theory, again considering its connections with the pathology. Then, we will discuss the prescriptions recommended for the therapy and the drugs appearing in them. We will compare these drugs, their frequency of appearance and their medical qualities, trying to see what caused them to be chosen and to assess the consistency of the commentators' medical systems. Subsequently, we will compare the Arabic and Latin commentaries with each other and with *K. al-Qānūn* and try to determine on what the therapeutic choices were based. Finally, we will compare all this information with the objective effects of the simples as determined by modern pharmacology, in order to see how consistent the theory and the practice were with the facts available to them as well as to us, asking the important question whether, in spite of the difference in medical theory and different world views, Ibn Sīnā and his commentators did have a close connection to the world of reality, and if so, whether that connection was in contradiction to or consistent with the inner coherency of their medical systems.

Let us first turn to the causes of nosebleed as explained by Gentile da Foligno and Jacques Despars.

5.3.2. *Causes of Nosebleed in the Latin Commentaries*[186, 187]

In the following section, we will briefly compare the causes, symptoms and results of nosebleed in the Latin commentaries to the description of nosebleed in *K. al-Qānūn*. Jacques Despars' commentary (this time a true commentary, not an epitome, like those of the Arabic authors) is much longer than the original, containing practically all the material given by Ibn Sīnā, plus additions. Gentile da Foligno's commentary, because it concentrates on explaining issues assumed to be unclear to contemporary Italian readers, functions at times as a glossary rather than a true commentary on the text. However, in some parts it adds considerably to the original, and even raises a *quaestio* to be discussed.

Gentile da Foligno

We will first discuss Gentile da Foligno's commentary. He repeats approximately two thirds of the causes for nosebleed given by Ibn Sīnā:

[186] See Stage 1, pp. 106–108, and Stage 6, pp. 115–116, above.

[187] In the following chapters, I have numbered the items for clarity's sake. Unless otherwise indicated, the numbers do not appear in the original. Comments to the Latin commentators' description of nosebleed and its treatment in the footnotes in Chapters 5.3.2, 5.3.3 and 5.3.4 are my interpretation based on the medieval medical theory as it appears in *K. al-Qānūn*.

1. Nosebleed can follow acute diseases.[188] It can also follow a headache.
2. Gentile also recognizes critical nosebleed, especially in fevers, while Ibn Sīnā particularly mentions acute diseases, smallpox and measles.[189]
3. The quality of the blood as a cause for nosebleed was very important to Ibn Sīnā. Gentile faithfully repeats Ibn Sīnā's list of blood qualities which cause nosebleed. To the dominance of yellow bile in the blood and thinness of blood, he adds the quality of sharpness, corresponding to an overdose of yellow bile in the blood. To the qualities described as "plethora of blood" and "predominance of blood rising strongly",[190] Gentile adds the quality, "blood multiplying periodically in the arteries".[191]
4. Gentile does not specifically list hotness of blood, but mentions the hotness of the whole body that Ibn Sīnā, too, sees as a cause for nosebleed in addition to hotness of blood and hot, sharp humors.[192] Furthermore, both in the original text and in the commentary, dominance of bile concerns both the patients and their blood: choleric persons, according to Gentile, have a tendency to develop nosebleed. Both writers mention a predisposition to nosebleed as a cause.
5. The rupture of both veins and arteries in the brain is also mentioned as a cause for nosebleed. To Ibn Sīnā's mention of the rupture of arteries (presumably somewhere else than in brain), Gentile adds the possibility of eruption of veins. Gentile, however, gives much more weight to the question of blood vessels than does Ibn Sīnā.[193]

Thus, it is obvious that here, at least, Gentile not only clarifies details of the text to his audience but also creates a complete picture of the syndrome through his choice of causes taken from Ibn Sīnā's text.

Gentile omits only the following causes given by Ibn Sīnā: As common causes of nosebleed, Ibn Sīnā lists headaches, blows or falls, acute diseases, and a burning sensation. Of these, Gentile retains only headaches and acute diseases. This is interesting for two reasons. One, he disregards

[188] The exact causal connection is, however, hard to determine. See p. 130, above.
[189] Clearly, the writers refer to the same phenomenon with different words.
[190] In these conditions the veins are stretched, which causes them to rupture.
[191] This would presumably have caused the periodic nosebleed mentioned by Ibn Sīnā.
[192] In *K. al-Qānūn*: ascending, hot vapors.
[193] See pp. 188–189, below.

blows and falls, the only cases in which mere external, physical action might cause the problem. Two, while mentioning acute diseases as preceding nosebleed, Gentile ignores nosebleed as a sign of crisis in smallpox and measles.

Thus, although Gentile does not purport to give a complete description of causes of nosebleed, it appears that his omissions are quite minor. In fact, except for his innovations, he seems to follow Ibn Sīnā both in most details and in the general structure of his understanding of the symptom. Furthermore, although Gentile's additions are quite numerous, most of them are mere elaborations on categories already existing in the description of *K. al-Qānūn*. However, there are four definite innovations in Gentile's list:[194]

1. Gentile added to the causes listed by Ibn Sīnā the effect of possible dysfunction of the sub-faculties of the natural faculty.[195] In the long discourse at the beginning of his chapter on nosebleed, Gentile raised the *quaestio* of the true cause of nosebleed, asking whether it is a failure of the expulsive or the retentive faculty, or both. He finally reached the conclusion that nosebleed is an *accidentium* of both the expulsive and the retentive powers. In his theory of nosebleed, there was an expulsive power that pushed out blood with excessive force and at times when nature did not demand it, while the retentive power was too weak or inefficient to oppose this expulsion and retain the flowing blood. He believed that the excessive strength of the expulsive force was caused by humors that were faulty or which had become abnormal, thus setting off the expulsive power which would remove the humors and, with them, the blood.
2. He lists different flaws in the veins.[196] Although these are connected to the rupture of the veins and arteries that Ibn Sīnā's lists as possible causes, it is interesting to see that whereas Ibn Sīnā saw the quality of blood as decisive in causing the eruption, Gentile regarded both the blood and the veins themselves as equally important. In his view,

[194] Here "innovation" is to be understood "in comparison with Ibn Sīnā", as surely most, if not all, of the ideas expressed here belong to the wider cultural background of Latin Middle Ages.
[195] The faculties are one of the seven naturals of the Galenic system. See above, pp. 44–45.
[196] Supposedly also in the arteries; it is to be supposed that Gentile used the word 'vein' for both, except when he discussed them in comparison with each other.

ruptures of the vessels had several factors, the first being a general quality of thinness and softness of the veins, making them more prone to breaking, but not being in themselves real defects. The second factor was a bad vein texture which made it more fragile. In this case he indicated not a mere characteristic quality but a real defect. The last factor was a defect in the vein which caused the vein to open out and release blood, such as a lesion or undefined damage in the vein. This last factor approximates Ibn Sīnā's description, in which the rupture itself is considered a cause of bleeding. However, Gentile made it clear that it could also be the vein's own consistency that made it more breakable, thus extending the focus from blood and body fluids to the tissues themselves.

3. Gentile wrote about quick flow of blood, which could be nearly identical with one of the causes given by Ibn Sīnā, abundance of blood extending the veins, if the main consideration is the pressure that the walls of the veins have to endure. On the other hand, if Gentile's remark does not refer to pressure but to the speed of the exiting blood, implying that quick flow of blood leads to quick bleeding, it is an innovation.
4. Gentile suggested that skin diseases might cause nosebleed. This is quite interesting, as it seems to imply that he considered the inside of the nose to be like the skin and assumed that if the skin could bleed when there was a rupture, the nose could, too.[197]

This material demonstrates how Gentile on the one hand reports Ibn Sīnā's ideas faithfully and in detail, preserving the balance of importance given by Ibn Sīnā, while on the other hand he provides an innovative explanation of the factual causes of nosebleed. He even probes into the underlying layers of medicine and presents a theoretical basis for the elimination of nosebleed as well as several other problems by treating the causes of these maladies, i.e. by influencing the forces that are assumed to be unbalanced in the body as a whole. Furthermore, Gentile heavily stresses the importance of the texture of the vein. This indicates a change from purely humoral pathology to the pathology of tissues. (Even so, Gentile does not deny the basic importance of humoral pathology; his explanation of the causes connected with the quality of blood shows that he accorded great significance to that aspect.) In summary, Gentile's

[197] On the other hand, if this cause is mentioned together with acute diseases, it must be seen as a crisis or result of an acute disease that also has skin symptoms; in this case, it is little more than an elaboration of the question of acute diseases.

writings grant the old causes the same importance as before, while at the same time widening the perspective. In fact, in the case of Gentile's description of nosebleed, there is no selection by omission; however, it will be interesting to see how his additions influenced his therapeutic choices.

Jacques Despars

If Gentile's description of the causes of nosebleed contains only a small amount of selection by omission, Despars' contains none at all. He repeats and comments on everything Ibn Sīnā mentioned.[198] Thus, the innovations in Despars' thinking are to be sought solely in his additions. As in the case of Gentile, many of these additions can be interpreted as elaborations on a particular point in Ibn Sīnā's scheme, while the rest can be considered true innovations. Of course, this is not the only way to determine where Despars stressed different issues than the *K. al-Qānūn* (if this was the case): he could have stressed any issue on the list simply by repeating it several times, granting more space to its discussion, etc. However, since the development of a measuring-stick for this kind of qualitative research lies beyond the scope of our research, we will satisfy ourselves by discerning what were Despars' innovations and, later, how they influenced his choice of therapy. We only have to remember that the mere mention of a cause or symptom, or even a therapeutic quality, in the Latin commentaries does not necessarily imply that it was taken very seriously by the authors.[199] This is because these are explanatory commentaries that pride themselves on their completeness, whereas the Arabic commentaries we studied earlier were abbreviations, containing only strictly necessary details. On the one hand, when the Arabic commentaries performed selection by omission it carried more weight, and the additions and innovations they made can be supposed to have been serious, as otherwise they would not have been added to a text which ideally was to be short; thus, we can assume them to show a better level of criticism. On the other hand, the Latin commentaries, because of their attempt at completeness and detail, provide a far wider variety of suggestions for

[198] Apparently by mistake, he seems to forget the bitterness of the blood, but as he repeats the subject in various forms under other headings, e.g. biliousness of the body and yellow bile predominating in the blood, this can be considered an exception rather than a clearly stated opinion.

[199] More about this when we discuss their choices of plants, pp. 204–205; 208–209, below. There, it becomes clear that Despars routinely repeats all the information given by Ibn Sīnā, but shows additional attention only to part of it.

drugs and a greater possibility of comparing the number of appearances of the different drugs to determine their relative importance. Thus, the strength of the Arabic commentaries is their criticality, of the Latin ones their variety. From the Arabic commentaries, one can expect more accurate and well-founded information, from the Latin ones more ideas and innovation. Nonetheless, we must keep in mind that these qualities result less from the difference between the Arabic and the Latin commentary traditions than from the difference between epitome and expostulatory commentary.

The following are causes for nosebleed originally given by Ibn Sīnā which Despars includes in his description of nosebleed:

1. follows strong and acute illness
2. rising hot vapors
3. choleric constitution of the body
4. blow
5. heat, hotness of blood, intensity of boiling blood
6. critical nosebleed
7. eruption of arteries
8. fall
9. follows headache
10. follows burning sensation of head
11. crisis in measles
12. rupture of the veins and arteries of brain, of the network of brain, of *rete mirabile*, of *pia* and *dura mater*
13. excess of blood
14. tendency to nosebleed
15. excess of boiling blood
16. crisis in smallpox
17. spontaneous nosebleed
18. yellow bile dominating in the blood, choleric blood
19. thinness of blood

Concerning the additions not influenced by Gentile, part of them can be seen as direct developments of Ibn Sīnā's ideas:

1. In addition to the "acute diseases" mentioned by Ibn Sīnā, Despars states that nosebleed can follow acute fever, *frenesis* and *synocha* fever. It can also be a crisis in *synochis*, both putrid and non-putrid. He also explains why this happens: the disease causes the blood to swell (*tumescens*), and this causes the veins to burst.

2. As mechanical reasons, Despars mentions vigorous blowing of the nose and tickling of the nostrils.[200]
3. Peripleumonia and pleurisy are also mentioned by Ibn Sīnā as physical conditions which nosebleed may relieve. According to Despars, these conditions make hot vapors rise into the brain, which then cause rupture of the veins or arteries and lead to bleeding. Here, Despars elaborates the original text to express the underlying thought.
4. A hot apostema in the liver causes nosebleed in the same way. This is also mentioned in Ibn Sīnā's list of conditions relieved by nosebleed, but not as a cause.
5. To the list of blood qualities that cause nosebleed, Despars adds the piercing quality of blood, which, together with Gentile's two innovations, quick movement of the blood and its sharpness, causes the veins to open and bleed. This is apparently connected with Ibn Sīnā's quality of thin, bitter blood, which surely would be expected to have a similar corrosive effect on the veins.
6. The last independent cause Despars gives for nosebleed is swelling of blood and humors, which causes the rupture of veins. This is, of course, closely connected with Ibn Sīnā's idea of a "plethora," but its cause is not necessarily the same. For Despars, the swelling of blood is caused by hot baths, exposure to the sun, or tournaments and similar sport causing burning sensation of the head; this burning causes a superfluous dilation of blood in otherwise "quiet" veins and arteries, thus causing them to break. Despars also repeats the idea of "plethora", (as well as the idea of plethora of blood in the veins, which is not explicitly expressed by Ibn Sīnā) in his description of a cause already found in Gentile, namely "accumulation of blood in the arteries" (for Gentile, however, this is a periodical phenomenon). By contrast, he connects the swelling of humors with headache (caused by thin, choleric blood or yellow bile), which would draw many humors to the hurting place, as pain was always believed to do. There, the humors would then stretch the veins and the arteries and cause a rupture, especially in the network of the brain where the arteries and veins were assumed to diverge to cre-

[200] The first can clearly cause a rupture in a vein located in the nose; the second might be connected either with the urge to blow or scratch one's nose because of the tickling sensation, or with an oncoming cold that may have a bad effect on the nostrils and, again, lead to a vigorous blowing of the nose or some other cause for rupture.

ate very thin, and therefore more breakable, threads of vessels.[201]

Of the causes mentioned by Gentile but not by Ibn Sīnā, Despars mentions the strong expulsive power, which he locates in the blood, and the blood's power to burst the veins. For Despars, both qualities belong to a superfluity of heated blood; thus, they are also connected to Ibn Sīnā's plethora and hotness in blood.

There is good historical reason to believe that Despars read Gentile's commentary or was at least acquainted with the thoughts expressed in it, as the commentary must have been part of the general medieval Latin tradition.

We can see that Despars' innovations in this field are quite peripheral, except for the fact that he repeats Gentile's idea about the importance of the quality of the vessels. Rather, his innovativeness—which is great—lies in the field of connecting the phenomena. As is apparent in the examples above, he uses the same elements and mentions the same basic causes as Ibn Sīnā; however, where the latter simply describes a chain of connected phenomena which quickly reaches the level of physical, concrete, visual nosebleed,[202] Despars' explanation of the causes of the bleeding is much more explicit. Using the elements given by Ibn Sīnā, Despars succeeded in defining causal relations on which Ibn Sīnā never elaborated. Indeed, it is doubtful whether he would have even asked the questions Despars asked.

5.3.3. *Symptoms of Nosebleed in the Latin Commentaries*[203]

Gentile da Foligno

Gentile does not have much of anything original to say about the symptoms of nosebleed,[204] its different types, and the signs belonging to the differential diagnostics of the type of nosebleed. He discusses the same points as Ibn Sīnā, even surprisingly faithfully, except the following:

1. He does not mention the maximum amount (even up to 20 or 25 *raṭl*s)[205] of bleeding that the patient can bear before death.

---

[201] This thinness of the vessels is already mentioned by Gentile as a cause for nosebleed, pp. 188–189, above.

[202] Of course all the levels of explanation would be concrete from Ibn Sīnā's and Despars' point of view.

[203] See Stage 1, pp. 106–108, and Stage 6, pp. 115–116, above.

[204] For nosebleed as a symptom, see p. 129, above.

[205] See p. 131, n. 24, above.

2. He does not differentiate between bleeding from both nostrils and bleeding from only one nostril, as Ibn Sīnā does, even though Ibn al-Nafīs actually developed this differentiation into a basis for differing treatments.[206]
3. He does not explicitly mention that nosebleed is sometimes difficult. This, however, can so clearly be read between the lines that it is easy to imagine how he could have neglected mentioning something so self-evident.

The only original detail added by Gentile is found in his discussion of the flashes of light and white or yellow streaks that some patients saw during nosebleed. Whereas Ibn Sīnā does not even try to explain them, Gentile dares to identify their cause as the "shininess" of the blood.

Gentile does not add any of his own qualities to Ibn Sīnā's description of nosebleed. His change of emphasis in discussing the causes of nosebleed does not seem to influence this part of the text, and, indeed, there is no reason for it to do so: the connection between causes and symptoms is not clear enough,[207] and the new material does not disrupt the coherence of the original scheme in any way.

Jacques Despars

In accordance with his general style, Despars faithfully repeats everything Ibn Sīnā wrote about the manifestations of nosebleed, with slight elaborations and some explanations of the physiological background of Ibn Sīnā's often short explanations. Despars' special additions to Ibn Sīnā's text can be divided into four areas:

1. He elaborates the differential diagnosis between arterial and venal nosebleed, describing arterial bleeding as lighter, more mobile and more piercing than venal bleeding (in addition to being hotter, redder and thinner, as Ibn Sīnā already notes). According to him, all three qualities are caused by the greater thinness and swiftness of arterial over venal blood, and the greater heat of arterial blood is explained by the great amount of vital spirits it contains. Despars also adds that the color of venal blood is dark purplish red, in contrast to the bright red color of the arterial blood mentioned already by Ibn Sīnā.

[206] See pp. 131, 138, 168, and 173, and Ibn al-Nafīs' Prescription #9, p. 172, above.
[207] See the causes and the symptoms by Ibn Sīnā in Chapters 5.1.2 and 5.1.3, above.

2. Despars also develops his own distinction between the flow of nosebleed from a visible and from an invisible place. This distinction offers interesting possibilities for treatment and for different degrees of seriousness of the bleeding. Ibn Sīnā does not mention sites of bleeding at all, except the network of veins and arteries in the brain, which he considers very serious. On the other hand, most of his therapies are local; thus, he must have had a tacit understanding of the location of less serious bleedings. Here, Despars elaborates on this unspoken understanding.
3. Despars differentiates between continuous bleeding and dropwise bleeding. The first type leads to death after the loss of 20 or 25 *raṭl*s of blood. The second type allows the assumption that the patient still has enough nutriments and can endure a greater loss of blood than in the case of continuous flow.
4. Finally, Despars lists two additional phenomena that can precede nosebleed: redness of the face and eyes, and yellowness of the eyes and face in choleric diseases.[208] He postulates that the redness is probably caused by a plethora, the yellowness by the choleric constitution of the body that causes tendency to nosebleed.

As we can see, Despars' additions are elaborations of Ibn Sīnā's divisions, giving a better (or different) understanding of his text. His innovations in considering the causes do not have any effect on his description of the symptoms; however, there is, again, no logical necessity for them to do so: whatever the reason for the leakage of blood from the veins, the outward phenomena are quite similar—and it is this external manifestation of the internal causes that is relevant in the discussion of symptoms.

5.3.4. *Consequences of Nosebleed in the Latin Commentaries*[209]

Next, we will determine what, according to Ibn Sīnā's Latin commentators, are consequences of the causes and the symptoms of nosebleed.

Gentile da Foligno

Concerning the consequences of nosebleed, the difference between the original text and the commentary becomes more marked. Gentile omits nearly two thirds of Ibn Sīnā's explanation, although he is still more

[208] Of these, only the redness is already mentioned by Ibn Sīnā. See p. 132, above.
[209] See Stage 1, pp. 106–108, and Stage 6, pp. 115–116, above.

prolific than the Arabic commentators. He accepts Ibn Sīnā's distinction between beneficial and harmful kinds of flows of nosebleed and gives examples of both. Like Ibn Sīnā, Gentile claims that nosebleed (supposedly in the right amount) is beneficial for apostemas of the brain, diaphragm, liver, and lungs, although he does not mention "sanguinary or choleric" apostemas. However, he may have assumed this or simply have wished to shorten the text. On the other hand, he omits the benefits of nosebleed to patients with acute illnesses or choleric, thin blood, and its comparatively minor harm (even when strong) for patients with a predominance of yellow bile. They might, of course, be implied—after all, he mentions in his discussion of causes that nosebleed often follows acute diseases, and that it can be caused by thinness of blood and choleric constitution. However, these causes are not mentioned explicitly. Finally, he does not in fact say, as Ibn Sīnā did, that nosebleed is more beneficial in pleurisy than in peripleumonia. However, he does speak of apostemas of the diaphragm and the lungs, writing that nosebleed is more useful when the apostema is in the pleura or diaphragm than when it is in the lungs. Since one of the most obvious signs of pleurisy and peripleumonia are apostemas in the pleura and the lung, respectively, he factually makes the same claim as Ibn Sīnā, albeit with fewer words. It is here that Gentile adds his only innovation concerning consequences of nosebleed: he says it is also beneficial in apostemas of the pleura.[210]

Another area connected with the beneficial results of nosebleed and ignored by Gentile are the signs by which the physician can determine whether the bleeding has been beneficial or not.

Among the harmful effects of excessive nosebleed, Gentile, like Ibn Sīnā, mentions syncope;[211] however, he omits Ibn Sīnā's other indications of weakness and the effect on the mental functions of the patient: on the physical side, a decline of strength and extreme emaciation,[212] on the mental side signs of corruption of brain functions, and finally even death. Nor does he discuss the basic result of too much bleeding, which causes all the other symptoms, namely the loss of blood.

Gentile also mentions the flowing of blood to the stomach, and although he does not explain in detail what may happen if this is not avoided, he strictly exhorts the reader to prevent it.

---

[210] *paniculo velante costas*.
[211] In *K. al-Qānūn*: unconsciousness.
[212] Or weakness.

Gentile also agrees with Ibn Sīnā that nosebleed can cool the extremities, and explains this phenomenon by the fact that blood returns from the extremities to the heart and carries the warmth with it.

The last detail Gentile reproduces from Ibn Sīnā's writings is the change of a choleric person's skin color to yellow as a result of nosebleed. He omits all other effects of nosebleed on skin color that were listed by Ibn Sīnā.

Finally, Gentile omits the two diseases that Ibn Sīnā believed could be caused by nosebleed: weakness of the liver and dropsy.[213]

Thus, it appears that Gentile mainly simplifies Ibn Sīnā's main groupings of listed consequences of nosebleed, mentioning only a few examples from Ibn Sīnā's lists. This is especially apparent in his discussion of the beneficial effects of nosebleed and the different consequences connected with weakening. On the other hand, he decides to mention the danger of blood dripping into the stomach and the danger of coolness of extremities, while ignoring the diseases possibly caused by these problems. It is impossible to reconstruct his reasoning, except to conclude, perhaps that he wished to shorten the text, especially considering how faithful he was to Ibn Sīnā in the description of causes and symptoms in great detail. One possible reason for this omission, however, may have been directly connected to therapy: the consequences omitted would not have changed the treatment of the problem much at all. All symptoms connected with weakness could have been treated with strengthening drugs, while diseases following nosebleed could only be prevented by stopping the bleeding. However, the mention of coldness of the extremities is actually part of a therapeutic explanation, and preventing the blood from entering the stomach is a very practical form of prophylaxis. We will investigate later how these considerations are reflected in the treatment, and whether a similar explanation can be applied to Gentile's other omissions.

Jacques Despars

In his typical manner, Despars reproduces Ibn Sīnā's entire text and adds considerably to it. Sometimes, he simply elaborates on a thought already suggested by Ibn Sīnā, as when he explains the changes in the patient's skin color caused by the loss of blood: he asserts that much bleeding causes paleness, through which changes in the constitution of blood can

---

[213] In fact, he omits all three diseases: in our discussion of the weakness caused by the loss of blood (p. 133, above), we already mentioned the extreme emaciation which, however, might suggest tuberculosis rather than loss of blood.

be seen (for example, leaden colored skin is caused by the predominance of phlegm in the blood,[214] and so forth). Ibn Sīnā only mentions changes in the patient's color without discussing their underlying reasons. This same predominance of phlegm can also cause decrease of the innate heat.

Along with a loss of heat, Despars also explains the cooling of the extremities of the body, already mentioned by Ibn Sīnā. According to Despars, as the blood flows out, natural heat dissolves, making the remaining blood return to the interior of the body and leaving the extremities cold.

Both Ibn Sīnā and Despars deemed that too much bleeding is generally very weakening. Here, however, Despars adds two conditions to Ibn Sīnā's list of different types of weakness resulting from the loss of blood: the diminishing of forces, and the weakening of the pulse. The powers physically leave the body through the bleeding. This weakening, and the syncope that follows, can, however, according to him also have positive results, as it may itself stop the bleeding.

According to Despars, in general a great loss of blood can also lead to chronic diseases. Among these he mentions, in addition to hydropsy (mentioned by Ibn Sīnā), *cachexia* and consuming fever. Hydropsy can also lead to breathing difficulties and finally to death.

Finally, Despars mentions all the same possible effects of blood flowing into the stomach that Ibn Sīnā gives. Additionally, reverting to the authority of Hippocrates, Despars claims that the blood putrefies in the stomach. (This would obviously lead to new medical problems, which he, however, does not explain further.)

As we see here, Despars' innovations lie more in his way of explaining the rationale behind Ibn Sīnā's terse statements than in any major additions that diverge from Ibn Sīnā's line of reasoning. A few possible exceptions are the chronic diseases that, according to Despars, follow excessive bleeding. Although these, too, are merely an extension of Ibn Sīnā's category, they are relatively independent.

Our comments concerning both Latin commentaries would be as follows:

1. The Latin commentaries directly quote much more of Ibn Sīnā's text than the Arabic ones—Despars actually mentions and comments on everything Ibn Sīnā wrote. This is natural, since the Arabic commentaries are abbreviations, whereas Gentile's text is a combination

[214] Presumably after too much blood has been lost.

of an explanatory glossary and a true commentary, and Despars' great work explicitly intends to explain in detail what Ibn Sīnā mentions more briefly. This both forces him to discuss everything and gives him great opportunity to add material of his own.

2. Both commentaries create a logical whole; in other words, by reading the commentary, the readers can understand the nature, causes, symptoms or visible phenomena, and consequences of nosebleed, even without seeing the original.[215]
3. In certain areas (for example Gentile's discussion of the causes of nosebleed), the emphasis that Ibn Sīnā placed on a certain area is changed somewhat and additional aspects are taken into focus. There are also some real additions (for example, the chronic diseases in Despars' list of consequences of nosebleed).

Our next task is to compare the therapeutic principles as presented in the Latin commentaries and to see how much the theoretical pathological picture undergirding the commentaries influences the therapy recorded there. We will do this in the next chapter.

5.3.5. *Treatment of Nosebleed in the Latin Commentaries*[216]

5.3.5.1. Treatment, Theory, in the Latin Commentaries

We now come to therapy presented in the Latin commentaries. We will start by comparing the theoretical basis of Gentile's and Despars' therapy of nosebleed with Ibn Sīnā's (as seen in the *K. al-Qānūn*) in an attempt to see how their earlier choices in the field of pathology influence their choice of therapy. This comparison is presented in a tabular form in Table 5.16, Appendix 16.

Gentile da Foligno

Gentile includes approximately half of Ibn Sīnā's therapeutic qualities in his commentary. This is rather strange, since he repeats most of Ibn Sīnā's list of causes of nosebleed.

In fact, however, there is a clear pattern behind Gentile's choices. He simply includes all the qualities found in the list at the beginning of Ibn Sīnā's description of therapy: astringency (to which he adds the term

---

[215] This is true for the Arabic commentaries as well.
[216] See Stage 2, pp. 108–109, and Stage 6, pp. 115–116, above.

styptic); cooling, thickening and inspissation of the blood; adhesiveness; causticity (or cauterizing); and remedies with a special property. He does not mention the possibility of a medication having several of these qualities, supposedly regarding this as redundant. In addition, he includes the stopping of the blood flow—an intuitively obvious choice—and coldness, which is a variant of Ibn Sīnā's "cooling."

If we consider (on the basis of the general principles of physiology and pharmacology in *K. al-Qānūn*) how these drug qualities are connected with the above-mentioned causes, symptoms and consequences of nosebleed, the following picture emerges:

1. Astringent[217] and caustic[218] drugs presumably stop the bleeding immediately by closing the aperture from which the blood streams. Their effect is meant to be local. This is beneficial for any rupture of the veins, as long as they can be reached manually. For Gentile, different defects of the veins and arteries are a relevant aspect of the causality of nosebleed.
2. Adhesive drugs also stop the bleeding locally; however, whereas astringent and caustic drugs bring the sides of the aperture closer together, adhesive drugs add a protecting film over the rupture, which mechanically prevents the blood from exiting from the vessel.
3. Cold and cooling drugs are used either locally, benefiting from their coagulating effect (according to Gentile, thinness of blood is a cause for nosebleed), or orally, since hotness of blood, too, can cause the problem. In the latter case, Gentile would be dealing with the primary, underlying problem rather than the symptom (or the primary problem in addition to the symptom).
4. Thickening and inspissating drugs act against the thinness and quick flow of the blood.

Thus, Gentile, like Ibn Sīnā, aims to attack the problem both on the symptomatic level and on the level of its causes.

In addition to some variants in *K. al-Qānūn*, of which Gentile includes only one in his commentary,[219] Gentile chooses to omit the following:

1. Sharp [remedies]. It is unclear in Ibn Sīnā's text whether the medicine should be sharp **and** caustic, or sharply caustic. It is difficult to know whether Gentile omits this because he sees it as a mere

[217] See p. 135, n. 46; p. 157, above.
[218] See p. 135, n. 49, above.
[219] Cooling *vs*. cooling the blood; thickening the blood *vs*. simply thickening.

qualification of caustic, whether he considers it similar enough to caustic, or whether he simply does not regard it as useful or relevant enough.

2. Measures to be taken for the removal of blood from the stomach if it has flowed there. He does not mention the potential for blood flow to the stomach earlier in the text and that one should be cautious against it; therefore, he does not recommend drugs that cause vomiting or drugs that help to expel the blood from the stomach.
3. Anesthetizing medications. Possibly, he omits these because their main contribution to the treatment of nosebleed is their extreme cooling effect, and he has already mentioned cooling drugs.
4. Purging of the bile and adjustment of the blood. This omission is quite strange, as bile is definitely part of his conception of the causality of nosebleed, and as Ibn Sīnā uses drugs with these two qualities for the treatment of a tendency to developing nosebleed, which Gentile also mentions.
5. Strengthening drugs. Perhaps, he omits these because they belong to the general therapy of any medical condition rather than to nosebleed in particular. In addition, Ibn Sīnā mentions strengthening only in connection with the use of wine and when it is needed, not as an independent medical treatment.

Gentile does not make any therapeutic innovations; rather, his opinions are expressed through his choices of inclusion and omission.

Again, we see that there is a definite connection between the causes and phenomena of the condition and Gentile's therapeutic advice, just as there is in the Arabic commentaries. Two issues are discussed somewhat flimsily: one concerns the case of nosebleed caused by yellow bile. Gentile writes that there is no way to eliminate yellow bile or even modify the quality of blood (except to cool it so much that it naturally turns into another kind). The second issue, Gentile's own innovation, is that of nosebleed caused by problems in the expulsive and retentive powers. Curiously, it does not receive any therapeutic consideration. Otherwise, however, the logical picture we drew earlier of the pattern behind Gentile's selection of therapies continues.

Jacques Despars

As usual, Despars repeats practically all the therapeutic qualities mentioned by Ibn Sīnā with only slight emendations. Uncharacteristically, he omits "thickening," but the reason is surely that he also mentions "thickening the blood," and in this particular case the blood is the only thing that needs to be thickened. On the other hand, where Ibn Sīnā only recommends in general the removal of bile, Despars specifically advocates that it be purged from the blood.

Most of Despars' innovations again lie in his elaborations: they do not really initiate a new way of thinking, but they add clarifications, explanations and details to the old one. Along these lines, we can see that "generating blood of moderate thickness" and "generating blood of moderate hotness" are not far from "regulating blood"—the blood is simply adjusted by generating new blood of a suitable kind.

In the same way, "closing the openings of the veins," "sealing," and "creating a scab on the opening of the vein" seem to be variants of astringent and caustic, especially since Ibn Sīnā specifically warns the reader in connection with caustic drugs that a scab can fall and cause worse damage than the bleeding itself. The general idea here is simply to close the aperture in the vein.

The next complex of ideas that Despars presents, however, is truly new. The administration of aromatic, cold remedies in order to retain the patient's life-giving power, and, in another place, the re-introduction of the spirits lost through bleeding—in short, the revival of the patient after the loss of blood—is a subject not much discussed by Ibn Sīnā, except in connection with the question of when and when not to use wine. Part of Despars' discussion also concerns the issue of wine, but the concept is nevertheless quite far from mere strengthening.

Thus, we see that the Latin commentaries do not change Ibn Sīnā's therapeutic ideas much: Despars adds an innovation of his own, Gentile makes a few surprising omissions, but the basic core qualities seem to continue from Ibn Sīnā through the Arabic commentaries to the Latin ones. After studying the practical therapeutics, we will see how these core ideas influence, or are connected with, the choice of drugs administered to the patient.

5.3.5.2. Treatment, Practice, in the Latin Commentaries[220]

Prescriptions used in the Latin commentaries

We will now study the prescriptions suggested by Gentile da Foligno and Jacques Despars for the treatment of nosebleed.[221] Unlike our earlier

[220] See Stage 3, pp. 109–111, and Stage 6, pp. 115–116, above.

[221] Discussion of physical therapies is omitted because it is not part of our main

method, we will discuss both commentators concurrently in tabular form (Table 5.17, Appendix 17), a form made possible[222] and even profitable by the close connection between the original and the commentators. Latin plant names are translated into English according to the identifications given in Appendix 18, Table 5.18. Where the different Latin synonyms had to be translated with a single English term, the Latin term follows in brackets. As was already mentioned above,[223] here also one should bear in mind that our English names are not intended to be exact translations of the Latin terms—in fact, this would be impossible in many cases, e.g. when we do not know the exact meaning of the term, when it encompasses several different plants, etc. The English names are given only to make the text more readable.

We will first give the translation of Ibn Sīnā's Arabic text from the Būlāq (1294 H) version, which we used as the source of the Arabic text in the whole study. Then, we will give the Latin translation of Gerard of Cremona as found in the *Liber Canonis Avicenne*, (Venetiis, 1505), since it sometimes differs from the Arabic text and also helps us to understand the choice of terms by the commentators (in other words, it helps clarify what exactly was the problem they were trying to solve). Next, we will give the English translation of the comments of Jacques Despars on the prescription in question, and finally Gentile da Foligno's comments. This order is historically awkward, as Gentile da Foligno wrote his comments before Despars, but as Despars' commentary is much richer in detail and includes practically all of Ibn Sīnā's prescriptions, it seems easier to handle them side by side.

We have removed all accompanying material that is not directly connected with the *materia medica*. Also, we have not translated the prescriptions exactly but rather have written them in the same format used earlier for Ibn Sīnā's prescriptions and the Arabic commentaries.[224] Our goal is to simplify reading and make the relevant points easier to grasp. Furthermore, except for the amounts of simples used, we have omitted most of the instructions for preparation. This ensures that we keep the focus on our main issue—the simples—and are not carried away by a multitude of tangential details.

---

subject, *i.e.*, the simple drugs used in the treatment, and would lengthen the discussion unnecessarily.

[222] See 5.3.1, point 4, pp. 184–185, above.

[223] See p. 111, above.

[224] See Chapters 5.1.5.3 and 5.2.5.2, above.

The plants in each prescription are numbered,[225] a method which results in making clear for the reader any correspondence between a given simple in the Latin commentaries and the same simple in Ibn Sīnā's text, as well as highlighting the Latin commentaries' omissions from and additions to Ibn Sīnā's text. Whenever either of the commentators discusses the prescription but omits something, or if the Latin translation omits something, this is indicated with the number of the drug in the prescription and three lines (–). In addition, drugs to be used as substitute drugs[226] for a drug mentioned in the prescription are marked with the letter Q. Synonymy between different drug names is indicated by an equation mark (=). Drug amounts are not mentioned.[227] Gentile's and Despars' additions to *K. al-Qānūn* are given in bold italics.

In order to avoid unwieldiness, we mention neither the part(s) of the plant involved in making the drug nor methods of preparation. The exceptions are products where a part of the plant is called by a specific name of its own (pomegranate flower, *jullanār*, vs. pomegranate, *rummān*).[228]

Those plants that represent pure synonymy are labeled with the same name, with the Latin name following in parentheses. Where two simples are mentioned as synonyms but the terms do not seem to refer to the same simple, they are marked with an equation mark but given different English names, followed by their Latin names in parentheses.

The numbering system of the prescriptions corresponds to that used in the analysis of the prescriptions from *K. al-Qānūn* in Chapter 5.1.5.3, above. Additions by the commentators are numbered according to the prescription they follow, with an additional lower-case letter. The same procedure is followed if Ibn Sīnā's original prescription is divided into several prescriptions by the Latin commentators.

When comparing the Latin commentaries' prescriptions with those in the Arabic commentaries, one difference emerges clearly: the former either follow Ibn Sīnā's prescriptions in detail, as in the case of Despars, or they are at least connected with them clearly enough to allow unequivocal ascription of the comments. Furthermore, Gentile's comments do not seem to be generated by the relevancy of the subject matter but by

225 The numbering of the prescriptions is not original, either, but our addition for the comfort of the reader.
226 For substitute drugs, see Levey, 1971.
227 See pp. 122–123, above.
228 See pp. 112–113, above.

the need to clarify Ibn Sīnā's text for a contemporary audience; this is especially true in many cases concerning plant names. Thus, it becomes clear that Despars' innovations lie in his additions, while Gentile's lie in his areas of greatest interest. However, the latter are sporadic and do not give a good overview of which therapies he preferred. In general, Gentile is less consistent in the matter of prescriptions than he is in describing the causes, symptoms and results, or in therapeutic theory. This may well be connected with the fact that his commentary was clearly meant to be read with the original text; therefore, as long as there is no need for explanation or additions, the reader is tacitly referred to the main text.

Despars makes two major kinds of additions: 1) He adds new material to prescriptions that he transmits. This is done either to allow for alternative choices when an ingredient is missing (although sometimes unintentional alternatives arise from faulty synonymies), or to improve the prescription by adding ingredients. 2) He adds complete prescriptions, part of which also include new simple drugs.[229] His innovations also lie in the way he asserts his preference for some of the ingredients mentioned by Ibn Sīnā by repeating them.

This is what we will look at next: first, the identifications of the Latin drug names appearing in these prescriptions; secondly, the number of times individual drugs appear in the prescriptions; and thirdly, a list of Gentile's and Despars' possible preferred drugs. Afterwards, we will try to see why they preferred precisely these drugs.

Simple drugs used in the Latin commentaries[230]

The simple drugs listed in Table 5.18, Appendix 18, are either used in at least one of the commentaries or in the Latin translation of *Kitāb al-Qānūn* to which we refer. The identifications are based both on the literature concerning medieval drug names mentioned in Chapter 4.2, *Suggested Methodology*, Stage 6,[231] the most important being André's and Daems' glossaries, and on the internal evidence, both in the form of synonymy given by the commentators and the use of certain Latin drug names corresponding to the respective Arabic ones in the prescriptions, either by the translator or by the commentators or both. We will first

[229] See Prescriptions #40, #43 and #53b, pp. 391–395, although the last is actually a prescription for a clyster for removing the blood from the stomach if it has flowed there.

[230] See Stages 3 and 4, pp. 109–113, and Stage 6, pp. 115–116, above. For details of the method used, see Ch. 5.1.5.3, above.

[231] See p. 115, above.

give the English name of the drug that we have used in the prescriptions above, then its medieval Latin name, and then its modern Latin identification. If the plant clearly has separate identities in its Arabic and Latin forms, we will mention both, first Latin and then Arabic, separated by a slash. An English name may have many Latin counterparts if the drug is one of the many synonymous ones that appear in the prescriptions, especially in cases where the commentators are explaining the identity of a specific drug.[232] Concerning modern Latin names, we have decided to use only the generic names of the plants in order to maintain simplicity. For the same reason, as much as possible, we have chosen to relate only to the primary identifications,[233] that is, those that appear consistently in our sources. Thus, all the generic names listed below a primary name really do belong to the central identification. Afterwards, if the plant has already appeared in Ibn Sīnā's Arabic text, we will give its Arabic name and its generic identification.[234] In this way, it will be possible to compare the identifications of the Arabic terms with those of the Latin ones. Lastly, we will mention the synonyms of the drug name as given by the Latin commentators. The synonyms will also be separately identified in their respective places in the list. The identification of the synonyms and the identification of the Arabic terms will be taken into consideration when choosing the suitable generic names.

This method of identification creates the hazard of conflating two drugs, such as when a name that seems to refer to a single plant actually refers to different plants in the Latin European commentaries and in the Arabic texts. We have, however, decided to take that risk, for the following reasons:

1. We have provided the identification of both plant names, the Arabic and the Latin, and remarked on the issue if they seem to be far removed from each other. There is no intention to claim that the Latin and the Arabic plant that have been translated with the same English word are in fact the same—but there is definitely reason to believe that they are, in most cases.
2. Even in cases where the identification does not seem to be exactly the same but the two identifications seem to have something in common—as is actually the case in most of the identifications—there is the distinct possibility that plants included in some name or

[232] See *e.g.* basil and chamomile/wild pomegranate/saltwort, Appendix 18.
[233] See Ch. 5.1.5.3, above.
[234] See Ch. 5.1.5.3.

term include the same plant as one of the alternatives, and possibly the effective one. Here, as in the discussion of differential diagnosis in ancient and medieval medicine, one can be sure that many situations that we would not include in the same category were indeed included. Many cases of illness were supposedly diagnosed incorrectly, but this does not preclude the possibility that the great majority of them were indeed caused by the disease that the doctors identified. A certain number of successful diagnoses and treatments was sufficient; no one expected all of one's patients to be healed. In the same way, if part of the drug material used for the therapy was effective, this would supposedly already have guaranteed the popularity of the drug. In addition, as we saw, most of the composed drugs have at least a few ingredients, which enhanced the possibility of a successful treatment even in cases where all the ingredients were occasionally incorrect (in fact, it was rare that they were all wrong simultaneously).

3. Even in cases where two drug identifications differ so much that they cannot possibly be explained as the same drug, these identifications still tell us something about the development of the tradition: not how effective drugs survived and ineffective ones were removed, but (a) how unknown drugs could be replaced by well-known (and hopefully effective) ones by claiming the latter and the former to be synonyms (e.g. saltwort/chamomile), or (b) how the name of a drug could be retained in the tradition although its practical meaning was lost, either because the drug was not known anymore or because it was impossible to obtain (e.g. *aldulb*).

It is clear when studying the following list that the identifications of the different terms differ greatly in accuracy. For example, the identifications of aloe and basil seem to be sure, whereas the difference between Indian lycium and lycium or the synonymy of teasel and knotgrass are highly uncertain matters. This uncertainty reaches its height in cases like that of saltwort/chamomile. Still, we should keep in mind that we are conducting cumulative research, whereby the influence of possible errors on the whole study is minimized.

In the list in Table 5.18, first the English name of the drug is given, then its Latin name as it appears in the Latin translation of *K. al-Qānūn* or in either of the Latin commentaries, and then its possible identifications (on the level of genus). If the drug appears in *K. al-Qānūn*, its Arabic name and identification (according to Chapter 5.1.5.3) are mentioned, and finally the possible Latin synonyms are listed as they appear in either of the commentaries (the original name that is being explained is written in bold letters, while the explanative term uses a plain font).

Comparison between K. al-Qānūn *and the Commentaries*

We now count the number of appearances of each different drug in the prescriptions (Table 5.19, Appendix 19). This is done in order to (a) determine Gentile's and Despars' preferred drugs for nosebleed, (b) compare both with the core drugs of Ibn Sīnā's drug collection, and (c) evaluate each drug in regard to the qualities recommended by Ibn Sīnā for the treatment of nosebleed. In this way, we can see whether the Latin commentaries' respective medical systems, causes, manifestations, theoretical therapy and practical drug therapy constitute a coherent system as far as nosebleed is concerned. We present the number of appearances concurrently in one table. As Despars usually repeats all of Ibn Sīnā's prescriptions, we show his independent use of the drugs in the last column of the table, omitting repetitions of Ibn Sīnā's recommendations, in order to determine his true preferences. We also list separately those drugs that Gentile or Despars mention only to explain the meaning of a problematic term, as they cannot for that reason alone be considered preferred drugs. Synonymy is, on the other hand, used in this table in order to combine in a single category drug names that are either mentioned as synonyms or whose identification makes it clear that they belong to the same plant family. As we wish to determine the Latin commentators' preferred drugs, this approach is more useful than considering different appearances of the same plant or two plants of the same family as separate entities.

If we look at these results from the point of view of core groups, i.e. of the drugs that are most central for each author, we see that Gentile concentrates nearly exclusively on explaining the problematic drug names. There are only five mentions of drugs unconnected by synonymic explanations: jujube, lemon, opium, orange, and vinegar, each appearing once. Of these, vinegar belongs to Ibn Sīnā's and to the supracommentary's core groups (in fact, it is the only drug repeated in the supracommentary). Opium is part of Ibn al-Nafīs' core group, and appears three times in Ibn Sīnā; thus, it is popular with him also, although it does not belong to his "top ten." Jujube does not appear in any Arabic commentaries, and appears only once in *K. al-Qānūn*. Lemon and orange are both innovations by the Latin commentaries, orange not appearing even in Despars.

Despars lists all the drugs mentioned by Ibn Sīnā and by Gentile, except oranges. If we look at his preferred drugs independently of *K. al-Qānūn*, we see that his nine preferred drugs represent 12 % of the drugs he mentions for nosebleed and 42 % of all appearances (59 appearances). They are: plantain (+ fleawort) (12 appearances), cotton (+ cotton-like substances) (9 appearances), rose (8 appearances), vitriols (6 appearances), camphor (6 appearances), clay (5 appearances), opium (+ poppy) (5 appearances), dragon's blood (4 appearances), and shepherd's purse (4 appearances). Of these, vitriols, camphor and rose belong to Ibn Sīnā's core group, and clay and plantain also appear quite often in his prescriptions. Camphor also belongs to Ibn al-Nafīs' core group, as does opium. Rose is part of Ibn al-Nafīs' core group and it is the only drug al-Jaghmīnī repeats more than once (three times). Vinegar is the supracommentary's most mentioned drug, also appearing three times. In addition, four drugs appear three times in Despars' commentary, and eleven drugs appear twice, independently of Ibn Sīnā's text. Of these, frankincense, knotgrass and excrement of donkey are part of Ibn Sīnā's core group. Thus, we can see a definite connection between the different core groups.

5.3.5.3. Relationship between the Choice of Simple Drugs and their Qualities[235]

We have already seen that Ibn Sīnā's drug preferences influenced the choices of his commentators. Now it remains to determine the connection between the drugs appearing in the Latin commentaries and their medical qualities as given in Book II of *K. al-Qānūn*. We will do this in the same way as in Chapter 5.2.5.3, *Relationship between the Choice of Simple Drugs and their Qualities*, where we compared the most popular drugs in the Arabic commentaries of *K. al-Qānūn* with the drugs having the greatest number of medical qualities to see whether there was any connection, using only the drug qualities recommended by Ibn Sīnā. This should show us whether the Latin commentators also were aware and interested in the theory behind Ibn Sīnā's pharmaceutical decisions. The material is presented in Table 5.20a, *Medical Qualities in the Latin Commentators' Drugs for Nosebleed*, in Appendix 20, followed by Tables 5.20b and 5.20c showing the degree of this connection.

---

[235] See Stage 5, pp. 113–115, and Stage 6, pp. 115–116, above.

Our comments are the following:

1. Altogether, 62 drugs are included in the above comparison.
2. The most preferred drugs of the Latin commentaries are opium and vinegar, the only ones which appear both in *K. al-Qānūn* and in both of them (= 3 %).
3. There are 25 simples out of 62 that appear both in *K. al-Qānūn* and in at least one commentary (= 40 %).
4. As regards therapeutic qualities (which will in the following sometimes be referred to simply as "qualities"), there is one drug, coriander, with five qualities (2 %). Myrtle has four qualities (both of them together 3 %).
5. The percentage of drugs having three or more medical qualities (11 items) is 18 %.
6. If we consider those drugs recommended by Ibn Sīnā which also appear in at least one Latin commentary, we receive the following results:
    a. Of the two most popular drugs, opium has three medicinal qualities, and it is thus among the 18 % of drugs with the most qualities, whereas vinegar has two qualities and is among the 50 % of drugs with the most qualities.
    b. Of the drugs mentioned in at least one commentary in addition to *K. al-Qānūn*, 21 % have three or more qualities; 54 % have at least two qualities. A comparison to the corresponding numbers for drugs that appear only in *K. al-Qānūn*—16 % having at least three qualities and 47 % at least two qualities—shows a tendency for the qualities of the drug to influence its acceptance also among the Latin commentators. However, as in the case of the Arabic commentators, we have to bear in mind that the drugs with the highest number of therapeutic qualities were already favored by Ibn Sīnā; therefore, it is difficult to conclusively deduce the direct cause for the commentators' decisions.
    c. If we compare the drugs with the most qualities to those with the least qualities, it becomes even clearer that when the commentators chose drugs, the therapeutic quality of drug was of prime importance. Although the drug endowed with the most qualities, coriander (five qualities), is not repeated by either of the commentators,[236] five (= 45 %) of the eleven drugs

[236] Reason for this is not clear.

> embodying three qualities or more are recommended by at least one commentary. If we compare this with the corresponding percentage for all drugs recommended for nosebleed in *K. al-Qānūn*, 39 % and especially with the drugs having no suitable qualities (7 %), we see that there is a clear correlation.

We can thus claim that there exists a clear connection between the number of therapeutic qualities Ibn Sīnā assigns to a drug and its popularity among the Latin commentators. This connection resembles that between the *K. al-Qānūn* and its Arabic commentaries. It is based either on a conscious preference for drugs embodying these qualities or on a more direct following of the preferences of Ibn Sīnā, who himself preferred drugs with more medical qualities and whose drug preferences were often adhered to by the commentators.[237] It can be supposed, however, that the choices, whatever their reason, were subconscious, and may have been based on several motivations working together. In addition, we have not yet considered in detail the possibility that medical efficacy as experienced when using a specific drug could have been a decisive factor in these choices. This question will be discussed in the next chapter via an evaluation of the plant drugs Ibn Sīnā and the commentators used against nosebleed and a comparison of the results of this evaluation with the popularity or usage pattern of the drugs.

5.4. *Relationship between the Medical Efficacy of Drugs and their Popularity*[238]

We have already identified the most preferred simple drugs used against nosebleed and have seen the connection between Ibn Sīnā's drug preferences and those of the Arabic and Latin commentators of *K. al-Qānūn*. The next step is to evaluate the medical effect of these drugs in the therapy in order to see to what degree objective, empiric, and repeatable medical effects might have been responsible for drug choices. To this purpose, we will use the paradigms of Western biomedicine.[239]

---

[237] See Chapters 5.1.5.4 and 5.2.5.2, above.
[238] See Stage 7, pp. 116–124, above.
[239] For reasons for this decision, see pp. 100–101, above. For the description of the evaluation process and its problems, especially the question of efficacy, see pp. 116–124, above.

This evaluation will be performed with the help of existing research on herbs in modern pharmaceutical literature, especially the handbooks and online databases mentioned in Chapter 4.2, Stage 7.[240] The handbooks provide a good perspective of previous decades of past research, whereas the databases discuss recent developments.

We will concentrate only on plant drugs, excluding animal-based and mineral medications. We have made this choice because plants are a well-researched group of medications, whereas animal products have been studied only very sporadically and would therefore yield less accurate results. Our primary aim is not to find out whether every specific medication would have had an effect or not, but to see the general picture. This is achieved more easily by concentrating on the group of drugs that has been best researched.

We will first list the qualities most likely to assist the treatment of nosebleed according to reliable phytotherapeutic literature. Then, we will examine whether, according to the literature, the plant in question has any of these qualities. We will not consider a plant as having a specific medical effect solely on the basis that it contains chemical constituents that have this effect, for three reasons. First, the amounts of the chemicals are often omitted in the descriptions and, in addition, they often fluctuate. Secondly, we do not know the exact amount of the chemical necessary for the therapy to be successful. Thirdly, the effect of the whole plant drug is quite often different from that of any of its parts.[241] Instead, we will include only those plants for which the needed effects and/or indications have been listed in pharmacognostic literature. Exceptions to this principle are mentioned separately.

When studying a specific plant, we will examine its whole genus rather than only its species: first, because most identifications of both the Arabic and the Latin plant names are not specific enough; secondly, because we do not necessarily have enough information about the species; and thirdly, because plants of the same family usually have similar phytochemistries, the differences being quantitative rather than qualitative. Although this method involves the danger of attributing to a plant effects it does not have, the benefits it entails and the ability of the cumulative evidence to compensate for smaller miscalculations outweigh this disadvantage.

---

240 See p. 118, above.
241 See pp. 118–119, above.

An important issue to bear in mind is that we cannot consider a plant ineffective against a disease even if the literature does not attribute the desired qualities to it, as this lack may merely indicate that the plant has not been studied from the aspect of its effectiveness against that particular disease. In practice, then, the number of plant drugs which are efficacious against the given disease may be greater than the results will show.

On the basis of relevant phytopharmacological literature, we have chosen the following medicinal qualities as criteria for the efficacy of a plant against nosebleed. We also mention some of the chemicals from the plants to be evaluated that are known to have the desired effect. Although the effectiveness of a plant is not guaranteed by the mere fact that it contains the chemical constituent, such efficacy is certainly made more likely by the fact.

1. *Hemostatic Drugs*
In addition to explicitly hemostatic, (hemo)styptic and antihemorrhagic drugs, this category includes drugs described as stopping different types of bleeding, such as inner bleedings and uterine bleeding. Hemostatic chemical compounds include pectin and pectic substances.[242]

2. *Analgesic Drugs*
This category includes analgesic and local anesthetic drugs. They act locally by causing vasoconstriction of the capillaries. Local anesthetic chemical compounds include eugenol and its derivatives.[243]

3. *Antiscorbutic Drugs*
Since one of the causes of a tendency toward nosebleed is lack of Vitamin C, antiscorbutic drugs can be expected to help in some cases. Antiscorbutic chemical compounds naturally include Vitamin C.[244]

---

[242] See *Dr. Duke's Phytochemical and Ethnobotanical Databases. Chemicals with hemostat activity*. Phytochemical Database, USDA—ARS—NGRL, Beltsville Agricultural Research Center, Beltsville, Maryland. James A. Duke. *http://www.ars-grin.gov/cgi-bin/duke/chemical_activity.pl*.

[243] *Ibid*., Chemicals with Analgesic Activity. ⟨http://www.ars-grin.gov/cgi-bin/duke/chemical_activity.pl?Analgesic⟩.

[244] *Ibid*., Chemicals with Antiscorbutic Activity. ⟨http://www.ars-grin.gov/cgi-bin/duke/chemical_activity.pl?Antiscorbutic⟩.

4. *Astringent Drugs*
Astringent drugs cause the upper layers of the mucosa to draw together and harden, thus stopping the bleeding from the capillaries. Astringent drugs include tannins and rosmarinic acid.[245]

5. *Caustic Drugs*
Caustic drugs applied locally also draw the sides of the wound together, stopping the bleeding.

6. *Blood Coagulating Drugs*
Drugs accelerating blood coagulation cause a clot to form on the wound, thus blocking bleeding. Blood coagulating drugs include calcium and vitamin K (in cases where the slowness of blood coagulation is caused by the lack of these elements).[246]

7. *Drugs Protecting the Mucous Membranes*
Drugs protecting the mucous membranes prevent external irritations and help to keep the membranes intact. They include mucilages.

8. *Drugs that Strengthen the Blood Vessels*
These drugs strengthen the blood vessels and the capillaries, making them more flexible and less fragile. They include rutin and flavonoids.[247]

9. *Vasoconstrictor Drugs*
These drugs constrict the blood vessels and prevent the flow of blood to the wound.

10. *Wound-healing Drugs*
This category includes drugs that variously effect the healing of the wound, as opposed to its temporary closing, e.g. by accelerating granulation, assisting cicatrisation, by drying or by epithelizing the wound.

Table 5.21 in Appendix 21 lists the existence of the above-mentioned relevant medicinal effects in plants identified as the ones recommended by

[245] *Ibid.*, Chemicals with Astringent Activity. ⟨http://www.ars-grin.gov/cgi-bin/duke/chemical_activity.pl?Astringent⟩.
[246] *Ibid.*, Biological Activities of Vitamin K. ⟨http://www.ars-grin.gov/cgi-bin/duke/chem-activities.pl⟩.
[247] *Ibid.*, Chemicals with Capillariprotective Activity ⟨http://www.ars-grin.gov/cgi-bin/duke/chemical_activity.pl?Capillariprotective⟩.

either Ibn Sīnā or any of the commentators for the therapy for nosebleed, according to the drug identifications in Chapters 5.1.5.3, 5.2.5.2 and 5.3.5.2. In cases where the plant has several possible identifications, associated with different genera, all possibilities are examined and the results later combined in Table 5.22. Plants or plant products that are too general to be defined in terms of their genus (e.g. "cotton-like substance from other plants") are excluded from the list.

Out of 105 plant genera listed, 46 have at least one of the effects necessary for the therapy of nosebleed. Thirty plant genera contain one or several potentially useful chemical compounds. Plants belonging to twenty-nine genera are ineffective against nosebleed, as far as can be ascertained by modern phytochemical research. For the rest, no results were found. The effect of the drugs seems to be based mostly on astringency (28 %), hemostatic effect (12 %), and the local anesthetic effect (13 %). More general wound-healing drugs are also strongly represented (12 %).

We will now combine this information about the medical efficacy of the single plant genera with the plant identifications made in Chapters 5.1.5.3, 5.2.5.2 and 5.3.5.2 to determine the possible effect of the plants as they were known to Ibn Sīnā and his commentators, as well as the extent to which their efficacy could have contributed to their popularity.

Table 5.22 in Appendix 22 shows how many times each drug appears in the prescriptions of Ibn Sīnā and each of his commentators and its medical effect according to the modern Western bioscience. Synonyms (both Arabic and Latin) have been collected and counted as one, as have those plant drugs that can be identified as members of the same genus even though their synonymy is not explicitly stated. In the final evaluation, a plant is considered efficient if any of its possible identifications has the sought-after effect. This final degree of efficacy is marked in bold, underlined symbols in Column #1 on the side of the English identification of the drug.

Let us now see what conclusions can be drawn from this table concerning the relationship between the popularity of a drug in *K. al-Qānūn* and its commentaries and its medical efficacy according to Western biomedicine. Did the objective medical effect of the drug influence its popularity? Or, from another point of view, is there a parameter that can be used to evaluate the possible medical efficacy of a drug by studying the way in which Ibn Sīnā and his commentators use it in their texts?

We are considering the following aspects:[248]

1. Relationship between the most preferred drugs of Ibn Sīnā and their medical efficacy.
2. Relationship between the most preferred drugs of the commentators and their medical efficacy.
3. Relationship between the continuous popularity of a drug and its medical efficacy.
4. Relationship between the status of the drug as an innovation and its medical efficacy.
5. Relationship between the number of recommended qualities in a drug and its medical efficacy.

Of all the plant drugs recommended by Ibn Sīnā or any of the commentators that can be defined with the necessary accuracy on the level of a genus (70), fully 64 % (45) are efficacious against nosebleed according to modern Western biomedicine. An additional 29 % (20) have chemical compounds that may cause the drug to be effective. The remaining 7 % (5) either have not been studied or have been proven to be ineffective against nosebleed.

1. *Relationship between the Most Preferred Drugs of Ibn Sīnā and their Medical Efficacy*

Table 5.23. Plant Drugs: Number of Recommendations by Ibn Sīnā *vs*. Medical Efficacy.[249]

	4 ≤ app	**3 ≤ app**	**2 ≤ app**	**All app**	**1 app**
++	**67% (4)**	**79 % (11)**	**70 % (16)**	64% (25)	56 % (9)
+	33 % (2)	21 % (3)	26 % (6)	31 % (12)	38 % (6)
—	0 %	0 %	4 % (1)	5 % (2)	6 % (1)
# of plants	6	14	23	39	16

Of the drugs recommended by Ibn Sīnā for the therapy of nosebleed, we can evaluate according to our criteria[250] the efficacy of 39 simples. Of

[248] For details, see pp. 124–126, above.

[249] ++ = efficacious; + = contains a potentially efficient chemical; — = non-efficacious; # of plants = number of plants in the column; app = number of appearances; ≤ as much or more. Percentages over 64 % (the percentage of the efficacious drugs in the whole sample of drugs recommended either by Ibn Sīnā or by the commentators) are in bold letters.

[250] See pp. 116–117, above. Dock is not included here as it does not appear in the Arabic text of *K. al-Qānūn* but only in the Latin translation.

these, 64 % are efficacious according to the evaluation in Appendix 21. In addition, 31 % contain chemicals that have some of the medical effects needed for stopping nosebleed, but we do not know their amounts, and the drugs themselves have not been defined as having those medicinal qualities. Five percent are, in light of present knowledge, ineffectual in the treatment of nosebleed.

If we examine Ibn Sīnā's most preferred drugs, we see that of the drugs he recommends four or more times, only six are plant drugs. Of these, 67 % are efficacious and an additional 33 % contain a potentially effective chemical. For plant drugs recommended three times or more, and twice or more, the percentages of efficacious drugs are 79 % and 70 %, respectively, with all but one of the rest of the drugs containing potentially effective chemicals.

Ibn Sīnā's most preferred plant drugs thus have a high potential of being efficacious against nosebleed from the view-point of Western bioscience. In addition, 64 % of all of his drug choices are evaluated as efficacious. It seems that we can consider the achieved medical effect to have been an important criterion both for his choice of drugs and his drug preferences.

2. *Relationship between the Most Preferred Drugs of the Commentators and their Medical Efficacy*

Table 5.24. Number of Efficacious Plant Drugs: Number of Recommendations by the Commentators *vs*. Medical Efficacy.[251]

	b.N.	**J**	**sc**	**GF**	**JD**
6 ≤ app	—	—	—	—	**80 %** (4/5)
4 ≤ app	—	—	—	—	**86 %** (6/7)
3 ≤ app	—	**100 %** (1/1)	—	—	**75 %** (9/12)
2 ≤ app	**100 %** (6/6)	**100 %** (1/1)	—	**100%** (1/1)	**67 %** (14/21)
All app	**79 %** (11/14)	**86 %** (6/7)	**83 %** (5/6)	**100%** (3/3)	**69 %** (33/48)
1 app	63 % (5/8)	**83 %** (5/6)	**83 %** (5/6)	**100 %** (2/2)	**70 %** (19/27)

[251] b.N. = Ibn al-Nafīs, J = al-Jaghmīnī, sc = supracommentary, GF = Gentile da Foligno, JD = Jacques Despars (innovations only); app = number of appearances in the text; ≤ as much or more. Percentages over 64 % (the percentage of efficacious drugs in the whole sample of drugs recommended either by Ibn Sīnā or by the commentators) are in bold letters. The percentage gives the amount of the plants evaluated as effective against nosebleed, the number in brackets the number of efficacious plants / the number of all plants.

Here we can see the following:

1. All the drugs recommended by Gentile da Foligno are efficacious.
2. Ibn al-Nafīs' most preferred plant drugs are more efficacious than those he mentions only once. The same holds true with al-Jaghmīnī, but the amount of material is too small for any conclusions to be drawn.
3. The plant drugs which belong to Jacques Despars' core group, i.e. those which he recommends four or more times, have an 86 % probability of being effective against nosebleed. This rate drops abruptly for the drugs he mentions three times.
4. A comparison of the efficacy rate of the plant drugs recommended in the *K. al-Qānūn* (64 %) with the efficacy rates of those recommended in the commentaries shows that the drug choices of all the commentators are closer to the evaluations of Western bioscience than those of Ibn Sīnā.

This permits the conclusion that the drug choices of all commentators approximate observable reality more closely than Ibn Sīnā's choices do, and that Ibn al-Nafīs and Jacques Despars' favorite drugs, i.e. their "core groups",[252] are more efficacious than the rest of the plants they recommend. This seems to show not only that the commentators' choices were guided by the observable effect of the drugs, but also that their choices improved on Ibn Sīnā's, a fact that suggests a critical attitude towards the tradition.

3. *Relationship between the Continuous Popularity of a Drug and its Medical Efficacy*

Here we discuss only those plants mentioned in the commentaries which were already recommended by Ibn Sīnā.

Table 5.25. Ibn Sīnā's Plant Drugs: Number of Commentaries in which a Plant Drug Appears *vs*. its Medical Efficacy.[253]

	3 comm's	**2 ≤ comm's**	**1 ≤ comm's**	**Altogether**	**No comm's**
++	**86 %** (6)	**89 %** (8)	**73 %** (19)	64 % (25)	46 % (6)
+	0 %	0 %	23 % (6)	31 % (12)	46 % (6)
—	14 % (1)	11 % (1)	4 % (1)	5 % (2)	8 % (1)
# of plants	7	9	26	39	13

[252] See p. 174 (Ibn al-Nafīs) and p. 209 (Jacques Despars), above.

[253] ++ = efficacious; + = has a potentially efficacious chemical; — = non-efficacious;

Plants that are recommended twice or more are clearly more effective than the average (70 %), reaching 89 % with nine plants mentioned. Also, the trend for the estimated efficacy to be reduced the less often it is recommended is consistent in the commentaries: even plants chosen by only one commentator in addition to Ibn Sīnā are 73 % effective, as opposed to plants not recommended by any commentators, where the corresponding value is 46 %. We can thus clearly see that the historical continuity of the use of a plant against nosebleed correlates well with its observable effect. This could be considered another proof for the commentators' critical attitude towards the tradition: without denying the possible effect of any of the drugs recommended by Ibn Sīnā, they themselves chose mostly the efficacious ones.

4. *Relationship between the Status of the Drug as an Innovation and its Medical Efficacy*

Table 5.26. Innovations of the Commentaries and their Medical Efficacy.[254]

	b.N.	**J**	**sc**	**GF**	**JD**
++	**100 %** (1)	**100 %** (2)	**100 %** (1)	**100 %** (1)	58 % (15)
+	0 %	0 %	0 %	0 %	31 % (8)
—	0 %	0 %	0 %	0 %	12 % (3)
# of plants	1	2	1	1	26

Here, we consider only drugs that are not recommended against nosebleed in *K. al-Qānūn*. Ibn al-Nafīs, the author of the supracommentary, and Gentile each have only one innovation for these drugs, and al-Jaghmīnī has two, all five of which are deemed efficacious according to Western bioscience. Jacques Despars' innovations, surprisingly enough, have a lower efficacy rate than the total of Ibn Sīnā's plant drugs (64 %); their efficacy rate corresponds to the efficacy rate of those plant drugs that are not mentioned by any of the commentaries (46 %). This corrob-

# of plants = number of plants in the column; comm's = commentaries; ≤ as much or more. 'Altogether' includes drugs by Ibn Sīnā not recommended in the commentaries. Percentages over 64 % (the percentage of efficacious drugs in the whole sample of drugs recommended either by Ibn Sīnā or by the commentators) are in bold letters.

[254] ++ = efficacious; + = has a potentially efficacious chemical; — = non-efficacious; # of plants = number of plants in the column. b.N. = Ibn al-Nafīs, J = al-Jaghmīnī, sc = supracommentary, GF = Gentile da Foligno, JD = Jacques Despars; all = all the innovations of all the commentators. Percentages over 64 % (the percentage of efficacious drugs in the whole sample of drugs recommended either by Ibn Sīnā or by the commentators) are in bold letters.

orates the phenomena that we have partially observed in Chapter 5.2.5.2, namely that only very few innovations have been accepted by and incorporated into the ongoing tradition. Perhaps this acceptance is connected with the objective effect of the drug. There might not yet have been enough time for Despars' innovations to undergo the empirical evaluation of the contemporary medical community, which tends to "choose the best and ignore the rest".

5. *Relationship between the Number of Recommended Qualities in a Drug and its Medical Efficacy*

For the following table we will consider only those drugs mentioned by Ibn Sīnā and exclude the innovations of the commentaries.[255] Drugs that have not been described in Book II of *K. al-Qānūn* are omitted.

Table 5.27. Relationship between the Number of Recommended Qualities in a Drug *vs*. its Efficacy.[256]

	5 q	**4 ≤ q**	**3 ≤ q**	**2 ≤ q**	**1 ≤ q**	**Altogether**	**0 q**
++	0 %	50 % (1)	**80 %** (8)	**68 %** (15)	**72 %** (23)	**69 %** (27)	57 % (4)
+	100 % (1)	50 % (1)	20 % (2)	27 % (6)	25 % (8)	26 % (10)	29 % (2)
—	0 %	0 %	0 %	5 % (1)	3 % (1)	5 % (2)	14 % (1)
# of plants	1	2	10	22	32	39	7

Here, we cannot find any clear correlation. Although the efficacy rate of the plants that contain at least one suitable medical quality is higher than that of all plants together, the difference is small, and there is no clear trend indicating that drugs with more qualities would have a consistently higher probability rate of medical efficacy against nosebleed.

Altogether, the main results can be summarized as follows:

1. Ibn Sīnā's plant drug choices are reasonably congruent with the observable phenomena, as 64 % of all the plant drugs he mentions are effective against nosebleed. In addition, his most preferred drugs (in three or more prescriptions) are more efficacious than those he mentions more seldom.

---

255 See p. 181, above.

256 ++ = efficacious; + = has a potentially efficacious chemical; — = non-efficacious; q = number of qualities; # of plants = number of plants in the column; ≤ as much or more. 'Altogether' includes drugs having no suitable qualities. Percentages over 69 % (the percentage of efficacious drugs in the whole sample of drugs recommended either by Ibn Sīnā or by the commentators) are in bold letters.

2. The recommendations of the commentaries follow the same line: the recommendations of al-Jaghmīnī and the supracommentary are all of efficacious drugs. Moreover, the high number of recommendations (six and five, respectively) perceptibly lowers the possibility of mere coincidence. The efficacy rate of the plant drugs recommended by any of the commentators (except Ibn al-Nafīs) is higher than that of the drugs Ibn Sīnā recommends; in addition, even in the case of Ibn al-Nafīs, his most preferred drugs are more efficient than those he mentions only once. The connection between Jacques Despars' drug efficacy rates and the number of recommendations is less clear: the rate reaches 86 % in his core group (drugs he recommends four or more times) and then drops abruptly, but the pattern does not continue with the lower numbers of recommendations.
3. Plants recommended in two or more commentaries (nine plants, 89 %) are clearly more effective than the average (64 %), and are much more likely to be effective than those not mentioned by the commentaries at all (46 %).
4. Innovations by the Arabic commentators and Gentile have a high efficacy rate, but those by Despars have a very low one, possibly related to the fact that he introduces much more innovations than the others, some of which may not have yet become part of the tradition.
5. The number of recommended medical qualities in a plant drug does not correlate with the medical efficacy of the plant as evaluated by Western bioscience.

In general, the efficacy rate both of drugs recommended by Ibn Sīnā and of drugs recommended by his commentators is high: 64 % both for Ibn Sīnā and for all drugs mentioned either by him or by the commentators. This result defies the claims quoted in Chapter 4.1, *The Efficacy of Medieval Medicine*, concerning the non-effectiveness of medieval drug therapy. If we also keep in mind that an ongoing pharmacological study of plants may prove the true rate to be even higher,[257] the results reached by the ancient doctors are truly remarkable. This level of accuracy should remove all doubt concerning those earlier physicians' ability to accurately

[257] In fact, this is exactly what happened between the writing of the dissertation this book is based on and the writing of the book itself. The results changed considerably especially in Chapter 7.

observe medical phenomena and discredit the supposition that literary medicine was not intended to be used in practice.[258]

It seems, then, that during the Middle Ages, therapy (especially practical therapy) primarily developed through a process by which omissions slowly modified the existing paradigms, rather than by active innovation. This can also be observed, albeit to a lesser extent, in the pathological description of nosebleed: for example, Ibn al-Nafīs' omission of yellow bile as a cause for nosebleed shows a basic difference in his way of thinking about the problem. This thinking also led him to choose only some of the therapeutic qualities Ibn Sīnā considered relevant. The picture that emerges from his accounts is different from Ibn Sīnā's, but that difference is created through omission, not through innovation. Even additions in the field of practical drug therapy are scarce in the Arabic commentaries, becoming more copious only in Despars' text. Despite this apparent traditionalism, however, the Arabic commentators succeeded in choosing the most trustworthy medications from among Ibn Sīnā's rich *materia medica*. The lack of correlation between drug qualities and medical efficacy, together with the correlation between medical efficacy and preference for a drug on the one hand and a high concentration of medical qualities and preference for a drug on the other show that actual therapeutic choices were based both on theory and on observation, which partly overlapped. Therefore, while the therapeutic system of medieval medicine was comprehensive (it covered the causes of a medical problem, its symptoms and the therapeutic theory, and enabled a physician to choose drugs on its basis), a different, concurrent observation-based system was also in operation. It was mainly this system that determined which drugs would continue to exist and be used through the generations. The partial overlapping makes it possible for both systems to exist side by side and support each other—the theory providing justification for the practical choices, and the empirical choices bringing the system in sufficient contact with reality for it to survive for centuries.

This contact with reality also equips us for the last step in this study: the testing of our original hypotheses[259] and practical applications. Can the pharmacology of Ibn Sīnā and his commentators, in either its theoretical or practical aspects, be used as a heuristic tool for modern pharmacological research, enabling us to benefit in a systematic way from the information collected and chosen by the ancient medical authors? At this

[258] See pp. 89–92, above.
[259] Chapter 4, *Method of the Study*, especially pp. 85–87, above.

juncture we will attempt to find the parameters that enable us to predict with the highest possible accuracy which of the drugs mentioned by the Arabic and Latin authors are objectively effective in the treatment of nosebleed. These parameters will also be tested in the next two chapters, using cough and diabetes as examples. If the test results for all three therapies agree, these parameters can be assumed also to be valid in pharmacological research for new uses for known medicinal plants.

The first question is whether it is at all meaningful to try and use medieval medical literature to find pharmacological leads. Our results, which show the general level of efficacy of all the drugs recommended by Ibn Sīnā and/or the commentators to be around 64 %, indicate that these texts can indeed be used as a tool, even without any additional refinement of method. However, we will attempt to improve the level of accuracy by using additional parameters.

As we have seen above, an attempt to use Ibn Sīnā's theory of relevant qualities as a parameter for finding the plants with the highest probability of effectiveness against nosebleed would keep the accuracy of the results above 70 %; in other words, every drug that has one or more of the qualities relevant for nosebleed therapy would be efficacious with a probability of more than 70 %. However, this list would include 82 % of all studied simples, and thus the criterion is quite weak. In addition, it is less trustworthy, as the correlation between the amount of qualities and the efficacy rate of the plants is not consistent. We therefore suspend our judgment of these criteria until later. Better results can be reached by choosing Ibn Sīnā's most preferred drugs (79 %; 11 plants out of 14), which have a very high chance of efficacy and which, moreover, include 11 of the 45 plants evaluated as effective. The probability rate rises still higher with the drug recommendations of al-Jaghmīnī, the author of the supracommentary and Gentile da Foligno; even without choosing their most preferred drugs, the probability rates for their efficacy are 86 %, 83 % and 100 %, respectively, covering 7, 6, and 2 plants. Jacques Despars' most preferred drugs are also a good choice, with an accuracy of 86 %, and even Ibn al-Nafīs' choices with a rate of 79 % are clearly an improvement to *K. al-Qānūn*. The benefit of the commentaries is that their most preferred drugs may include plants that are not recommended in this context by *K. al-Qānūn*.

Another way of reaching safe results is to choose the drugs that appear in two or three commentaries in addition to *K. al-Qānūn*. These drugs can truly be considered as "tested by time". Their accuracy in the treatment of nosebleed is 89 %, covering nine plants.

There are, however, two problems with all these parameters:

1. It is impossible to know, on the basis of the treatment of one medical problem, whether the results will be similar in the case of other diseases, particularly in the case of nosebleed, where there is only one symptom, one that is externally visible, and the result of treatment is immediately apparent. The only incident factor is the fact that the blood flow could have stopped by itself.
2. The amount of high-probability material found by using these parameters is fairly low, about 10 plants in one search.

The first problem will be solved by testing the parameters on other diseases that have a known treatment (see the following chapters). The second can be solved either by following any of the above-mentioned parameters in order to get a smaller amount of relatively sure plant drugs, or by combining the above-mentioned paradigms, including (i) Ibn Sīnā's most preferred drugs, (ii) the most preferred drugs of each of the commentators, and (iii) drugs mentioned by Ibn Sīnā and two or three commentators. In this way, we will find 19 efficacious plants, with an accuracy level of 79 %. The choice will then depend on the needs of the research, i.e. on the priority given to accuracy or variety.

We will look at the cough, following the same research procedure pursued with nosebleed in order to see whether the commentators handle this condition in the same way and whether the pattern that has emerged in the case of nosebleed can indeed be considered as the way in which the Arabic and Latin commentators generally handle their material.

CHAPTER SIX

COUGH[1]

The second symptom or disease to be studied is cough. This ailment, like diabetes in the subsequent chapter, will be discussed much more succinctly than nosebleed; methodological questions will be referred to the earlier chapter on that medical problem.[2] Emphasis will be placed on drug therapy, while causality and symptoms will only be discussed peripherally, for the sake of economy.

The reasons for choosing this ailment are the following:

1. It is simple to treat, but at the same time can be a serious health risk if left untreated.
2. As a symptom, it is easy to recognize.[3]
3. Its herbal therapy is well-documented in modern literature—in fact, many of the drugs recommended by the ancient authors are still in use.

Cough can be defined as a sudden explosive expiratory maneuver that tends to clear material (sputum) from the airways.[4] This movement helps protect the lungs against aspiration. A major function of the cough reflex is to help clear secretions from the airways, particularly to help expel them through the larynx.

Cough can have many different causes, which can often be diagnosed according to sound and the way in which the symptom occurs. A cough irritated by a change of position may suggest chronic lung abscess, cavitary tuberculosis, bronchiectasis, or a pedunculated tumor, whereas a cough connected with eating suggests a disturbance of the swallowing

[1] Translations of the Arabic and Latin quotations in chapter 6 and the related tables are the author's, if not otherwise indicated. Bracketed [ ] material in the translation indicates additions made to the English text for the purpose of intelligibility.

[2] See pp. 127 ff., above.

[3] See Chipman, 2002, p. 136.

[4] The following description is based on *The Merck Manual of Diagnosis and Therapy*, Sec. 6, Ch. 63, Approach to the Pulmonary Patient. ⟨http://www.merck.com/pubs/mmanual/section6/chapter63/63b.htm⟩.

mechanism or possibly a tracheoesophageal fistula. A cough presenting on exposure to cold air or during exercise may suggest asthma. A morning cough persisting until sputum is expectorated typifies chronic bronchitis. A cough that is associated with rhinitis or wheezing or that is seasonal may be an allergic response. Sometimes cough is a symptom of a life-threatening disorder, as in the hemoptysis of tuberculosis, while in other cases it can be just a mild discomfort, as in an ordinary bronchitis. Yet even in less serious cases, much depends on the patients' physical condition prior to the beginning of the illness.

Treatment of cough mainly consists of treating the underlying cause. A productive cough should not be suppressed except in special circumstances.

6.1. *Cough in* Kitāb al-Qānūn

6.1.1. *General Presentation*[5]

Ibn Sīnā's description of cough and cough therapy is found in the 10th *Fann* of *Kitāb al-Qānūn*, "On the Conditions of the Lung and the Chest", in the 3rd *Maqāla*, "On Cough and Hemoptysis". The *Fann* starts with the chapter "On Voices and Breath", followed by chapter, "On Voice." After the chapter on cough come those entitled, "On the Theoretical Bases of the Knowledge About Apostemas and Ulcers in Organs in the Region of Chest, Except the Heart," and "On the Practical Bases of The Same." The chapter "On Cough" is four pages long, containing a very through theoretical section, as well as 82 prescriptions for treatment.[6]

Ibn Sīnā defines cough as one of the strategies by which nature protects a certain organ from harm. In the case of cough, this organ is the lung (along with all the organs connected with it).

Ibn Sīnā wrote that cough is to the chest as sneezing is to the brain. A cough is performed by expansion and contraction of the chest, together with movement of the diaphragm.

---

[5] See Ch. 5.1.1, above.

[6] *K. al-Qānūn*, vol. 2, pp. 228–232.

6.1.2. *Cough: Causes*[7]

Since, as stated above, Ibn Sīnā sees cough as a movement by which nature protects the lung or the organs connected to it from harm, it follows that he sees the primary cause of cough as that potential harm itself. Ibn Sīnā also postulates, however, that the ailment can be caused by several other factors either connected with the lungs themselves or with related organs. These are: (a) direct physical causes harming either the temperament or the condition of the chest and thus causing the cough reaction; (b) changes in the temperament of the lungs; and (c) participation of other members.

According to Ibn Sīnā, these three groups of factors which can cause cough can be seen as general categories. Below, each category appears, along with Ibn Sīnā's list of specific cough-causing sub-factors that fall under each category:

(a) Causes of cough directly related to the chest or lungs:

1. Cold that hits the lung, the chest muscles or similar organs
2. Causes that warm the lung or the chest
3. Causes that dry
4. Particles that coarsen the lungs, such as dust or smoke
5. Moisture in the lung
6. Simple hot, cold or dry dyscrasia
7. Taste of sour, acrid or pungent food
8. Alien particles lodged in those channels which are designed to filter only air.
9. First stage of onset of hot apostemas in the area of the chest, until the stage when they mature
10. Hard apostema
11. Apostemas and obstruction in the diaphragm, the lung or the throat
12. Pus clogging the hollow of the chest
13. Parchedness of the chest
14. Abscesses of the lung
15. Suppuration

[7] For methodology, see Ch. 5.1.2, above. In the following chapters, I have numbered the items for clarity's sake. Unless otherwise indicated, the numbers do not appear in the original. Comments to Ibn Sīnā's description of cough and its treatment in the footnotes in Chapters 6.1.2, 6.1.3, 6.1.4, 6.1.5.1 and 6.1.5.2 are my interpretation based on the medieval medical theory as it appears in *K. al-Qānūn*.

(b) Factors that cause cough by influencing the temperament of the lung:

1. Factors that warm the temperament
2. Factors that cool the temperament
3. Factors that moisten the temperament
4. Factors that dry the temperament

These causes can either be non-material[8] or composed of (a) sanguinary, (b) biliary, (c) thin or thick phlegmatic, or (d) melancholic matter.

According to Ibn Sīnā, when this matter flows down from the head and glides along the sides of the trachea, it does not provoke much cough; by contrast, if it flows in the central hollow of the trachea, burns, or gets stuck in the lung, it provokes cough. This matter can also be produced by and flow from the stomach, the liver, or various chest organs to others. A weakness of the body's faculty of expulsion can prevent it from cleansing itself of extraneous matter.

(c) Factors related to other organs:

1. General condition of the whole body when being affected by fever, especially a burning fever, a one-day fever caused by tiredness, or an epidemic fever
2. General condition of the whole body (without fever)
3. Apostemas of the liver
4. Apostemas of the spleen
5. Condition of the stomach (plethora or emptiness)
6. Catarrh

In addition, Ibn Sīnā notes that cough is more frequent in the winter and during a wintry (and sometimes during a moderate) spring, as well as at times when the north wind blows. If the summer is "northern", with little rain, and the autumn is "southern" and rainy, cough will be frequent in the winter.

6.1.3. *Cough: Symptoms*[9]

Ibn Sīnā divides cough into dry, moist, hot and cold, with the following differential diagnostics:

---

[8] These are coughs that are caused solely by an imbalance in the complexion of the patient, with no material cause.

[9] For methodology, see Ch. 5.1.3, above.

1. Dry cough, of which the following is true:
    a. It is alleviated by bathing, drinking of moistening drinks, rest, and satiety.[10]
    b. It increases with hunger and movement.[11]
    c. It may occur with or without fever.
2. Moist cough, of which the following is true:
    a. It is found in people who have a moist temperament, as well as in the elderly population, who naturally tend to moistness.
    b. It is caused by excessive moistness, especially of the substance of the lung.[12]
    c. It is accompanied by snoring, especially during and after[13] sleep.
3. Hot cough, of which the following is true:
    a. It is accompanied by a burning sensation.
    b. It lessens in response to cold air rather than in response to water.
    c. It is accompanied by a strong pulse.
    d. It is accompanied by redness of face.
    e. It is accompanied by thirst.[14]
    f. It is found in patients whose nature tends towards dissolution, as heat in general causes dissolution.
4. Cold cough, of which the following is true:
    a. When accompanied by catarrh, it presents the following symptoms:
        1. The descent of something to the chest and the sensation of its distension in the pharynx.
        2. A sensation of distension near the forehead.
        3. Non-maturated expectoration.
        4. Yellowish and greenish expectoration.
        5. Phlegmatic expectoration.
        6. The cough does not cause expectoration at first.
        7. Fever (sometimes).
    b. It decreases with the rising of the external temperature.

[10] These activities were supposed to moisten the temperament.
[11] Hunger and movement would have had an additional drying effect.
[12] Ibn Sīnā does not explain how this would be recognized.
[13] "Snoring after sleep" might mean rasping breathing resulting from the phlegm that has collected in the respiratory channel during sleep.
[14] Items c)–e) belong also to the general differential diagnostics of sanguinary temperament.

   c. It causes the face to assume a dull gray color, caused by the dominating phlegmatic or melancholic humor.
   d. It is accompanied by a decrease of thirst.[15]
   e. The patient cools down when exposed to cold temperatures.[16]

Simple[17] dry, moist, hot, and cold coughs are not accompanied by expectoration; coughs involving matter, by contrast, are accompanied by expectoration, the type of which indicates the type of matter causing the cough. This expectoration can be thick or thin.

Cough resulting from other causes can be recognized by the following symptoms:

1. For cough caused by parchedness of the chest:
   a. no expectoration, neither thin nor thick, as this kind of cough has no material causes, but depends only on local condition in the chest
2. For cough occurring because of the condition of the stomach:
   a. cough is aroused during the digestive process
   b. cough increases with the filling or emptying of the stomach
   c. symptoms of stomach diseases are evident
3. For cough occurring because of the condition of the liver:
   a. symptoms of liver diseases are evident
4. For cough caused by suppuration:
   a. dryness (although the cough is often moist)
   b. pain
   c. symptoms of suppuration
5. Cough caused by apostema:
   a. symptoms of cold or hot pleurisy
   b. symptoms of pneumonia
   c. symptoms of similar diseases (i.e. diseases connected with apostemas in the chest and lungs)
   d. fever (with hot apostema)
   e. heaviness/sediments[18] (with non-hot apostema)

---

[15] Coldness does not, in itself, cause thirst; rather it is even used as a physical therapy against it. See pp. 291–292, below.

[16] In the Latin translation: … *additio eius ex frigore* … which would make more sense.

[17] *I.e*. non-material. These are coughs that are caused solely by an imbalance in the complexion of the patient, with no material cause.

[18] Depending on the diacritical points: heaviness with the root *thql*, sediments with the root *thfl*. See Lane, 1886–1893, Vol. 1, p. 344.

Additional types of cough that are mentioned separately are children's cough and chronic cough. Pain is an additional symptom, possibly found with all types of cough.

Sometimes, stone-like particles of the size of a chick-pea or a hailstone exit during the cough. They consist of thick humor petrified by heat.[19]

We see that Ibn Sīnā's differential diagnostics for different kinds of cough are clear and comprehensive, and in most cases based on easily recognizable phenomena. As the cough types are classified according to their causes, the congruity between causality and symptomatology is evident.

6.1.4. *Cough: Consequences*[20]

As described by Ibn Sīnā, cough can have both positive and negative effects:

1. When successful, cough achieves its goal of expelling harmful matter from the chest, lungs and connected organs or protecting them from the harmful influence of the surroundings.
2. On the other hand, if cough lasts too long, it can lead to expectoration of blood, a much more dangerous condition than cough itself.
3. If expectoration is obstructed for some reason, and the cough is accompanied by fever, the matter that should be expelled putrefies (presumably because it is confined to the patient's chest and influenced by the heat of the fever), finally leading to consuming or putrid fever.
4. A continuous cough during fever can cause the fever to return to its initial stages rather than to abate.

6.1.5. *Cough: Treatment*

6.1.5.1. Treatment, Theory[21]

Next, we will look at Ibn Sīnā's therapeutic advice, considering first its theoretical side, i.e., the kind of qualities a medication should have in order to be helpful. For an overview, the reader is referred to Table 6.1, *Medical Qualities Recommended for Cough by Ibn Sīnā*, in Appendix 23,

---

[19] Ibn Sīnā mentions as witnesses to this Alexander and Paul, and finally also himself.
[20] For methodology, see Ch. 5.1.4, above.
[21] For general principles, see Chapter 5.1.5.1, above.

which lists on the right-hand side Ibn Sīnā's exact recommendation and on the left side the necessary quality in a more abstract form, with code letters to be used later in the study.[22]

Ibn Sīnā considers the following qualities as useful for a cough medication:

1. Collects the expectoration.[23] According to Ibn Sīnā, cold medications are good for this, but if their action exceeds the proper limit, it coagulates the sputum.
2. Performs asthma therapy.[24]
3. Astringent. Gargling with astringents that do not have a sour or acrid taste is recommended against catarrh that is causing cough. Here, too, Ibn Sīnā calls for carefulness: astringents narrow the channels of expectoration and can thus prevent matter from being expelled.
4. Works as an antidote.[25] See Qualities 18 and 21 in this list.
5. Performs catarrh therapy. "And if its reason is catarrh, the catarrh is treated."[26]
6. Performs a clearing effect.[27] See Qualities 10 and 11 in this list.
7. Has coldness. Ibn Sīnā recommends cold medications and foods primarily for the therapy of hot cough,[28] such as cold vegetables and a cold poppy medication (*diyāqūdhā bārid*). Coldness has also the effect of collecting the matter for expectoration. See Quality 1 in this list.
8. Is cooling. Cooling cerates are used against cough with dry temperament and fever, together with moistening drugs. See Quality 17 in this list.
9. Is cutting. Ibn Sīnā advises to remove thick matter in the cough by cutting medications that loosen the matter from where it is stuck and cut it to smaller pieces. These medications were to be used together with emetics and with dissolving, clearing, and softening

[22] In Chapters 6.1.5.4, 6.2.5.1 and 6.2.5.3, below.
[23] This is necessary if the matter is too thin to be expelled by cough.
[24] Fumigations mentioned in the chapter on asthma are prescribed also for old moist cough, probably because asthma is also caused by moistness of temperament.
[25] Antidotes are presumably used to counteract the negative side effects of narcotics.
[26] *K. al-Qānūn*, vol. 2, p. 231.
[27] Drugs with this quality are used in order to remove thick matter, and can be applied together with dissolving drugs for this purpose. Against moisture in the lung causing cough, they are used with desiccants.
[28] According to the *contraria contrariis curantur* principle.

drugs and drugs that affect the thick matter so that it slides easier out of the bronchia. See Quality 11 in this list.

10. Acts as a desiccant. Ibn Sīnā recommends treating moist temperament and moisture in the lung with dry desiccants mixed with clearing drugs, in order to both dry and to clear away the residues. See Qualities 6 and 12 in this list.
11. Acts as a dissolving medication. According to Ibn Sīnā, thick matter should be removed by dissolving, clearing, softening, cutting, enabling it to slide, and by administering emetics. See Quality 9 in this list.
12. Has a dry property.[29] See Quality 10 in this list.
13. Emetic. Emetics are used as dissolving medications.[30] See Quality 10 in this list.
14. Heating. Hot mucilage electuaries are recommended against cold cough.[31] Hot antidotes are also added to narcotic and soporific cough pills.[32] According to Ibn Sīnā, hot medications, however, prevent expectoration by thinning the matter, and must therefore be used with caution. See Qualities 18 and 21 in this list.
15. Rarefying.[33] These drugs are used against hot cough.
16. Maturating. Thin matter is maturated with poppy medicaments, so that it may be thickened enough[34] to be expectorated.
17. Moistening. Against cough with dry temperament and fever, moistening drinks and foods as well as continual moistening of the food with oils are recommended.
18. Anesthetic. Drugs which anesthetize can be added to medications for hot cough.[35] Ibn Sīnā also recommends cough pills based primarily on narcotics, to which are mixed hot antidotes and soporifics. See Qualities 4 and 21 in this list.

---

[29] These are used as desiccants.

[30] The effect is based on emesis causing a cough reaction. See Lewis and Elvin-Lewis, 1977; Vohora, 1986, pp. 201–202.

[31] This is clearly according to the principle of *contraria contrariis*, since many of the other drugs mentioned in this context also belong to the category of "hot drugs" (narcissus oil, lily oil, sagapenum), although this is not specifically mentioned.

[32] Possibly in order to counteract by heat the cooling effect of narcotic drugs, whereas the effect of the antidotes themselves counteracts other negative side effects.

[33] "*Mulaṭṭif* (refining): Applied to the quality which makes any matter more rarefied, as for example hyssop." Young, 1961, p. 70.

[34] With the help of the drug's coldness.

[35] Supposedly because of their strong cooling effect.

19. Acts to obstruct catarrh. By preventing the catarrh from flowing down the throat, the cough caused by the catarrh can also be affected.
20. Enables the expectorated material to slide easily. Drugs with this effect are used for removing thick matter in the cough (see no. 9) after drugs with other qualities have loosened the expectoration.
21. Softening. As in Quality 11 in this list.
22. Soporific. For cough pills mentioned in Quality 18 in this list.

It is evident that Ibn Sīnā's therapy concentrates mainly on the temperamental causes of cough and on the more symptomatic treatment of the matter to be expectorated. The four main types of cough-hot, cold, dry and moist—are all treated by *contraria contrariis*, with either drugs or food, with the intention of healing the disease by removing its cause. Similarly, in the case of cough caused by catarrh, the treatment of the cough is futile unless the catarrh is cured. For expectoration, the main principle is to thicken the thin matter by different methods and to loosen and remove the thick matter. In addition, painkillers are recommended, not only for their cooling effect but also for symptomatic use;[36] their side effects are counteracted with hot antidotes.

Ibn Sīnā does not give specific advice for the treatment of cough caused by the effect of another organ on the lungs. Again, his principle seems to be direct treatment of the underlying disease. In other cases, his therapeutic recommendations attack the main causes and symptoms of cough in a way that shows his clinical and therapeutic concepts to be as consistent here as in his description of nosebleed.

6.1.5.2. Physical Therapies[37]

The only non-medicinal therapy Ibn Sīnā recommends for cough is one that treats a mildly cold temperament that causes the cough. The patient is enjoined to hold his breath in order to warm the lung immediately and easily. If this does not suffice, drug therapy is prescribed.

---

[36] Ibn Sīnā does not, however, specifically mention the symptomatic use.
[37] See Ch. 5.1.5.2, above.

6.1.5.3. Treatment, Practice

Prescriptions[38]
Ibn Sīnā lists 82 prescriptions for cough:

Prescription #1

Cold things collecting the matter together for expectoration, such as:

poppy potion[39]
silk[40]

It is notable that if the coldness is excessive, it congeals the matter.

Prescription #2

In order to clear thick expectorated material:

hyssop potion

It is an excellent clearing drug, but not for thin expectorated material.

Prescription #3

If there is no expectoration, neither thin nor thick (i.e., if the cause of cough is the parchedness of the chest):

electuaries

Prescription #4

For cough in feverish persons; for collecting the expectoration together:

barley water

---

[38] The prescriptions are numbered for the comfort of the reader. Concerning general principles of presenting the prescriptions, see Ch. 5.1.5.3, above. For the English names of the drugs, see p. 111 and Ch. 5.1.5.3, above. Asterisk after the list of ingredients indicates the method of application of the drug. Drug names connected with 'OR' are alternative choices for the same prescription.

[39] syrup: *sharāb*: "1. Sirup, Arzneitrank; 2. Wein" (Fellmann, 1986, pp. 269–272).

[40] *al-ḥarīra*. In the Latin translation *puls* 'porridge', A dish made by boiling crushed spelt or other grain in water, a kind of porridge.

Prescription #5

If there is need for a stronger treatment for cold temperament than holding one's breath:

myrrh OR storax (*may'a*)

with

honey

It is made into a pill of the size of hazelnut and held under the tongue.

Prescription #6

For cough caused by a cold temperament:[41]

resin dregs (*durdī al-qiṭrān*)

To be eaten.

Prescription #7

For cough caused by a cold temperament:

terebinth resin (*'ilk al-buṭm*)
honey

To be eaten.

Prescription #8

For cough caused by a cold temperament:

balsam oil
sagapenum

To be drunk.

Prescription #9

For cough caused by a cold temperament:

sulfur
poached egg (*al-nimbirisht*)[42]

Prescription #10

For cough caused by a cold temperament:

hot mucilage electuaries

---

[41] In the Latin text prescriptions #6 and #7 appear as one.
[42] Bos, 1989, p. 87, n. 37.

Prescription #11

For cough caused by a cold temperament:[43]

vetch
honey

Prescription #12

For cough caused by a cold temperament:

water of sweet pomegranate
honey OR *fānīdh* sugar[44]

Honey or *fānīdh* sugar is thrown on the tepid water of a sweet pomegranate.

Prescription #13

For cough caused by a cold temperament:

lily oil (or a similar simple drug)
narcissus oil (or a similar simple drug)

with

red wax
tragacanth

Used as unguents on the chest.

Prescription #14

For cough caused by a cold temperament:

rose honey (*al- julunjubīn al- ʿasalī*)[45]
fig water
raisin
licorice root
maidenhair

Prescription #15

For cough caused by a cold temperament:

almond oil
qūfī[46]

---

[43] In the Latin text prescriptions #11 and #12 appear as one.
[44] When sugar has been boiled twice and poured into a mold shaped like a pineapple, it is called *fānīdh* (Dols, 1984, p. 145, n. 7).
[45] *julunjubīn* = rose-honey or rose-preserve, *Mel rosarum* (*ibid*., p. 163).
[46] A kind of incense. See Appendix 24.

Prescription #16

For cough caused by a cold temperament:

decoction of hyssop
hyssop
asarabacca
fig
and the like

Prescription #17

For cough caused by a cold temperament, nourishment, such as:

wheat soup

with

fenugreek
butter

Prescription #18

For cough caused by a cold temperament, a list of recommended nourishments:

fig
date
roots of Damascene leek

Prescription #19

For cough caused by a cold temperament, nourishment from among the oils:

pistachio oil

Prescription #20

For cough caused by a cold temperament, nourishment, such as:[47]

pine nut
pasta (*al-iṭriya*)
fānīdh sugar

[47] Prescription #20 may also be considered as two separate prescriptions, the second starting from "pasta".

Prescription #21

For cough caused by a cold temperament; nourishment, meats:

meat of young birds
meat of cocks
meat soups (*al-isfīdbājāt*)[48] in which they are used
meat of yearlings of sheep

Prescription #22

For cough caused by a cold temperament; nourishment, such as:

pistachio
pine nut
raisin

with

fenugreek
sugar cane
fig
apricot
banana

Prescription #23

For cough caused by a cold temperament; and to stop a chronic cough:

dry figs
nut
almond

Prescription #24

For cough caused by a cold temperament:

aged aromatic wine
hydromel (*māʾ al-ʿasal*)

---

[48] *isbīdbāja* "thick bouillon" ⟨Persian *ispīd-bā* "cibi genus ex carne, cepis, butyro, oleo, apio et coriandro paratum" (Vullers, 1962, Vol. 1, p. 92; Dozy, 1881, Vol. 1, p. 20; Kahl, 2007, p. 210, n. 72); a dish made of meat, onions, butter, cheese, etc., or sometimes only bread and milk (Steingass, 1947, p. 58; Ullmann, 1971, p. 288); or of sheep meat, onions, sesame oil, chick peas, coriander, pepper and salt (Dietrich, 1954, p. 39, n. 116); in Middle Persian, a type of curd soup (Mackenzie, 1971, p. 76; Savage-Smith, 1980, p. 140, n. 22).

Prescription #25

For hot cough:

simple poppy medicament (*al-diyāqūdhā al-sādhaj*)[49]

To be drunk in early morning and late evening.

Prescription #26

For hot cough, prescription for poppy electuary:

poppy, not very fresh
spring water OR rain water
honey OR sugar
*electuary

The not-very-fresh poppies are macerated in spring water or rain water, preferably for a day and a night. This mixture is then cooked until it breaks into pieces and sieved. Then for every part of the filtration, half a part of honey or sugar is poured on it. It is made into an electuary.

Prescription #27

For hot cough, especially when it has maturated or is in its end stage:

barley water
sebesten
violet potion
violet jam
cold decoction of hyssop

Prescription #28

For hot cough:

pomegranate water
crystalline sugar (*al-sukkar al-ṭabarzadh*)[50]
sugar cane

The two sugars are poured on the pomegranate water.

---

[49] Cf. *diyāmirūn* = mulberry potion, from Greek *dia morun* = with mulberry (Fellmann, 1986, p. 272).

[50] "*Al-sukkar al-ṭabarzadh* is sugar that is brought to boil three times with a tenth of its bulk being fresh milk, which has been added to the sugar; when it solidifies, it is called *ṭabarzadh*." Dols, 1984, p. 145, n. 6.

Prescription #29

For hot cough:

fleawort mucilage
quince seed
starch
gum Arabic
certain seeds and kernels that will be mentioned in the chapter about cough pills[51]
*electuaries

Prescription #30

For hot cough:[52]

anesthetics

Prescription #31

For hot cough, nourishment, such as:

cold vegetables
kernels

for example:

cucumber (*al-qithā*')
pumpkin
cucumber (*al-khiyār*)

with

almond oil

Prescription #32

For hot cough, nourishment, such as:

Fava bean, crushed and boiled to pieces

with

almond oil
pumpkin oil
barley water

[51] See *K. al-Qānūn*, vol. 3, pp. 428–431. We will not consider the issue further here.
[52] Addition to prescription #29.

Prescription #33

For hot cough, nourishment:

soup made of[53]
barley
Fava bean
vegetables
starch
bran water (*māʾ al-nukhāla*)

Prescription #34

For hot cough, if the patient's nature tends to dissolution; nourishment, such as:

barley gruel (*sawīq al-shaʿīr*)[54]

with

sugar
pasta (*al-iṭriya*)

Prescription #35

For hot cough, if the patient's condition[55] takes a turn for the worse; nourishment, such as:

barley water
crabs
salted ash water

The crabs, their extremities having been removed, are washed in salted ash water and eaten with barley water.

Prescription #36a

For hot cough, prescription for a cold poppy medicament (*diyāqūdhā bārid*):

fresh poppy
sugar

The poppy is cooked until it falls to pieces in water and sieved, and on it is poured sugar, until it reaches the constituency of julep.

---

[53] All the ingredients of the soups are missing from the Latin translation, which only says: *sorbitiones facte*.
[54] *sawīq* = meal of parched barley, sometimes wheat; it is generally made into a kind of gruel, being moistened with water, clarified butter, fat of sheep's tail, etc. (Dols, 1984, p. 132, n. 17).
[55] *I.e.*, illness or dissolution of nature.

Prescription #36b

For hot cough:[56]

If there is not fresh poppy, its dry ground seed is macerated in water for a day and a night and then cooked.

Prescription #37

For hot cough:[57]

If there is need for something stronger than Prescription #36, use the poppy along with it its peel, especially from the black poppy.

Prescription #38

For hot cough, if the patient's condition becomes aggravated:[58]

henbane seed
opium

Opium is mixed to henbane seed, and the mixture is added to Prescription #36.

Prescription #39

For the treatment of the moist temperament and moisture in the lung itself; a composition according to this prescription:

Armenian clay
tragacanth
gum Arabic
peppermint
hyssop
thyme
cinnamon
maidenhair

The ingredients are kneaded together and used.[59]

---

[56] Continuation to prescription #36a.
[57] Addition to prescription #36.
[58] Addition to prescription #36.
[59] The Latin translation adds after cinnamon *yreos*.

Prescription #40

For the treatment of the dry temperament if there is no fever:

milk of ass
milk of goat
milk of other similar animals

It is used with the rest of the regimen.

Prescription #41

For the treatment of the dry temperament, if there is fever:

the rest of the moistening drugs
*drink

Prescription #42

For the treatment of the dry temperament, if there is fever:

well-known cooling cerates[60]

Prescription #43

For the treatment of the dry temperament, if there is fever:

barley water

Prescription #44

For the treatment of the dry temperament, if there is fever:

oils

Nourishment is continually moistened with oils.[61]

Prescription #45

For the treatment of the dry temperament, if there is fever:

moistening almond soups

They are drunk.

---

[60] *Al-qayrūṭiyyāt. Qayrūṭī, qīrūṭī* = a wax-salve or cerate, from the Greek *kerute* (Dols, 1984, p. 147, n. 14).

[61] In the Latin translation: *humectatio pedum sempre cum oleis*, "moistening the feet . . ." instead of the moistening of the nourishment.

Prescription #46

If there is thin matter in the lungs, it is ripened[62] by:

the simple poppy medicaments (*al-diyāqūdhāt al-sādhaja*)
the poppy electuary
the mucilage electuary

Prescription #47

Specifically for cases when the expectorated material is thick:

pistachio resin (*ʿilk al-anbāṭ*)

with

honey

Prescription #48

Specifically for cases when the expectorated material is thick:

safflower

with

honey

Prescription #49

Specifically for cases when the expectorated material is thick:

yellow nut grass
honey

Prescription #50

Specifically for cases when the expectorated material is thick:[63]

licorice rob[64]
tragacanth

[62] In the Latin translation, *iuuat* instead of 'ripened'.
[63] Prescriptions #50 and #51 seem to be understood as one prescription in the Latin translation.
[64] *Rubb, rubūb* = General name for jams or syrups made out of fruits; inspissated juice of fruit. Thick residuum of fruit after it has been pressed and cooked. See Lev and Amar, 2008, p. 566.

Prescription #51

Specifically for cases when the expectorated material is thick:

galbanum[65]
sweet almond

Prescription #52

Specifically for cases when the expectorated material is thick:

aloe
honey

It is held in the mouth.

Prescription #53

For cases when the expectorated material is thick:

eggs, whole
honey
butter
pepper

The pepper is pounded and kneaded with the mixture of eggs, honey and butter. It is left to coagulate without being well cooked.

Prescription #54

For cases when the expectorated material is thick:

Damascene leek
water
honey

Take seven heads of Damascene leek. Cook them in water until there is a third left. Sieve and mix with the rest of the juice and honey.

Prescription #55

For cases when the expectorated material is thick:

fresh roses
pine nut
terebinth resin
raisin
honey
*electuary

[65] Galbanum is missing from the Latin text.

Prescription #56

Good medicament for cough:

water mint
pine nut
nettle seed
flax seed
pepper
honey

The first five ingredients are kneaded with the honey and used.

Prescription #57

For cough:

date
lily
saffron
pepper
vetch
honey of which the froth has been removed

The first five ingredients are kneaded with the honey.

Prescription #58

For cough:

saffron
valerian
pepper[66]
horehound
hyssop
myrrh
lily
honey

The first seven ingredients are kneaded with the honey.

[66] Missing from the Latin text.

Prescription #59

For the chronic cough:

resin (*al-qiṭrān*)

with

honey

It is to be taken as an electuary.

Prescription #60

For the chronic cough:

Indian costus

with

boiled dill water
vinegar[67]

Prescription #61

For the chronic cough:

roasted flax seed

with

honey

Possibly also:

pepper

It is taken with roasted flax seed with honey, either alone or with pepper.

Prescription #62

For the chronic cough:

peppermint

Prescription #63

For the chronic cough:

fluid storax (*ʿasal al-lubnā*)
bee honey

To be licked.

---

[67] In the Latin translation there is *olei sisamini* instead of vinegar. This may be due to different diacritic marks in the texts: vinegar is in Arabic *khall*, sesame oil *ḥall*.

Prescription #64

For the chronic cough, remedy options:

opoponax
mustard
bitter almond
Mithridatium[68]

Prescription #65

For children's cough:

basil (*ḥabaq*)[69]
milk of woman OR water of fresh fennel

Basil is cooked in the milk of woman until it gets to the consistency of honey, or in the water of fresh fennel.

Prescription #66

If the reason for the cough is catarrh, the catarrh is treated. For obstructing the catarrh:

fig dressings
They are used on the head.

Prescription #67

For obstructing the catarrh:

starch pills

They are hold under the tongue at all times, especially at night.

Prescription #68

For obstructing the catarrh:

The patient is to gargle with astringents which have neither a sour taste nor an acrid taste.

Prescription #69

For obstructing the catarrh, if it is hot:

the simple poppy medicament (*al-diyāqūdhā al-sādhaj*)[70]

---

[68] See Appendix 24, p. 455, n. 80, below.
[69] In the Latin text there is, instead of *al-ḥabaq, sorbitiones*.
[70] According to the Latin text this is used as a gargle.

Prescription #70

For obstructing the catarrh, if it is cold:[71]

myrrh
saffron
other similar drugs

Prescription #71

For hot cough:

pills for the hot cough
the known cough pill[72]

They are held in the mouth.

Prescription #72

For hot cough:

licorice rob
gum
tragacanth
starch
fleawort mucilage
quince seed[73]
seed kernels
*cucumber (*al-qithā'*) seeds
*pumpkin seeds
*cucumber (*al-qathad*) seeds
*mallow seed
Tabasheer
poppy seeds
other drugs similar to these
*pills

---

[71] Continuation to Prescription #70. According to the Latin text this is used as a gargle.
[72] In the Latin translation the 'known cough pill' is missing.
[73] The Arabic *ḥabb al-safarjal* is translated in the Latin text *granis & citoniorum*.

Prescription #73

For hot cough, prescription:

starch
tragacanth
licorice rob
lettuce juice
*pills

The other ingredients are made into pills with the juice of lettuce.

Prescription #74

Pills for the cold cough:

licorice rob
tamarind
wheat (*al-qamḥ*) kernels
saffron
tragacanth
pine nut
cotton seed
myrtle seed
poppy seed and its peel
aniseed
dill
myrrh
saffron
fānīdh sugar

Prescription #75

For cough:

pills in which the narcotic and the soporific qualities are added.

They are mainly narcotic-based, and in them are mixed hot antidotes.

Prescription #76

For calming the chronic painful cough; a tried drug:[74]

the well-known storax (*mayʿa*) pill

[74] See p. 136, n. 55. above.

Prescription #77

For cough:

storax (*may'a*)
castoreum
asarabacca
opium
*pills

The pills are held in the mouth.

Prescription #78

For cough:

henbane seed
alum[75]
pine nut
saffron
grape syrup (*maybukhtaj*)[76]
*pills

The mixture is made into pills.

Prescription #79

For cough:

storax (*may'a*)
myrrh
opium
balsam oil
saffron
*pills

They are made into pills of the size of vetch seed.

Prescription #80

For chronic moist cough

the smokes mentioned in the chapter on asthma

---

[75] Here Arabic *shabb* has been understood as with different diacritic points to be 'six' in Latin, so there is a change both in the ingredients and in their amounts: in the Latin translation: … *etiam seminis iusquami. vi. partes granorum pini partes iij.* …

[76] Arabic *maybukhtaj* has been translated in the Latin translation as 'rob' which seems to have less informative value.

Prescription #81

For chronic moist cough, if the moisture is in too great a measure:

vapors of
*red arsenic
*excrement of hare
*barley flour
*pistachio peel
egg yolk

The first four ingredients are kneaded with egg yolk. The mixture is made into tablets which are dried in the sun. They are used as a fumigation thrice.

Prescription #82

For chronic moist cough:

birthwort
myrrh[77]
storax (*may'a*)
thistle[78]
arsenic
butter of cow

The first five ingredients are kneaded with the butter and made into a pill. One pill is vaporized.

Simple Drugs Used[79]

For the identification of the simple drugs mentioned in the prescriptions, see Appendix 24, Table 6.2.

Table 6.3 in Appendix 25 shows the frequency with which these simple drugs are used in the above prescriptions. The number of appearances of the drugs in the prescriptions is tallied by considering every prescription in which a drug appears once as one appearance. However, if a drug appears twice in the same prescription or appears in two immediately successive prescriptions, where the second merely gives additional ingredients to the first, they are counted as appearing only once. These rates of appearance will be relevant when choosing the most suitable material for the next steps of the research.

As we can see, Ibn Sīnā's most preferred drug is honey, mentioned 20 times. Next are barley and poppy (eight mentions), almond (seven), fig, myrrh, pine, saffron, and tragacanth (each mentioned six times).

[77] In the Latin translation myrrh is lacking, *melle*, 'honey', added.
[78] See Appendix 24, p. 461, below.
[79] See Ch. 5.1.5.3, above, for the general principles.

Altogether, there are 225 mentions of different simple drugs, which means that the most popular, honey, comprises 9 % of the total. A clear indication of the importance of these nine most frequent drugs is the fact that although they represent only 9 % of Ibn Sīnā's simple drugs for cough, they cover a total of 32 % of all mentions of simple drugs.

6.1.5.4. Relationship between the Drugs Recommended for Treatment and their Therapeutic Qualities[80]

The therapeutic qualities discussed in this chapter are those listed by Ibn Sīnā as relevant for drugs to be used for the treatment of cough.[81] In addition, we added the following basic idea to the list:

XX = cough[82]

The comparison between these recommended therapeutic qualities and the descriptions of the drugs in Book II of *K. al-Qānūn* is presented in Table 6.4a, *Medical Qualities in Ibn Sīnā's Drugs for Cough*, in Appendix 26. After examining the frequency of the different therapeutic qualities found in these 88 drugs, we obtained the results given in Appendix 26, Table 6.4b. Table 6.4c in Appendix 26 shows these qualities divided tentatively into clusters. It was important not to force these divisions artificially: if two qualities did not clearly overlap, either completely or by the inclusion of one in the other, we deemed it best not to combine them.

According to these tables, the qualities appearing most often in the drugs recommended by Ibn Sīnā against cough are the following (please note the two-letter code used for each therapeutic quality and the percentage of drugs having the quality in question):[83]

1. FF Clearing drugs (43 %), which remove both thick matter and moisture in the lung that cause cough. They are used with desiccants.
2. KK Dissolving drugs (44 %) remove the thick matter.
3. UU Softening drugs (43 %) help to remove the thick matter.
4. XX Against cough in general (41 %).

---

[80] For the method used, see Chapter 5.1.5.4, above.

[81] See pp. 232–234, above.

[82] For the meaning of codes used, see pp. 231–232, above, and pp. 447–448, below.

[83] I have numbered the items for clarity's sake. The content of the items is from *K. al-Qānūn*, vol. 2, pp. 228–232.

5. JJ + LL Desiccants and dry drugs (40 %); used against moist temperament and moisture in the lung itself causing cough.
6. CC Astringent drugs (36 %); used against catarrh causing the cough.

As we can see, the most popular three qualities all aid the removal of thick matter, i.e., they provide symptomatic therapy. The combination FF + JJ + LL, too, is part of symptomatic therapy, which works against moisture in the lung itself. Only the dry desiccants additionally aid the treatment of primary causes, namely the moist temperament that causes the cough. XX, therapy against cough, is surprisingly widespread.

Now, we will examine the relationship between Ibn Sīnā's drug preferences and the qualities of his preferred drugs to see whether a correlation exists between the frequency with which a given drug appears in Ibn Sīnā's prescriptions and the fact that it has several suitable qualities.[84] The material is presented in Table 6.5a, *The Connection between Ibn Sīnā's Frequency of Use of Drugs for Cough and their Qualities*, in Appendix 27, followed by Tables 6.5b and 6.5c showing the degree of this connection.

In our study, those drugs for which qualities are not given in Book II of *K. al-Qānūn* are not taken into account.

Here, we see that out of 91 drugs, Ibn Sīnā's most preferred simple drug, honey, appears 20 times and has 5 suitable medical qualities. Poppy has the greatest amount of qualities appearing in one drug (10 qualities), and it is mentioned in 8 prescriptions. All of Ibn Sīnā's nine favorite drugs (9 % of the total amount of drugs he recommends against cough, each mentioned at least six times) have at least two qualities suitable for the therapy, 67 % of them at least six qualities. Comparing these percentages with the corresponding percentages in the total of drugs recommended against cough (85 % with at least two qualities, 23 % with at least six qualities) or in drugs that appear only once (78 % and 13 %, respectively), it is obvious that the number of suitable qualities in a drug correlates directly with its ranking in Ibn Sīnā's order of preference.

The same trend can be seen, although with less clarity, in Table 6.5b: 52 % of the drugs having any medicinal qualities recommended against cough appear at least twice in the description of the practical therapy, whereas of those having no suitable qualities, or only one, only 29 % are repeated. There does also seem to be a trend that favors drugs with more qualities: out of the seven drugs that have eight qualities or more, 57 %

[84] See pp. 154–159, above, for methodological details.

appear at least six times, while only 36% of those with seven qualities, only 29% of those with six qualities, and only 15% of those with four qualities appear at least six times. Of the drugs that have only one quality, or do not have any, none appear more than five times.

Thus, it appears that the answer to the question posed earlier about the correlation of therapeutic theory and practice must again be answered positively. It is impossible to determine the direction of the correlation or influence, i.e. to assess whether the drug qualities determined the choice of the drugs or whether the drugs assumed these qualities after being chosen for such therapies. But it is obvious, as it was in the case of nosebleed, that there is a correlation, and this correlation of the pathology of cough, its causes and manifestations, with the therapeutic recommendations, asserts the coherence of the entire picture created by Ibn Sīnā's writings. Now, let us see what happens to this tendency in the therapeutic tradition later in the Middle Ages.

6.2. *Cough in the Arabic and Latin Commentaries*[85]

6.2.1. *General Description*

For the sake of brevity, in this section we will discuss all five commentaries together. All of them pay considerable attention to cough, showing that the treatment of cough was an important part of the doctor's practical repertoire.

6.2.2, 6.2.3, 6.2.4. *Causes, Symptoms and Consequences of Cough in the Arabic and Latin Commentaries*[86]

In the following, causes, symptoms and consequences of cough will appear in only tabular form, with no analysis. Instead, changes and additions made by the commentators, along with other potentially interesting details are marked with bold letters for the benefit of the reader. The reason is that while these issues are not immediately relevant to our research topic, the drug therapy, they are interesting and can, in some

[85] For a general description of the Arabic and the Latin commentaries and their way of treating the material passed on by Ibn Sīnā, see Ch. 5.2.1 and Ch. 5.3.1, above.

[86] For methodological details, see Chapters 5.2.2, 5.2.3, 5.2.4, 5.3.2, 5.3.3, and 5.3.4, above.

cases, throw light on changes in therapeutic choices, both theoretical and practical.[87]

For causes of cough, the reader is referred to Appendix 28, Table 6.6; for symptoms and different manifestations of cough, to Appendix 29, Table 6.7; and for its consequences, to Appendix 30, Table 6.8.

As we can see, changes in the description of cough in the commentaries are minimal; thus, the coherence of causes, symptoms and consequences remains largely the same as in *K. al-Qānūn*.

In the following, we will see how this general picture taken from Ibn Sīnā relates to the therapeutic theory of the commentators, and whether the latter introduce any changes to this theory.

6.2.5. *Treatment of Cough in the Arabic and Latin Commentaries*

6.2.5.1. Treatment, Theory, in the Arabic and Latin Commentaries[88]

We will begin the comparison between Ibn Sīnā's and the commentators' theories concerning cough therapy with Table 6.9 (Appendix 31), which presents the medical qualities considered relevant by any or all of the sources.[89] In the case of Ibn al-Nafīs, asthma therapies are also included, since he considers asthma treatment useful for cough. They have been marked separately.

From Table 6.9 it becomes obvious that the changes the commentaries make to Ibn Sīnā's therapeutic theory concerning cough are more radical than those they make to his theory of nosebleed. In addition to the usual omissions, they add a considerable amount of new ideas.

Ibn al-Nafīs

Ibn al-Nafīs chooses the following 10 out of the 22 qualities recommended for drugs against cough by Ibn Sīnā, although he recommends most of them against asthma and not specifically against cough.[90]

---

[87] See p. 4, above.

[88] See Chapters 5.2.5.1 and 5.3.5.1, above, for methodological details.

[89] I have numbered the items for clarity's sake. The following comments to commentators' descriptions of drugs suitable for the treatment of cough are my interpretation based on the medieval medical theory as it appears in *K. al-Qānūn*.

[90] *Mūjaz al-Qānūn*, pp. 182–185. Although asthma is not always connected with cough, Ibn al-Nafīs clearly sees the connection between these medical problems of sufficient significance to warrant some common treatments. In practice, the doctor would in any case know the type of patients who would benefit from this kind of treatment.

1. Asthma therapy. Ibn al-Nafīs clearly considers all asthma therapies suitable for certain types of cough, thus widening Ibn Sīnā's original recommendation to use asthma fumigations for inveterate moist cough.
2. Obstructing the descent of material to trachea if the cough is caused by catarrh.
3. For cough caused by catarrh, Ibn al-Nafīs recommends in addition to other treatments the use of cold in the form of ice water because, according to him, its thickening effect would stop the catarrhal fluids.
4. Ibn al-Nafīs prescribes for asthma (and thus indirectly for cough) cooling drinks; clearing, rarefying, maturating, and softening drugs; emetics; and hot spices from among Ibn Sīnā's recommendations for cough.

Ibn al-Nafīs omits the following recommendations given by Ibn Sīnā:

1. Collecting the expectoration. However, he does recommend using coldness to thicken the catarrhal fluids, which results in collection of expectoration.
2. Astringent drugs that Ibn Sīnā uses against catarrh (which causes cough), as well as catarrh therapy as a general category. Ibn al-Nafīs deals with catarrh both by obstructing the flow of material to trachea and by thickening material by cooling.
3. Cutting and dissolving drugs, as well as drugs which cause smooth passage of matter down the throat, all of which Ibn Sīnā uses for the removal of thick material causing the cough. Ibn al-Nafīs, however, uses for this purpose clearing, maturating, softening and emetic drugs, as suggested by Ibn Sīnā.
4. Ibn al-Nafīs omits both dry drugs and desiccants, on the one hand, and moistening drugs, on the other hand. This is strange, since at the same time he considers moisture and dryness to be possible causes for cough.
5. Finally, he mentions neither anesthetics and soporific drugs nor the antidotes needed for counteracting their side effects. Perhaps he marginalized the issue of pain in cough.

Ibn al-Nafīs also recommends new qualities, not found in Ibn Sīnā:

1. For obstructing the descent of the material to the trachea in cough caused by catarrh, he prescribes thickening drugs.[91]
2. For cough caused by catarrh, he also suggests moving this material in the direction of the nose with sternutatories.
3. He explains in more detail than does Ibn Sīnā the treatment of cough caused by an underlying disease by treating that primary disease. For example, in cases of cough caused by pleurisy, he recommends therapy against pleurisy; for cough resulting from an apostema in the liver, he recommends treatment of the apostema.
4. For asthma, Ibn al-Nafīs' main innovation is the idea of evacuating the material from the chest, be it melancholic or phlegmatic. He also recommends drugs for warming the chest, as well as "opening drugs".[92]

Thus we can see that Ibn al-Nafīs only changes Ibn Sīnā's therapeutic pattern slightly, most notably by paying relatively more attention to catarrh as a cause of cough and by concentrating less on the *contraria contrariis* therapy than on the primary causes of the problem. By adding the asthma therapy to cough treatments, he clearly widens the range of therapeutic possibilities. Generally speaking, despite the changes that Ibn al-Nafīs introduces, his own clinico-therapeutic frame is relatively coherent, although its main focus shifts from etiology to symptomatology.

Al-Jaghmīnī and the Supracommentary

Al-Jaghmīnī does not mention in his succinct therapeutic recommendations any theoretical basis for them. The supracommentary tries to correct this lack, although its theoretical description is limited to the following four qualities: clearing, dissolving, opening and moistening.

1. Clearing drugs for cough caused by moisture.[93]
2. Dissolving drugs, for the same indication.[94]
3. Opening drugs, also for cough caused by moisture. This is an innovation by Ibn al-Nafīs, who, however, recommends it for asthma and not for cough.

[91] They would presumably make the catarrhal fluids thicker and thus prevent their flow downwards.
[92] Possibly in order to facilitate breathing.
[93] Supposedly the intention is to remove the moisture from the lungs.
[94] This would help the clearing process.

4. The author of the supracommentary mentions moistening, although not as a therapeutic quality against dry cough but as an alleviating measure.

Thus, the main thrust of therapy is indicated against moist and dry cough, according to the major division made by al-Jaghmīnī.[95] Although this leaves out most of the wider medical picture given by Ibn Sīnā, if one considers *Qānūnja* and the supracommentary together as an independent unit, the description of causes, symptoms and recommended therapy is indeed coherent.

Gentile da Foligno

Surprisingly enough, Gentile da Foligno repeats nearly all the medical qualities recommended by Ibn Sīnā for cough medicines. He omits only the following four:

1. Dryness, which could be seen as included in the desiccants.
2. Obstructing catarrh. However, Gentile does mention general therapy for catarrh as treatment against cough caused by catarrh.
3. Enabling the materials to slide[96] easily down the throat. This is part of the therapy used against thick material which causes cough, and Gentile repeats most of the other therapeutic qualities belonging to this category.
4. Emetics. Since emetics act as expectorants, the repetition of the specifically emetic quality may have seemed unnecessary.

Gentile's innovations can be schematically categorized in the following way:

1. Expectorants. This tendency is visible already in Ibn al-Nafīs' recommendations, from which Gentile borrows the recommendation to evacuate obstructing material, both from the chest and in general. In addition, he recommends both drugs that increase the patient's strength for expectoration and those which change the material to the right consistency for possible expectoration. This is akin to Ibn Sīnā's drug quality of collecting the expectoration together.
2. Connected with the first innovation are digestion of the material and assisting in the expectoration of thick material.[97]

[95] See Appendix 28.
[96] *E.g.* more easily out of the bronchia.
[97] *I.e.* preparing it for expulsion either by thickening or thinning it, as the case may be.

3. Drugs that dilate the chest cavity are possibly also intended to assist in the removal of thick material.
4. Finally, Gentile gives the prophylactic recommendation of strengthening the lungs so that material which would then later cause cough could not even enter the lungs to begin with.

As we see, Gentile da Foligno preserves the integrity of Ibn Sīnā's entire clinical and therapeutic picture, as his omissions do not change Ibn Sīnā's general ideas in any essential way. Gentile's own main emphasis is on assisting in the expectoration of foreign matter, i.e., he stresses symptomatic treatment. This is, however, more of a shift in the focus of interest than a radical change. After all, despite his difference in emphasis, Gentile nonetheless retains Ibn Sīnā's therapeutic advice concerning the treatment of primary causes of cough.

Jacques Despars

Despars also repeats all the qualities that Ibn Sīnā mentioned, adding to them the following ideas:

1. He expands several of Ibn Sīnā's ideas: from "cooling" to "cooling the chest," from "moistening" to "moistening the chest," from "softening" to "softening the chest" and "softening the surfaces of the bronchia."
2. Ibn Sīnā's "maturating the humors" is widened to include both thick and thin humors instead of only thin humors. "Thickening the humors" may be understood as part of this concept.
3. Despars gives much importance to evacuating the humors that cause cough, both from the chest and from the whole body. For this purpose, he also finds it useful to draw the humors from the chest to elsewhere in the body.
4. As a part of cough therapy, Despars explicitly mentions a group of diseases that can cause cough and their treatment, to the purpose of healing the underlying disease that causes the cough.
5. Despars recommends different warming and rubefacient treatments, clearly to be used against cold cough, but at the same time advises acting against excessive heat.
6. Finally, Despars advises eliminating any other causes of cough, dryness and parchedness of the throat.

Despars' additions to Ibn Sīnā's cough therapy are therefore more along the lines of refining the latter's original thought than changing it in any radical way. Despars' overall theoretical picture does not depart from that found in Ibn Sīnā's text.

6.2.5.2. Treatment, Practice, in the Arabic and Latin Commentaries[98]

Prescriptions Used by Ibn al-Nafīs[99]

Ibn al-Nafīs listed the following 17 prescriptions for the treatment of cough:

Prescription #1

For cough caused by thick phlegm or coldness that has afflicted the chest:

refer to other prescriptions listed in *Mūjaz al-Qānūn* for the treatment of asthma

Prescription #2

For cough caused by thick phlegm or coldness that has afflicted the chest:

theriac[100]

Prescription #3

For cough caused by thick phlegm or coldness that has afflicted the chest:

electuary of squill bulb

Prescription #4

For cough caused by heat or dryness:

barley (*sha'īr*) water
violet potion and violet oil
oil of sweet almond

[98] For general principles concerning the Arabic prescriptions, see Chapters 5.1.5.3 and 5.2.5.2, above.

[99] *Mūjaz al-Qānūn*, pp. 184–185. Asterisk after the list of ingredients indicates the way of application of the drug. Drug names connected with 'OR' are alternative choices for the same prescription.

[100] Theriac (Greek *theriake*) was originally an antidote to counteract bites of venomous creatures, but already Galen recommended it also, for example, epilepsy, and its supposed range of effect widened to include in the Middle Ages for example gout and malaria. See Tibi, 2006, p. 1. n. 3 and p. 12; Lev, 2003, p. 97. For a detailed discussion on theriac, see Lev and Amar, 2008, p. 569; Watson, 1966; Amar, 1996–1997.

Prescription #5

For cough caused by heat or dryness:

violet electuary
The violet electuary is more effective than the potion made of violet.

Prescription #6

For cough caused by heat or dryness:

electuary of sweet pomegranate
potion of sweet pomegranate

Prescription #7

For cough caused by heat or dryness:

kernels of seed of cucumber (*qithāʾ*)
kernel of cucumber (*khiyār*) seeds
kernel of pumpkin seeds
poppy
tragacanth
starch
licorice rob
potion of sweet pomegranate
purslane (*baqla*) seed
*pill

The first seven ingredients are pulverized and then kneaded with sweet pomegranate potion; if the cough is accompanied by strong heat, purslane (*baqla*) seed is added.

Prescription #8

Nutriments:

pumpkin *muzawwara* dish[101]
mallow (*khubbāzā*)
mallow (*mulūkhiyya*)
amaranth
purslane
yolk of poached egg

---

[101] *muzawwarat al-qarʿ*. On *muzawwarāt*, see p. 175, n. 169, above.

Prescription #9

Nutriments. Immediate relief is provided by:

warmed egg-yolk
henna

Prescription #10

Nutriments:

grape rob

Prescription #11

Nutriments, if there is need for meats:

cow trotters
wheat (*ḥinṭa*) OR pasta (*al-rishta*)
some of the vegetables mentioned in the above prescriptions[102]

Prescription #12

Nutriments:

oil of sweet almond
sweets (*ḥalwā'*)[103]
made of
  starch
  sugar
  pumpkin

Prescription #13

For cough caused by catarrh, sternutatories are used to move the matter in the direction of the nose, and fluid descending to the trachea is to be obstructed by using the following:

poppy potion
made of
  poppy peel
  barley water

---

102 See Prescriptions #7 and #8, p.263, above.

103 *ḥalāwa* = sweets, halva (Lev and Amar, 2008, p. 571). The basic ingredients for sweets were honey and/or sugar, starch, almonds and walnuts (Garcia Sánchez, 2002, p. 286/12).

Prescription #14

For cough caused by catarrh, sternutatories are used to move the matter in the direction of the nose, and fluids descending to the trachea are to be obstructed by gargling with thickening drugs, such as the following:

lentil
jujube
sebesten
malva (*khaṭmī*)
mallow (*khubbāzā*)
poppy

These are boiled, and the patient gargles with the water in which they were boiled.

Prescription #15

For cough caused by catarrh; thickening:

ice water

The patient gargles with it.

Prescription #16

For cough connected with diarrhea:

myrtle potion
pomegranate
sandalwood
sweet pomegranate

Prescription #17

For cough connected with diarrhea:

gums
starch
*pill

The ingredients are roasted and prepared as pills.

Simple Drugs Used by Ibn al-Nafīs[104]

For the drug identifications of simple drugs in the prescriptions, see Appendix 32, Table 6.10. The frequencies of the drugs in the prescriptions will be discussed together with the other Arabic and Latin commentators in *Comparison between* K. al-Qānūn *and the Commentaries* in Chapter 6.2.5.2, for brevity's sake.

[104] For methodological details, see Chapter 5.2.5.2, above.

Prescriptions Used by al-Jaghmīnī[105]

Al-Jaghmīnī gave the following six prescriptions for the treatment of cough:

Prescription #1

For cough caused by moisture:

violet jam
pine nut oil OR pistachio oil

To be eaten.

Prescription #2

For cough caused by moisture:

lily oil
narcissus oil

The patient's throat[106] is embrocated with these oils.

Prescription #3

For cough caused by moisture, nutriment:

barley water
violet jam
crystalline sugar

Prescription #4

For cough caused by dryness:

decoction of dragon's blood[107]
cassia fistula
fānīdh sugar[108]
almond oil
poppy potion
sebesten
jujube
violet

---

[105] For general principles concerning the Arabic prescriptions, see Chapters 5.1.5.3 and 5.2.5.2, above. Asterisk after the list of ingredients indicates the way of application of the drug. The drug names connected with 'OR' are alternative choices for the same prescription.
[106] *I.e.*, front neck area.
[107] Despite the name, a plant drug. See Appendix 32.
[108] See p. 237, n. 44, above.

Prescription #5

For cough caused by dryness, nourishment:

barley water

made with

white poppy
sugar

Prescription #6

For cough caused by dryness:

wax
violet oil

The patient is to embrocate his chest with these elements.

Prescriptions in the Supracommentary

The author of the supracommentary lists the following 11 prescriptions for cough:

Prescription #1

[For cough caused by moisture:][109]

[violet jam]
[pine nut oil]
[pistachio oil]

Prescription #2

For cough caused by moisture:

bran water
crystalline sugar

Prescription #3

For cough caused by moisture:

peeled almond
pistachio
sugar

To be eaten.

109 Text in brackets is from *Qānūnja*, confirmed by the supracommentary.

Prescription #4

For cough caused by the moisture of the lung itself, an excellent remedy:

Armenian clay
gum Arabic
tragacanth
maidenhair
hyssop
peppermint[110]
thyme
cinnamon
honey

The other ingredients are put together, ground and kneaded with honey.

Prescription #5

For cough caused by dryness. This prescription alleviates it:

moistening drinks

Prescription #6

For cough caused by dryness:

electuary of sweet pomegranate
crystalline sugar

The sweet pomegranate is squeezed and filtered, then boiled in a pot on low fire until half of its volume remains. Next, a portion of crystalline sugar equal to half the amount of the pomegranate liquid is added to the potion.

Prescription #7

For cough caused by dryness if the patient has no fever:

milk

To be drunk.

Prescription #8

For cough caused by dryness:

cucumber (*khiyār*) water
julep[111]

---

[110] In the Arabic text *fūnīkh* instead of *fūdhanj*.
[111] *julāb* = syrup made of rose water, sugar and possibly other ingredients (Bos, 1989, p. 84, n. 17); general name of refined and fragrant liquid and specific name for rose water or sweets mixed with rose water (Lev and Amar, 2008, p. 562).

Prescription #9

For cough caused by dryness:

fleawort mucilage

Prescription #10

For cough caused by dryness, moistening pills:

kernels of seed of cucumber (*qithā'*)
kernels of seed of musk melon
kernels of seed of pumpkin
Fava bean flour
tragacanth
plum pits
fānīdh sugar[112]
*pill

It is made into a pill and held in the mouth to dissolve.

Prescription #11

For cough caused by dryness: drug made of

violet
pumpkin seed
white wax
lettuce water
coriander
egg-white

Simple Drugs Used by al-Jaghmīnī and the Supracommentary[113]

For al-Jaghmīnī's and the supracommentary's drug identifications, see Appendix 32. For brevity's sake, the frequencies of the drugs in the prescriptions will be discussed together with the other Arabic and Latin commentators in *Comparison between* K. al-Qānūn *and the Commentaries* in Chapter 6.2.5.2.

Prescriptions Used in the Latin Commentaries[114]

We will now compare the prescriptions given by Ibn Sīnā for the treatment of cough with those given by Jacques Despars and Gentile da Foligno. The prescriptions appear in Table 6.11 in Appendix 33.

---

112 See p. 237, n. 44, above.
113 For methodological details, see Ch. 5.2.5.2, above.
114 For methodological details, see Ch. 5.3.5.2, above.

The picture that emerges is quite similar to that found for nosebleed: the prescriptions of the Latin commentators either follow Ibn Sīnā's prescriptions in detail, as in the case of Despars, or make additions which are clearly set off from the part of the prescription that closely follows Ibn Sīnā's. Gentile's commentary on cough prescriptions seems to be more connected to the relevancy of the subject matter than is the case with his commentary on nosebleed, although his predominant purpose is still to clarify Ibn Sīnā's text for a contemporary audience, especially in connection with plant names. Despars again unobtrusively changes the therapy both by adding new material to prescriptions that he transmits and by prescribing completely new prescriptions, a number of which also include new drugs. His innovations therefore lie in (1) the introduction of new material, and (2) showing his preference for a number of the simple drugs recommended by Ibn Sīnā.

Now we will look at the identifications of the Latin drug names appearing in these prescriptions, and then the numbers of appearance of different drugs in the prescriptions, marking Gentile's and Despars' most preferred drugs for further consideration. For the drug identifications, see Appendix 34, Table 6.12.[115]

Comparison between K. al-Qānūn *and the Commentaries*[116]

Here we tally the number of appearances of the different drugs in the commentators' prescriptions (Table 6.13, Appendix 35). This is done in order to (a) determine each commentator's most preferred drugs for cough, (b) compare the results with the core drugs of Ibn Sīnā's drug collection, and (c) compare the results with the qualities recommended by Ibn Sīnā for the treatment of cough. In this way, we can see whether the commentators' respective medical systems, causes, manifestations, theoretical therapy and practical drug therapy concerning cough comprise a coherent system and whether there emerges a core drug group for the treatment of cough in our Arabic and Latin sources in general.

There are 32 simple drugs that Ibn al-Nafīs recommends in the treatment of cough. They are mentioned forty-seven times altogether, and the most popular drug, pomegranate, appears in five prescriptions. Proportionally, it constitutes 11 % of all occurrences. Poppy, pumpkin and starch each appear three times. These four core drugs amount to 30 % of all appearances.

[115] For methodological details, see Ch. 5.3.5.2, above.
[116] For methodological details, see Chapters 5.2.5.2 and 5.3.5.2, above.

Comparing these four simple drugs to Ibn Sīnā's nine most preferred drugs (32 % of all appearances), we find that poppy appears in both lists. Starch is also recommended by Ibn Sīnā five times, but pomegranate and pumpkin appear only two and three times, respectively.

Al-Jaghmīnī recommends 15 different drugs for treating cough. One of these, violet, is mentioned four times, and poppy, barley and sugar twice. Sugar also appears five times in Ibn Sīnā, but violet only once. Instead, violet appears twice in Ibn al-Nafīs, and is also among Despars' most preferred drugs. Poppy belongs both to Ibn Sīnā's and to Ibn al-Nafīs' core drug group, barley to those of Ibn Sīnā and Despars.

The supracommentary lists 31 drugs for the treatment of cough. Sugar is the favorite, being mentioned three times, followed by tragacanth and pumpkin, mentioned twice. Together, these three drugs constitute 20 % of all appearances. Sugar appears five times in *K. al-Qānūn*, nine times in Despars, and is recommended by all the commentators. Tragacanth is part of both Ibn Sīnā's and Despars' core drug groups.

Gentile recommends 27 drugs for treating cough, instead of concentrating nearly exclusively on explaining the problematic drug names, as he does for nosebleed. Two of these, fig and hyssop, are mentioned three times (18 %), almond, barley and *fānīdh*-sugar twice (all five together, 35 %). Fig, almond and barley belong to Ibn Sīnā's core drug group, while almond is also recommended by every commentator. Barley is also part of Despars' core drug group. Hyssop appears five times in Ibn Sīnā.

Despars repeats all drugs mentioned by Ibn Sīnā, but not all those mentioned by Gentile. His five most preferred drugs (differing from those of *K. al-Qānūn*) are honey, poppy (eleven appearances each), barley, violet and sugar (nine appearances each). These represent 6 % of the 77 drugs Despars recommends for cough and 29 % (or a total of 49) of all drug appearances independent from *K. al-Qānūn* (168). If drugs appearing at least seven times are considered (milk and tragacanth in addition to the aforementioned), the corresponding percentages are 9 % (seven drugs) and 37,5 % (sixty-three appearances). Of these, honey, poppy, barley and tragacanth belong to Ibn Sīnā's core drug group. Poppy also belongs to Ibn al-Nafīs' and Gentile's core drug groups, violet to al-Jaghmīnī's core group, and sugar to supracommentary's core group drugs.

Thus, the core drug groups of the different authors overlap significantly, creating a common core drug group for the therapy of cough.[117]

[117] Cf. also with corresponding results from the 13th-century pharmaceutical manual,

6.2.5.3. Relationship between the Choice of Simple Drugs and their Qualities[118]

It appears that Ibn Sīnā's drug preferences influenced the choices of his commentators. The next connection to be determined is the one found between the drugs that appear in the commentaries and their medical qualities as given in Book II of *K. al-Qānūn*. We will do this in the same way as in Chapter 6.1.5.4, *Relationship between the Drugs Recommended for Treatment and their Therapeutic Qualities*, where we studied the connection between the frequency and the qualities of a drug in Ibn Sīnā's text by comparing the most preferred drugs with those drugs having the most medical qualities and examining whether there is any connection between them. The existence of such a connection would indicate that the commentators were aware of and interested in the theory behind Ibn Sīnā's pharmaceutical choices. The material is presented in Table 6.14, *Medical Qualities in the Commentators' Drugs for Cough*, in Appendix 36. Only drugs recommended already in *K. al-Qānūn* for cough are included.

The following results emerge:

1. A total of 91 drugs are included in the above comparison.
2. The most preferred drugs of all commentaries are almond, sugar and violet, the only drugs which appear in all of them (= 3 %).
3. Barley, poppy, tragacanth and *fānīdh* sugar appear in *K. al-Qānūn* and four commentaries (together with almond, sugar and violet: 8 %).
4. Eight drugs appear in *K. al-Qānūn* and in three commentaries, nineteen appear in *K. al-Qānūn* and in two commentaries, and twenty-six simples appear in *K. al-Qānūn* and in one commentary. The total amount of plants mentioned by both Ibn Sīnā and the commentaries is 60 (= 66 %).
5. One drug, poppy, has ten therapeutic qualities (it comprises 1 % of all drugs mentioned). It is followed by myrrh, fenugreek (nine qualities each; 2 %), lily, pine, saffron and vinegar (eight qualities

Minhāj al-dukkān by Abū al-Munā al-Kūhīn al-ʿAṭṭār al-Isrāʾīlī, where the most common plants in cough recipes are licorice (52.5 % of recipes), (13) gum tragacanth (37.5 %), gum arabic (35 %), grape/raisin and maidenhair (both 30 %), sebesten (27.5 %), hyssop, poppy and rocket (each 22.5 %), almond, fennel and jujube (each 20 %), and cucumber, fig, marshmallow, mallow and quince (each 17.5 %). See Chipman, 2002, p. 142.

[118] For methodology, see Chapters 5.2.5.3 and 5.3.5.3, above.

each; 4 %). There are seven drugs with seven qualities each (8 %) and another seven drugs with six qualities each (8 %).

6. The percentage of drugs that have five or more medical qualities (30 items) is 33 %.
7. A look at the drugs recommended by Ibn Sīnā which also appear in at least one commentary yields the following results:
   a) The most popular medical substances, almond, sugar and violet, have six, three and two medicinal qualities, respectively; therefore, almond belongs to the 23 % of drugs having the highest amount of qualities.
   b) Of the drugs mentioned in at least two commentaries in addition to *K. al-Qānūn* (34 items), 26 % have six or more qualities, while 56 % have at least four qualities. For drugs mentioned in three or more commentaries (15 items), percentages are 20 % and 53 %. If this is compared to the corresponding percentages for drugs that appear only in *K. al-Qānūn*—23 % having at least six qualities and 42 % at least four qualities—we see that there is a similar correlation between the popularity of a drug and the amount of its qualities as in the case of nosebleed.
   c) The impression noted above is reinforced when the drugs having the most qualities are considered. The drug with the most qualities, poppy (10 qualities), is mentioned in five of the commentaries, while nine (or 43 %) of the 21 drugs that have six or more qualities are recommended at least by two commentaries. A comparison with the corresponding percentage for all the drugs for cough in *K. al-Qānūn*, 37 %, and with the drugs with no suitable qualities (17 %), again shows that a correlation exists, but that it is not very strong.

Thus, there is a connection between the amount of the therapeutic qualities Ibn Sīnā ascribes to a drug and its popularity among the commentators, but it is not strong. In the next chapter, we will examine whether the medical efficacy of specific drugs could have been a decisive factor in their being selected for use in treatment, especially in light of the apparent secondary importance that theory was granted in the decision-making process.

6.3. *Relationship between the Medical Efficacy of Drugs and their Popularity*[119, 120]

Finally, we shall compare the medical efficacy of drugs with their frequency of mention in prescriptions to see how much the objective, empiric, repeatable medical effects might have been responsible for the authors' drug choices. For this purpose, we will use the paradigms of Western biomedicine.[121]

On the basis of relevant phytopharmacological literature, we have chosen the following medicinal qualities as criteria for the efficacy of a plant in the treatment of cough. We also mention some of the chemicals that have the relevant effect. Although the mere existence of these chemicals does not justify the conclusion that the plant containing them had the desired effect, their existence does suggest a greater possibility of such an effect than there would otherwise be.

The following medical effects were chosen as relevant criteria for the efficacy of a drug on the basis of Lewis and Elvin-Lewis' and Vohora's studies.[122]

1. Acts against cough. Includes plants that are evaluated as good against various kinds of cough without further details.
2. Antitussive
3. Expectorant
4. Bronchodilator (and spasmolytic)
5. Anti-inflammatory
6. Antimicrobial
7. Antihistaminic; antiallergic
8. Antiasthmatic
9. Emetic[123]
10. Increases immune resistance of body; modification of immunological response. Immunostimulating.
11. Mucilaginous

---

[119] For methodology, see Ch. 5.4, above.
[120] On evaluating the efficacy of medieval cough therapies, see the pioneering article by L.N.B. Chipman (Chipman, 2002).
[121] For reasons for this decision, see pp. 100–101, above. For the description of the evaluation process and its problems, especially the question of efficacy, see pp. 116–124, above.
[122] Lewis and Elvin-Lewis, 1977; Vohora, 1986, pp. 201–202.
[123] Emetics can act as expectorants.

Of these, however, we decided to ignore numbers 4, 6, 10 and 11—spasmolytic, immunostimulating and mucilaginous drugs are too margin2al, and antimicrobial drugs comprise too broad a category.

Table 6.15 in Appendix 37 indicates the presence of the above-mentioned relevant medicinal effects in the plants recommended by Ibn Sīnā or by any of the commentators, according to the drug identifications in Chapters 6.1.5.3 and 6.2.5.2. In cases where the plant has several possible identifications belonging to different genera, we examine them all, combining the results in the Table 6.16. Plants or plant products that are too general to be defined in terms of their genus were excluded from the list.

Of the 128 plant genera on the list, 92 produce at least one of the effects necessary for the treatment of cough. An additional eleven of the plant genera have one or more potentially useful chemical compounds. Twenty-five of the plants are ineffective against cough according to the standards of modern phytochemical research.

Now, we will look at our data about the medical efficacy of individual plant genera in light of the plant identifications made in Chapters 6.1.5.3 and 6.2.5.2. Our goal is to determine the possible effect of each plant (according to Ibn Sīnā and his commentators) and the extent to which its efficacy could have contributed to its preference by the authors.

Table 6.16 in Appendix 38 shows how many times each drug appears in the prescriptions of Ibn Sīnā and each of his commentators and its medical effect according to the modern Western bioscience. Synonyms (both Arabic and Latin) have been collected and counted as one, as have been plant drugs that can be identified as members of the same genus although their synonymy is not explicitly stated in the texts themselves. In the final evaluation, a plant is considered efficacious if any of its possible identifications produces the sought-after effect. This final degree of efficacy is marked in bold, underlined symbols in Column #1 on the side of the English identification of the drug.

Again, we will consider the following aspects:[124]

1. Relationship between the most preferred drugs of Ibn Sīnā and their medical efficacy.
2. Relationship between the most preferred drugs of the commentators and their medical efficacy.

[124] Compare to Ch. 5.4, above.

3. Relationship between the continuous popularity of a drug and its medical efficacy.
4. Relationship between the status of the drug as an innovation and its medical efficacy.
5. Relationship between the number of recommended qualities in a drug and its medical efficacy.

Of all the plant drugs recommended by Ibn Sīnā or any of the commentators (82), 84 % (69) are efficacious against cough according to modern Western biomedicine. An additional 7 % (6) have chemical compounds that may cause the drug to be effective. The rest, 9 % (7), either has not been studied or has been proven to be ineffective against cough.

1. *Relationship between the Most Preferred Drugs of Ibn Sīnā and their Medical Efficacy*

Of the drugs recommended by Ibn Sīnā for cough therapy, our criteria[125] allow us to evaluate the efficacy of 58 simple drugs. Of these, 50 (86 %) are effective according to the evaluation in Appendix 38. In addition, 3 (5 %) contain chemicals that produce some of the medical effects needed against cough; however, their amounts are unknown, and the drugs themselves have not been defined as having those medicinal qualities. Meanwhile, 5 (9 %) are ineffectual against cough according to present levels of information.

Table 6.17. Plant Drugs: Number of Recommendations by Ibn Sīnā *vs*. Medical Efficacy.[126]

	10 ≤ app	8 ≤ app	7 ≤ app	6 ≤ app	5 ≤ app	4 ≤ app	3 ≤ app	2 ≤ app	All app	1 app
++	**100 %** (2)	**100 %** (5)	**100 %** (7)	**100 %** (12)	**100 %** (15)	**94 %** (17)	**95 %** (19)	**85 %** (29)	**86 %** (50)	**88 %** (21)
+	0 %	0 %	0 %	0 %	0 %	0 %	0 %	3 % (1)	5 % (3)	8 % (2)
—	0 %	0 %	0 %	0 %	0 %	6 % (1)	5 % (1)	12 % (4)	9 % (5)	4 % (1)
# plants	2	5	7	12	15	18	20	34	58	24

125 See pp. 116–117, above.

126 ++ = efficacious; + = contains a potentially efficacious chemical; — = non-efficacious; # plants = number of plants in the column; app = appearances; ≤ as much or more. Percentages over 84 % (the percentage of the efficacious drugs in the whole sample of drugs recommended either by Ibn Sīnā or by the commentators) are in bold letters.

Of the drugs Ibn Sīnā recommends five times or more (17), fifteen are plant drugs with a clear botanical definition.[127] These are all efficacious against cough. For plant drugs recommended three times or more (twenty), the percentage of efficacious drugs remains at about 95 %, dropping to 85 % for any drug recommended more than once and to 88 % for drugs mentioned only once.

Thus, there is a clear correlation between Ibn Sīnā's preference for a plant drug and its medical efficacy from the point of view of Western bioscience. In addition, 86 % of all of his drug choices are evaluated as efficacious. It seems that the medical effect was a significant criterion for both his choice of drugs and his drug preferences.

2. *Relationship between the Most Preferred Drugs of the Commentators and their Medical Efficacy*

Table 6.18. Number of Efficacious Plant Drugs: Number of Recommendations by the Commentators *vs*. Medical Efficacy.[128]

	b.N.	J	sc	GF	JD
10 ≤ app	—	—	—	—	**100 %** (2/2)
9 ≤ app	—	—	—	—	**100 %** (5/5)
8 ≤ app	—	—	—	—	**100 %** (5/5)
7 ≤ app	—	—	—	—	**100 %** (6/6)
6 ≤ app	—	—	—	—	**86 %** (6/7)
5 ≤ app	**100 %** (2/2)	—	**100 %** (1/1)	—	**89 %** (8/9)
4 ≤ app	**100 %** (2/2)	**100 %** (1/1)	**100 %** (2/2)	—	**91 %** (10/11)
3 ≤ app	**100 %** (5/5)	**100 %** (2/2)	**100 %** (2/2)	**100 %** (5/5)	**92 %** (11/12)
2 ≤ app	**100 %** (8/8)	**100 %** (4/4)	**100 %** (4/4)	**100 %** (6/6)	83 % (15/18)
All app	**90 %** (19/21)	**92 %** (12/13)	83 % (15/18)	**100 %** (19/19)	**88 %** (37/42)
1 app	**85 %** (11/13)	**89 %** (8/9)	79 % (11/14)	**100 %** (13/13)	**92 %** (22/24)

The following results emerge:

1. All drugs mentioned at least twice by Ibn al-Nafīs, al-Jaghmīnī, the supracommentary and Gentile (eight, four, four, and six plants respectively, amounting to 12 altogether) are efficacious.

---

[127] The two others are honey and starch.

[128] b.N. = Ibn al-Nafīs, J = al-Jaghmīnī, sc = supracommentary, GF = Gentile da Foligno, JD = Jacques Despars (innovations only); app = number of appearances in the text; ≤ as much or more. Percentages over 84 % (the percentage of the efficacious drugs in the whole sample of drugs recommended either by Ibn Sīnā or by the commentators) are in bold letters. The percentage gives the amount of the plants evaluated as efficacious against cough, the number in brackets the number of efficacious plants / the number of all plants.

2. The efficacy rate of all drugs recommended by Gentile (100 %), al-Jaghmīnī (92 %) and Ibn al-Nafīs (90 %) is also high.
3. Despars' six most preferred drugs (mentioned at least seven times) are all effective against cough; the efficacy rate for drugs mentioned at least three times (twelve) remains high, around 90 %, but drops abruptly thereafter.
4. When comparing the efficacy rate of all the plant drugs recommended by Ibn Sīnā (86 %) with that of the drugs recommended by the commentaries, the drug choices of Gentile are clearly superior to Ibn Sīnā's, those of Ibn al-Nafīs, al-Jaghmīnī and Despars are in a slightly higher level than his, and those of the supracommentary in a slightly lower level.

From this we can conclude not only that the drug choices of the commentators were guided by the observable effect of the drugs, but also that their choices improved on those of Ibn Sīnā's, possibly suggesting a critical attitude towards the tradition.

3. *Relationship between the Continuous Popularity of a Drug and its Medical Efficacy*

Here, only those plants recommended in the commentaries which are already recommended by Ibn Sīnā are discussed.

Table 6.19. Ibn Sīnā's Plant Drugs: Number of Commentaries in which a Plant Drug Appears *vs*. its Medical Efficacy.[129]

	5 comm's	**4 ≤ comm's**	3 ≤ comm's	**2 ≤ comm's**	**1 ≤ comm's**	**Altogether**	**No comm's**
++	**100 %** (3)	**100 %** (6)	**100 %** (12)	**92 %** (23)	**90 %** (36)	**86 %** (50)	78 % (14)
+	0 %	0 %	0 %	0 %	2 % (1)	5 % (3)	11 % (2)
—	0 %	0 %	0 %	8 % (2)	8 % (3)	9 % (5)	11 % (2)
# plants	3	6	12	25	40	58	18

129 ++ = efficacious; + = contains a potentially efficacious chemical; — = non-efficacious; # plants = number of plants in the column; comm's = commentaries; ≤ as much or more. 'Altogether' includes drugs by Ibn Sīnā not recommended in the commentaries. Percentages over 84 % (the percentage of the efficacious drugs in the whole sample of drugs recommended either by Ibn Sīnā or by the commentators) are in bold letters.

The twelve plants that are recommended in three or more commentaries are clearly more effective than the average (84 %), reaching 100 % efficaciousness. In addition, a consistent parallel decline of estimated efficacy and number of mentions is evident: plants recommended in at least two commentaries have an efficacy rate of 92 % (23), and even plants chosen by only one commentator in addition to Ibn Sīnā have a corresponding rate of 90 %; by contrast, plants not recommended by any commentator have an efficacy rate of 78 %. Thus, historical continuity of the use of a particular plant against cough was clearly related to its observable effect. This can be seen as further proof of the commentators' critical attitude towards their tradition: without denying the possible effect of any of the drugs recommended by Ibn Sīnā, they preferred to choose the efficacious ones.

4. *Relationship between the Status of the Drug as an Innovation and its Medical Efficacy*

Table 6.20. Innovations of the Commentaries and their Medical Efficacy.[130]

	b.N.	**J**	**sc**	**GF**	**JD**
++	**86 %** (6)	67 % (2)	0 %	**100 %** (2)	**86 %** (12)
+	0 %	33 % (1)	0 %	0 %	14 % (2)
—	14 % (1)	0 %	100 % (1)	0 %	0 %
# of plants	7	3	1	2	14

Here, we will consider only those drugs recommended in the commentaries against cough that are not recommended by *K. al-Qānūn*. According to Western bioscience, al-Jaghmīnī's innovations (3) are somewhat less efficacious than the plants recommended by Ibn Sīnā. The author of the supracommentary has only one innovation, which is not known to be efficacious. On the other hand, Ibn al-Nafīs' and Jacques Despars' innovations approximate the efficacy rate of Ibn Sīnā's plant drugs, and Gentile's two new drugs are both efficacious. All this might point to a

[130] ++ = efficacious; + = contains a potentially efficacious chemical; — = non-efficacious; # of plants = number of plants in the column. b.N. = Ibn al-Nafīs, J = al-Jaghmīnī, sc = supracommentary, GF = Gentile da Foligno, JD = Jacques Despars; all = all the innovations of all the commentators. Percentages over 84 % (the percentage of the efficacious drugs in the whole sample of drugs recommended either by Ibn Sīnā or by the commentators) are in bold letters.

phenomenon partially observed above:[131] only some of the commentators' innovations were accepted and made part of the ongoing tradition, possibly—or at least partly—because of their lack of objective effect. The innovations suggested by the Arabic commentaries had possibly not yet passed the observation-based evaluation of the contemporary medical community which would choose the best of them for further use and transmission.

5. *Relationship between the Number of Recommended Qualities in a Drug and its Medical Efficacy*

In the following table, we will consider only those drugs mentioned by Ibn Sīnā.[132] Drugs that have not been described in Book II of *K. al-Qānūn* are omitted.[133]

Table 6.21. Relationship between the Number of Recommended Qualities in a Drug *vs.* its Efficacy.[134]

	10 q	**9 ≤ q**	**8 ≤ q**	**7 ≤ q**	**6 ≤ q**	**5 ≤ q**	**4 ≤ q**	**3 ≤ q**	**2 ≤ q**	**1 ≤ q**	**Altog**	**0 q**
++	**100 %** (1)	**100 %** (3)	**86 %** (6)	**83 %** (10)	**89 %** (16)	**83 %** (19)	**86 %** (30)	**86 %** (38)	**88 %** (45)	**89 %** (48)	**86 %** (49)	33 % (1)
+	0 %	0 %	0 %	0 %	0 %	0 %	3 % (1)	5 % (2)	4 % (2)	4 % (2)	5 % (3)	33 % (1)
—	0 %	0 %	14 % (1)	17 % (2)	11 % (2)	17 % (4)	11 % (4)	9 % (4)	8 % (4)	7 % (4)	9 % (5)	33 % (1)
# plants	1	3	7	12	18	23	35	44	51	54	57	3

Here, we can see that the correlation between the number of recommended qualities and the efficacy rate of the plant is far from clear. Of the plants that have nine or more recommended qualities (three), all are efficacious; of the plants that have no relevant therapeutic qualities (three), two are non-efficacious. The rest of the data does not form any clear pattern, the efficacy rate of the different groups fluctuating randomly between 83 % and 89 %.

---

131 See pp. 180–181, 219–220, above.
132 See p. 181, above.
133 The following drugs were not described in Book II of *K. al-Qānūn*: basil (*ḥabaq*), cucumber (*qathad*), cucumber (*khiyār*), and plant mucilages.
134 ++ = efficacious; + = contains a potentially efficacious chemical; — = non-efficacious; q = number of qualities; # of plants = number of plants in the column; ≤ as much or more. 'Altog(ether)' includes drugs having no suitable qualities. Percentages over 84 % (the percentage of the efficacious drugs in the whole sample of drugs recommended either by Ibn Sīnā or by the commentators) are in bold letters.

In conclusion, the following results emerge:

1. Ibn Sīnā's plant drug choices are largely congruent with observable phenomena, as 86 % of all the plant drugs he mentions are efficacious against cough. In addition (as in the case of nosebleed), his most preferred drugs (those appearing in three or more prescriptions) are more efficacious than drugs he mentions less frequently.
2. When comparing the efficacy rate of all plant drugs Ibn Sīnā recommends against cough (86 %) with the corresponding rates of drugs recommended in the commentaries, the drug choices of all commentators except the supracommentary (especially Gentile's) are superior to Ibn Sīnā's.
3. Plants that are recommended in three or more commentaries (twelve plants, or 100 %) are clearly more effective than the average (84 %), and have a much higher rate of probable effectiveness than those not mentioned by the commentaries at all (78 %). Also, a consistent parallel decrease of estimated efficacy and number of recommendations is evident: plants mentioned at least twice have an efficacy rate of 92 % (23), and even plants chosen by only one commentator in addition to Ibn Sīnā have a corresponding rate of 90 %. By contrast, plants not recommended by any commentator have an efficacy rate of merely 78 %.
4. Only an insignificant correlation exists between the number of recommended medical qualities in a plant drug and its medical efficacy as evaluated by modern Western bioscience.
5. The innovations of the commentators show as a group a degree of medical efficacy (as evaluated by Western bioscience) close to that of all other plant drugs mentioned for the treatment of cough, that is, all those that are not innovations of the commentators but are recommended by Ibn Sīnā as well. The correlation between the plant's status as an innovation and efficacy does not, however, form any clear pattern but differs from commentator to commentator.

Thus, the efficacy levels both of drugs recommended by Ibn Sīnā and of drugs recommended by his commentators are high: 86 % of Ibn Sīnā's drugs and 84 % of all drugs mentioned either by him or the commentators are efficacious. The pattern that emerges is very similar to that suggested by our study of nosebleed: both Ibn Sīnā's and commentators' drug preferences correlate with the drug's efficacy; plants appearing in several commentaries (i.e. accepted as part of the tradition) are more efficacious than those not recommended in the commentaries; innovations are less surely effective than Ibn Sīnā's choices. The plant drugs chosen for the treatment of nosebleed and cough together testify to the critical observation of therapeutic effects by medieval doctors, which enables us to trust their preferences in our search for new leads for pharmacological research. In the next chapter, we will test this hypothesis further through the study of diabetes in *K. al-Qānūn* and its commentaries.

CHAPTER SEVEN

DIABETES[1]

Diabetes[2] is one of the most striking examples in Arabic medical literature of an illness whose description is quite accurate (even if sometimes partially deficient from our point of view),[3] while its etiology is explained in a way which misses the disease's true origin. This inability to determine the ailment's cause stems from the necessity to base an understanding of diabetes on mere observation of the physical symptoms, i.e., by tracing the cause and the primary physiological origin of the disease to the place where the physical symptoms can be seen. In the case of diabetes, the visible symptom, polyuria, caused the doctors to connect the illness with a deficiency or error in the function of the kidneys.[4] Of course, the true cause of *diabetes mellitus*, deficient insulin production in the pancreas, could not have been realized at that time. We chose diabetes for research because it is an extreme example of a much more general problem in evaluating and applying ancient and medieval medical literature: if the theory behind the treatment is not even approximately consistent with the physical reality as we see it, can we maintain the tenets of the treatment as criteria for the evaluation of the medical effectiveness of the chemical constituents of the drugs purported to treat the disease? In the preceding chapters, we endeavored to answer the preliminary question of whether a treatment can be effective despite the inadequacy of the theory

[1] Translations of the Arabic and Latin quotations in chapter 7 and the related tables are the author's, if not otherwise indicated. Bracketed [ ] material in the translation indicates additions made to the English text for the purpose of intelligibility.

[2] I use in continuation the word 'diabetes' about the group of symptoms called by the Arabic authors *diyānīṭas* for simplicity's sake, fully realizing that our categorization does not correspond exactly with the Arabic one.

[3] In opposition to the commonly accepted opinion, the Arabic medical literature did not evidence cognizance of the sweet taste of the urine of diabetes patients. See Thies, 1971, pp. 27–41.

[4] This would of course have been accurate in the case of *diabetes insipidus*. It is, however, at least in modern times much rarer than *diabetes mellitus*. In addition, the therapy seems to indicate that the type of diabetes intended here would in most cases have been *diabetes mellitus*, as the plant drugs used are to a great extent hypoglycemic. See Appendix 53.

on which it is based. The question is, of course, more quantitative than qualitative, since according to the strictest criteria one might say that Ibn Sīnā's etiological explanations are never exact.

There are two types of diabetes: *diabetes insipidus* and *diabetes mellitus*. *Diabetes insipidus* is a pathological endocrine condition with extreme thirst and excessive urination, caused by lack of antidiuretic hormone. It is relatively rare.[5]

Diabetes mellitus is a disorder of carbohydrate metabolism caused by insufficient production of insulin or reduced sensitivity to it. The main symptoms are thirst, increased urine, weight loss, weakness and itching. Hyperglycemia and glycosuria are typical manifestations, and hyperglycemia on its part causes many of the diabetic complications, most serious of which are cardiovascular problems, diabetic retinopathy[6] and susceptibility to infection. Untreated diabetes leads quickly to death through diabetic coma, whereas treated diabetes may still shorten the life of its victim through diabetic complications.

The main purpose of therapy is to keep the level of the blood sugar as even as possible, both via insulin and through a diet that may include oral hypoglycemic drugs.[7]

The identification of the disease as *diabetes mellitus* based on the description in *K. al-Qānūn* (especially in the list of symptoms such as continuous thirst, polyuria and weight loss) seems in most cases beyond any reasonable doubt.[8] Modern research has identified new symptoms and discovered the correct etiology, but it has not cast doubt on the diagnosis of earlier cases of the disease, not even in the early Greek descriptions upon which Ibn Sīnā's work was ultimately based.[9]

---

[5] For a thorough description, see *The Merck Manual of Diagnosis and Therapy*. Sec. 2, Ch. 7. Pituitary Disorders. ⟨http://www.merck.com/pubs/mmanual/section2/chapter7/7c.htm#A002-007-0108⟩.

[6] Al-Rāzī seems to have recognized the connection between diabetes and eye problems. See Álvarez-Millán, 2000, pp. 298, 301.

[7] *The Merck Manual of Diagnosis and Therapy*. Sec. 2, Ch. 13, Disorders of Carbohydrate Metabolism. ⟨http://www.merck.com/pubs/mmanual/section2/chapter13/13a.htm⟩.

[8] See the description of symptoms in pp. 287–288. This is so even when one does not agree with the extreme claims of the historians of medicine, according to whom Ibn Sīnā recognized, in addition to the sweet taste of the urine of the patients, also their irregular appetite, loss of sexual function and the gangrene often caused by the disease. These claims are based on the paraphrase of the relevant part of *K. al-Qānūn* written by Dr Dinguizli, quoted through Robin, 1913. Cf. p. 283, n. 3, above; Thies, 1971, pp. 27–41.

[9] For ex. Aretaeus' description of diabetes, in Major, 1959, pp. 236–237.

7.1. *Diabetes in* Kitāb al-Qānūn

7.1.1. *General Presentation*[10]

Diabetes is described in *Maqāla* 2 of *Fann* 19 of Book III of *K. al-Qānūn*: "About Things that Happen in Connection with the Urine", where it is discussed in the following six different *Faṣla*s: "On Diabetes", "On Treatments", "On Poultices", "On Liniments", "Prescription for Clysters" and "On their Food". Thus, diabetes is listed among illnesses of the urinary tract, preceded by urinary incontinence and bed-wetting, and followed by polyuria. The description is 14 lines long, including first the definition of diabetes, then its different names in Greek and Arabic,[11] its causes and pathological mechanism, and finally its consequences. The description of the recommended treatment spans two pages, containing 24 prescriptions.

The term used by Ibn Sīnā for diabetes, *diyānīṭas*, is a loan word from the Greek *diabetes*.[12] Both his pathology and therapeutic recommendations are also strongly based on his Greek predecessors.[13] Ibn Sīnā defines diabetes in the following way: "Diabetes is [a disease in which] the water exits [from the body] as it was drunk, in a short time."[14]

He explains the different names of the disease, most of which describe the continuous flow of water through the patient, and then adds a short description of the symptoms:

> One [suffering from] it is thirsty and drinks, but [is not able to] quench his thirst, but urinates [the same amount] as he drank, incapable of retention at all.[15]

Since, according to Ibn Sīnā, diabetes was a disease of the kidney, one might wonder why it was classed together with types of polyuria instead of being placed in the 18th *Fann* with other kidney diseases such as coldness of the kidney and kidney stones. The most plausible explanation seems to be the practical attitude of *K. al-Qānūn* towards healing. The work's characteristic style is that of a handbook for the practicing physician whose level of theoretical expertise did not necessarily reach the

---

[10] See Ch. 5.1.1, above.

[11] For a comprehensive discussion about the subject, see Thies, 1971, pp. 53–73.

[12] Liddell and Scott, 1977. The change from b to n is caused by a change in the diacritic points.

[13] See Thies, 1971, *passim*.

[14] *K. al-Qānūn*, Vol. 2, p. 526.

[15] *Ibid*.

level of his practical skills (nor the level of skills expected from him). The 18th *Fann* presents the medical states that may cause diabetes, such as weakness of the kidney, along with etiological explanations and suitable treatments. Not being fully aware of the disease's assumed etiology, the practicing physician, however, might not have searched for information on diabetes in that part of the *K. al-Qānūn*. Thus, the disease was categorized according to its most readily observable symptoms, and the appropriate treatment was described, replete with its theoretical basis as well as practical medical formulas, etc.

7.1.2. *Diabetes: Causes*[16]

According to Ibn Sīnā, diabetes is caused by a malfunction of the kidneys, namely weakness or an excessive attraction of moisture. Weakness of the kidneys is supposedly caused by coldness dominating either the whole body or the liver, or, according to another version, the kidney itself (which would seem more logical).[17, 18] This weakness causes the apertures of the channels of kidney to expand and open, lacking the strength to contract, thereby hindering the retention of moisture inside the kidney for a sufficient period for the body to absorb it, as it needs to do.

The other main cause of diabetes, in Ibn Sīnā's writings, is excessive attraction of moisture to the kidneys, assumed to be caused by a hot, unnatural force in the kidneys, material or non-material,[19] or—as he also says (though without specific mention of the kidneys)—'fiery heat'.[20] Ibn Sīnā explains the process vividly: Since the liver is the organ that immediately precedes the kidneys in the digestive tract, the kidney pulls mois-

[16] For methodology, see Ch. 5.1.2, above. In the following chapters, I have numbered the items for clarity's sake. Unless otherwise indicated, the numbers do not appear in the original. Comments to Ibn Sīnā's description of diabetes and its treatment in the footnotes in Chapters 7.1.2, 7.1.3, 7.1.4, 7.1.5.1 and 7.1.5.2 are my interpretation based on the medieval medical theory as it appears in *K. al-Qānūn*.

[17] Here the intention is both for the external physical coldness, as when drinking cold water, and the coldness connected to the Galenic humoral theory. In Ibn Sīnā's thinking, however, these two would hardly be separate. The fact that kidney is naturally warm (Gruner, 1930, p. 66) would make the situation still more serious.

[18] A textual variant in our text is 'retention of urine', *ḥaṣr*, instead of which both the context and the Latin translation seem to prefer 'strong suffering from cold', *khaḍr*. This condition would again be brought about by biting cold.

[19] *I.e.*, force that is due solely to an imbalance in the complexion of the patient, with no material cause.

[20] By nature, heat attracts humors. See Gruner, 1930, p. 142.

ture from the liver, thereby forcing the liver to draw moisture from the organs preceding it. At the same time, the kidney naturally has to push the surplus moisture forward, since it attracts much more moisture than it can maximally retain. This fluid, when pushed onwards forcefully, creates a vacuum, which again causes attraction, and so forth. The problem therefore takes the form of a vicious cycle.

7.1.3. *Diabetes: Symptoms*[21]

As already mentioned, the most basic description of diabetes is that it is a disease in which the amount and quality of urine are equal to the amount of water drunk, since the body cannot retain the water long enough to absorb it. This continuous cycle of drinking and urinating has given rise to several descriptive Arabic names for the disease: in addition to the original Greek, *diabetes*, it is also called *dūlāb*, 'water-wheel'; 'slipperiness of the kidney'; 'slipperiness of the passage'; and 'crossing'. All of these suggest either the speed of the water quitting the body or the cycle of drinking and urinating.

The two main symptoms of diabetes in *K. al-Qānūn* are thus excessive urinating and thirst.[22] The patient feels thirst and drinks, but is unable to quench his thirst because all the water drunk is discharged in the urine; this, in turn, is caused by the patient's inability to contract the channels of the kidney and thereby retain the water long enough to absorb it into the body. At the same time, the hot, unnatural[23] power operating in the kidney forcefully attracts water from the liver, thus forcing the liver to attract water from the preceding organs in the alimentary system and finally from the mouth; this causes both more thirst and more urinating, since the kidney is incapable of holding any of this water it attracts. The cycle is reinforced by the fact that the forceful propulsion of fluid (e.g. from the kidney, when the kidney cannot hold it) creates a vacuum which again causes the attraction of moisture.

Ibn Sīnā claims that this attraction of moisture has other untoward effects in addition to thirst. As it causes a premature discharge of moisture from the body, it deprives the body of the remainder of the water taken in by drinking. In addition, the patient usually suffers from a tendency to

---

[21] For methodology, see Ch. 5.1.3, above.
[22] *K. al-Qānūn*, Vol. 2, p. 526.
[23] *quwwa hārra ghayr ṭabīʿiyya. Ibid.*, p. 527.

constipation ("... most of them are dry of nature ..."), which, according to Ibn Sīnā, is a natural consequence e.g. of diuretics, the removal of much moisture from the body.

The connection of these symptoms with the causes mentioned in Chapter 7.1.2 is clear, as seen in Figure 7.1:

Figure 7.1 Causes of Diabetes → Symptoms of Diabetes

Coldness overpowering the whole body or the liver/kidneys[24]
→ weakness of kidney
  → apertures of the channels in kidney expand and open without contracting
    → moisture is not retained inside the kidney long enough
      → excessive flow of urine
        (→ constipation)

Hot, unnatural force in the kidneys[25]
→ strong attraction of water to the kidney
  → The kidney keeps attracting too much moisture from the liver. Unable to tolerate all of this moisture, the kidney pushes it onward to the next organ in the digestive cycle, and then attracts more moisture from the liver, forcing the liver to attract moisture from preceding organs in the cycle
    → excessive flow of urine
      (→ constipation)
      → thirst

Ibn Sīnā explained that the inability of the kidneys to retain water would further a quick discharge and therefore an increase in the flow of urine. Furthermore, the active propulsive force with which the kidney expels the excess of moisture that it attracts through its heat perpetuates the excessive flow of urine. This operation also causes thirst, since the chain of moisture attraction eventually affects the mouth. The body is not able to absorb the moisture it needs, and the need for moisture (i.e. water) is felt more and more strongly. It is interesting, however, that Ibn Sīnā notes specifically that thirst is also felt in diabetes caused by coldness, but that this thirst is less; this is logical considering that diabetes caused by coldness involves no force attracting the moisture but only a weakness of the body's retentive faculty; therefore, the lack of moisture is less dramatic.

[24] The Arabic text has 'liver', Latin 'kidneys,' which seems more natural in this context.
[25] Kidneys are naturally warm. See Gruner, 1930, p. 66.

7.1.4. *Diabetes: Consequences*[26]

Ibn Sīnā calls diabetes a malicious disease,[27] arguing that it can lead to consuming fever[28] and emaciation[29] by attracting moisture from the body and depriving the body of the moisture ordinarily remaining in it after drinking.

7.1.5. *Diabetes: Treatment*

7.1.5.1. Treatment, Theory[30]

Next, we will look at Ibn Sīnā's therapeutic advice, considering first its theoretical side, i.e., the kind of qualities a medication should have in order to be helpful. For an overview, the reader is referred to Table 7.1, *Medical Qualities Recommended for Diabetes by Ibn Sīnā*, in Appendix 39, which lists on the right-hand side Ibn Sīnā's exact recommendation and on the left side the necessary quality in a more abstract form, with code letters to be used later in the study.[31]

The connection between causes and symptoms of the disease and Ibn Sīnā's therapeutic recommendations can be seen from Figure 7.2.

Ibn Sīnā's therapy for diabetes is largely aimed at fighting what he sees as the main external causes for the weakness of the patient's kidneys and the kidneys' propensity to draw water to themselves, that is, heat and coldness.[32] As the excessive attraction of water to the kidneys is caused by a hot force in the kidneys, it is natural that the treatment should cool the body, and particularly the kidneys. If a particularly strong attack on the hot attractive force in the kidneys is necessary, it is expedient to anesthetize the lower back in order to disable the kidneys' ability to

---

[26] For methodology, see Ch. 5.1.4, above.

[27] Omitted in the Latin translation.

[28] Consuming fever is a less obvious result of diabetes, except that it is an essentially dry disease and may therefore be precipitated by the dryness of the body.

[29] Emaciation seems to be the logical consequence of malnourishment, caused by the inability of the body to retain moisture long enough to get from it what it needs.

[30] For general principles, see Chapter 5.1.5.1, above.

[31] In Chapters 7.1.5.4, 7.2.5.1 and 7.2.5.3, below.

[32] The differential diagnostics between hot and cold diabetes are not very clearly given in *K. al-Qānūn*. It seems that the physician would be obliged to use also his general knowledge of the patient in order to be able to determine the cause from the symptoms. On the other hand, as most of the cases in general were caused by heat, in an unclear case the physician could have tried the therapy for this type of diabetes quite safely.

attract water.[33] Another option suggested by Ibn Sīnā is to counteract the kidneys' ability to attract water by diverting the moisture attracted to or already in the kidney by making the patient vomit and perspire.

Figure 7.2 Connection between the Causes and the Symptoms of Diabetes to the Therapy

Coldness overpowering the whole body or the liver/kidneys[34]
→ hot + warming drugs
→ rubefacient
→ apertures of the channels of kidney expand and open without contracting
→ astringency
→ weakness of kidney
→ strengthening

Hot, unnatural force in the kidneys
→ cold + cooling
→ cooling the kidney
→ anesthetizing (the lower back)[35]
→ numbing [and thereby disabling] the kidney's faculty to attract water
→ strong attraction of water to kidney
→ causing perspiration
→ emetics

Thirst
→ against thirst
→ moistening (+ moist)
→ rarefying
→ soporific

Tendency to develop constipation
→ laxatives

Diabetes caused by coldness, which results in the weakening of the kidney and of its ability to retain moisture, is counteracted by hot drugs or drugs that warm the patient's body, as well as rubefacient drugs.[36]

[33] As anesthetizing drugs are cold *per se*, there is no contradiction between these qualities, but rather by its very nature a medication that is cold enough would cause anesthetization.

[34] See p. 288, n. 24, above.

[35] Anesthetic drugs are by definition cold (see pp. 135–136, n. 52, above) and therefore help in cases of excessive heat. At the same time they nullify the kidney's ability to attract water. Thus these drugs work against the "hot, unnatural force" on two different levels.

[36] The use of rubefacients supposedly warms the body from the outside.

Alternately, the doctor may decide to treat the secondary cause with astringent drugs, useful in constricting the channels of the kidney and supporting moisture retention, or by strengthening drugs, countering the weakness of the kidney.

Now let's look at the alleviation of symptoms. In order to assuage the patient's thirst, Ibn Sīnā recommends moistening drugs and, for nutrition, rarefying kinds of food. Moistening drugs also counter the loss of moisture that the entire body suffers through the insufficient absorption of water.[37] Sleep, too, alleviates thirst. Finally, purgation or at least the administration of laxatives counters the dry nature of many patients, i.e. their tendency to constipation.

In addition, the patient should avoid diuretics, certain types of food, and fatiguing of the back.[38] Diuretics may make the ailment worse by adding to the excessive flow of urine. Foods that evaporate and dissolve—causing, because of their rarefied nature and sparseness, any residue to dry up—are not recommended by Ibn Sīnā, since the patient already suffers from a tendency to have constipation.[39] The reason for the warning against types of food that quickly transform into a bilious substance because of their rarefied nature is less obvious.[40]

So far, then, we can see that the causes of diabetes that Ibn Sīnā assumed did lead logically to its symptoms, and that his therapeutic theory is designed to combat these causes and symptoms. Very noteworthy here is Ibn Sīnā's wish to attack the causes in order to heal the disease, instead of concentrating on alleviating the symptoms.

7.1.5.2. Physical Therapies[41]

Among the physical therapies Ibn Sīnā proposes, resting in a cold, moist climate or sitting in a cold bathtub are recommended for diabetes caused by fiery heat. This extreme cooling should according to him cause the

---

[37] They can thus possibly prevent certain complications of the disease.

[38] The reason for the warning against exhaustion of the back is not quite clear, but may be connected with weakness of the kidney as a cause for diabetes.

[39] See pp. 287–288, above.

[40] Perhaps the bile, which is by nature hot (see p. 43, above), would increase the heat of the kidneys (although of course in that case it would help against diabetes caused by coldness that overpowers the whole body or the liver/kidney; see pp. 286, 288, above.)

[41] See Ch. 5.1.5.2, above.

patient's thirst to subside, his kidney to cool and his muscle[42] to become stronger.[43] Sometimes venesection is recommended at the beginning of diabetes.

For diabetes caused by coldness, Ibn Sīnā (while admitting to not having seen it himself) quotes a complex treatment prescribed by "an ancient learned man"[44] which entails several days of purgation and instigation to vomit and, subsequently, warming of the patient's body through the application of cupping glasses,[45] hot compresses, and fumigations, especially on his extremities. Then, after a rest of some days from these strenuous treatments, the therapy prescribes physical exercise by moderate riding[46] and moderate rubbing, especially of the extremities, and the use of hot baths. The main intent is to warm the patient in order to combat the original cause of the disease.

7.1.5.3. Treatment, Practice

Prescriptions[47]

Ibn Sīnā lists the following 22 prescriptions for diabetes:

Prescription #1

Diabetes due to fiery heat (a cooling, moistening treatment):

lettuce
poppy
other cold herbs and fruit[48] and robs[49] that do not cause [the urine] to flow

[42] Ibn Sīnā does not explain this any further.

[43] Thus, the therapy would have both an immediate effect on the symptoms and a more basic effect on the primary cause of the disease.

[44] See Prescription #22, p. 298, below.

[45] One of the purposes of cupping is to render a member warm, drawing blood into it. See Gruner, 1930, p. 511.

[46] Equestrian or other.

[47] The prescriptions are numbered for the comfort of the reader. Concerning general principles of presenting the prescriptions, see Ch. 5.1.5.3. For the English names of the drugs, see p. 111 and Ch. 5.1.5.3, above. An asterisk after the list of ingredients indicates the method of application of the drug. The drug names connected with 'OR' are alternative choices for the same prescription.

[48] This is an interesting allowance, as in general Arabic physicians tended to be suspicious of fresh fruit. See Kuhne Brabant, 2002, esp. pp. 322–323/169–170, according to whom fruit were considered essentially as medicaments.

[49] See p. 245, n. 64, above.

Prescription #2

Diabetes due to fiery heat (a cooling, moistening treatment):

camphor
water lily
similar cold aromatic plants
*to be sniffed

Prescription #3

sour, cooled whey,[50] esp. the one made of the milk of ewes
*drink

The more inspissated the whey is, the better.

Prescription #4

water of roasted pumpkin
*drink

Prescription #5

juice of cucumber
fleawort
*drink

Prescription #6

water of sour pomegranate
*drink

Prescription #7

water of mulberry
*drink

Prescription #8

water of plum
other similar drugs (as in Prescriptions #3-#8)
*drinks

Regarding Prescriptions #3-#8: These drinks, and drinks like these, should be drunk without water as the patient would drink water, according to his ability.

[50] On the preparation of whey, see Kahl, 2007, pp. 250–251, Prescription #226.

Prescription #9

mint rob
*drink

Prescription #10

Useful for the patients and to alleviate their thirst:

rose water OR pressed juice of rose
*drink
*dose 2 cotulas[51]

The drug is to be given at the appropriate time.

Prescription #11

Useful for the patients and to alleviate for their thirst:

water filtered from the sour whey of cows or the sour whey of ewes
*drink

Prescription #12[52]

eggs
vinegar
*drink

The eggs are macerated in vinegar for a day and a night, and then drunk.

Prescription #13

barley flour
filtered water of sour whey
*made to a brew (*fuqqāʿ*)[53]

Barley flour and the filtered water of sour whey are brewed after the curdling of the whey. The brewing process is repeated several times, and [also] its filtration. Every time this is repeated, the drug gets colder. It is drunk cooled.[54]

---

[51] In the Latin translation: *& dosis quantitas cotile vnius lactis* (thus *lactis* seems to have been added as an ingredient).

[52] This prescription does not exist in the Latin translation.

[53] *fuqqāʿ* = drink made out of barley (similar to beer) (Lev and Amar, 2008, p. 571). According to Waines, *fuqqāʿ* (a kind of barley beer) could be made in different variations: by mixing into the basic barley ingredients such as wheat, rice or walnuts, or sweetening the barley with honey and spicing it with pepper, cloves, ginger, cinnamon and rue. The mixture was left to ferment for two days in a skin container. See Waines, 1989, p. 26.

[54] The explanation of the method of preparing *alfoca* is missing from the Latin translation: *Et de illis que nos experti sumus ad eos est vt sumatur alfoca de farina hordei: & quotiens conturbatur est magis frigidum: quare bibatur infrigidatum.*

Prescription #14

Lozenges of pomegranate flowers

acacia
rose
pomegranate flower
gum
tragacanth
*lozenges

It is taken with

mucilage of fleawort
cold water OR water of pumpkin OR water of cucumber OR water of pomegranate[55]

Prescription #15

Tabasheer lozenges

They are drunk with

water of pumpkin OR water of cucumber OR water of pomegranate.

Prescription #16

Tabasheer
terra sigillata
burned, washed river crab
lac
poppy seed
lettuce seed
mucilage of fleawort
*lozenges

The other ingredients are collected in the mucilage of fleawort and made into lozenges.

[55] The phrase, "or the cucumber, or with the water of pomegranate" is missing from the Latin translation.

Prescription #17

A cooling and strengthening dressing.

gruel
shoots of vine
fresh rose
rhubarb
green, unripe grapes
knotgrass
peels of pomegranate

Added, if they can be obtained:[56]

flowers of quince
flowers of apple
flowers of medlar[57]
*apply as dressing

All the ingredients are mixed to form a dressing.

Prescription #18

acacia
frankincense
juice of salsify
ladanum
rāmik[58]
gallnut
water of fresh myrtle
*liniment

The other ingredients are powdered and kneaded with the water of myrtle.

---

[56] That is, the basic formula is effective even without them, but will be improved by the addition of them. Flowers were naturally not to be had out of the season.
[57] In the Latin translation *oleo* instead of 'flowers'.
[58] Astringent medicine. See Appendix 40.

Prescription #19

Excellent clyster, effective for this disease:

whey
cold, astringent juices mentioned for the dressings:[59]
[gruel
shoots of vine
fresh rose[60]
rhubarb
green, unripe grapes
knotgrass
peels of pomegranate
flowers of quince
flowers of apple
flowers of medlar]
*clyster

Prescription #20

fresh milk[61]
oil of pumpkin
oil of almond

With these, clysters are given.

Prescription #21

Suitable nourishment:

broth[62] of barley[63]
barley water[64]
maṣūṣāt[65]
halāmāt[66]

In addition, ingredients are added that counter the above dishes' effect of "arresting the nature".[67]

---

59 See p. 296, Prescription #17, above. The following list is taken from there.

60 In the Latin translation, *sulla*.

61 In Arabic *ḥalīb*. The Latin translator read the Arabic original as *ḥulb(a)*, translating it *fenugrecum*.

62 *ḥasā'*. Lev and Amar, 2008, p. 571: *ḥasw*, *ḥasā'* = soup, porridge.

63 *khandarūs*.

64 Or pounded barley, *ma' kashk al- sha'īr*. *Kashk* can also be a dough made of bulghur and sour milk. See Dols, 1984, p. 132, n. 16.

65 A meat dish.

66 A meat dish. For a recipe for a *halām*, see Waines, 1989, p. 20.

67 *I.e.*, their constipative effect.

[Other suitable nourishment:]

meat soups (*isfīdbājāt*),[68] made with the meat of young lamb
fattened chicken
cow trotters
fresh fish, made sour and not made sour
milk of ewes

The milk should be cooked in water until the water and some of the milk disappear.

Prescription #22 – Step a

For diabetes occurring because of coldness:[69]

aloe tablets

*This is a prescription from one of the ancient learned men.

First it is necessary to treat the patient gently in order to alleviate his thirst, then he is purged with soft clysters several times and then purged with aloe tablets. Then the patient is allowed to recover for three days, after which the treatment is repeated.

Prescription #22 – Step b

Continuation of Prescription #22, Step a:

radish
other similar drugs

After the treatment prescribed in Prescription #22, Step a, radishes are used to make the patient vomit after his meals.

Prescription #22 – Step c

Continuation of Prescription #22, Step b:

aromatic wine

To be given to drink at the end of the treatment.

Simple Drugs Used[70]
For the identification of the drugs appearing in the above prescriptions, see Appendix 40, Table 7.2a.

---

[68] See p. 239, n. 48, above.
[69] Prescriptions #22 – Step a, #22 – Step b, and #22 – Step c are different stages of the same treatment.
[70] See Ch. 5.1.5.3, above, for the general principles.

Table 7.3a in Appendix 41 shows the frequency with which these simple drugs are used in the above prescriptions. The number of appearances of the drugs in the prescriptions is arrived at by considering every prescription in which a drug appears once as one appearance. However, if a drug appears twice in the same prescription or appears in two immediately successive prescriptions, where the second merely gives additional ingredients to the first, they are counted as appearing only once. On the other hand, we have treated the two appearances of the same list of drugs, first as a dressing and after that as a clyster, (Prescriptions #17 and #19, respectively) as two separate cases, because it seems that the efficacy of the drugs caused them to be mentioned twice.

These rates of appearance will be relevant when choosing the most suitable material for the next steps of the research.

As we can see, Ibn Sīnā's preferred drug is pomegranate, mentioned five times. Next are grapevine, pumpkin, rose and whey with four appearances, and cucumber and fleawort with three appearances. Altogether, there are 83 different instances in which a simple drug or food item is mentioned, which means that the most popular, pomegranate, comprises 6 % or—if we count instead the number of prescriptions containing pomegranate—23 % of the total.[71] A clear indication of the importance of these seven most frequently mentioned drugs is the fact that they comprise a total of 33 % of all instances. If we count all the drugs that appear at least twice (a total of 53 instances), the figure rises to 64 %. From the point of view of our system, however, it seems more reasonable to consider only the seven most frequently mentioned drugs (14 % of the total number of drugs) as comprising the core group of Ibn Sīnā's simple drugs for diabetes, since otherwise the core group would include more than half of all drugs, as opposed to 15 % for nosebleed[72] and 9 % for cough.[73]

7.1.5.4. Relationship between the Drugs Recommended for Treatment and their Therapeutic Qualities[74]

The qualities discussed in this chapter are those listed by Ibn Sīnā as necessary for drugs used in the treatment of diabetes.[75] Here we also make

[71] For the problems involved in this method of counting, see pp. 139–140, 153, above.
[72] See pp. 153–154, above.
[73] See pp. 253–254, above.
[74] For the method used, see Chapter 5.1.5.4, above.
[75] See pp. 289–291, above.

an exception to the earlier noted principle of not including compound medications in the further stages of the study: brew and *rāmik*, which are mentioned as separate articles in Book II of *K. al-Qānūn*, are included in the following table not as mixtures of their ingredients but as single elements with separate, clear medicinal qualities.

Here, grapevine and the juice of unripe grapes, which were earlier lumped together, are treated separately, as they have separate descriptions in Book II of *K. al-Qānūn*.

The comparison between these recommended qualities and the descriptions of the drugs in Book II of *K. al-Qānūn* is presented in Table 7.4a, *Medical Qualities in Ibn Sīnā's Drugs for Diabetes*, in Appendix 42. Out of the 45 drugs examined, we reached the results given in Appendix 42, Table 7.4b, concerning the frequency of their different therapeutic qualities. There is no need for further combination of the qualities, as they do not seem to have any relevant overlapping areas.[76]

The qualities appearing most often in the drugs recommended by Ibn Sīnā against diabetes are therefore the following (each quality is preceded by the two-letter code used for each therapeutic quality and the percentage of drugs having the quality in question):[77]

1. AA Astringent (56 %): Drugs with this quality counteract expansion and dilation of the apertures of the channels of kidney and assists in their contraction, enabling them to retain water longer.
2. II Laxative (42 %): Laxative drugs counteract the average patient's tendency toward dryness, which leads to constipation. Thus these drugs do not in fact alleviate the disease but one of its symptoms.
3. LL Strengthening (38 %): Drugs with this quality combat the weakness of the kidney that causes the insufficient contraction of the apertures in the channels of kidney, thus preventing water from remaining there long enough to be absorbed.
4. CC Cold + Cooling (27 %): Drugs with these qualities counteract the hot, unnatural force in the kidneys that attracts water to them.
5. EE Hotness + Warming the Body (24 %): Drugs with these qualities alleviate coldness that overpowers the whole body or the liver/kidneys[78] and causes the weakness of kidneys.

[76] Cf. to Chapters 5.1.5.4 and 6.1.5.4, above.
[77] I have numbered the items for clarity's sake. The following comments to Ibn Sīnā's description of drugs suitable for the treatment of diabetes are my interpretation based on the medieval medical theory as it appears in *K. al-Qānūn*.
[78] See p. 288, n. 24, above.

6. FF Rarefying (18 %): Drugs with this quality alleviate thirst.
7. GG Moistening + Moist (18 %): Drugs with these qualities alleviate thirst.

It appears that these therapeutic qualities were intended to both treat the primary underlying causes of the disease (CC + EE) and to alleviate the symptoms (II + FF + GG). Furthermore, they combat both diabetes caused by cold and diabetes caused by heat, although the therapy for diabetes caused by cold seems to take precedence (AA + LL + EE vs. CC).

Now, we will examine the relationship between Ibn Sīnā's drug preferences and the qualities of those drugs to see whether there is a correlation between, for example, the frequency of a certain drug in the prescriptions and the fact that it has several suitable qualities.[79] The material is presented in Table 7.5a, *The Connection between Ibn Sīnā's Frequency of Use of Drugs for Diabetes and their Qualities*, in Appendix 43, followed by Tables 7.5b and 7.5c showing the degree of this connection.

Drugs whose qualities are not given in Book II of *K. al-Qānūn* are not taken into account here.

Out of forty-five cases, pomegranate, the most preferred drug, appears five times and has four suitable medical qualities. Wine has the greatest number of qualities appearing in a single drug, namely six, but is mentioned only in one prescription. Each of Ibn Sīnā's seven most preferred drugs (mentioned by him in the context of diabetes three times of more) that has been described in Book II of *K. al-Qānūn* (altogether four) have at least two qualities suitable for the therapy, and 75 % of them have three qualities; even out of his top twenty (each mentioned at least twice), of which sixteen have been described in Book II of *K. al-Qānūn*, 88 % have at least two suitable qualities, and 63 % have three or more qualities. Let's compare these percentages with the corresponding totals of number of drugs recommended against diabetes (76 % with 2 ≤ qualities, 51 % with 3 ≤ qualities) or in drugs that appear only once (69 % and 45 %, respectively). From the results, it is obvious that the number of suitable qualities in a drug correlates directly with its popularity with Ibn Sīnā.

The same trend can be discerned, although with less clarity, in Table 7.5c, where we see that 38 % of the drugs with any medicinal qualities recommended against diabetes appear at least twice in the description of the practical therapy, whereas only 18 % of those with no or only one

[79] See pp. 154–159, above, for methodological details.

suitable quality are repeated. On the other hand, as long as a drug has at least one suitable quality, its number of qualities does not seem to influence its popularity.

Thus, it appears that the answer to the question posed earlier about the correlation between therapeutic theory and practice must again be answered in the affirmative. It is impossible to determine the direction of the correlation or influence, i.e. to assess whether drug qualities determine the choice of drugs or whether the drugs assumed these qualities after being chosen for such therapies. However, it is obvious (as it was in our parallel topical discussion of nosebleed and cough) that there is a correlation, and this correlation of the causes and manifestations of diabetes with therapeutic recommendations asserts the coherence of Ibn Sīnā's general account. Now, we will examine the development of this tendency in the later medieval therapeutic tradition.

7.2. *Diabetes in the Arabic and Latin Commentaries*[80]

7.2.1. *General Description*

Only the three commentaries by Ibn al-Nafīs, Gentile and Despars discuss diabetes; *Qānūnja* and its supracommentary pass it without mention. This omission seems strange, since both Ibn al-Nafīs and Despars write on the subject quite comprehensively, clearly considering it important.

Similarly to our procedure in the chapter on cough, we will discuss all three commentaries together.[81]

7.2.2, 7.2.3, 7.2.4. *Causes, Symptoms and Consequences of Diabetes in the Arabic and Latin Commentaries*[82]

In the following section, causes, symptoms and consequences of diabetes will appear in only tabular form, with no analysis. Instead, changes and additions made by the commentators and other potentially interesting details are marked with bold letters for the benefit of the reader. The

[80] For a general description of the Arabic and the Latin commentaries and their way of treating the material passed on by Ibn Sīnā, see Ch. 5.2.1 and Ch. 5.3.1, above.

[81] See Ch. 6.2.1, above.

[82] For methodology, see Chapters 5.2.2, 5.2.3, 5.2.4, 5.3.2, 5.3.3 and 5.3.4, above.

reason is that while these issues are not immediately relevant to the topic of the present research—the drug therapy—they are interesting and can, in some cases, throw light on changes in therapeutic choices, both theoretical and practical.[83]

For causes of diabetes, the reader is referred to Appendix 44, Table 7.6; for symptoms and different manifestations of diabetes, to Appendix 45, Table 7.7; and for the long-term consequences of the disease, to Appendix 46, Table 7.8.

As we can see, the changes in the description of diabetes by Ibn al-Nafīs and Jacques Despars are minimal. Consequently, the causes, symptoms and consequences of the disease correspond in a similar way in these two commentaries as they do in *K. al-Qānūn*. Gentile da Foligno omits the entire discussion: he clearly trusts Ibn Sīnā's description to be intelligible to the reader, and concentrates instead on the therapy.

In the following, we will examine how this general account, adopted from Ibn Sīnā, relates to the therapeutic theories of the commentators, and whether these theories introduce any changes.

7.2.5. *Treatment of Diabetes in the Arabic and Latin Commentaries*

7.2.5.1. Treatment, Theory, in the Arabic and Latin Commentaries[84]

We will begin the comparison between Ibn Sīnā's and the commentators' theories about therapy for diabetes with Table 7.9 (Appendix 47), which presents all the medical qualities considered relevant by any of them.[85]

Ibn al-Nafīs

In terms of therapeutic advice, Ibn al-Nafīs' list is much shorter than Ibn Sīnā's.[86] His only innovation is the prescription of the same therapy that is used for urinary incontinence—a logical suggestion if we remember that diabetes was considered a disease of the kidneys and that its main symptom was inordinate urination. We will, however, discuss only those therapeutic qualities recommended against urinary incontinence that

[83] See p. 4, above.

[84] See Chapters 5.2.5.1 and 5.3.5.1, above, for methodological details.

[85] I have numbered the items for clarity's sake. The following comments to commentators' descriptions of drugs suitable for the treatment of diabetes are my interpretation based on the medieval medical theory as it appears in *K. al-Qānūn*.

[86] *Mūjaz al-Qānūn*, pp. 246–247.

also appear in Ibn Sīnā's recommendations in *K. al-Qānūn*. Ibn al-Nafīs recommends the use of drugs with the following qualities:

1. Ibn al-Nafīs recommends all cold, astringent robs, fruit and medications for the treatment of diabetes. Ibn Sīnā also recommends astringent, cold juices, but only for diabetes caused by fiery heat.[87] In addition, Ibn al-Nafīs uses hot astringents for urinary incontinence caused by cold.[88]
2. The case of cooling drugs (in addition to the above-mentioned) is similar: Ibn al-Nafīs lists them, together with moistening drugs, as primary remedies against diabetes in general, while Ibn Sīnā recommends them against diabetes caused by fiery heat. Since diabetes is, according to Ibn al-Nafīs, partly caused by a hot force attracting moisture to the kidney, cooling medications are a logical remedy for it.
3. The combination of hot astringents (for urinary incontinence caused by cold, and thus also for diabetes) is an innovation. Ibn Sīnā recommends astringents (see point 1) for diabetes caused by fiery heat, and the warming of the patient's body with hot compresses and fumigations for diabetes caused by coldness, but does not combine the two qualities. Since, according to Ibn al-Nafīs, diabetes can be caused by coldness, this combination may also deal with the underlying causes.
4. The other main quality of drugs against diabetes is moistening. Ibn Sīnā recommends it against diabetes caused by fiery heat. Ibn al-Nafīs, however, seems to regard its effect as compensating for the loss incurred by the hot force attracting moisture to the kidney.[89]

On the other hand, Ibn al-Nafīs eliminates a number of qualities from Ibn Sīnā's list, as is evident by the following:

1. He does not recommend any medications that specifically aim to alleviate thirst (although he suggests that cooling and moistening, at least, might help). These eliminated treatments include anesthetizing the region of the lower back, numbing and therefore disabling

[87] By contrast, Ibn al-Nafīs intends all his diabetes therapies for diabetes in general, not for any particular type of it.
[88] Astringency may possibly counter the expansion of the kidney's channels, at least of the smaller ones.
[89] Also, moistening presumably alleviates both thirst and any problems resulting from lack of moisture, such as emaciation.

the kidney's ability to attract water, and inducing sleep. (Apparently, Ibn Sīnā recommends these treatments specifically for diabetes caused by fiery heat for the purpose of making the patient forget his thirst.) For diabetes caused by coldness, Ibn Sīnā recommends rarefying therapies. On the other hand, although Ibn al-Nafīs does not explain the therapy against thirst in detail and does not include this as a required drug quality, he certainly considers thirst an important symptom.

2. Ibn al-Nafīs does not explain how to draw moisture out of the kidney, although he speaks about the hot force attracting it to the kidney. Here Ibn Sīnā recommends perspiration therapy and vomiting.[90]
3. Concerning purges, Ibn al-Nafīs omits Ibn Sīnā's remarks about the patient having a "dry nature" (i.e., tendency to constipation), as well as the therapy for it.
4. Ibn al-Nafīs omits strengthening drugs, which seems odd, as he does agree with Ibn Sīnā about the fact that one of the causes of diabetes is weakness of the kidneys.
5. Ibn al-Nafīs omits rubefacient drugs. However, they are often quite similar to warming drugs, and that may be the reason they were left off Ibn al-Nafīs' list of drug qualities.

It is interesting to note that Ibn al-Nafīs omits some of the qualities mentioned most frequently in Ibn Sīnā's list, namely strengthening medications, purgatives and narcotics. At the same time, Ibn al-Nafīs' recommendations are completely consistent with his description of the disease and its causes, the only oddity being the omission of strengthening drugs (see above). It may even be said that his recommendations are more closely connected to the main causes of the disease than Ibn Sīnā's, with no excursive digressions.

Gentile da Foligno

Gentile also radically shortens Ibn Sīnā's list of qualities, choosing only five of his fourteen recommended qualities. As he does not describe the causes and symptoms of diabetes, it is not possible to evaluate the congruity of Gentile's clinical account with his therapeutics. However, a consideration of his therapeutic choices in relation to the causes and symptoms as described by Ibn Sīnā yields the following conclusions:

---

[90] Vomiting is also supposed to alleviate thirst.

1. Gentile recommends cold, softening drugs; he believes that the coldness alleviates the heat in the kidneys or the whole body that causes diabetes. The combination of cold and laxative qualities is an innovation.
2. He explains the use of cupping glasses by their warming effect.[91] Although he does not mention this quality in connection with drug therapy, he presumably recognizes the type of diabetes caused by cold and tries to counteract it with heat, using either physical or medicinal methods.
3. Gentile's recommendation of purgatives and cold, softening drugs is a symptomatic therapy, designed to counteract the tendency to develop constipation that often accompanies diabetes.
4. For the alleviation of thirst, Gentile suggests sleeping.[92] However, not satisfied with a merely symptomatic therapy, Gentile explains that "taking care of the thirst" means "dealing with its cause".

He omits the following therapeutic methods:

1. Therapy that makes use of rubefacient drugs to treat diabetes caused by cold; however, these may be considered a subclass of warming drugs, which Gentile recommends for the therapy.
2. Therapy that cools the patient's kidney in the treatment of diabetes caused by heat; again, this is a subclass of cooling drugs, which Gentile recommends.
3. Therapy that anesthetizes the region of the lower back (thereby numbing and thus disabling the kidney's ability to attract moisture) to alleviate thirst; this method may be (but is not necessarily) included in "dealing with its cause." Astringent drugs may belong to the same category, as their purpose is to retain water in the kidneys long enough for the body to absorb the moisture it needs. Rarefying food and moistening may belong to symptomatic treatment.
4. A strengthening therapy against the weakness of the kidney that causes diabetes (at the same time, Gentile assumes this weakness is caused by cold, and we can see that in a different therapy he already deals with it on a more basic level).
5. A therapy that treats continuous urination. Perhaps Gentile believes this symptom to be not symptom of diabetes but a long-term consequence of the disease, one that can be treated by controlling the

[91] See p. 292, n. 45, above.
[92] In order to make the patient oblivious.

> other aspects of the ailment. In this way, Gentile moves the treatment of continuous urination from the realm of treatment of symptoms to treatment of the disease itself. It is therefore logical that, unlike Ibn al-Nafīs, he does not suggest medication against urinary incontinence or mention any treatment intended to draw away the moisture aggregating in the kidneys, either by perspiration or by vomiting.

Gentile does not add any innovations to the therapeutic theory.

Thus, Gentile's therapy attacks both the main causes of diabetes and its most troublesome symptoms in a way that covers most of the phenomena mentioned by Ibn Sīnā. The main omissions are treatments for the weakness of the kidneys and for the excessive flow of urine. These symptoms, however, could potentially be cured by the use of the other therapies with the above-mentioned qualities. Therefore, although we cannot evaluate Gentile's therapeutic theory in relation to its consistency with his pathological theory, as he completely omits the latter, his therapy at least seems consistent with the causes and symptoms described by Ibn Sīnā.

Jacques Despars

As is his custom, Despars discusses nearly all the therapeutic qualities recommended by Ibn Sīnā, omitting only strengthening. This omission of a quality so prominently present in Ibn Sīnā's recommendations of simple drug against diabetes is odd. However, as the weakness of the kidneys, against which strengthening drugs are used, is caused by cold, and since Despars includes all therapeutic qualities against cold, the problem is already dealt with at a more primary level.

The main changes and additions Despars makes to Ibn Sīnā's recommendations are the following:

1. Rather than speaking about anesthetizing the region of the lower back and numbing and thus disabling the kidney's ability to attract water, he recommends numbing the power of sensation, suggesting that the attraction of water to the kidneys is connected with sensation.[93] This idea is not mentioned by any other writer.
2. He combines the qualities of coldness and anesthetizing in a quality he calls "anesthetizing coldness" that affects both the heat that causes diabetes and the kidney's ability to attract water.

---

[93] Possibly connected with this is the commentators' idea about pain attracting blood. Cf. to p. 138, n. 60, above.

3. Despars narrows Ibn Sīnā's definition of the drug quality of moistening from "general moistening" to "moistening of the kidneys and the liver". The goal of moistening in general, as recommended by Ibn Sīnā, seems to be to alleviate the patient's thirst, while moistening of the kidneys and the liver, by contrast, must be intended to target some other cause or symptom. Perhaps moistening the kidneys simultaneously cools them or partially satisfies the body's tendency to attract moisture to the kidney and, before that, to the liver.
4. A further innovation, cooling the liver, may have the same purpose as point number 3, above. Although no author mentions heat of the liver as a cause for diabetes, when the idea of a hot force in the kidneys attracting water from the liver is combined with the concept of the liver attracting water from preceding organs in the digestive process, it may seem useful to decrease any heat that may possibly attract water to the liver.

It is evident that Despars preserves most of Ibn Sīnā's therapeutic theory. Since Despars makes few innovations in both the pathological and the therapeutic descriptions, he presents an overall picture of diabetes that has almost as much inner consistency as does Ibn Sīnā's depiction of the disease. The only parts of Despars' therapeutic theory not really integrated in the general framework of his understanding of the disease are the moistening of the kidneys and the liver therapy, neither of which can be connected in more than speculative terms to any cause or symptom. It seems, then, that in his commentary, Despars begins to introduce to the theory of diabetes the concept that both the involvement of liver and the dryness of various organs are more involved in the attraction of water to those organs than was previously granted. This re-orientation of the theory of diabetes is not yet finalized in Despars' writings.

A comparison of the therapeutic theories of all four authors with regard to their core groups of most relevant drug qualities yields the following results:

1. Two drug qualities are recommended by all the authors, namely "cold/cooling" and "hot/warming". As these two qualities are intended to counteract the heat and the coldness that are seen by the authors as the primary causes of diabetes, it is obvious that a treatment of the causes of the disease is considered more important than symptomatic therapy.
2. Of the qualities that appear in at least three texts, most are connected with symptomatic therapy—either the alleviation of the

thirst (GG + KK + MM) or counteraction of the tendency to develop constipation (II). The exception is astringency, which is intended to help retain moisture in the kidneys long enough for the body to absorb it.

Our next step is to see how these therapeutic qualities are reflected in the choice of simple drugs that the commentators prescribe against diabetes.

7.2.5.2. Treatment, Practice, in the Arabic and Latin Commentaries

Prescriptions Used by Ibn al-Nafīs[94]

Ibn al-Nafīs lists nine prescriptions for diabetes and urinary incontinence, whose therapeutic treatments can also be used against diabetes:[95, 96]

Prescription #1

For diabetes:

eggs
vinegar

The eggs are macerated in vinegar for a day and a night and then drunk.

Prescription #2

For urinary incontinence caused by heat: cold astringents like

rose bud
sumac
dry coriander
juice of unripe grapes
oak
lettuce seed
purslane seed
camphor
potion of sour pomegranates OR sour milk

The cold astringents are either used each separately or brought together in sour pomegranate potion or sour milk.

---

[94] *Mūjaz al-Qānūn*, pp. 246–247. For general principles concerning the Arabic prescriptions, see Chapters 5.1.5.3 and 5.2.5.2, above.

[95] An asterisk after the list of ingredients indicates the method of application of the drug. Drug names connected with 'OR' are alternative choices for the same prescription.

[96] For more about therapies for urinary incontinence used also for diabetes, see pp. 303–304, above.

Prescription #3

For urinary incontinence caused by coldness: hot astringents like

sukk[97]
yellow nut grass
costus
myrrh
lavender
frankincense
cumin

The drugs are taken and crushed finely so that they can penetrate.

Prescription #4

For urinary incontinence caused by coldness:

rose
sugar

Rose is made into jam with sugar. It is taken in the morning and in the evening, 2 dirhams each time.

Prescription #5

Food for hot urinary incontinence:[98]

food made of sumac OR food made of the juice of unripe grapes

Prescription #6

Food for cold urinary incontinence:[99]

hot spices

The food should be sprinkled with hot spices.

Prescription #7

Food for cold urinary incontinence:

roasted meat
dry coriander

---

[97] *sukk* = "Confection, oriental aromatic remedy composed of date juice, gallnut and Indian astringent drugs" (Lev and Amar, 2008; Meyerhof, 1940).
[98] *I.e.*, urinary incontinence caused by heat.
[99] *I.e.*, urinary incontinence caused by cold.

Prescription #8

For hot urinary incontinence, local medications:

rose oil

Prescription #9

For cold urinary incontinence, local medications:

drumstick tree oil
costus [oil]

These nine prescriptions, with the exception of Prescriptions #2 and #3 (which are, in fact, lists of simple drugs to be used either alone or in different combinations), are simple and short. The first prescription is identical to Ibn Sīnā's Prescription #12 in its Arabic form.[100] The others are not clearly modeled in *K. al-Qānūn*. Furthermore, the ingredients used differ widely. This results from the fact that all except the first prescription are primarily for use against urinary incontinence, diabetes being only a secondary indication. Only four of the prescriptions are oral drugs, whereas three are food recommendations and two are used in local therapy.[101]

Simple Drugs Used by Ibn al-Nafīs[102]

For the identifications of the simple drugs in the prescriptions, see Appendix 48. For the sake of brevity, the frequencies of the drugs in the prescriptions will be discussed together with the other Arabic and Latin commentators in *Comparison between* K. al-Qānūn *and the Commentaries* in Chapter 7.2.5.2.

Prescriptions Used in the Latin Commentaries[103]

In the following, we will compare the prescriptions given by Ibn Sīnā for the treatment of diabetes with those given by Jacques Despars and Gentile da Foligno. The prescriptions appear in Table 7.11, Appendix 49.

The results confirm the conclusions we reached in Chapters 5.2.5.2 and 6.2.5.2 when comparing Gentile's and Despars' prescriptions with those by Ibn Sīnā. Gentile's remarks are quite sporadic and do not give

100 See p. 294, above.
101 It is doubtful if Ibn al-Nafīs really intended also these two prescriptions, #8 and #9, to be part of the therapy for diabetes, as they as local medications would only make it easier not to let the urine flow freely, but would not lessen its amount.
102 For methodological details, see Chapter 5.2.5.2, above.
103 For methodological details, see Chapter 5.3.5.2, above.

a good general overview of the type of therapies he prefers. From the perspective of our study, the value of Gentile's remarks is found more in his innovations and less in the choices he made from among the material offered by Ibn Sīnā. Despars, on the other hand, succeeds in expressing his preferences both through choosing and stressing some of Ibn Sīnā's drugs and through his own additions.

Next, we will identify the Latin drug names appearing in these prescriptions and then list Gentile's and Despars' most preferred drugs. Afterwards, we will try to see why they chose precisely these drugs.

Simple Drugs Used in the Latin commentaries[104]

See Appendix 50, Table 7.12, for the identifications of simple drugs used in the prescriptions for diabetes in the Latin commentaries. The frequencies of the drugs in the prescriptions will be discussed together with the other Arabic and Latin commentators in the following section.

Comparison between K. al-Qānūn *and the Commentaries*[105]

In this chapter, we compare usage of the drugs in *K. al-Qānūn* and in the commentaries by Ibn al-Nafīs, Gentile and Despars to (a) determine each commentator's most preferred drugs for diabetes, (b) compare the results with the core drugs of Ibn Sīnā's drug collection, and (c) compare them with the drug qualities recommended by Ibn Sīnā for the treatment of diabetes. In this way, we can see whether each author's respective medical system, causes, manifestations, theoretical therapy and practical drug therapy are a coherent system as far as diabetes is concerned, and whether there emerges a core group for the treatment of diabetes in our Arabic and Latin sources in general. The comparison is based on Table 7.13 in Appendix 51.

Ibn al-Nafīs recommends a total of 22 simple drugs against diabetes, mentioned 28 times altogether. The most popular drug, rose, appears in three prescriptions, two of which are for hot urinary incontinence and one for cold urinary incontinence.[106] Proportionally, rose constitutes 11 % of all occurrences. Coriander, costus, juice of unripe grapes and sumac each appear twice. These five core drugs amount to 39 % of all appearances.

[104] For methodological details, see Ch. 5.3.5.2, above.

[105] For methodological details, see Chapters 5.2.5.2 and 5.3.5.2, above.

[106] Rose is quite moderate from the point of view of heat and coldness, making possible its use against the extremes of either quality.

Comparing these five simple drugs to Ibn Sīnā's seven most preferred drugs (33 % of all appearances), we find that grapevine[107] and rose appear in both lists. By contrast, coriander, costus and sumac are Ibn al-Nafīs' innovations.

Gentile recommends ten drugs in his therapy for diabetes instead of concentrating nearly exclusively on explaining the problematic drug names, as he does for nosebleed. Only one of these, dough, is mentioned twice. It is an innovation, not appearing in any of the other texts. Of the other drugs, coriander belongs to Ibn al-Nafīs' core group. Meat and milk are mentioned by all the commentaries, gallnut by both Ibn Sīnā and Despars. In addition, grape products, considered as a group, appear in all the texts, and belong to the core groups of both Ibn Sīnā and Ibn al-Nafīs.

Despars again lists all the drugs mentioned by Ibn Sīnā and Gentile, except pasta and flour, but he does not necessarily mention each and every occurrence of them. Oak, plum and violet, Despars' three favorites (independently of *K. al-Qānūn*), each appear three times, representing 4 % of the 82 drugs he mentions for diabetes and 9 % of all appearances (in a total of 99 appearances). If we consider the drugs that appear at least twice, the corresponding numbers are 17 % (14 drugs) and 31 % (31 appearances). Of these, pomegranate belongs to Ibn Sīnā's core group. He also recommends plum, apple and chicken, and Ibn al-Nafīs mentions oak. Otherwise, Despars' core group is independent of the other texts.

We can thus see a definite connection between the different core groups, although there is also considerable independence between them.

7.2.5.3. Relationship between the Choice of Simple Drugs and their Qualities[108]

Thus, we see that Ibn Sīnā's drug preferences are preserved, generally speaking, by his commentators. Now, it remains to determine the connection between the drugs that appear in the commentaries and their medical qualities as given in Book II of *K. al-Qānūn*. We will do this via the same method used in Chapter 7.1.5.4, *Relationship between the Drugs*

[107] In *K. al-Qānūn*, twice as grapevine and twice as the juice of unripe grapes.
[108] For methodology, see Chapters 5.2.5.3 and 5.3.5.3, above.

Recommended for Treatment and their Therapeutic Qualities, where we examined the connection between a drug's frequency and its qualities in Ibn Sīnā's text. In that part of our study, we compared Ibn Sīnā's most preferred drugs and those drugs having the most medical qualities to determine whether there is any connection between the two factors. Using the same method with the commentaries will show us whether the commentators were aware of and interested in the theory behind Ibn Sīnā's pharmaceutical choices. The material is presented in Table 7.14, *Medical Qualities in the Commentators' Drugs for Diabetes*, in Appendix 52.

The following results emerge:

1. Altogether, 45 drugs are included in the above comparison.
2. The most preferred drugs of all the commentaries are milk and meat, the only two drugs that appear in all of them (= 4 %).
3. Gallnut, lettuce, pomegranate, rose and vinegar appear in *K. al-Qānūn* and in two commentaries (together with milk and meat, 16 %).
4. There are altogether 25 simples out of 45 that appear in *K. al-Qānūn* and in at least one commentary (= 56 %).
5. At the same time, there is one drug, wine, with six therapeutic qualities (2 %). Next are meat, myrtle, plum, poppy and quince with five qualities each (together with wine, 13 %).
6. The percentage of drugs having four or more medical qualities, 15 items, is 33 %.
7. A consideration of the drugs recommended by Ibn Sīnā that also appear in at least one commentary yields the following results:
    a. The most popular substances, meat and milk, have five and four medicinal qualities, respectively; thus, meat belongs to the 13 % of drugs with the most qualities, milk to the top 33 %.
    b. Of the drugs mentioned in at least one commentary in addition to *K. al-Qānūn* (25 items), 40 % have four or more qualities. Sixty percent of these have at least three qualities. If this is compared to the corresponding percentages for drugs that appear only in *K. al-Qānūn*—25 % having at least four qualities and 40 % at least three qualities—it becomes clear that the qualities of the drug also influence its acceptance by the Latin commentators. However, as with the Arabic commentators, we have to bear in mind that the drugs with the highest number of therapeutic qualities are also those that Ibn Sīnā has pre-

ferred; therefore, it is difficult to determine conclusively the direct cause for the commentators' choices.

c. A look at the drugs with the most qualities reinforces the sense of the importance of the drug qualities in choice of drugs. Ten (or 67 %) of the 15 drugs that have four or more qualities are recommended by at least one commentary. When compared with the corresponding percentage for all drugs against diabetes in *K. al-Qānūn*, 56 %, and with the drugs that have no suitable qualities (33 %), a clear correlation emerges.

Thus, there exists a close connection between the number of therapeutic qualities in a drug listed by Ibn Sīnā for the treatment of diabetes and its popularity among the commentators. This connection indicates either a conscious preference for drugs with these qualities or a more indirect imitation of Ibn Sīnā's preferences, which were based on medical qualities and were often followed by the commentators.[109] It can be supposed, however, that the choices, whatever their reason, were unconscious, and that, therefore, several motives may have acted together. In addition, we have not yet examined in detail the possibility that medical effectiveness experienced when using a specific drug could have been a decisive factor in these choices. We will discuss this question in the next chapter, wherein we evaluate the plant drugs used by Ibn Sīnā and the commentators against diabetes and compare the results of the evaluation with the pattern of usage of the drugs.

7.3. *Relationship between the Medical Efficacy of Drugs and their Popularity*[110]

Finally, we shall compare the medical efficacy of drugs with the frequency with which they appear in prescriptions to see how much a drug's objective, empiric, repeatable medical effects might have been responsible for its preference by Ibn Sīnā and the commentators. For this purpose, we will use the paradigms of Western biomedicine.[111]

[109] See Chapters 7.1.5.4 and 7.2.5.2, above.
[110] For methodology, see Ch. 5.4, above.
[111] For reasons for this decision, see pp. 100–101, above. For the description of the evaluation process and its problems, especially the question of efficacy, see pp. 116–124.

On the basis of relevant phytopharmacological literature, we have chosen the following medicinal qualities as criteria for the efficacy of a plant. We also mention some chemicals that have a similar effect. Although the existence of these chemicals in a drug does not warrant the conclusion that a plant is effective only because it contains the chemical constituent, its existence does imply that this possibility is greater than it otherwise would be.

1. *Antidiabetic Drugs.*
These include plants that either inhibit the development of streptozotocin diabetes, are supposed to counter non-insulin dependent adult diabetes, or are simply recommended as antidiabetic. Chemicals belonging to this category include S-methyl cysteine sulfoxide, S-allylcysteine sulfoxide, dimethoxy derivative of leucocyandin 3-O-beta-D-galactosyl cellobioside, leucopelargonidin glycoside and dimethoxy derivative of pelargonidin 3-O-alpha-L rhamnoside.

2. *Hypoglycemic Drugs*
Oral hypoglycemic drugs are substituted for insulin in reducing the blood sugar level. Chemicals belonging to this category include inulin, chrom and chamaemeloside.

3. *Drugs that Affect the Insulin Mechanism*
These drugs can initiate the release of insulin from pancreatic beta cells or heighten the effect of insulin. Among these are S-allylcysteine sulfoxide and fagomine.

4. *Drugs Against* Diabetes Insipidus
No suitable plants were found.

We decided not to include in the list any of drug effects that would merely prevent complications of diabetes: the multiplicity of possible complications of diabetes would make the list unwieldy, and the main focus of this chapter lies in treating the actual disease.[112]

[112] This is not meant to deny the importance of the drugs intended merely to alleviate and prevent those complications, as they can definitely lengthen the patient's life and improve its quality.

Table 7.15 in Appendix 53 lists which of the above-mentioned relevant medicinal effects are found in the plants identified as the ones recommended either by Ibn Sīnā or any of the commentators in the therapy for diabetes, according to the drug identifications in Chapters 7.1.5.3 and 7.2.5.2. In cases where a plant has several possible identifications belonging to different genera, all are examined, and the results are combined in Table 7.16. Plants or plant products that are too general to be defined in terms of their genus are excluded from the list.

Out of 105 plant genera on the list, 61 have at least one of the effects necessary for the therapy of diabetes. Additionally, six plant genera have one or several potentially useful chemical compounds. According to the findings of contemporary phytochemical research, 38 of the listed plants are ineffective against diabetes. The effect of the drugs seems to be based mostly on their hypoglycemic influence: nearly all plant genera that have either antidiabetic or insulin-stimulating effects are also known as hypoglycemic.

Now, we combine information about the medical efficacy of the single plant genera against diabetes with the plant identifications made in Chapters 7.1.5.3 and 7.2.5.2 to examine the possible effects of the plants as known to Ibn Sīnā and his commentators, as well as to examine the extent to which the efficacy of the plants could have contributed to their popularity.

Table 7.16 in Appendix 54 shows how many times each drug appears in the prescriptions of Ibn Sīnā and each of his commentators and its medical effect according to the modern Western bioscience. Synonyms (both Arabic and Latin) have been collected and counted as one, as have been plant drugs that can be identified as members of the same genus although their synonymy is explicitly stated. In the final evaluation, a plant is considered efficacious if any of its possible identifications has the sought-after effect. This final degree of efficacy is marked in Column #1 on the side of the English identification of the drug in bold underlined symbols.

We will consider the following aspects:

1. Relationship between the most preferred drugs of Ibn Sīnā and their medical efficacy.
2. Relationship between the most preferred drugs of the commentators and their medical efficacy.
3. Relationship between the continuous popularity of a drug and its medical efficacy.

4. Relationship between the status of the drug as an innovation and its medical efficacy.
5. Relationship between the number of recommended qualities in a drug and its medical efficacy.

Of all the plant drugs recommended by Ibn Sīnā or any of the commentators (a total of 77), 69 % (or 53) are efficacious against diabetes from the point of view of Western biomedicine. An additional 5 % (4) have chemical compounds that may cause the drug to be effective. The remaining 26 % (20) either have not been studied or have been proven to be ineffective against diabetes.

1. *Relationship between the Most Preferred Drugs of Ibn Sīnā and their Medical Efficacy*

Table 7.17. Plant Drugs: Number of Recommendations by Ibn Sīnā *vs*. Medical Efficacy.[113]

	4 ≤ app	**3 ≤ app**	**2 ≤ app**	**All app**	**1 app**
++	**100 %** (3)	**100 %** (6)	**78 %** (14)	**75 %** (24)	**71%** (10)
+	0 %	0 %	6 % (1)	6 % (2)	7 % (1)
—	0 %	0 %	17 % (3)	19 % (6)	21 % (3)
# of plants	3	6	18	32	14

Of the drugs recommended by Ibn Sīnā for the therapy of diabetes, our criteria[114] allow us to evaluate the efficacy of 32 simples. Of these, 75 % are efficacious and 22 % are (in light of present knowledge) inefficacious for the treatment of diabetes from the point of view of Western biomedicine, according to the evaluation in Appendix 53.

Of Ibn Sīnā's most preferred drugs, 100 % (3) of those recommended four or more times are efficacious. This percentage remains the same for plant drugs recommended three times or more (6), but drops to 78 % for plants recommended twice or more (18).

[113] ++ = efficacious; + = has a potentially efficacious chemical; — = non-efficacious; # of plants = number of plants in the column; app = appearances; ≤ as much or more. Percentages over 69 % (the percentage of the efficacious drugs in the whole sample of drugs recommended either by Ibn Sīnā or by the commentators) are in bold letters.

[114] See pp. 116–117, above.

Thus, Ibn Sīnā's most preferred plant drugs seem to have a higher likelihood of efficacy against diabetes than the other plants he recommends, even from the point of view of modern Western bioscience. In addition, 75 % of all of his drug choices are evaluated as efficacious. It seems that a plant's medical effect was an important criterion both in Ibn Sīnā's choice of drugs and in his drug preferences.

2. *Relationship between the Most Preferred Drugs of the Commentators and their Medical Efficacy*

Table 7.18. Number of Efficacious Plant Drugs: Number of Recommendations by the Commentators *vs*. Medical Efficacy.[115]

	b.N.	**GF**	**JD**
6 ≤ app	—	—	**100 %** (1/1)
5 ≤ app	—	—	**100 %** (1/1)
4 ≤ app	—	—	**100 %** (1/1)
3 ≤ app	**100 %** (1/1)	—	**100 %** (4/4)
2 ≤ app	**80 %** (4/5)	—	**69 %** (9/13)
All app	**76 %** (13/17)	**100 %** (4/4)	67 % (36/54)
1 app	**75 %** (9/12)	**100 %** (4/4)	66 % (27/41)

Here it appears that:

1. All of Gentile's recommendations (4) are efficacious.
2. Plant drugs that Despars recommends three or more times (4) have a 100 % probability of having a positive effect in the treatment of diabetes. This rate drops abruptly for drugs mentioned twice, to the same level as that of the total of drugs for diabetes examined in this study (69 %).
3. The same phenomenon occurs with Ibn al-Nafīs' most preferred plant drugs: the one simple he recommends three times is efficacious, as are 80 % of the drugs he mentions twice (5).

[115] b.N. = Ibn al-Nafīs; GF = Gentile da Foligno; JD = Jacques Despars (innovations only); app = number of appearances in the text; ≤ as much or more. Percentages over 69 % (the percentage of the efficacious drugs in the whole sample of drugs recommended either by Ibn Sīnā or by the commentators) are in bold letters. The percentage gives the amount of the plants evaluated as efficacious against diabetes, the number in brackets the number of efficacious plants / the number of all plants.

4. Comparing the efficacy rate of **all** plant drugs recommended for diabetes by Ibn Sīnā (75 %) with those of the drugs in the commentaries, Gentile's core drugs approximate the evaluations of Western bioscience more closely than Ibn Sīnā's, whereas the efficacy level of the drugs recommended by Ibn al-Nafīs is approximately the same as that of Ibn Sīnā's drug recommendations. By contrast, the efficacy probability of Despars' total of plant drugs (67 %) falls considerably below Ibn Sīnā's.

3. *Relationship between the Continuous Popularity of a Drug and its Medical Efficacy*

Here we discuss only those plants mentioned in the commentaries which were already recommended by Ibn Sīnā.

Table 7.19. Ibn Sīnā's Plant Drugs: Number of Commentaries in which a Plant Drug Appears *vs.* its Medical Efficacy[116]

	3 comm's	**2 ≤ comm's**	**1 ≤ comm's**	**Altogether**	**No comm's**
++	**100%** (1)	**83%** (5)	67 % (12)	**75 %** (24)	**86 %** (12)
+	0 %	17 % (1)	11 % (2)	6 % (2)	0 %
—	0 %	0 %	22 % (4)	19 % (6)	14 % (2)
# of plants	1	6	18	32	14

Plants that are recommended thrice (1) or twice (5) are more effective than the average (69 %), respectively 100 % and 83 %. However, drugs not mentioned in any commentary have also an efficacy rate of 86 %. The historical continuity of the use of a plant against diabetes correlates thus only partially with its observable effect.

[116] ++ = efficacious; + = has a potentially efficacious chemical; — = non-efficacious; # of plants = number of plants in the column; comm's = commentaries; ≤ as much or more. 'Altogether' includes drugs by Ibn Sīnā not recommended in the commentaries. Percentages over 69 % (the percentage of the efficacious drugs in the whole sample of drugs recommended either by Ibn Sīnā or by the commentators) are in bold letters.

4. Relationship between the Status of the Drug as an Innovation and its Medical Efficacy

Table 7.20. Innovations of the Commentaries and their Medical Efficacy.[117]

	b.N.	**GF**	**JD**
++	**82 % (9)**	**100 % (1)**	66 % (25)
+	9 % (1)	0 %	3 % (1)
—	9 % (1)	0 %	32 % (12)
# of plants	11	1	38

Here, we will consider only drugs that are **not** recommended against diabetes by *K. al-Qānūn*. Ibn al-Nafīs has 11 innovations, of which 82 % are efficacious according to modern Western bioscience. Gentile's only innovation, coriander, is efficacious. Jacques Despars' innovations have considerably lower rate of efficacy (66 %) than Ibn Sīnā's plant drugs altogether (75 %). Clearly, Despars' innovations have not yet had time to pass through the critical selecion of the scientific community.

5. Relationship between the Number of Recommended Qualities in a Drug and its Medical Efficacy

For the following table, we will consider only those drugs mentioned by Ibn Sīnā.[118] Drugs that have not been described in Book II of *K. al-Qānūn* are omitted.

117 ++ = efficacious; + = has a potentially efficacious chemical; — = non-efficacious; # plants = number of plants in the column. b.N. = Ibn al-Nafīs; GF = Gentile da Foligno; JD = Jacques Despars; all = all the innovations of all the commentators. Percentages over 69 % (the percentage of the efficacious drugs in the whole sample of drugs recommended either by Ibn Sīnā or by the commentators) are in bold letters.

118 See p. 181, above.

Table 7.21. Relationship between the Number of Recommended Qualities in a Drug *vs*. its Efficacy.[119]

	5 q	**4 ≤ q**	**3 ≤ q**	**2 ≤ q**	**1 ≤ q**	**Altogether**	**0 qualities**
++	75 % (3)	73 % (8)[120]	78% (14)	73% (19)	74% (20)	74% (23)	75 % (3)
+	0 %	9 % (1)	6 % (1)	4 % (1)	4 % (1)	6 % (2)	25 % (1)
—	25 % (1)	18 % (2)	17 % (3)	23 % (6)	22 % (6)	19 % (6)	0 %
# plants	4	11	18	26	27	31	4

There is no clear correlation between a plant having a high number of qualities recommended for the treatment of diabetes and the plant's rate of efficacy.

Summarized, this study yields the following results:

1. Ibn Sīnā's plant drug choices are as congruent with observable phenomena as the commentators': 75 % of all the plant drugs he mentions are efficacious against diabetes, as compared to 69 % of all the plants mentioned either by him or by the commentaries. However, Ibn Sīnā clearly prefers drugs that are also effective against diabetes according to Western biomedicine.
2. While Gentile's and Despars' recommendations follow the same line, Despars' most preferred drugs are more efficacious than the average, and all his drugs maintain an average level of efficaciousness. Ibn al-Nafīs' drugs are altogether above average, and he gives a clear preference to drugs also evaluated efficacious by Western bioscience.
3. There is no clear correlation between the number of recommended medical qualities in a plant drug and its medical efficacy as evaluated by Western bioscience.
4. In Despars' commentary, the fact that the plant drug is an innovation does not correlate with the medical efficacy of the plant as evaluated by Western bioscience; however, the efficacy rate of the innovations is close to the average of all plants recommended for

[119] ++ = efficacious; + = has a potentially efficacious chemical; — = non-efficacious; q = number of qualities; # of plants = number of plants in the column; ≤ as much or more. 'Altogether' includes drugs having no suitable qualities. Percentages over 69 % (the percentage of the efficacious drugs in the whole sample of drugs recommended either by Ibn Sīnā or by the commentators) are in bold letters.

[120] Rosa and rosa/alfalfa are here counted as one drug.

diabetes therapy. Ibn al-Nafīs' innovations have a higher rate of efficacy – 82 %.[121]

5. The historical continuity of the use of a plant against diabetes correlates only partially with its observable effect, as plants that are recommended thrice or twice are more effective than the average (69 %), but also drugs not mentioned in any commentary have an efficacy rate of 86 %.

In summary, the efficacy level of drugs recommended by Ibn Sīnā and his commentators for diabetes (69 %) is considerably lower than that of drugs recommended for cough (84 %), but close to those for nosebleed (64 %). Furthermore, with the exception of the partial lack of correlation between historical continuity of the use of the plant and its efficacy, the relevant parameters are similar. Of course it must be remembered that the true levels of efficacy may be discovered to be higher as pharmacological study of plants continues. In the next chapter, we will discuss the results of the three last chapters and try to determine whether, in addition to the positive average results of medieval doctors' selective work, a pattern emerges that may reveal the potential efficacy of the plant drugs, indicating the value of historical material for more effective pharmacological screening.

[121] See p. 321, above.

CHAPTER EIGHT

CONCLUSIONS

The most relevant issues we should address in this study are:

1. Traditionalism vs. empiricism, continuity vs. change.
2. The practical relation between pharmaceutical theory and practice.
3. Other factors influencing the choice of drugs by Ibn Sīnā and his followers.
4. Possible implications.

We will now discuss the issues in the light of our research and its results.

1. *Traditionalism* vs. *Empiricism, Continuity* vs. *Change*
According to the traditional view, medieval drug therapy was considerably static, copying older material without the desire or even the ability to apply critical standards.[1] Traditionalism was viewed as an unquestioning acceptance and blind following of the teachings of the ancients. In this kind of mental environment, empiricism and critical evaluation of transmitted knowledge would have been impossible. However, when we scrutinize *Kitāb al-Qānūn* and its commentaries more closely, concentrating on the three symptoms/syndromes of nosebleed, cough and diabetes, and when we search not for direct denial of older claims but instead examine what the authors chose to retain, add, or omit, the picture seems quite different.

First of all, the *materia medica* underwent many changes from the 10th to the 15th century. The following tables give the numbers of innovations and of drugs retained and omitted in the three symptoms/syndromes we have studied. The starting point for comparison is Ibn Sīnā's drug recommendations.

In the last column only Despars' independent recommendations will be taken into account and not his routine repetition of Ibn Sīnā's therapies.

[1] See Ullmann, 1978, *passim*.

Table 8.1a. Nosebleed (Ibn Sīnā recommends 67 drugs for this ailment.)[2]

	b.N.	J	sc	GF	JD	Altogether
Innovations	1	2	2	2	45	45
Retained drugs	18	5	6	3	67	39
Omissions	49	62	61	64	0	26
# of drugs recommended	19	7	8	5	112	84

Table 8.1b. Cough (Ibn Sīnā recommends 102 drugs for this ailment.)

	b.N.	J	sc	GF	JD	Altogether
Innovations	12	3	4	3	34	50
Retained drugs	21	13	20	30	102	69
Omissions	81	89	82	72	0	34
# of drugs recommended	33	16	24	33	136	119

Table 8.1c. Diabetes (Ibn Sīnā recommends 54 drugs for this ailment.)

	b.N.	J[3]	Sc	GF	JD	Altogether
Innovations	12	—	—	5	62	73
Retained drugs	10	—	—	7	54	27
Omissions	44	—	—	47	0	25
# of drugs recommended	22	—	—	12	116	100

From these tables we can see the following:

1. The percentage of omissions is very high in all the commentaries, naturally with the exception of those by Jacques Despars: the greatest numbers of Ibn Sīnā's drug recommendations retained in a commentary are found in those of Gentile da Foligno for cough (29 %) and of Ibn al-Nafīs for nosebleed (27 %). Obviously, this is mainly due to the character of these commentaries; as abridgements and explanatory glossaries (at least as far as drugs are concerned), the amount of drug information they can offer is more limited than that of Ibn Sīnā.
2. The percentage of the total number of drugs which are innovations fluctuates strongly, from Ibn al-Nafīs' 5 % in nosebleed to his 55 % in

[2] In Tables 8.1a, 8.1b, and 8.1c, b.N. = Ibn al-Nafīs, J = al-Jaghmīnī, sc = supracommentary to *Qānūnja*, GF = Gentile da Foligno, JD = Jacques Despars. Altogether = all commentaries considered together. In the last column only Despars' independent recommendations will be taken into account, not his routine repetition of Ibn Sīnā's therapies.

[3] *Qānūnja* and its supracommentary do not discuss diabetes at all.

> diabetes. The number of innovations is highest in diabetes therapy, where, if one considers all the commentaries together, the number of new drugs is nearly three times that of the drugs inherited from Ibn Sīnā.

We may thus reach the conclusion that the degree of change in drug therapy was quite high. Out of the 67 drugs recommended by Ibn Sīnā for the therapy of nosebleed, only 39 (58 %) are included in any of the commentaries;[4] for cough,[5] 69 (68 %) out of 102 are included, and for diabetes,[6] 27 (50 %) drugs out of 54.[7] At the same time, the number of innovations for nosebleed, cough, and diabetes, respectively, is 45 (54 % out of the total of 84 drugs recommended by any one of the commentaries), 50 (42 % out of 119), and 73 (73 % out of 100). Thus, both the amounts of new drugs included and old drugs excluded indicate that the tradition was not completely static and that it was not accepted blindly but that the medical authors used their faculty of choice and did not feel bound by fidelity to ancient authorities concerning their drug preferences.

How much, then, did the theoretical views connected with the different symptoms/syndromes change in the commentaries? They did indeed change, both through omissions and additions and through differences in stressing the various aspects of Ibn Sīnā's descriptions of pathology. In general, however, the clinical picture the commentators present is very consistent, symptoms being originated by the causes and leading then to consequences of the disease, and therapeutics being used either to attack the causes of the problem or to deal with the symptoms. From this we can possibly conclude that the theory was a living theory: each commentator describes a slightly different medical reality, choosing from the different materials offered by Ibn Sīnā according to his own preferences, but bearing in mind the need for consistency. Remarkable here is Ibn al-Nafīs' effort to organize the syndromes into groups according to their similarities, thus unifying their therapy: he recommends the use of asthma medications for cough, and, grouping together diabetes and urinary incontinence, he prescribes for both nearly exclusively drugs indicated against

---

[4] See Table 5.25 in p. 218, above.
[5] See Table 6.19 in p. 278, above.
[6] See Table 7.19 in p. 320, above.
[7] Here we take into consideration concerning Jacques Despars only the drugs mentioned also independently by him, as he repeats in a routine way almost all the drugs appearing in *K. al-Qānūn*.

urinary incontinence—in both cases with surprising therapeutic success. It would be interesting to study the issue further to know how often his rearranging of material into new categories and groupings indeed had the simplifying effect he aimed at without loss of therapeutic accuracy. After all, it is this same combination of sharp observation and logical thought that led him also to speculate about the pulmonary transit of the blood.

These two issues, the changes in the choice of drugs for a specific syndrome, and the gradual modifying of the theory, illuminate the attitude of the commentators towards the original text of *K. al-Qānūn*: on the one hand, each of them is ready to modify Ibn Sīnā's theories and his practical advice, both passively, through omissions, and actively, by adding to the tradition from their own experience or learning. On the other hand, however, they all show a similar degree of reverence and respect towards Ibn Sīnā, a respect that becomes especially clear in cases where the commentator actually uses *K. al-Qānūn* mainly as a framework for the expression of his own ideas. A good example of this is *Qānūnja*, for which al-Jaghmīnī takes the general structure of the book and the method of exposition from *K. al-Qānūn*—not to mention the prestige connected with its title—at the same time abbreviating the text to such an extent that at times any mention of theory is missing. The commentary by Jacques Despars, otherwise the complete opposite of *Qānūnja*, uses *K. al-Qānūn* in a similar way: Despars repeats faithfully almost every word Ibn Sīnā wrote, but by his comments and by the introduction of new drug uses he simultaneously transfers the text slowly from one geographic area and one medico-philosophical frame to another. At the same time, both al-Jaghmīnī and Jacques Despars try to convince the reader—and are themselves convinced—that they are just making the original text easier to understand and use. There is no place for correcting or criticizing the master—even in the Latin commentators' long scholastic arguments, their purpose is not to prove or disprove any statement of Ibn Sīnā's—rather, they merely question how he should be understood. This same attitude can be found across the board in all the commentaries; the commentators combine a clearly expressed reverence towards the original text with a silent approval of specific, separate changes when necessary, without any general scepticism towards the whole system. The often doubted critical attitude exists, but for the most part it is not explicitly expressed.

It seems from the above that the allegedly deep gap between medieval Arabic medicine, often described by medical historians as static and uncritical, and the Latin medical tradition of late Middle Ages, border-ing on the Renaissance, is not reflected in our texts. As we noted already, the Latin commentaries do not criticize Ibn Sīnā's thoughts—rather, they discuss how Ibn Sīnā should be rightly understood, not whether he was right or wrong. On the other hand, the presumably tradition-bound Arabic commentaries are extremely liberated in their development of Ibn Sīnā's drug pool for the therapy of specific conditions, both adding and omitting drugs. In addition, one feature that is conventionally considered modern appears consistently, especially in Ibn Sīnā's own therapeutical theory, but also in that of his Arabic commentators: the therapy is primarily directed towards the etiology of the disease, based on the principle that treating the cause will take care also of the disease or symptom itself, and only secondarily towards its symptoms (although symptomatic therapy also has an important part in alleviating the patient's suffering while the doctor is still monitoring the causes). This attitude seems to be slightly less prominent in the Latin commentaries, giving way to an increased emphasis on the treatment of the more easily recognizable symptoms, which is the only sense in which the Latin commentaries could be described as more practical and less intellectually oriented than Ibn Sīnā's writings.

2. *The Practical Relationship between Pharmaceutical Theory and Practice*

After examining the connection between Ibn Sīnā's and the commentators' theoretical advice for therapeutics and the causes and the symptoms they listed for specific medical conditions (which lead to the realization that their pathology and their therapeutics are in each case quite congruent), we went a step further, asking how much the therapeutic theory influenced, or was at least congruent with the actual choice of the drugs. This level, in which the drug qualities recommended by Ibn Sīnā as useful for therapy were compared with the qualities described to exist in the drugs recommended for treatment, also showed a surprising degree of consistency. This is all the more relevant as this relationship can only be assessed by a detailed examination of the material, so if the connection between theory and practice had been merely formal, it could easily have been broken without the authors even taking notice. The close connection we have found between theory and practice, on the other hand, makes it possible to hypothesize that there was a conscious effort to adjust the drug choices to fit with recommendations about drug qualities. Likewise, it could be that the drugs chosen for the treatment of a specific disease or symptom for some other reason, such as their medical efficacy or their magical connotations, were then endowed with qualities suitable for the treatment of the symptom in question in the drug descriptions of the pharmacopoeias. Both possibilities would tacitly admit the importance of these qualities, although only in the first case would it be rational to use the qualities of the drugs also as a tool for the development of therapeutics. A medication that was, theoretically, most suitable for the treatment of a certain disease would be selected, and its effect would be tested in practice, a method that was encouraged in medieval medical literature.[8]

3. *Other Factors Influencing the Choice of Drugs by Ibn Sīnā and his Followers*

The last factor influencing the choice of drugs by Ibn Sīnā and the commentators is the connection between their drug choices and the objective efficacy of these drugs against a given symptom or syndrome, as evaluated in the relevant literature.[9] In evaluating this factor, we deem "efficacious" both those drugs that really cure (e.g. tannins in nosebleed) and those that alleviate the symptoms (e.g. expectorants in cough) or directly lengthen the patient's life (hypoglycemic medicines in diabetes). On the other hand, we exclude those drugs that are currently known to contain chemical constituents having a beneficial effect, but one which has not been ascribed in the relevant literature to the plant itself.[10] For practical reasons only plant drugs have been included in our study.

The final conclusions here show a surprising percentage of efficacy. Of all the drugs mentioned either by Ibn Sīnā or any of his commentators, the percentage of efficacious drugs is high even in the more modestly successful cases, nosebleed (64 %) and diabetes (69 %), while the drugs prescribed for cough are highly successful, reaching a probable efficacy level of 84 %. If we consider these results in the light of present-day doubts about the efficacy of ancient and medieval therapeutics,[11] they seem to show unequivocally that medical care in the Middle Ages was not based merely on convention and placebo therapy and justified by both the patient's and doctor's equally low expectations, but that the medicines

---

[8] Several authors, however, question this ever having been put to practice. See Chapter 4.1.

[9] As evaluated by Western bioscience. See pp. 100–101, above.

[10] See pp. 118–119, above.

[11] See Ch. 4.1.

used could be effective. These percentages are too high to be incidental.[12] In addition, we have to remember that these evaluations are based on our present level of knowledge only, and so the true efficacy of the prescribed drugs may be considerably higher.[13]

A subject for further research would be to check whether there exists a reverse correlation between the effectiveness of the therapy for a specific condition and the number of innovations in the commentaries. One might venture to assume that the relative lack of effect of the medications would have led the doctors to seek for new possibilities—i.e., innovations—which would again show their critical attitude towards information handed down through tradition. If this assumption is correct, it would indicate that medieval doctors were fully aware of their lack of success in certain areas and were willing to try new solutions.

Finally, we have examined the connection between the use of drugs in prescriptions and their potential efficacy.[14] This shows us another aspect of the connection between the authors' choice of drugs and the therapeutic reality: assuming that the choice was based at least partly on experience, one would expect the drugs favored by authors to be more efficacious than the marginal ones.

a. *Relationship between the Most Preferred Drugs of Ibn Sīnā and their Medical Efficacy*

In all the cases we researched in this study, there is a clear connection between a drug appearing repeatedly (i.e., more than once) in the

---

[12] It is difficult to reconcile this result with the conclusion reached by Álvarez-Millán, 2000 (see pp. 91–92, above), according to which recorded case studies do probably reflect the practice, whereas the learned textbook tradition does not. The subject clearly needs more research, especially on the possibility that the more limited variety of both diseases treated and *materia medica* used would reflect the local needs and possibilities in the way described in Lev and Amar, 2008, pp. 20–26: the local physician would select from the pool of knowledge collected through generations those possibilities that he best was able to use. In this way the practice of the case studies would be seen as a microsystem *inside* the written tradition instead of a totally separate system. Further research is needed.

[13] Of course there are also many causes that would lessen the positive impact of the knowledge of the doctor. The amount of the relevant chemical in a plant might be lower than expected, the doctor might have identified it wrong, or the method of preparing it might destroy the chemical. In our days, standardization of natural products is still a problem. The problems of the medieval physician may still have been smaller than assumed, as we have to remember that the doctor had much personal knowledge both about the plants and about their patients and could surely have adjusted and monitored the dosage according to the patient's need.

[14] Material for this comparison is taken from the conclusions of Chapters 5, 6, and 7, pp. 216–224, 275–282, and 318–323, above.

prescriptions of *K. al-Qānūn* and its potential medical effect. This can be best appreciated by comparing the probable efficacy values of these drugs with the corresponding values of the drugs mentioned only once. Likewise, the total efficacy rate of the drugs recommended by Ibn Sīnā for a specific syndrome is either same or slightly higher than that of all drugs recommended either by Ibn Sīnā or by the commentators for the same syndrome.

b. *Relationship between the Most Preferred Drugs of the Commentators and their Medical Efficacy*

This relationship is also very clear. In the Arabic commentaries, the choices made by Ibn al-Nafīs and al-Jaghmīnī seem to be well-based on objective efficacy. In particular, their most preferred drugs are all efficacious against nosebleed and cough. The author of the supracommentary clearly favors the efficacious drugs as well. Gentile da Foligno's choices are still more positive, as all of the plants recommended by him are efficacious. Despars' favorites—or at least the four to six most often recommended ones—also have a high rate of efficacy, but that rate drops abruptly at stages which are different in each symptom/syndrome.

There is, therefore, a definite correlation between the repeated recommendation of certain drugs by the authors of the commentaries for the therapy of a specific symptom or syndrome and the medical efficacy of those drugs against that symptom. This seems to be the result of critical observation: the commentators apparently knew by experience which were the most effective drugs. Another factor is the fact that drugs favored by Ibn Sīnā were often chosen also by the commentators. These drugs were Ibn Sīnā's favorites mainly because they were effective. Both of these factors, both personal experience and Ibn Sīnā's preferences may have influenced the commentators' choices.

c. *Relationship between the Continuous Popularity of a Drug and its Medical Efficacy*

In light of the above, it would make sense to assume that a clear correlation would exist also between the historical continuity of the use of a drug and its efficacy—another sign of the authors' critical approach. And, indeed, this is the case concerning nosebleed and cough: there is a clear tendency for the drugs mentioned by several commentators against a specific symptom or syndrome to be efficacious more often than those that appear only in one commentary or are not included in commentaries at all. However, diabetes gives us a opposite picture, in which the plants used by Ibn Sīnā that do not appear in any of the commentaries are effective more often than those included in commentaries. This might be caused by the fact that whereas nosebleed and cough are isolated symptoms, the purpose of their treatment being simply to remove the symptom, diabetes is a more complicated syndrome, consisting, according to Ibn Sīnā, of thirst, excessive flow of urine, and tendency to develop constipation. The role that the pancreas and the elevated level of blood sugar play in the disease was not even vaguely understood. As a result, the doctors strove to control one or more of the symptoms with drugs—and may even have succeeded in that endeavor—while at the same time they failed to address the real problem—the patient's hyperglycemia. Even in this case, Ibn Sīnā and his commentators were surprisingly successful: of all plants recommended against diabetes, 69 % have some hypoglycemic effect. This is much more than an arbitrary result would be, and it must have been reached through the doctors' observation that these recommended plants alleviated all three symptoms simultaneously. It seems that the plants mentioned in the commentaries were chosen because of their effect on any one of the individual symptoms, and therefore they do not correspond to our criteria for efficacious diabetes drugs.

d. *Relationship between the Status of the Drug as an Innovation and its Medical Efficacy*

Here it is quite difficult to see any kind of generalized pattern. In most cases the percentage of efficacious drugs calculated from the total number of new drugs against a specific condition is approximately the same as that percentage calculated for all the drugs prescribed against the same condition. Ibn al-Nafīs' and Gentile da Foligno's innovations show high and consistent rates of efficacy. Jacques Despars' rates are lower, while the amount of his innovations is much higher than that of the other commentators.

The relatively modest number of pharmacologically effective new drugs might be explained by the fact that these innovations have not yet had time to pass the observation-based evaluation of the contemporary medical community, which tends to choose the best drugs and just ignore the rest. In a sense, the individual commentators' innovations stand in contradistinction to those drugs which appear in several commentaries and already form part of the tradition.

e. *Relationship between the Number of Recommended Qualities*[15] *in a Drug and its Medical Efficacy*

A vague correlation seems to exist between the number of recommended qualities in a plant and its probable efficacy. This correlation is not completely consistent, and the number of the qualities in a plant must be relatively high for it to be efficacious. In addition, in nosebleed this connection is quite unclear. An interesting situation is thus created, in which, on the one hand, there is a clear correlation between the amounts of qualities in a drug and its popularity, both in Ibn Sīnā and in the commentaries, and also between the popularity of a drug and its probable medical effect, while the direct correlation between a drug's number of qualities and its efficacy is less obvious.

To conclude: There exists a clear correspondence between a drug's popularity, both in *K. al-Qānūn* and in its commentaries, and its medical efficacy. Furthermore, the historical continuity of the use of a plant indicates a high probability of its medicinal effectiveness. It seems that the authors really selected critically from Ibn Sīnā's recommendations—just as Ibn Sīnā selected from the texts of those preceding him—the drugs with the right medicinal activity, thus slowly changing the tradition by re-evaluating it. Most of this process took place through omissions and through emphasis on the most relevant drugs, that is, by selecting from the existing material; the importance of innovations was limited, as at that time they had not been verified by repeated experience of generations of healers.

4. *Possible Implications*

As we can conclude from the above results, the accuracy of drug choices made by Ibn Sīnā and his commentators would justify the use of their texts—and by implication, those of other medieval authors—as a tool for modern drug development, especially for preclinical screening of leads.[16]

The main theoretical problem in developing a heuristic method for that purpose, based on medieval medical literature, is the conundrum of the relative success of medieval medicine. We would expect that Western bioscience would lead to right practice. In medieval medicine, however, we have a theory that is inconsistent with Western bioscience

[15] I.e., pharmacological effects of drugs that Ibn Sīnā mentions as necessary for the treatment of a symptom/syndrome.

[16] Holland, 1996b, pp. 1–3.

but still leads to right practice and also maintains internal consistency. How can this be? Adding new drugs to the framework, endowing them with suitable qualities and introducing them as innovations to special therapies is relatively simple and was done with all the new drugs with which the Arabs familiarized themselves through trade and commerce.[17] Using theory as a guide for finding new uses for known drugs was, at least, hypothetically encouraged in the medieval framework. In order to apply the theory and practice of that time as a tool for choosing from the simple drugs the ones most likely to be efficacious in the treatment of a specific symptom or disease, we would have to go beyond the scope of medieval usage. This act cannot be justified on theoretical grounds, for while we can perceive the connection between the theory, practice and effect of medieval medicine, we are unable to explain it. However, as merely a heuristic tool, any applicable method based on the existing store of medieval pharmacological knowledge both could and should be put into use in view of the benefit to be gathered from the accumulated experience of the generations. We cannot afford to ignore all that data.

Even simple collection of drug information from the texts would be useful. The rates of efficacy for the total of the plant drugs for each specific symptom/syndrome discussed in this study is high; for nosebleed, 64 %, for diabetes, 69 %, and in the case of cough it reaches 84 %. Furthermore, this efficacy is directed toward a clearly defined set of symptoms, such as hyperglycemia in the case of diabetes.[18] The accuracy of these results can, however, easily be improved by using the first three criteria from the list above. By examining both Ibn Sīnā's and the commentaries' favorites, along with those drugs which evidence continuous historical continuity in the commentaries, we can ameliorate the accuracy of our predictions from 69 % to 79 % (nosebleed), from 84 % to 93 % (cough), and from 69 % to 77 % (diabetes) respectively, including in our study respectively 19, 30, and 22 plants.

The results mentioned above were reached through studying symptoms/syndromes, the herbal therapy of which is clearly known to us. A problem in interpolating them to lesser known areas in search for new leads is that the general level of efficacy of the drugs recommended

[17] This trade was motivated both by the fact that many of the simple drugs imported were also used as spices, and by the belief in the wonderful effects of exotic drugs.

[18] As opposed to the traditional type of ethnopharmacological research in which the researcher did first ask the relevant questions about the use of the *materia medica*. After this stage, however, the whole material was subjected to, for example, a laboratory study concerning its bacteriostatic qualities, with no connection to its original use.

cannot be tested, which means that even if the criteria for our selection of the plants would in themselves be appropriate, it is difficult assess the likelihood of their efficaciousness. In-depth study of the causal and pathological theory behind the therapy is needed, so that the researcher is made aware of the possible danger of getting sidetracked by the treatment of a marginal symptom that is considered central by the medieval pathology. Alternatively, the researcher could concentrate on cases in which the gap between our understanding and the medieval understanding concerning a particular syndrome is not too wide. The possible correlation between the number of innovations in the commentaries and the success or failure of the therapy is also suggested as a way of evaluating the general efficacy of Ibn Sīnā's therapy in less well-known areas.[19] This subject needs, however, additional study. It is also important to remember that even much lower levels of accuracy in predicting the outcome of the therapy with a drug can prove to be valuable, especially while searching for therapy for a disease that is little known.

Concerning the above-mentioned issues, some further research would be necessary:

1. Ibn al-Nafīs' attempt to organize the diseases into wider therapeutic units (e.g. cough/asthma, diabetes/urinary incontinence) did not necessarily succeed in every case. It would be interesting to know how successful his other categorization attempts were, both from the point of view of the theory and from the point of view of his choice of drugs that was based on that theory.
2. In order to search for leads for pharmacological research, it is important first to assess the anticipated probability of efficacy of all drugs used for the treatment of a specific disease. Testing the hypothesis about a reverse correlation between the number of innovations in the commentaries and the efficacy of the drugs recommended by Ibn Sīnā might give us a simple indicator for this.
3. The applicability of this method to material collected from other cultures should be tested, considering each medical system separately.

None of the main topics of this book—the Arabic prescription tradition in general, the relationship between Arabic pharmacological theory and clinical practice, and the general objective efficacy of the Arabic thera-

[19] See pp. 322–323, point 4, above.

peutic tradition—have yet been extensively studied. This kind of research demands an interdisciplinary attitude which is similar to ethnopharmacology, combining linguistics and pharmacology. Some scholars claim that this attitude goes against the methods used by the history of medicine as a historical discipline. Yet surely it is historically important to know if a given therapy was efficacious or not. If it was efficacious, it could have had an effect on demographic history, and if it was not, the fact that it still continued to be used demands a socio-historical explanation. In either case, we see this research not as a historical inquiry with some medical tendencies but as a combination of historical and medical studies. For such research, we would definitely deem the use of the methods of both disciplines to be appropriate.[20]

Such detailed study of practical therapy, mostly left undone until now, presents quite a different picture than that of the static, lifeless, repetitive patterns so often mentioned in histories of Arabic medicine. No two commentaries are similar, and the changes in the *materia medica* are remarkable. This study also shows that to a certain degree, Arabic medicine was closer to Renaissance medicine than to the medicine of the Latin Middle Ages. Arabic medical theory, in itself consistent, agrees with its own recommended medical practice. This practice is to a high degree congruent with the results of modern pharmacology, and the commentary tradition shows a clear striving towards still more accurate therapeutic choices. All this might advocate further studies in the manner of our present research in other cultural environments as well; besides being a matter of interest in the history of pharmacology, such studies might have an impact on modern pharmacological research, through a selection of potentially efficacious vegetal drugs for a given disease or a group of diseases. Our research clearly illustrates that the Arabic and Latin medieval doctors, while founding their drug therapy on tradition and respecting it highly, were also able to develop it further—reflecting the possibility of similar development also in other medical systems currently considered static.

[20] See p. 87, above.

APPENDIXES

APPENDIX 1

(See p. 137)

5.1. Medical Qualities Recommended for Nosebleed by Ibn Sīnā.

Code	**Quality**
AA	Sharp remedies
BB	Astringent remedies
CC	Purging bile from the patient
DD	Acting to stop [the nosebleed]
EE	Caustic remedies
FF	Congealing remedies
GG	Making the blood viscous
HH	Cooling remedies
II	Cooling the blood
JJ	Cold remedies
KK	Expelling the blood from the stomach quickly
LL	Adhesive remedies
MM	Regulating the blood
NN	Anesthetizing remedies
OO	Remedies with a special property
PP	Strengthening remedies
QQ	Thickening remedies
RR	Thickening the blood (therapy after venesection)
SS	Vomiting (therapy against blood in stomach)
TT	Remedies that combine two or three [of these] qualities

APPENDIX 2

(See p. 153)

5.2. Identification of Drugs Recommended for Nosebleed by Ibn Sīnā.[1]

English Name	Arabic Name	Latin (Scientific) Name
Acacia	*qāqiyā*[2]	*Acacia* sp.[3] *Acacia arabica* Willd. var. *nilotica* Del.[4] *Acacia nilotica* [L.] Del.[5] *Acacia Senegal* [L.] Willd.[6]
Aloe	*ṣabr*	*Aloe* L.[7] *A. vera* L.[8]
Basil	*bādharūj*	*Ocimum basilicum* L.[9]
Brains of chicken	*dimāgh al-dajāj*	*dajāj* = *Gallus gallus domesticus*,[10] chicken[11]
Broom[12]	*makānis*	
Buckthorn	*ʿawsaj*	*Lycium* spp.[13] *Lycium afrum* L.[14] *Lycium europeum* L.[15] *Rhamnus* spp.[16]

[1] For methodology, see Ch. 5.1.5.3.

[2] Variant of *aqāqiyā* (Schmucker, 1969, no. 61; Lev and Amar, 2008, p. 180).

[3] Lev and Amar, 2008, p. 325; Beck, 2005, I:101, p. 72. *Acacia vera* (Dubler, 1953, I:113, pp. 86–87).

[4] Schmucker, 1969, no. 61; Levey, 1966, p. 234.

[5] Lev and Amar, 2008, p. 180; Dietrich, 1991, I:103, pp. 74–75.

[6] Kahl, 2003, pp. 206, 232; Kahl, 2007, pp. 323, 343; Dietrich, 1991, I:103, pp. 74–75.

[7] Schmucker, 1969, no. 452; Lev and Amar, 2008, pp. 94–97; Lev and Amar, 2002, n. 19, p. 74; Lev, 2003, pp. 33–34; Dubler, 1953, III:23, pp. 279–280; Levey, 1966, p. 297.

[8] Schmucker, 1969, no. 452; Kahl, 2003, p. 207; Kahl, 2007, pp. 328, 342; Dubler, 1953, III:23, pp. 279–280; Levey, 1966, p. 297; see Beck, 2005, III:22, p. 187.

[9] Dietrich, 1991, II:124, p. 131; Dubler, 1953, II:130, pp. 224–225; Kahl, 2003, pp. 201, 234; *ibid*., 2007, pp. 324, 345; Lev and Amar, 2008, p. 108; Schmucker, 1969, no. 95; see Beck, 2005, II:141, p. 151.

[10] Lev and Amar, 2008, p. 141.

[11] Kahl, 2007, pp. 324.

[12] See Lev and Amar, 2002, n. 43, p. 98: *makānis* = Egyptian millet = *Sorghum vulgare* var. *technicum*; Dietrich, 1991, III:7, pp. 152–153: *al-mukainisa* (among Spanish farmers) = *qanṭūriyūn ṭūlibṭūn* = *Centaurium minus* Moench. (*Erythraea centaurium* [L.] Pers.)

[13] Schmucker, 1969, no. 510; Dietrich, 1991, I:92, p. 68; Kahl, 2007, pp. 323, 343.

[14] Lev and Amar, 2008, p. 121; Levey, 1966, p. 308.

[15] Schmucker, 1969, no. 510; Dietrich, 1991, I:92, p. 68.

[16] Schmucker, 1969, no. 510; Dubler, 1953, I:98, pp. 72–73.

English Name	Arabic Name	Latin (Scientific) Name
Camphor	*kāfūr*	*Cinnamomum camphora* Fr. Nees[17]
Cheese[18]	*jubn*	
Clay, pottery	*turāb al-fahhar*	
Clay pottery/pepper cress *clay pottery *pepper cress	= *turāb ḥurf abyaḍ*[19] = *khazaf*[20] = *ḥurf* *ḥurf abyaḍ*	 = *Lepidium sativum* L.[21]
Clove	*qaranful*	*Syzygium aromaticum*[22, 23]
Cobweb[24]	*nasj al-ʿankabūt*	
Coriander	*kuzbara*	*Coriandrum sativum* L.[25]
Cotton-like substances from plants[26]	*quṭn sāʾir mā yakhruju mina al-nabāt*	

[17] Kahl, 2003, pp. 204, 233; *ibid*., 2007, pp. 326, 343; Lev and Amar, 2008, p. 123; Levey, 1966, p. 321; Schmucker, 1969, no. 610; see Lev and Amar, 2002, n. 149, p. 206. Schmucker suggests also *Dryobalanops aromatica* Gaertn.; *Blumea balsamifera* Dc.

[18] Lev and Amar, 2008, p. 132; see Lev and Amar, 2002, n. 197, p. 256: *jubn* = cheese (from the milk of cow *Bos taurus*).

[19] The Arabic text has *turāb ḥurf abyaḍ* which could either be punctuated *turāb ḥurf abyaḍ* and translated 'clay (sic!) of white pepper cress' (see p. 343, n. 21, below), or it could be punctuated *turāb khazaf abyaḍ* and translated 'clay of white clay pottery' (see p. 343, n. 20, below), which seems more reasonable from the point of view of the Latin translation. *turāb* = clay, earth (see Lev and Amar, 2002, n. 223, p. 284); dust (Kahl, 2003, p. 208).

[20] Schmucker, 1969, no. 269.

[21] Kahl, 2003, pp. 204, 234; *ibid*., 2007, pp. 325, 343; Lev and Amar, 2008, p. 172; Lev, 2003, pp. 54–55; Levey, 1966, pp. 257–258; Schmucker, 1969, no. 239; see Beck, 2005, II:155, p. 157.

[22] = *Caryophyllus aromaticus* L. = *Jambosa caryophyllus* = *Eugenia caryophyllata* Thunb. (Schmucker, 1969, no. 572).

[23] Kahl, 2003, pp. 206, 235; *ibid*. 2007, pp. 327, 343; Lev and Amar, 2008, p. 151; Lev, 2003, pp. 48–49; Levey, 1966, pp. 315–316; Schmucker, 1969, no. 572; see Lev and Amar, 2002, n. 12, p. 66.

[24] Levey, 1966, p. 340; possible identifications of the spider: *Galeodes* sp. (Lev and Amar, 2008, p. 552); *Araneus* (*Epeira*) sp. (Dubler, 1953, II:56, pp. 156–157); *Araneus diadematus* Clerck. (Dietrich, 1991, II:51, p. 105).

[25] Dietrich, 1991, III:59, p. 176; Dubler, 1953, III:67, pp. 309–310; Kahl, 2003, pp. 204, 233; *ibid*., 2007, pp. 326, 343; Lev and Amar, 2008, p. 156; Levey, 1966, pp. 326–327; Schmucker, 1969, no. 635; see Beck, 2005, III:63, p. 208; Lev and Amar, 2002, n. 37, p. 92.

[26] *quṭn* = *Gossypium herbaceum* L. (Kahl, 2003, pp. 205, 233; *ibid*., 2007, pp. 328, 342; Lev and Amar, 2008, p. 391; Levey, 1966, p. 317; Schmucker, 1969, no. 584).

English Name	Arabic Name	Latin (Scientific) Name
Cucumber	*qithāʾ*	*Cucumis flexuosus*[27] *Cucumis melo* var. *chate*[28] *Cucumis sativus* L.[29]
Dates, unripe	*balaḥ (al-nakhl)*	*Phoenix dactylifera* L.[30]
Dog-rose	*nisrīn*	*Rosa canina* L.[31]
Egg[32]	*bayḍ*	
Excrement[33] of donkey	*rawth al-ḥimār* *sirqīn al-ḥimār*	*ḥimār* = donkey, *Equus asinus*[34]
Frankincense	*kundur*	*Boswellia carterii* Birdw.[35] *Boswellia* spp.[36]
Frogs[37]	*ḍafāḍiʿ*	
Gallnut	*ʿafṣ*	gallnuts,[38] for ex. from **Quercus infectoria*[39] **Quercus* sp.[40]

---

[27] Schmucker, 1969, no. 562; Kahl, 2003, pp. 206, 233; *ibid.*, 2007, pp. 327, 345. On the difficulty to identify the plant, see Savage-Smith, 1980, p. 139, n. 19.

[28] Lev and Amar, 2008, p. 138; see Lev and Amar, 2002, n. 99, p. 154.

[29] Dubler, 1953, I:124, pp. 217–220; Dietrich, 1991, II:118, pp. 128–129; see Beck, 2005, II:135, p. 149.

[30] Dubler, 1953, I:125–126, pp. 96–97; Kahl, 2007, pp. 324, 343; Lev and Amar, 2008, p. 397; Schmucker, 1969, no. 765, article *nakhl*; see Beck, 2005, I:109, p. 79.

[31] Dietrich, 1991, I:96, p. 70; Kahl, 2003, pp. 202, 235; Lev and Amar, 2008, pp. 261–262; Schmucker, 1969, no. 768. On the agricultural importance of roses in the Middle Ages, see Lev, 2003, pp. 52–54.

[32] Dubler, 1953, II:44, pp. 148–149; Kahl, 2007, pp. 324, 329; Lev and Amar, 2008, p. 141; Levey, 1966, pp. 248, 298.

[33] For more information on the use of excrement for healing purposes, see Beck, 2005, II:80, pp. 124–125.

[34] Lev and Amar, 2008, p. 162.

[35] Schmucker, 1969, no. 651; Lev and Amar, 2008, p. 168; Dietrich, 1991, I:58, p. 57; see Beck, 2005, I:68, p. 49.

[36] Kahl, 2003, pp. 204, 232; *ibid.*, 2007, pp. 326, 343; Dietrich, 1991, I:58, p. 57. Schmucker, 1969, no. 651, adds *Boswellia serrata* Roxb., *B. thurifera* and *B. frereana* Birdw.

[37] Several species of *Rana* (Dubler, 1953, II:25, pp. 139–140). See Lev and Amar, 2008, p. 551.

[38] = Protective tissue developed by the plant after the eggs of wasps (especially *Cynips tinctoria*) and other pests are deposited in its branches (Lev and Amar, 2008, p. 225; Schmucker, 1969, no. 492; Beck, 2005, I:107, p. 78).

[39] Schmucker, 1969, no. 492; Dubler, 1953, I:123, pp. 94–95; see Beck, 2005, I:107, p. 78.

[40] Schmucker, 1969, no. 492; Lev and Amar, 2008, p. 225; Kahl, 2003, pp. 201, 235; see Lev and Amar, 2002, n. 16, p. 70.

English Name	Arabic Name	Latin (Scientific) Name
Grapevine	*karm*	*Vitis vinifera* L.[41]
Grapevine, unripe/sour fruit	*ḥiṣrim*	*Vitis vinifera* L.[42]
Gypsum	*jiṣṣ* = *jibsīn*[43] = *jibs*[44]	gypsum = $CaSO_4.2H_2O$, calcium sulphate[45]
Hare, fur of[46]	*wabar arnab*	*arnab* = *Lepus* spp.[47]
Henbane	*banj*	*Hyoscyamus albus L.*[48] *Hyoscyamus niger* L.[49]
Ink[50]	*ḥibr*	
Jujube	*ʿunnāb*	*Zizyphus jujuba*[51] *Zizyphus vulgaris* Lam.[52]
Knotgrass	*ʿaṣā al-rāʿī*	*Polygonum aviculare* L.[53]
Leek	*kurrāth*	*Allium porrum* L.[54]
Lemongrass	*qaṣab al-dharīra*	*Andropogon (= Cymbopogon) Martini Roxb.*[55] *Cymbopogon citratus*[56]

[41] Kahl, 2003, pp. 204, 235; *ibid.*, 2007, pp. 326, 345; Schmucker, 1969, no. 632; see Beck, 2005, V:1, p. 330. For an extensive description of the different vine products and their use in medieval pharmacy, see Lev, 2003, pp. 57–59.

[42] Kahl, 2007, pp. 325, 343; Lev and Amar, 2008, p. 176; Lev, 2003, pp. 57–59; Schmucker, 1969, no. 245; see Beck, 2005, V:5, p. 332.

[43] Schmucker, 1969, no. 197.

[44] *Ibid.*, no. 187.

[45] Kahl, 2003, pp. 203, 236; Lev and Amar, 2008, p. 416; Schmucker, 1969, nos. 187, 197; see Beck, 2005, V:116, p. 387.

[46] Kahl, 2007, pp. 329.

[47] Dietrich, 1991, II:18, p. 96; Kahl, 2003, pp. 204, 236; *ibid.*, 2007, pp. 329.

[48] Schmucker, 1969, no. 147; Lev and Amar, 2008, p. 418; Dubler, 1953, IV:70, pp. 416–418; Levey, 1966, p. 246.

[49] Schmucker, 1969, no. 147; Lev and Amar, 2008, p. 418; Kahl, 2003, pp. 201, 234; *ibid.*, 2007, pp. 324, 343; Dubler, 1953, IV:70, pp. 416–418; Levey, 1966, p. 246.

[50] Kahl, 2007, p. 325. On the preparation of ink, see Beck, 2005, V:162, pp. 400–401.

[51] Kahl, 2003, pp. 208, 235; Kahl, 2007, pp. 329, 344.

[52] Schmucker, 1969, no. 499; see Lev and Amar, 2002, n. 176, p. 232.

[53] Dubler, 1953, IV:4, pp. 378–379; Kahl, 2003, pp. 201, 235; *ibid.*, 2007, pp. 323, 344; Schmucker, 1969, ns. 430, 490, 767; see Beck, 2005, IV:4, p. 253.

[54] Dietrich, 1991, II:132, p. 134; Dubler, 1953, II:138, pp. 229–230; Kahl, 2003, pp. 204, 232; *ibid.*, 2007, pp. 326, 344; Lev and Amar, 2008, p. 433; Levey, 1966, pp. 323–324; Schmucker, 1969, no. 624; see Beck, 2005, II:149, p. 154.

[55] Schmucker, 1969, no. 579; Dubler, 1953, I:17, pp. 25–26. But according to Lev and Amar, 2008, p. 369: *Acorus calamus*.

[56] Kahl, 2003, pp. 206, 233; *ibid.*, 2007, pp. 327, 344.

English Name	Arabic Name	Latin (Scientific) Name
Lentil	*ʿadas*	*Lens esculenta* Moench[57]
Lettuce	*khass*	*Lactuca sativa* L.[58]
Lime	*nūra*	quicklime[59] lime[60]
Lime, slaked	*jiṣṣ mayyīt*	see Gypsum
Linen, flax	*kattān*	*Linum usitatissimum* L.[61]
Lycium, Indian	*ḥuḍaḍ hindī*	*ḥuḍaḍ*:[62] = *Lycium* spp.[63] *Rhamnus* spp.[64]
Mandrake	*sirāj al-quṭrub* = *yabrūḥ ṣanamī*[65]	*yabrūḥ*: = *Mandragora officinarum* L.[66] *Mandragora* sp.[67]
Milk[68]	*laban; albān* (pl.)	
Mill dust[69]	*ghubār al-raḥā*	
Mint	*naʿnaʿ*	*Mentha piperita* L.[70] *Mentha sativa* L.[71] *Mentha* spp.[72]

[57] Dietrich, 1991, II:92, p. 118; Dubler, 1953, II:98, pp. 192–193; Kahl, 2003, pp. 201, 234; *ibid*., 2007, pp. 323, 344; Lev and Amar, 2008, p. 435; Levey, 1966, p. 302; Schmucker, 1969, no. 679; see Beck, 2005, II:107, p. 137.

[58] Dietrich, 1991, II:119, p. 129; Kahl, 2003, pp. 205, 234; *ibid*., 2007, pp. 325, 344; Lev and Amar, 2008, p. 437; Schmucker, 1969, no. 270; see Beck, 2005, II:136, p. 150; Lev and Amar, 2002, n. 57, p. 112.

[59] Schmucker, 1969, no. 776, n. 2; Levey, 1966, pp. 340–341.

[60] Kahl, 2007, p. 327; Lev and Amar, 2008, p. 553. Lime (*kils*) was produced by burning limestone marble. When slaked with water, it was known as *nūra*. See Hill, 1993, p. 91.

[61] Dietrich, 1991, II:88, p. 116; Dubler, 1953, I:94, pp. 189–190; Kahl, 2003, pp. 204, 234; *ibid*., 2007, pp. 324, 344; Lev and Amar, 2008, p. 439; Schmucker, 1969, no. 620; see Beck, 2005, II:103, p. 135; Lev and Amar, 2002, n. 136, p. 190.

[62] *ḥuḍaḍ* and *ḥuḍaḍ hindī* are often used as synonyms (Schmucker, 1969, no. 246).

[63] Kahl, 2003, pp. 204, 234; *ibid*., 2007, pp. 325, 344; Dubler, 1953, I:112, pp. 85–86; Levey, 1966, p. 259.

[64] Schmucker, 1969, no. 246; see Beck, 2005, I:100, p. 71.

[65] *yabrūḥ ṣanamī* = *sirāj al-quṭrub* (Schmucker, 1969, no. 805, n. 13).

[66] Dietrich, 1991, IV:69, pp. 243–244; Kahl, 2007, pp. 330, 344; Schmucker, 1969, no. 805.

[67] Dietrich, 1991, IV:69, pp. 243–244; see Beck, 2005, IV:75, p. 280.

[68] Dietrich, 1991, II:58, p. 1097; Kahl, 2003, p. 201; *ibid*., 2007, pp. 326; Levey, 1966, p. 330.

[69] Dietrich, 1991, II:72, p. 111 and n. 1: Finely ground flour, literally: grindstone dust.

[70] Dietrich, 1991, III:32, p. 165; Schmucker, 1969, no. 772.

[71] Dubler, 1953, III:37, p. 290; Lev and Amar, 2008, p. 449; Schmucker, 1969, no. 772.

[72] Dietrich, 1991, III:32, p. 165; Kahl, 2003, pp. 206, 232; *ibid*., 2007, pp. 327, 344; Schmucker, 1969, no. 772; see Lev and Amar, 2002, n. 106, p. 160.

English Name	Arabic Name	Latin (Scientific) Name
Mummy, pure	*al-mūmiyāʾ al-khāliṣ*	*al-mūmiyāʾ* = asphalt[73]
Musk	*misk*	musk from *Moschus moschiferus*[74]
Myrrh	*murr*	*Commiphora myrrha* Engl.[75]
Myrtle	*ās*	*Myrtus communis* L.[76]
Nettle	*qurrayṣ*	*Urtica pilulifera* L.[77] *Urtica* spp.[78]
Opium	*afyūn*	opium from *Papaver somniferum* L.[79]
Paper	*qirṭās*	*Cyperus papyrus* L.[80]
Papyrus	*bardī*	*Cyperus papyrus* L.[81]

[73] Dietrich, 1991, I:72, p. 61; Lev, 2003, pp. 96–97; Schmucker, 1969, no. 747; see Lev and Amar, 2002, n. 227, p. 292; for a comprehensive analysis, see Lev and Amar, 2008, p. 354.

[74] Lev and Amar, 2008, p. 215: *misk* = musk, *Moschus moschiferus*. "Musk is a substance used as a perfume and medicine. Its source is the anal glands of the musk deer … The substance in its raw state is dark brown, but some time after extraction it turns black." Kahl, 2003, pp. 206, 236: *misk* = musk (from *Moschus moschiferus*); see Lev and Amar, 2002, n. 194, p. 254.

[75] Kahl, 2003, pp. 206, 233; *ibid*., 2007, pp. 327, 344; Lev and Amar, 2008, p. 221; Lev, 2003, p. 71; Schmucker, 1969, no. 704; see Beck, 2005, I:64, p. 45; Lev and Amar, 2002, n. 95, p. 150. Also *Balsamodendron myrrha* Nees. suggested: Dubler, 1953, I:63, pp. 47–48; Levey, 1966, pp. 333–334; Schmucker, 1969, no. 704.

[76] Dietrich, 1991, I:115, pp. 81–82; Dubler, 1953, I:128, pp. 99–100; Kahl, 2003, pp. 201, 234; *ibid*., 2007, pp. 323, 344; Lev and Amar, 2008, p. 223; Schmucker, 1969, no. 19; see Beck, 2005, I:112, p. 82.

[77] Dietrich, 1991, IV:75, pp. 249–250; Dubler, 1953, IV:95, pp. 436–437; Kahl, 2003, pp. 206, 235; Schmucker, 1969, no. 575; see Lev and Amar, 2002, n. 114, p. 168.

[78] Dietrich, 1991, IV:75, pp. 249–250; Dubler, 1953, IV:95, pp. 436–437; Schmucker, 1969, no. 575.

[79] Dietrich, 1991, IV:59, p. 239; Kahl, 2003, pp. 201, 234; *ibid*., 2007, pp. 323, 344; Schmucker, 1969, nos. 60, 273. Opium is the brown latex obtained from incisions made in the unripe seed-capsules of Papaver somniferum L. The poppy heads are split two weeks before ripening, and during the night the milky white resin flows out. The gummy sap that oozes from the cuts is collected immediately and again on the following day, a technique that has not changed for millennia. The exuded latex is then dried, and manipulated to form cakes. See Tibi, 2002, p. 2; Lev and Amar, 2008, pp. 231–232.

[80] Dietrich, 1991, I:88, pp. 66–67; Kahl, 2003, pp. 206, 233; *ibid*., Kahl, 2007, pp. 327, 344; Lev and Amar, 2008, p. 461.

[81] Dietrich, 1991, I:88, pp. 66–67; Dubler, 1953, I:95, p. 71; Lev and Amar, 2008, p. 461; Schmucker, 1969, no. 113; see Beck, 2005, I:86, p. 64.

English Name	Arabic Name	Latin (Scientific) Name
Pear	*kummathrā*	*Pyrus communis* L.[82] *Pyrus* spp.[83]
Pepper cress		see Clay pottery
Pitch	*zift*	pitch[84] bitumen[85] asphalt[86]
Plantain	*lisān al-ḥamal*	*Plantago major* L.[87] *Plantago* spp.[88]
Platanus	*dulb*	*Platanus orientalis* L.[89]
Pomegranate flower	*jullanār*	*Punica granatum* L., wild, flower[90] *Punica granatum* L., flower[91]
Quince	*safarjal*	*Cydonia oblonga* Mill.[92] *Cydonia vulgaris*[93]
Reed	*qaṣab*	*Arundo* spp.[94]

[82] Dubler, 1953, I:132, p. 107; Kahl, 2007, pp. 326, 344; Lev and Amar, 2008, p. 462; Schmucker, 1969, no. 648; see Beck, 2005, I:116, p. 85.

[83] Dietrich, 1991, I:123, p. 84; Schmucker, 1969, no. 648.

[84] Dietrich, 1991, I:68–70, p. 60; Kahl, 2003, p. 209; *ibid*., 2007, p. 330; Lev and Amar, 2008, p. 343; Lev, 2003, pp. 20–21; Levey, 1966, p. 276; Schmucker, 1969, no. 350.

[85] Lev, 2003, pp. 20–21; Lev and Amar, 2008, p. 343; Levey, 1966, p. 276.

[86] Lev, 2003, pp. 20–21. "Asphalt (Pitch, Bitumen, Tar, Pix). A resinous mineral, solid or semi-solid, which consists of a mixture of hydrocarbon created naturally, probably due to a solidification or oxidizing process. Asphalt sometimes erupts from the earth along the shores of the Dead Sea, from springs in the Judean Desert, and all along the Mediterranean coast." See Lev and Amar, 2008, p. 343. On asphalt trade, see Lev, 2003, pp. 20–21.

[87] Dubler, 1953, II:115, pp. 208–210; Kahl, 2007, pp. 326, 345; Lev and Amar, 2008, p. 242; Schmucker, 1969, no. 677.

[88] Dietrich, 1991, II:109, pp. 124–125; Dubler, 1953, II:115, pp. 208–210; Kahl, 2003, pp. 205, 235; Schmucker, 1969, no. 677.

[89] Dubler, 1953, I:87, pp. 65–66; Schmucker, 1969, no. 303.

[90] Dietrich, 1991, I:114, pp. 80–81; Dubler, 1953, I:127, pp. 97–98; Levey, 1966, p. 253; Schmucker, 1969, no. 201.

[91] Dietrich, 1991, I:114, pp. 80–81; Kahl, 2003, pp. 203, 235; *ibid*., 2007, pp. 325, 345; Lev and Amar, 2008, p. 248.

[92] Dietrich, 1991, I:119, p. 83; Kahl, 2003, pp. 207, 233; *ibid*., 2007, pp. 328, 345; Lev and Amar, 2008, p. 255.

[93] Dubler, 1953, I:131, pp. 101–107; Levey, 1966, pp. 282–283; Schmucker, 1969, no. 383.

[94] Dubler, 1953, I:94, p. 70; Kahl, 2007, pp. 327, 345; Schmucker, 1969, no. 578; see Beck, 2005, I:85, 64. Also *Phragmites* spp. (Kahl, 2003, pp. 206, 234; Lev and Amar, 2008, p. 389).

English Name	Arabic Name	Latin (Scientific) Name
Rose	*ward*	*Rosa gallica* L.[95] *Rosa* spp.[96]
Salsify	*liḥyat al-tays*	*Tragopogon porrifolius* L.[97] *Tragopogon pratensis* L.[98]
Salt water, bitter	*al-māʾ al-māliḥ al-murr*	*milḥ* = salt, NaCl[99]
Saltwort	*qāqullā*	*Salsola* spp.[100] *Bunias kakile*[101]
Sesame oil	*ḥall*[102]	*duhn al-ḥall*: = *shīraj*, made of *simsim*[103] *shīraj, simsim* = *Sesamum indicum* L.[104]
Sponge	*isfanj*	*Spongia officinalis*[105]
Sumac	*summāq*	*Rhus coriaria* L.[106]
Terra sigillata[107]	*ṭīn makhtūm*	a medicinal clay containing ferrous oxide[108]

95 Dubler, 1953, I:110, pp. 83–84; Levey, 1966, pp. 344–345; Schmucker, 1969, no. 797.

96 Dietrich, 1991, I:101, p. 73; Dubler, 1953, I:110, pp. 83–84; Kahl, 2003, pp. 208, 235; *ibid*., 2007, pp. 329, 345; Lev and Amar, 2008, pp. 261–262; Schmucker, 1969, no. 797; see Beck, 2005, I:99, p. 70; Lev and Amar, 2002, n. 47, p. 102. On the importance of rose in the medieval Middle East, see Lev, 2003, pp. 52–54.

97 Kahl, 2007, pp. 326, 345; see Beck, 2005, II:143, p. 152.

98 Kahl, 2007, p. 185, n. 17; Schmucker, 1969, nos. 672, 795.

99 Kahl, 2003, pp. 206, 237; see Lev and Amar, 2002, n. 220, p. 282.

100 Kahl, 2007, pp. 327, 345; Schmucker, 1969, no. 561.

101 Schmucker, 1969, no. 561.

102 Or: *khall*, vinegar.

103 Schmucker, 1969, no. 445; Kahl, 2003, pp. 202, 235.

104 Dietrich, 1991, II:84, pp. 114–115; Kahl, 2003, pp. 202, 208, 235; *ibid*., 2007, pp. 325, 344–345; Lev and Amar, 2008, p. 286; Schmucker, 1969, nos. 402, 445; see Lev and Amar, 2002, n. 171, p. 228. According to Dietrich, *duhn al-ḥall* is sesame oil from whole seeds, whereas *shīraj* is made of decorticated sesame seeds (Dietrich, 1991, II:84, pp. 114–115, n. 1).

105 Lev and Amar, 2008, p. 552; see Lev and Amar, 2002, n. 208, p. 268; Beck, 2005, V:120, p. 389.

106 Dietrich, 1991, I:110, p. 79; Dubler, 1953, I:124, pp. 95–96; Kahl, 2003, pp. 208, 235; *ibid*., 2007, pp. 329, 345; Lev and Amar, 2008, p. 490; Levey, 1966, p. 285; Schmucker, 1969, no. 401; see Beck, 2005, II:108, p. 78; Lev and Amar, 2002, n. 6, p. 60.

107 Schmucker, 1969, no. 476.

108 List and Horhammer, 1969–1979, Vol. 2, p. 1262. Cf. Kahl, 2003, p. 208: *ṭīn makhtūm* = sealing bole. *ṭīn* = clay, earth, bole (Lev and Amar, 2008, p. 149; see Lev and Amar, 2002, n. 223, p. 284).

English Name	Arabic Name	Latin (Scientific) Name
Verdigris[109]	*zanjār*	
Vinegar	*khall*	vinegar from *Vitis vinifera* L.[110]
Vitriol	*zāj*	a salt of sulphuric acid compounded with various metals such as iron, copper, lead, and zinc[111] *more specifically ferrous sulfate, $FeSO4$[112]
Vitriol, yellow	*qalqaṭār*	copper vitriol = $CoSO_4.7H_2O$[113]
Willow	*khilāf*	*Salix aegyptiaca*[114] *Salix* spp.[115]
Wine	*sharāb*	wine from *Vitis vinifera* L.[116] wine (in general) juice (in general)[117]

109 Copper sulphate $CuSO4$ = Blue vitriol (Lev and Amar, 2008, p. 308); $Cu(OH)_2.2CuCO_3$ (Kahl, 2003, pp. 209, 236); "basisch essigsaures Kupfer" (Schmucker, 1969, no. 354). On the preparation of verdigris, see Beck, 2005, V:79, pp. 364–365.

110 Kahl, 2003, p. 203; *ibid*., 2007, p. 325; Lev and Amar, 2008, p. 176. According to Waines, the medieval vinegar was genuine *vin aigre* or soured wine, as the term *khall khamr* indicates (Waines, 1989, p. 25). On medical uses of vinegar in the Middle Ages, see Lev, 2003, pp. 57–59.

111 Lev and Amar, 2008, p. 308; Schmucker, 1969, no. 336.

112 Kahl, 2003, pp. 208, 237; Lev and Amar, 2002, n. 216, p. 278; Schmucker, 1969, no. 336.

113 Kahl, 2003, pp. 206, 236. Kahl, 2007, pp. 327: *qalqaṭār* = iron sulphate; Schmucker, 1969, no. 590: gelbes Vitriol = "das naturliche rote bis gelbe Atrament, das durch Feuersetzen aus den vitriolischen Gesteins massen entstand"; Levey, 1966, p. 318: *qalqaṭār* = burnt vitriol; an impure iron sulfate, sometimes yellow because of impurities (Levey, 1962, p. 16).

114 Lev and Amar, 2008, p. 506; Schmucker, 1969, no. 279. Also *Populus* spp.; Schmucker, 1969, no. 279.

115 Dietrich, 1991, I:106, p. 77; Dubler, 1953, I:115, p. 89; Schmucker, 1969, no. 279.

116 Fellmann, 1986, pp. 269–272; Kahl, 2003, p. 207; *ibid*., 2007, p. 328. For a good overview of several products of grapevine and their medicinal uses, see Lev, 2003, pp. 57–59.

117 Fellmann, 1986, pp. 269–272.

APPENDIX 3

(See p. 153)

5.3. The Frequencies of the Drugs in the Prescriptions for Nosebleed by Ibn Sīnā.

Drug	Frequency
Acacia	2
Aloe	3
Basil	5
Brains of chicken	1
Broom	1
Buckthorn	2
Camphor	8[1]
Cheese	1
Clay pottery/white pepper cress + clay	2[2]
Clove	1
Cobweb	1
Coriander	1
Cotton-like substances from plants[3]	1
Cucumber	1
Dates, unripe	4
Dog-rose	1
Egg	5[4]
Excrement of donkey	4
Frankincense	6
Frogs	1
Gallnut	3
Grapevine	3[5]
Gypsum (+ lime) (*jiṣṣ*)	3[6]

[1] Prescriptions #14 and #15 (p. 143, above) are variants, and therefore camphor, appearing in both of them, is counted only once.

[2] The Arabic text has *turāb ḥurf abyaḍ* which could either be punctuated *turāb ḥurf abyaḍ* and translated 'clay of white pepper cress,' or it could be punctuated *turāb khazaf abyaḍ* and translated 'clay of white clay pottery.' We chose the latter as it seems more reasonable both when considering the word *turāb*, 'clay,' and from the point of view of the Latin translation, *terra testae*. *turāb* = 'clay; earth; dust' (Kahl, 2003, p. 208; Lev and Amar, 2002, n. 223, p. 284).

[3] Also here a cotton-like substance is intended. "Cotton" of papyrus and that of the rest of plants are counted separately, as it is clear that the source plants are not the same.

[4] Twice egg-shells, twice egg-white and once just eggs.

[5] Twice as grapevine, once as juice of unripe grapes.

[6] Limestone appears twice in Prescription #44 (p. 150, above), as slaked lime and lime dissolved in vinegar, but with different Arabic names, and it is therefore counted twice.

Drug	Frequency
Hare, fur of	2
Henbane	1
Ink	2
Jujube	1
Knotgrass	3
Leek	3
Lemongrass	1
Lentil	2
Lettuce[7]	1
Lime (*nūra*)	1
Lycium, Indian	2
Mandrake	1
Milk	1
Mill dust	3
Mint	2
Mummy, pure	1
Musk	1
Myrrh	1
Myrtle	1
Nettle	1
Opium	3
Paper	2
Papyrus, cotton of[8]	1
Pear	2
Pepper cress	See Clay
Pitch, melted	1
Plantain	3
Platanus	1
Pomegranate flower	2
Quince	2
Reed	1
Rose	4
Salsify	2
Salt water, bitter	1
Saltwort	2
Sesame oil	See Vinegar
Sponge	1
Sumac	1
Terra sigillata	1[9]

[7] Lettuce seed and its juice, from Prescription #2 (p. 141), are counted here as one, because they appear in the same prescription.

[8] Actually, a cotton-like substance is intended.

[9] Prescriptions #14 and #15 (p. 143, above), are variants, and therefore *terra sigillata*, appearing in both of them, is counted only once.

Drug	**Frequency**
Verdigris	3
Vinegar	6. See also Sesame.[10]
Vitriol	6
Vitriol, yellow	4
Willow	3
Wine	1

[10] The main body of the Arabic text of the Būlāq 1294 H version gives in Prescription #17 *ḥall*, 'sesame oil,' but a marginal remark corrects it to *khall*, 'vinegar'. The Latin text, and also Despars in his commentary, follow the correction with 'vinegar,' and 'wine vinegar,' respectively. As vinegar is one of Ibn Sīnā's favorite drugs for nosebleed, whereas sesame is not mentioned except in Prescription #17, we choose in the continuation 'vinegar' as the more probable translation. See pp. 144, above; 388, below.

APPENDIX 4

(See p. 155)

5.4. Medical Qualities in Ibn Sīnā’s Drugs for Nosebleed.[1, 2]

Drug	**AA**	**BB**	**CC**	**DD**	**DDb**	**EE**	**FF**	**GG**	**HH**	**II**	**JJ**	**LL**	**NN**	**OO**	**QQ**	**RR**
Acacia	+	+							+							
Aloe		+	+									+				
Basil		+			+											
Brains of chicken		+/−		+/+												
Buckthorn												+				
Camphor				+												
Cheese			+													
Clay[3]																
Clove	+															
Cobweb																
Coriander		+		+							+		+	+		
Cucumber																
Date:[4]																
balaḥ																
busr	+															
nakhl	+															
Dog-rose																
Eggs		+										+				
Excrement of donkey				−/+												

[1] AA = sharp remedies; BB = astringent remedies; CC = purging bile from the patient; DD = acting to stop the nosebleed; DDb = against nosebleed; EE = caustic remedies; FF = congealing remedies; GG = making the blood viscous; HH = cooling remedies; II = cooling the blood; JJ = cold remedies; LL = adhesive remedies; NN = anesthetizing remedies; OO = remedies with a special property; QQ = thickening remedies; RR = thickening the blood.

[2] The following drugs were not described in Book II of *K. al-Qānūn*: broom, saltwort, cotton-like substances from plants, juice of unripe grapes, pottery clay (*turāb al-fakhkhār*), and reed.

[3] For our choice of clay as the more appropriate identification for *turāb ḥurf abyaḍ* for the final analysis in Chapter 5.4, see p. 147, n. 91, above.

[4] The three terms for dates and date palm, *balaḥ, busr* and *nakhl*, are all examined together here, as the expression used in the prescriptions, *balaḥ al-nakhl*, is the combination of *balaḥ* and *nakhl*, and *balaḥ* and *busr* are described by Ibn Sīnā in the same article. *balaḥ*, *nakhl*, *busr* = date (unripe) = *Phoenix dactylifera* (Lev and Amar, 2008, p. 397).

Drug	AA	BB	CC	DD	DDb	EE	FF	GG	HH	II	JJ	LL	NN	OO	QQ	RR
Frankincense		+		+								+				
Frogs																
Gallnut		+									+					
Grapevine		+				+										
Gypsum		+		+								+				
Hare, fur of																
Henbane							+						+			
Ink[5]																
Jujube																+
Knotgrass		+							+							
Leek	+	+		+												
Lemongrass		+										+				
Lentil		+														+
Lettuce											+					
Lime (*nūra*)						+										
Lycium, Indian		+									+					
Mandrake		+		+												
Milk			+									+				
Mill dust																
Mint		+					+									
Mummy																
Musk																
Myrrh		+										+				
Myrtle		+		+					+		+					
Nettle				+		+										
Opium	+						+						+			
Paper				+												
Papyrus																
Pear		+					+									
Pitch																
Plantain		+							+		+					
Platanus																
Pomegranate flower												+				
Quince		+														

[5] *Midād*. *Ḥibr* does not exist in Book II of *K. al-Qānūn*.

Drug	**AA**	**BB**	**CC**	**DD**	**DDb**	**EE**	**FF**	**GG**	**HH**	**II**	**JJ**	**LL**	**NN**	**OO**	**QQ**	**RR**
Rose		+				+										
Salsify																
Salt water		+	+													
Sponge																
Sumac		+														
Terra sigillata									+			+				
Verdigris	+															
Vinegar[6]									+		+					
Vitriol		+			+	+										
Vitriol, yellow		+			+	+										
Willow		+														
Wine		+														
#62	5	30	4	11	3	6	4	0	6	0	7	10	3	1	0	2
%	8	48	6	18	5	10	6	0	10	0	11	16	5	2	0	3

[6] We examine here only vinegar, as sesame oil does not appear under the name *ḫall* in Book II of *K. al-Qānūn*. See p. 144, n. 80, above.

APPENDIX 5

(See p. 156)

5.5a. The Frequency of the Different Therapeutic Qualities in Drugs for Nosebleed by Ibn Sīnā.

Code	Quality	Frequency
BB	Astringent remedies	48 %
LL	Adhesive remedies	16 %
JJ	Cold remedies	11 %
HH	Cooling remedies	10 %
EE	Caustic remedies	10 %
AA	Sharp remedies	8 %
CC	Purging bile from the patient	6 %
FF	Congealing remedies	6 %
NN	Anesthetizing remedies	5 %
RR	Thickening the blood	3 %
OO	Remedies with a special property	2 %
GG	Making the blood viscous	0 %
II	Cooling the blood	0 %
QQ	Thickening remedies	0 %

5.5b. The Additional Qualities.[1]

Code	Quality	Frequency
DD	Acting to stop nosebleed	18 %
DDa	Acting to stop bleeding (in general)	58 %
DDb	Against nosebleed	5 %
DD or DDa or DDb	Acting to stop nosebleed or to stop bleeding in general or against nosebleed	66 %

[1] See pp. 154–155, above.

5.5c. The Frequency of the Different Therapeutic Qualities or Quality Clusters in Drugs for Nosebleed by Ibn Sīnā.

Code	Quality or Quality Cluster		Frequency
DD	Acting to stop nosebleed, remedies	18 %	
DDa	Acting to stop bleeding (in general)	58 %	
DDb	Against nosebleed	5 %	**= 66 %**
BB	Astringent remedies		**48 %**
LL	Adhesive remedies		**16 %**
JJ	Cold remedies	11 %	
HH	Cooling remedies	10 %	
II	Cooling the blood	0 %	**= 16 %**
EE	Caustic remedies		**10 %**
AA	Sharp remedies		**8 %**
CC	Purging bile from the patient		**6 %**
FF	Congealing remedies	6 %	
GG	Making the blood viscous	0 %	**= 6 %**
NN	Anesthetizing remedies		**5 %**
RR	Thickening the blood	3 %	
QQ	Thickening remedies	0 %	**= 3 %**
OO	Remedies with a special property		**2 %**

APPENDIX 6

(See p. 158)

5.6a. The Connection between Ibn Sīnā's Frequency of Use of Drugs for Nosebleed and their Qualities.[1, 2]

#1	Drug	#2	AA	BB	CC	DD	DDb	EE	FF	GG	HH	II	JJ	LL	NN	OO	QQ	RR
2	Acacia	3	+	+							+							
3	Aloe	3		+	+									+				
5	Basil	2		+			+											
1	Brains of chicken	2		+/−		+/+												
2	Buckthorn	1												+				
8	Camphor	1				+												
1	Cheese	1			+													
1	Clay[3]	0																
1	Clove	1	+															
1	Cobweb	0																
1	Coriander	5		+		+							+		+	+		
1	Cucumber	0																
4	Date:[4]	1																
	balaḥ																	
	busr			+														
	nakhl			+														
1	Dog-rose	0																

[1] Column #1: number of times the drug appears in the prescriptions; column #2: number of therapeutically suitable qualities it embodies. AA = sharp remedies; BB = astringent remedies; CC = purging bile from the patient; DD = acting to stop the nosebleed; DDb = against nosebleed; EE = caustic remedies; FF = congealing remedies; GG = making the blood viscous; HH = cooling remedies; II = cooling the blood; JJ = cold remedies; LL = adhesive remedies; NN = anesthetizing remedies; OO = remedies with a special property; QQ = thickening remedies; RR = thickening the blood. The quality DDa = 'acting to stop bleeding (in general)' is not included in this table, as it is an additional quality and does not belong to Ibn Sīnā's description of qualities effective against nosebleed.

[2] The following drugs were not described in Book II of *K. al-Qānūn*: broom, saltwort, cotton-like substances from plants, juice of unripe grapes, pottery clay (*turāb al-fakhkhār*), and reed.

[3] For our choice of clay as the more appropriate identification for *turāb ḥurf abyaḍ*, see p. 147, n. 91, above.

[4] The three terms for dates and date palm, *balaḥ, busr* and *nakhl*, are all examined together here, as the expression used in the prescriptions, *balaḥ al-nakhl*, is the combination of *balaḥ* and *nakhl*, and *balaḥ* and *busr* are described by Ibn Sīnā in the same article. *balaḥ*, *nakhl*, *busr* = date (unripe) = *Phoenix dactylifera* (Lev and Amar, 2008, p. 397).

#1	Drug	#2	AA	BB	CC	DD	DDb	EE	FF	GG	HH	II	JJ	LL	NN	OO	QQ	RR
5	Eggs	2		+										+				
4	Excrement of donkey	1				–/+												
6	Frankincense	3		+		+								+				
1	Frogs	0																
3	Gallnut	2		+									+					
2[5]	Grapevine	2		+				+										
3[6]	Gypsum	3		+		+								+				
2	Hare, fur of	0																
1	Henbane	2							+						+			
2	Ink[7]	0																
1	Jujube	1																+
3	Knotgrass	2		+							+							
3	Leek	3	+	+		+												
1	Lemongrass	2		+										+				
2	Lentil	2		+														+
1	Lettuce	1											+					
1	Lime (*nūra*)	1						+										
2	Lycium, Indian	2		+									+					
1	Mandrake	2		+		+												
1	Milk	2			+									+				
3	Mill dust	0																
2	Mint	2		+					+									
1	Mummy	0																
1	Musk	0																
1	Myrrh	2		+										+				
1	Myrtle	4		+		+					+		+					
1	Nettle	2				+		+										
3	Opium	3	+						+						+			
2	Paper	1				+												
1	Papyrus	0																
2	Pear	2		+					+									
1	Pitch	0																
3	Plantain	3		+							+		+					
1	Platanus	0																
2	Pomegranate flower	1												+				

[5] Not including the juice of unripe grapes.
[6] Including *jiṣṣ, jiṣṣ mayyīt*.
[7] *Midād*. *Ḥibr* does not exist in Book II of *K. al-Qānūn*.

#1	Drug	#2	AA	BB	CC	DD	DDb	EE	FF	GG	HH	II	JJ	LL	NN	OO	QQ	RR
2	Quince	1		+														
4	Rose	2		+				+										
2	Salsify	0																
1	Salt water	2		+	+													
1	Sponge	0																
1	Sumac	1		+														
1	*Terra sigillata*	2									+			+				
3	Verdigris	1	+															
6	Vinegar[8]	2									+		+					
6	Vitriol	3		+			+	+										
4	Vitriol, yellow	3		+			+	+										
3	Willow	1		+														
1	Wine	1		+														
	#62		5	30	4	11	3	6	4	0	6	0	7	10	3	1	0	2
	%		8	48	6	18	5	10	6	0	10	0	11	16	5	2	0	3

5.6b. The Relationship between Ibn Sīnā's Frequency of Use of Drugs for Nosebleed and their Qualities. Number of Qualities *vs*. Number of Appearances.[9]

	8 app	**6 ≤ app**	**5 ≤ app**	**4 ≤ app**	**3 ≤ app**	**2 ≤ app**	**Altogether**	**Only 1 app**
5 q							2 % (1)	3 % (1)
4 ≤ q							3 % (2)	7 % (2)
3 ≤ q		50 % (2)	33 % (2)	30 % (3)	40 % (8)	27 % (9)	18 % (11)	7 % (2)
2 ≤ q		75 % (3)	83 % (5)	70 % (7)	70 % (14)	61 % (20)	50 % (31)	38 % (11)
1 ≤ q		100 % (4)	100 % (6)	100 % (10)	95 % (19)	88 % (29)	76 % (47)	62 % (18)
Altogether	100 % (1)	100 % (4)	100 % (6)	100 % (10)	100 % (20)	100 % (33)	100 % (62)	100 % (29)

8 For the choice of vinegar instead of sesame oil in Prescription #17, see p. 144, n. 80.

9 app = number of appearances of the drug in prescriptions for nosebleed in *K. al-Qānūn*; q = number of therapeutically suitable qualities it embodies; ≤ as much or more. Numbers in brackets = the number of drugs. Drugs # = the total number of drugs in the column.

	8 app	6 ≤ app	5 ≤ app	4 ≤ app	3 ≤ app	2 ≤ app	Altogether	Only 1 app
0 + 1 q	100 % (1)	25 % (1)	17 % (1)	30 % (3)	30 % (6)	39 % (13)	50 % (31)	62 % (18)
0 q	0 %	0 %	0 %	0 %	5 % (1)	12 % (4)	24 % (15)	38 % (11)
Drugs #	1	4	6	10	20	33	62	29

5.6c. The Relationship between Ibn Sīnā's Frequency of Use of Drugs for Nosebleed and their Qualities. Number of Appearances *vs*. Number of Qualities.[10]

	5 q	4 ≤ q	3 ≤ q	2 ≤ q	1 ≤ q	Altogether	0 + 1 q	0 q
8 app					2 % (1)	2 % (1)	3 % (1)	
6 ≤ app			18 % (2)	10 % (3)	9 % (4)	6 % (4)	3 % (1)	
5 ≤ app			18 % (2)	16 % (5)	13 % (6)	10 % (6)	3 % (1)	
4 ≤ app			27 % (3)	23 % (7)	21 % (10)	16 % (10)	9 % (3)	
3 ≤ app			73 % (8)	45 % (14)	40 % (19)	32 % (20)	19 % (6)	7 % (1)
2 ≤ app			82 % (9)	65 % (20)	62 % (29)	53 % (33)	42 % (13)	27 % (4)
Altogether	100 % (1)	100 % (2)	100 % (11)	100 % (31)	100 % (47)	100 % (62)	100 % (31)	100 % (15)
1 app	100 % (1)	100 % (2)	18 % (2)	35 % (11)	38 % (18)	47 % (29)	58 % (18)	73 % (11)
Drugs #	1	2	11	31	47	62	31	15

10 app = number of appearances of the drug in prescriptions for nosebleed in *K. al-Qānūn*; q = number of therapeutically suitable qualities it embodies; ≤ as much or more. Numbers in brackets = the number of drugs. Drugs # = the total number of drugs in the column.

APPENDIX 7

(See p. 160)

5.7. Causes of Nosebleed in the Arabic Commentaries to *K. al-Qānūn*.

Ibn Sīnā	**Ibn al-Nafīs**	**al-Jaghmīnī**	**Supracommentary**
Acute illness, follows it + crisis in an acute illness			Crisis of hot, acute diseases
Ascending hot vapours			
Biliousness of the body			Predominance of bile in the blood
Bitterness of the blood			
Blow	Blow		
Boiling of intense heat	Excess of ebullition		Overpowering [effect] of the absolute consuming heat on blood
Critical nosebleed	Critical nosebleed		Critical nosebleed
Eruption of arteries			
Fall	Fall		
Headache, follows it	Violent headache can precede it		
Burning sensation, follows it	Burning sensation can precede it		
Measles, crisis in			
Plethora of blood	Strong plethora of blood		Plethora of blood (implicit)
Predisposition of the body			Tendency to nosebleed
Predominance of the blood rising/boiling strongly			Predominance of blood
Ruptures of the network of the veins and arteries in the brain	Eruption of the veins and arteries of the network [in the brain] + laceration of veins (because of plethora)		Rupture of the veins of the network [in the brain] + laceration of the veins of the network

Ibn Sīnā	Ibn al-Nafīs	al-Jaghmīnī	Supracommentary
Smallbox, crisis in			
Spontaneous nosebleed			
Yellow bile and thin blood in a person			Thinness of blood
	Smarting sensation can precede it		
			Sharpness of blood

APPENDIX 8

(See p. 163)

5.8. Possible Symptoms of Nosebleed in the Arabic Commentaries to *K. al-Qānūn*.

Ibn Sīnā	**Ibn al-Nafīs**	**al-Jaghmīnī**	**Supracommentary**
Blood loss can reach 20 or 25 *raṭls*[1] before death			
Blood exiting from both of the nostrils			
Blood exiting from only one of the nostrils			
Bleeding only once, in one gush			
Blood flowing in drops			Gradual bleeding
Blood flowing as a strong stream			
Blood coming through an eruption of the arteries [of the network in the brain]	Arterial nosebleed		
Blood coming through an eruption of the veins [of the network in the brain]	Venal nosebleed		From veins
Excessive bleeding	Excessive bleeding		Bleeding exceeding all [tolerable] limits
Hotter blood flow from the arteries			
Light nosebleed			

[1] The weight of a *raṭl* varies depending on the time and the geographic area where it is used. Hinz suggests the weight of 437,5 g (Hinz, 1970, p. 28 ff.).

Ibn Sīnā	Ibn al-Nafīs	al-Jaghmīnī	Supracommentary
Vision of flashes of light [especially following headache] can precede it			
Periodical bleeding			
Redder blood flow from the arteries	Reddish blood flow from arteries [as opposed to veins]		
Strong, piercing nosebleed			
Thinner blood flow from arteries	Thin blood flow from arteries [as opposed to veins]		
Vision of flashes of white, red and yellow streaks [especially following headache] can precede it			
	Piercing[2] blood flow from arteries [as opposed to veins]		

[2] Or: quick (Ar. *ḥāfiz*).

APPENDIX 9

(See p. 165)

5.9a. Consequences of Nosebleed in the Arabic Commentaries to *K. al-Qānūn*.[1]

Ibn Sīnā	**Ibn al-Nafīs**	**al-Jaghmīnī**	**Supracommentary**
+ Beneficial			+ laudable (i.e., beneficial)
– Harmful			
+ Beneficial for hot/acute[2] illnesses			
+ Beneficial for illnesses with internal sanguinary or choleric apostemas			
+ Beneficial for sanguinary or choleric apostemas in the brain			
+ Beneficial for sanguinary or choleric apostemas in the diaphragm			
+ Beneficial for sanguinary or choleric apostemas in the liver			
+ Beneficial for sanguinary or choleric apostemas in the lung[s]			
+ Benefits moderately yellow-bilious, thin-blooded persons			

[1] + = beneficial consequence;—harmful consequence.
[2] See p. 132, n. 30, above.

Ibn Sīnā	Ibn al-Nafīs	al-Jaghmīnī	Supracommentary
+ Benefits more in pleurisy than in peripleumonia			
+ Lightness of head rather than repletion (particularly when the patient suffers from hot/acute[3] illnesses and internal apostemas)	+ End of the heaviness that the patient has felt		
+ Moderation of color rather than strong redness (particularly in cases of hot/acute illnesses and internal apostemas)	+ Moderation of color rather than excessive redness		
+ Normalization of the external appearance after swollenness (particularly in cases of hot/acute illnesses and internal apostemas)	+ Normalization of the external appearance after swollenness		
– Blackening			
– Change of the patient's skin color: in choleric patients to a yellow color			
– Change of the patient's skin color: in melancholic patients to a swarthy yellow			
– Change of the patient's skin color: in phlegmatic patients to a dull grey			
– Coldness of extremities			

[3] *Ibid.*

Ibn Sīnā	Ibn al-Nafīs	al-Jaghmīnī	Supracommentary
– Death			– Lethal
– Decline of strength	– Decline of strength		– Decline of strength
– Diseases of weakness of the liver and the like			
– Dropsy and the like			
– Extreme emaciation[4]			
– Fainting			
– Harms less those in whom yellow bile predominates			
– Harms much those in whom phlegm or black bile predominate			
– Loss of blood			
– Signs of the corruption of brain functions			

5.9b. Consequences if Blood Starts Descending to the Stomach.

Ibn Sīnā	Ibn al-Nafīs	al-Jaghmīnī	Supracommentary
– Causes unconsciousness			
– Swells the stomach			
– Weakens the pulse			

4 Or: weakness (Ar. *dhubūl*).

APPENDIX 10

(See pp. 166–167)

5.10. Medical Qualities Recommended for Nosebleed by the Arabic Commentators.

Code	Ibn Sīnā	Ibn al-Nafīs	al-Jaghmīnī	Supracommentary
AA	Sharp remedies			
BB	Astringent remedies	Astringent remedies		Astringent (ther. against tendency to nosebleed)
CC	Purging bile from the patient			
DD	Acting to stop [the nosebleed]	Acting to stop the nosebleed		Acting to stop [the nosebleed]
EE	Caustic remedies	Caustic remedies		
FF	Congealing remedies	Congealing remedies		
GG	Making the blood viscous			
HH	Cooling remedies	Cooling remedies		
II	Cooling the blood	[Cooling the blood][1]		
JJ	Cold remedies			
KK	Expelling the blood from the stomach quickly (ther. against blood in stomach)			
LL	Adhesive remedies	Adhesive remedies		
MM	Regulating the blood			
NN	Anesthetizing remedies			
OO	Remedies with a special property	Remedies with a special property[2]		
PP	Strengthening remedies			

[1] By venesection.
[2] Arabic *fāʿila bi-l-khāṣṣiya*.

Code	Ibn Sīnā	Ibn al-Nafīs	al-Jaghmīnī	Supracommentary
QQ	Thickening remedies			
RR	Thickening the blood (therapy after venesection)			
SS	Vomiting (therapy against blood in stomach)			
TT	Remedies that combine two or three [of these] qualities			
nAA		Cooling the liver		

APPENDIX 11

(See pp. 173, 178)

5.11. Identification of Drugs Recommended for Nosebleed by the Arabic Commentators.[1]

English Name	Arabic Name	Latin (Scientific) Name
Ibn al-Nafīs:		
Sandalwood	*ṣandal*	*ṣandal abyaḍ* (white sandalwood) = *Santalum album* L.[2] *ṣandal aḥmar* (red sandalwood) = *Pterocarpus santalinus* L.[3]
Al-Jaghmīnī:		
Rhubarb	*rībās*	*Rheum ribes*[4] *Rheum* sp.[5]
Rose water	*al-māward*[6]	*Rosa* L.
Sandalwood	*ṣandal*	*ṣandal abyaḍ* (white sandalwood) = *Santalum album* L.[7] *ṣandal aḥmar* (red sandalwood) = *Pterocarpus santalinus* L.[8]
Supracommentary:		
Barberry	*anbarbārīs*	*Berberis vulgaris*[9] *Berberis* L.[10]
Pomegranate	*rummān*	*Punica granatum* L.[11]

---

[1] For methodology, see Chapters 5.1.5.3 and 5.2.5.2. Only those simple drugs which do not appear in the treatments recommended in *K. al-Qānūn* are given. For the identification of the rest of the drugs, see Appendix 1.

[2] Kahl, 2003, pp. 207, 235; *ibid*., 2007, pp. 328, 345; Lev and Amar, 2008, pp. 476–477; Schmucker, 1969, no. 461.

[3] Kahl, 2003, pp. 207, 235; *ibid*., 2007, pp. 328, 345; Lev and Amar, 2008, pp. 476–477; Levey, 1966, p. 298; Schmucker, 1969, no. 461.

[4] Kahl, 2007, pp. 328, 345; Schmucker, 1969, no. 333.

[5] Lev, 2003, pp. 76–77; Lev and Amar, 2008, p. 259; *ibid*., 2002, n. 161, p. 218.

[6] *māʾ al-ward* = rose water (Dols, 1984, p. 163; Kahl, 2003, p. 205).

[7] Kahl, 2003, pp. 207, 235; *ibid*., 2007, pp. 328, 345; Lev and Amar, 2008, pp. 476–477; Schmucker, 1969, no. 461.

[8] Kahl, 2003, pp. 207, 235; *ibid*., 2007, pp. 328, 345; Lev and Amar, 2008, pp. 476–477; Levey, 1966, p. 298; Schmucker, 1969, no. 461.

[9] Kahl, 2003, pp. 201, 232; *ibid*., 2007, p. 323; Lev and Amar, 2008, p. 114.

[10] Schmucker, 1969, no. 71; Lev and Amar, 2008, p. 114; see *ibid*., 2002, n. 36, p. 90.

[11] Dietrich, 1991, I:113, p. 80; Kahl, 2003, pp. 207, 235; *ibid*., 2007, pp. 328, 345; Schmucker, 1969, no. 329; Lev and Amar, 2008, p. 248; see *ibid*., 2002, n. 165, p. 222; Beck, 2005, I:110, p. 82.

APPENDIX 12

(See p. 173)

5.12. The Frequencies of the Drugs in the Prescriptions for Nosebleed by Ibn al-Nafīs.

Drug	**Frequency**
Acacia	1
Basil	1
Camphor	2
Cobweb	3
Excrement of donkey	2
Frankincense	1
Gallnut	2
Henbane	1
Ink[1]	1
Lentil	1
Lettuce	1
Mill dust	3
Mint	1
Opium	2
Plantain	1
Pomegranate flower	2
Rose	2
Sandalwood	2
Vitriol	1

[1] *Ḥibr*.

APPENDIX 13

(See pp. 178–179)

5.13a. The Frequencies of the Drugs in the Prescriptions for Nosebleed by al-Jaghmīnī.

Drug	**Frequency**
Camphor	1
Grapes, unripe, juice of	1
Lentil	1
Plantain	1
Rhubarb	1
Rose	3
Sandalwood	1

5.13b. The Frequencies of the Drugs in the Prescriptions for Nosebleed by Supracommentary to *Qānūnja*.

Drug	**Frequency**
Aloe	1
Barberry	1
Frankincense	1
Lentil	1[1]
Pomegranate seeds	1
Sumac	1
Vinegar	3
Wine	1

[1] Implicitly; see p. 177, n. 175, above.

APPENDIX 14

(See p. 179)

5.14. All the Drugs Used for Nosebleed and their Frequencies in *K. al-Qānūn* and the Different Arabic Commentaries.[1]

#Texts	**Drug**	**b.S.**	**b.N.**	**J**	**sc**
2	Acacia	2	1		
2	Aloe	3			1
1	Barberry				1
2	Basil	5	1		
1	Brains of chicken	1			
1	Broom	1			
1	Buckthorn	2			
3	Camphor	8	2	1	
1	Cheese	1			
1	Clay + clay, Armenian + clay, pottery + *terra sigillata*	3			
1	Clove	1			
2	Cobweb	1	3		
1	Coriander	1			
1	Cotton-like substance[2]	1			
1	Cucumber	1			
1	Dates, unripe	4			
1	Dog-rose	1			
1	Egg	5			
2	Excrement of donkey	4	2		
3	Frankincense	6	1		1
1	Frog	1			

[1] #texts = number of texts (= *K. al-Qānūn* or Arabic commentaries) in which the drug appears in prescriptions for nosebleed; b.S. = Ibn Sīnā; b.N. = Ibn al-Nafīs; J. = al-Jaghmīnī; sc = Supracommentary.

[2] See p. 150, ns. 98–99, above.

#Texts	Drug	b.S.	b.N.	J	sc
2	Gallnut	3	2		
1	Grapes, unripe, juice of + grapevine	3		1	
2	Hare, fur of	2			
2	Henbane	1	1		
2	Ink, scribes'	2	1		
1	Jujube	1			
1	Knotgrass + mandrake[3]	4			
1	Leek	3			
1	Lemongrass	1			
4	Lentil	2	1	1	1[4]
2	Lettuce	1	1		
1	Lime(stone) + gypsum, lime + quicklime	4			
1	Linen, flax	1			
1	Lycium, Indian	2			
1	Milk	1			
2	Mill dust	3	3		
2	Mint	2	1		
1	Mummy	1			
1	Musk	1			
1	Myrrh	1			
1	Myrtle	1			
1	Nettle	1			
2	Opium + poppy	3	2		

[3] Based on the Latin synonymy in Prescription #28, Appendix 17, p. 389, below.

[4] Not explicitly mentioned in the Supracommentary, but adding to Prescription #6 in *Qānūnja*, the main ingredient of which is lentil. See pp. 175, 177, above.

#Texts	Drug	b.S.	b.N.	J	sc
1	Paper + papyrus + rush	3			
1	Pear	2			
1	Pitch	1			
3	Plantain + fleawort	3	1	1	
1	Platanus	1			
1	Pomegranate				1
2	Pomegranate flower	2	2		
1	Quince	2			
1	Reed	1			
1	Rhubarb			1	
3	Rose	4	2	3	
1	Salsify	2			
1	Salt + salt, bitter	1			
1	Saltwort	2			
2	Sandalwood		2	1	
1	Sponge	1			
2	Sumac	1			1
1	Verdigris	3			
2	Vinegar, wine vinegar	6			3
2	Vitriol + yellow vitriol + copper vitriol	10	1		
1	Willow	3			
2	Wine	1			1

APPENDIX 15

(See p. 181)

5.15a. Medical Qualities in the Arabic Commentators' Drugs for Nosebleed.[1, 2]

#1	#2	Drug	AA	BB	CC	DD	DDb	EE	FF	GG	HH	II	JJ	LL	NN	OO	QQ	RR
2	3	Acacia	+	+							+							
2	3	Aloe		+	+									+				
1	0	Barberry																
2	2	Basil		+			+											
1	2	Brains of chicken		+/−		+/+												
1	1	Buckthorn												+				
3	1	Camphor				+												
1	1	Cheese			+													
1	0	Clay																
1	1	Clove	+															
2	0	Cobweb																
1	5	Coriander		+		+							+		+	+		
1	0	Cucumber																
1	1	Date:[3]																
		balaḥ																
		busr		+														
		nakhl		+														
1	0	Dog-rose																
1	2	Eggs		+										+				

[1] Column #1: number of texts (= *K. al-Qānūn* or Arabic commentaries) in which the drug appears in prescriptions for nosebleed; column #2: number of therapeutically suitable qualities it embodies. AA = sharp remedies, BB = astringent remedies, CC = purging bile from the patient, DD = acting to stop the nosebleed, DDb = against nosebleed, EE = caustic remedies, FF = congealing remedies, GG = making the blood viscous, HH = cooling remedies, II = cooling the blood, JJ = cold remedies, LL = adhesive remedies, NN = anesthetizing remedies, OO = remedies with a special property, QQ = thickening remedies, RR = thickening the blood.

[2] The following drugs were not described in Book II of *K. al-Qānūn*: broom, saltwort, cotton-like substances from plants, juice of unripe grapes, pottery clay (*turāb al-fakhkhār*), and reed.

[3] The three terms for dates and date palm, *balaḥ, busr* and *nakhl*, are all examined together here, as the expression used in the prescriptions, *balaḥ al-nakhl*, is the combination of *balaḥ* and *nakhl*, and *balaḥ* and *busr* are described by Ibn Sīnā in the same article. *balaḥ*, *nakhl*, *busr* = date (unripe) = *Phoenix dactylifera* (Lev and Amar, 2008, p. 397).

#1	#2	Drug	AA	BB	CC	DD	DDb	EE	FF	GG	HH	II	JJ	LL	NN	OO	QQ	RR
2	1	Excrement of donkey				+												
3	3	Frankincense		+		+								+				
1	0	Frogs																
2	2	Gallnut		+									+					
2	2	Grapevine		+				+										
1	3	Gypsum		+		+								+				
1	0	Hare, fur of																
2	2	Henbane							+						+			
2	0	Ink[4]																
1	1	Jujube																+
1	2	Knotgrass		+							+							
1	3	Leek	+	+		+												
1	2	Lemongrass		+										+				
4	2	Lentil		+														+
2	1	Lettuce											+					
1	1	Lime (*nūra*)						+										
1	2	Lycium, Indian		+									+					
1	2	Mandrake		+		+												
1	2	Milk			+									+				
2	0	Mill dust																
2	2	Mint		+					+									
1	0	Mummy																
1	0	Musk																
1	2	Myrrh		+										+				
1	4	Myrtle		+		+					+		+					
1	2	Nettle				+		+										
2	3	Opium	+						+						+			
1	1	Paper				+												
1	0	Papyrus																
1	2	Pear		+					+									
1	0	Pitch																
3	3	Plantain		+							+		+					
1	0	Platanus																
1	3	Pomegranate		+				+						+				

4 *Midād*. *Ḥibr* does not exist in Book II of *K. al-Qānūn*.

#1	#2	Drug	AA	BB	CC	DD	DDb	EE	FF	GG	HH	II	JJ	LL	NN	OO	QQ	RR
2	1	Pomegranate flower												+				
1	1	Quince		+														
1	0	Rhubarb																
3	2	Rose		+				+										
1	0	Salsify																
1	2	Salt water		+	+													
2	0	Sandalwood																
1	0	Sponge																
2	1	Sumac		+														
1	2	*Terra sigillata*									+			+				
1	1	Verdigris	+															
2	2	Vinegar									+		+					
2	3	Vitriol		+			+	+										
1	3	Vitriol, yellow		+			+	+										
1	1	Willow		+														
2	1	Wine		+														
		#66	5	31	4	11	3	7	4	0	6	0	7	11	3	1	0	2
		%	8	47	6	17	5	11	6	0	9	0	11	17	5	2	0	3

5.15b. The Relationship between the Number of Arabic Commentaries a Particular Drug Appears in for Nosebleed and the Qualities of the Drug. Number of Qualities *vs*. Number of Appearances.[5]

	4 app	**3 ≤ app**	**2 ≤ app**	**Altogether**	**Only 1 app**
5 q				2 % (1)	2 % (1)
4 ≤ q				3 % (2)	5 % (2)
3 ≤ q		40 % (2)	25 % (6)	19 % (12)	14 % (6)
2 ≤ q	100 % (1)	80 % (4)	58 % (14)	48 % (32)	43 % (18)
1 ≤ q	100 % (1)	100 % (5)	83 % (20)	73 % (48)	67 % (28)
Altogether	100 % (1)	100 % (5)	100 % (24)	100 % (66)	100 % (42)
0 + 1 q		20 % (1)	42 % (10)	52 % (34)	57 % (24)
0 q			17 % (4)	27 % (18)	33 % (14)
Drugs #	1	5	24	66	42

5.15c. The Relationship between the Number of Arabic Commentaries a Particular Drug Appears in for Nosebleed and the Qualities of the Drug. Number of Appearances *vs*. Number of Qualities.[6]

	5 q	**4 ≤ q**	**3 ≤ q**	**2 ≤ q**	**1 ≤ q**	**0 q**
All drugs	2 %	4 %	19 %	49 %	73 %	27 %
b.S.	2 %	4 %	19 %	51 %	77 %	24 %
b.N.	0 %	0 %	26 %	58 %	79 %	21 %
J	0 %	0 %	17 %	50 %	67 %	33 %
Sc	0 %	0 %	37,5 %	62,5 %	87,5 %	12,5 %

[5] app = number of texts (= *K. al-Qānūn* or Arabic commentaries) in which the drug appears in prescriptions for nosebleed; q = number of therapeutically suitable qualities it embodies; ≤ as much or more. Numbers in brackets = the number of drugs. Drugs # = the total number of drugs in the column.

[6] q = number of therapeutically suitable qualities the drug embodies; b.S. = Ibn Sīnā; b.N. = Ibn al-Nafīs; J. = al-Jaghmīnī; sc = Supracommentary; all drugs = any drug recommended in any of the four texts.

APPENDIX 16

(See p. 199)

5.16. Therapeutic Qualities Required for Drugs for Nosebleed according to *K. al-Qānūn* and the Latin Commentators.

	Ibn Sīnā	**Gentile**	**Despars**
AA	Sharp remedies		Sharp remedies
BB	Astringent remedies	Astringent remedies Styptic remedies	Astringent remedies Styptic remedies
CC	Purging bile from the patient		Purging choleric humors Purging yellow bile from the blood
DD	Acting to stop [the nosebleed]	Acting to stop the flow of blood	Acting to stop the flow of blood [from the nostrils] Preventing flow of blood from nostrils
EE	Caustic remedies	Cauterizing remedies	Burning remedies Caustic remedies Cauterizing remedies
FF	Congealing remedies		Coagulating remedies Nearly congealing the blood
GG	Making the blood viscous	Inspissating the blood	Inspissating the blood Generating thick blood
HH	Cooling remedies	Cooling remedies	Cooling remedies
II	Cooling the blood		Cooling the blood
JJ	Cold remedies	Cold remedies	Cold remedies Aromatic cold remedies
KK	Expelling the blood from the stomach quickly		Removing blood quickly from the whole body
LL	Adhesive remedies	Adhesive remedies	Adhesive remedies Glutinous remedies
MM	Regulating the blood		*Commensuratio sanguis*
NN	Anesthetizing remedies		Narcotic remedies
OO	Remedies with a special property	Through a [special] property	With the whole [special] property Through a [special] property
PP	Strengthening remedies		Strengthening the forces in the body

	Ibn Sīnā	Gentile	Despars
QQ	Thickening remedies		
RR	Thickening the blood (therapy after venesection)	Making the blood thick	Generating thick blood Thickening the blood
SS	Vomiting (therapy against blood in stomach)		Causing vomiting (treatment for blood in stomach)
TT	Remedies that combine two or three [of these] qualities		Remedies whose way of action combines two or three of these qualities
dAA			Aromatic (cold) remedies
dBB			Closing the openings of the veins
dCC			Creating a scab on the opening of the vein[1]
dDD			Replacing the lost spirits
dEE			Generating blood of moderate thickness (*corpulentia*)
dFF			Generating blood of moderate hotness
dGG			*retentum patientis virtus viuificanda* (treatment preventing death)
dHH			Sealing remedies
dII			Viscous remedies

[1] This is mentioned also in *K. al-Qānūn*, but not as a therapeutic quality.

APPENDIX 17

(See pp. 202–203)

5.17. The Prescriptions for Nosebleed by the Latin Commentators.[1]

Ibn Sīnā	Latin Translation	Despars	Gentile
		–cassia fistula ***–manna*** ***–tamarind*** ***–rhubarb*** –**diaprunis**[2] ***–rose*** –**diagredium**	
		–rose	
1. 1. salsify 2. acacia 3. pomegranate flower 4. rose[3] 5. lentil 6. gallnut 7. buckthorn 8. pear 9. quince 10. knotgrass	1. 1. berba hirci 2. accatia 3. balaustia 4. — 5. lentes 6. galla 7. sentis 8. pirum 9. cytonium 10. virga pastoris	1. 1. salsify (*herba hirci*) = salsify (*barba hircina*) = salsify (*ypoquistidos*) 2. acacia (*accatia*) = wild prunes (*prunella agrestis*) 3. pomegranate flower (*balaustia*) = pomegranate flower (*flos caducus malorum granatorum*) 4. — 5. lentil 6. gallnut 7. buckthorn (*sentis*) = bramble (*rubus*) = a briar bush (*dumus*) = bramble (*batus*) 8. pear 9. quince 10. knotgrass (*virga pastoris*) = teasel (*carduus fullonum*) ***–hematite*** ***–Armenian clay*** ***–dragon's blood***	1. 7. buckthorn (*sentis*) = bramble (*rubus*) or buckthorn (*spina alba*)

[1] Latin translation = the Latin translation of *K. al-Qānūn* by Gerard of Cremona as it appears in *Liber Canonis Avicenne* (Venetiis, 1507); M = amount; Q = substitute drug; = = synonym; drugs in bold italics = additions by the commentators. The numbering of the prescriptions corresponds to that of the prescriptions from *K. al-Qānūn* in Chapter 5.1.5.3, above. Additions by the commentators are numbered according to the prescription they follow, with an additional lower-case letter. The same procedure is followed if Ibn Sīnā's original prescription is divided into several prescriptions by the Latin commentators. Asterisk after the list of ingredients indicates the way of application of the drug. The drug names connected with 'OR' are alternative choices for the same prescription.

[2] Medication based on plums.

[3] Missing from the Latin translation and also from Despars.

Ibn Sīnā	**Latin Translation**	**Despars**	**Gentile**
2.	2.	2.	2.
1. opium	1. opium	1. opium	1. opium
2. camphor	2. camphora	2. camphor	8. saltwort
3. henbane[4]	3. iusquiamus	3. white henbane (*iusquamus albus*)	(*alchachille*)
4. gypsum[5]	albus	–***rose water***	= soldanella
5. lettuce	4. —	–***lettuce***	
6. willow	5. lactuce	4. —	
7. unripe dates of	6. salix	5. lettuce	
date palm	7. aqua foliorum	-***rose water***	
8. plantain	palmae	-***black poppy*** (*papauer nigrum*)	
9. saltwort	8. alkakile	6. willow	
		7. leaves of date palm (*aqua*	
		foliorum palmae)	
		= date palm (*palma arbor deferens*	
		dactilos)	
		8. saltwort (*alkakile*)	
		= wild pomegranate (*malum*	
		granatum silvestre)	
		9. plantain (*arnoglossa*)	
		= plantain (*lingua agni*)	
		–***purslane***	
		–***poppy***	
		–***nightshade***	
3.	3.	3.	3.
1. mill dust	1. pulvis	1. mill dust (*pulvis molendinis*)[6]	—
2. frankincense	molendinis	2. frankincense	
	2. thus	–***frankincense bark***	
		–***finely ground frankincense***	
		–***egg-whites***	
		–***terebinth***	
		–***fleawort mucilage***	
		–***cooked gum***	
		–***the finest mill dust***	
		–***mastic***	
		–***gum arabic***	
		–***tragacanth***	
		–***raw egg-whites***	
		–***cotton***	
		–***fur of hares***	

[4] Henbane seed is translated into Latin with *semen iusquiami albi*. Also Despars uses this translation. The expression *iusquiamus albus* is in these Latin texts more usual than mere *iusquiamus*. See Appendix 18.

[5] Missing from the Latin translation and from Despars.

[6] = *tenuissima farina que sua levitate a molendino elevata hincinde parietibus heret* (Despars).

Ibn Sīnā	Latin Translation	Despars	Gentile
4. 1. vitriols 2. yellow vitriol	4. 1. attramentum 2. colcathar	4. 1. vitriol: ***4 kinds:*** –***white vitriol*** –***red vitriol*** –***yellow vitriol*** *(atramentum citrinum)* –***green vitriol*** 2. yellow vitriol (*colcathar*) = a kind of vitriol (*species vitreoli*) = vitriol (*vitreolum*) –***vitriol*** (*vitreolum*) –***quicklime*** –**calcicheos** –***vitriol*** *(vitreolum)* –***copper vitriol*** –***quicklime*** –***red arsenic*** –***vitriol*** *(vitreolum)* –***lime(stone)***	4. 2. yellow vitriol (*colcothar*) = a kind of vitriol (*species vitreoli*)
5. 1. excrement of donkey 2. basil 3. mint	5. 1. stercus asini 2. albedarogi 3. menta	5. 1. excrement of donkey –***frankincense*** –***excrement of pig*** 2. basil (*albedarogi*) = basil (*ozimum fluuiale*) –***Levant cotton*** *(coton)* –***wine vinegar*** –***camphor*** 3. mint –***excrement of donkey***[7] –***excrement of pig***	5. 2. basil (*albedarogi*) = basil (*basilicon*)
		5a –***plantain*** *(arnoglossa)* –***shepherd's purse*** –***plantain*** *(quenqueneruia)* –***plantain*** (*plantago communis*) –***vitriol***	
6. 1. unripe dates of date palm[8] 2. acacia 3. camphor	6. 1. flos palmae 2. acatia 3. camphora	6. 1. flowers of palm (*flos palmae*) 2. acacia 3. camphor	6. —

[7] Despars repeats this and the following drug in spite of them having already been mentioned in this prescription.

[8] See p. 141, n. 72, above.

Ibn Sīnā	Latin Translation	Despars	Gentile
7. 1. unripe dates 2. salsify 3. camphor	7. 1. flos palmae 2. barba hirci 3. camphora	7. 1. flowers ([*aqua*] *florum* [*palmarum*[9]]) Q. plantain ([*aqua*] *plantaginis*) Q. shepherd's purse (*bursa pastoris*) 2. salsify (*barba hirci*) = salsify (*ypoquistidos*) 3. camphor	7. —
8. 1. unripe dates 2. leek	8. 1. [aqua] florum[10] 2. porrum	8. 1. flowers of date palms (*flos palmarum*) Q. dry roses (*rosa sicca*) Q. pomegranate flower (*balaustia*) 2. leek	8. 1. flowers ([*aqua*] *florum*) = date palm (*palma*)
9. 1. bitter salt water	9. 1. aqua salis amari	9. 1. water from which is made bitter-tasting salt	9. —
10. 1. coriander	10. 1. coriandrum	10. 1. coriander	10. —
11. 1. saltwort[11]	11. 1. camomilla	11. 1. chamomile (*camomilla*)	11. 1. saltwort (*cachille*) = soldanella
12. 1. cucumber 2. camphor	12. 1. cucumis 2. camphora	12. 2. camphor 1. cucumber	12. —
13. 1. basil 2. camphor	13. 1. albedarogi 2. camphora	13. 2. camphor 1. basil (*albedarogi*) = basil (*ozimum fluuiale*)	13. 1. basil (*albedarogi*) = basil (*basilicon*)
14. 1. plantain 2. *terra sigillata* 3. camphor	14. 1. arnoglossa 2. terra sigillata or 3. camphora	14. 2. *terra sigillata* 3. camphor 1. plantain (*arnoglossa*) = plantain (*lingua agni*)	14. 1. plantain (*arnaglossa*) = plantain (*plantago*)
15. 1. knotgrass (2. *terra sigillata*)[12] (3. camphor)	15. 1. virga pastoris (2. terra sigillata) (3. camphora)	15. 2. *terra sigillata* 3. camphor 1. knotgrass (*virga pastoris*) = knotgrass (*poligonium*) = teasel (*carduus fullonum*)	15. —

[9] Mentioned later in the prescription.
[10] *Palmarum*; see Gentile's comment.
[11] The Latin translation gives here *succus camomille*. Despars follows this translation, Gentile another, closer to *K. al-Qānūn*.
[12] Ibn Sīnā mentions *terra sigillata* and camphor in Prescription #14, of which Prescription #15 is a variant, but not in Prescription #15.

Ibn Sīnā	Latin Translation	Despars	Gentile
16. 1. juice of the fresh excrement of donkey	16. 1. succus stercoris asini recentis	16. 1. juice of the fresh excrement of donkey	16. —
17. 1. verdigris 2. sesame oil/vinegar[13]	17. 1. flos eris 2. acetum	17. 1. verdigris 2. wine vinegar	17. —
18. 1. pomegranate flower 2. plantain	18. 1. balaustia 2. plantago	18. 1. pomegranate flower 2. plantain (*plantago*)	18. —
19. 1. water 2. opium	19. 1. aqua 2. opium	19. 1. opium –***plantain*** *(plantago)* –***rose water*** 2. water	19. —
20. 1. [tampon] 2. ink 3. vitriol	20. 1. [tenta] 2. encaustum 3. dragantum	20. 1. [tampon] –***linen cloth*** –***cotton*** 2. scribes' ink 3. vitriol (*dragantum*) = vitriol (*vitreolum*)	20. —
21. 1. nettle 2. yellow vitriol 3. fur of hares 4. excrement of donkey 5. leek 6. frankincense	21. 1. vrtica 2. colcatar 3. pilus leporis 4. stercus asini siccum: aut humidum 5. porrum 6. olibanum	21. 1. nettle 5. leek 4. excrement of donkey 2. yellow vitriol (*colcathar*) = a kind of vitriol (*vitreoli species*) 3. fur of hares 6. frankincense (*olibanum*)	21. 2. yellow vitriol (*colcotar*) = a kind of vitriol (*species attrimenti*)
22. 1. Indian lycium 2. basil	22. 1. licium indum 2. aqua albedarogi	22. 1. Indian lycium (*licium indum*) Q. lycium from other areas (*licium alius regionis*) 2. basil	22. 1. lycium (*licium*) = storax (*succus cuiusdam arboris a qua egreditur storax*)
23. 1. mill dust 2. frankincense 3. aloe 4. vinegar 5. egg-white	23. 1. puluis molendinis 2. thus 3. aloe 4. acetum 5. albumin oui	23. 1. mill dust 2. frankincense 3. aloe 4. vinegar 5. egg-white	23. —

[13] For the choice of vinegar instead of sesame oil in Ibn Sīnā's Prescription #17, see p. 144, n. 80, above. Both the Latin translation and Despars prescribe vinegar, not sesame oil.

Ibn Sīnā	Latin Translation	Despars	Gentile
24. 1. vitriol 2. burned paper 3. frankincense 4. basil	24. 1. dragantum 2. charta combusta 3. thus 4. albedarogi	24. 1. vitriol (*dragantum*) = a kind of vitriol (*species vitreoli*) 2. burned paper (*carta combusta*) = rush (*iuncosa palustris*) 3. frankincense 4. basil (*albedarogi*) = basil (*ozimum fluuiale*)	24. —
25. 1. [tampon] 2. rose 3. yellow vitriol 4. aloe	25. 1. [tenta] 2. rosa 3. colcathar 4. aloe	25. 3. yellow vitriol (*colcathar*) = a kind of vitriol (*species vitreoli*) 4. aloe 1a [tampon] or 1b Levant cotton (*coton*) 2. rose	25. —
26. 1. leek 2. mint	26. [–tenta][14] 1. porrum 2. menta	26. –[tenta de] cotton or [–tampon][15] 1. leek 2. mint	26. —
27. 1. sponge 2. melted pitch 3. vinegar	27. 1. spongia 2. pix liquida 3. acetum	27. 1. sponge 2. fluid pitch[16] (*pix liquida*) 3. vinegar	27. —
28. 1a mandrake or 1b cobweb 2. yellow vitriol 3. vitriol 4. verdigris	28. 1a candela alcotrob or 1b tela araneae 2. colcatbar 3. dragantum 4. flos eris	28. 2. yellow vitriol (*colcathar*) = a kind of vitriol (*vitreoli species*) 3. vitriol (*dragantum*) = vitriol (*vitreolum*) 4. verdigris 1a mandrake (*candela alcotrob*) –mandrake (*alcotrob*) = teasel (*carduus fullonum*) –mandrake (*candela alcotrob*) = teasel (*carduus fullonum*) + wax + pitch (*pix*) 1b cobweb	28. —
29. 1. fur of hares 2. frankincense 3. aloe 4. egg-white	29. 1. pilus leporis 2. thus 3. aloe 4. albumin oui	29. 2. frankincense 3. aloe 4. egg-white 1. fur of hares	29. —

14 Not mentioned in the Arabic text of *K. al-Qānūn*.
15 Not mentioned in the Arabic text of *K. al-Qānūn*.
16 Bitumen.

Ibn Sīnā	Latin Translation	Despars	Gentile
30. 1. burned vitriol 2. opium 3. vinegar	30. 1. dragantum adustum 2. opium 3. acetum	30. 1. vitriol (*dragantum*) = vitriol (*vitreolum*) 2. opium 3. wine vinegar ***–[tenta de] cotton*** or ***–[tenta de] stupis***	30. 3. vinegar (*acetum*)
31. 1. egg-shells 2. ink 3. gallnuts	31. 1. cortex oui 2. encaustum 3. galla	31. 1. egg-shells 3. gallnuts 2. scribes' ink	31. —
32. 1. Indian lycium	32. 1. licium indum	32. 1. Indian lycium ***–reed***	32. —
33. 1. frog	33. 1. rana	33. 1. frog	33. —
34a 1. mill dust	34a 1. puluis molendinis	34a 1. mill dust[17]	34a —
34b 1. clay of white clay pottery (= porcelain)	34b 1. terra testa	34b 1. pottery clay = clay of which vases are made	34b 1. white pottery clay = a kind of clay
34c 1. lime	34c 1. nora.	34c 1. (quick)lime (*nora*) = quicklime (*calx uiua*)[18]	34c 1. (quick)lime (*nora*) = lime(stone)
35. 1. frankincense 2. paper 3. vitriol	35. 1. thus 2. charta 3. dragantum	35. 1. frankincense 2. burned paper (*charta combusta*) = rush (*iuncosa plaustris*) 3. vitriol (*dragantum*) = vitriol (*vitreolum*)	35. —
36. 1. platanus tree 2. new 'small jugs of clay' with their clay 3. clay of pottery	36. 1. aldulb 2. vrcei noui cum terra sua 3. terra siguli	36. 1. platanus (*adulb*) = platanus (*platanus*) = platanus (*dulb*) 2. *vrceus nouus cum terra ex que fiunt vrcei* 3. pottery clay (*terra siguli*)	36. 1. platanus (*dulb*) = platanus (*plantanus*) 4. pottery clay (*terra siguli*) = *terra de qua fiunt viceoli*
37. 1. egg-shells	37. 1. cortex oui	37. 1. cortex oui	37. —

[17] = *tenuissime farine que sursum eleuata sua leuitate hincinde sparsa heret* (Despars).
[18] But Despars writes: "… *suspecta est in casu praesenti & tutius est non ipsa vti* …".

Ibn Sīnā	Latin Translation	Despars	Gentile
38. 1. lemongrass 2. dog-rose 3. rose 4. clove 5. myrrh 6. gallnut 7. musk 8. camphor	38. 1. calamus aromaticus 2. lilium[19] 3. rosa 4. gariofilus 5. myrrha 6. galla 7. muschus 8. camphora	38. 1. lemongrass 2. lily (*lilium*) 3. rose 4. clove 5. myrrh 6. gallnut 7. musk 8. camphor	38. —
39. 1. willow 2. grapevine 3. myrtle 4. rose 5. linen [cloth]	39. 1. salix 2. vitis 3. myrtus 4. rosa 5. [pannus] lini	39. 1. willow 2. grapevine 3. myrtle 4. rose –***ice*** *or* –***cold water*** 5a linen [cloth] 5b silk [cloth]	39. —
40. 1. willow 2. buckthorn 3. grapevine 4. pear 5. quince 6. knotgrass	40. 1. salix 2. sentis 3. vitis 4. pirum 5. citonium 6. virga pastoris	40. 1. — [20] 2. buckthorn (*sentis*) = bramble (*rubus*) 3. grapevine (*vitis*) 4. pear 5. quince 6. knotgrass (*virga pastoris*) = knotgrass (*poligonium*) = teasel (*carduus fullonum*)	40. 2. buckthorn (*sentis*) = bramble (*rubus*) = bryony (*vitis alba*)
		40a Simple drugs: –***camphor*** –***sandalwood*** –***Armenian clay*** –***dragon's blood*** –***mandrake*** –***opium***	
		40b –***camphor*** –***Armenian clay*** –***opium*** –***willow*** *(salix)* –***bramble*** *(rubus)* –***grapevine***	

[19] For the translation, see p. 149, n. 96, above.
[20] 'Willow' appears also in the Latin translation, but Despars omits it.

Ibn Sīnā	Latin Translation	Despars	Gentile
		40c –***red sandalwood*** –***dragon's blood*** –***mandrake*** –***pear*** –***quince*** -***knotgrass***	
		40d –***quince*** –***willow*** *(salix)* –***bramble*** *(rubus)* –***grapevine*** –***wax*** –***olive oil*** –***camphor*** –***Armenian clay*** –***opium***	
		40e –***myrtle*** –***pear*** –***quince*** –***knotgrass*** –***olive oil*** –***wax*** –***red sandalwood*** –***dragon's blood*** –***mandrake***	
41. 1. fresh excrement of donkey	41. 1. stercus asini recens	41. 1. fresh excrement of donkey –***camphor*** –***opium*** –***water lily***	41. —

Ibn Sīnā	Latin Translation	Despars	Gentile
42. 1. reed 2. brooms 3a cotton[21] of papyrus 3b cotton-like substance from the rest of the plants	42. 1. canna 2. palma siluestris 3a coton papyri 3b coton reliquorum que egrediuntur ex plantis	42. 1. reed (*canna*) 2. broom (*palma siluestris*) –***excrement of donkey*** –***shepherd's purse*** –***plantain*** *(arnoglossa)* –***plantain*** (*plantago communis*) –***plantain*** *(lanceolata)* –***juices*** –***water*** 3a "cotton" from papyrus (*coton papyri*) 3b ***rush*** = ***papyrus*** 3b "cotton" from other plants 3b ***cotton*** (*bombax*) 3b ***thistles*** (*carduus*) 3b ***marigold*** 3b ***reed*** (*arundo*) -***rose***	42. —
43. 1. jujube	43. 1. iuiuba	43. 1. jujube –***pigs' trotters*** –***chicken liver*** –***rice*** –***peas*** –***water lily*** –***poppy*** –***purslane*** –***lettuces*** –***dock*** *(acedula)*	43. 1. jujube
44. 1. slaked lime or 2. lime [dissolved in] 3. vinegar	44. 1. gypsum infusum aqua aut 2. gypsum [infusum] 3. aceto	44. 1. gypsum in water or 2. gypsum 3. [in] wine vinegar	44. —
45. 1. verdigris	45. 1. flos eris	45. 1. verdigris (*flos eris*) –***vitriol*** *(vitreolum)* –***[tenta ex] cotton***	45. —
46. 1. basil 2. camphor	46. 1. albedarogi 2. camphora	46. 1. basil (*albedarogi*) = basil (*fluuiale ozimum*) –***[tente de] cotton*** 2. camphor	46. —
47. 1. pure mummy	47. 1. mumia pura	47. 1. pure mummy –***cotton***	47. —

[21] Literally, 'cotton'. Actually, a cotton-like substance is intended.

Ibn Sīnā	Latin Translation	Despars	Gentile
		47a –***cold aromatics*** –***meat water*** (*aqua carnis*) –***rose***[22]	
48. 1. lentil 2. sumac or 3. vinegar or 4. juice of unripe grapes	48. 1. [cibus] ex lentibus 2. sumach aut 3. acetum aut 4. agresta	48. 1. lentils 2. sumac or 3. vinegar or 4. juice of unripe grapes (*agresta*) = juice of unripe grapes (*veriutum antiquum*) –***barberry*** –***lemon*** *(citrus)*	48. –***lemon*** *(limonum)* –***orange***
49. 1. cheese	49. 1. caseum	49. 1. cheese	49. —
50. 1. milk	50. 1. lac	50. 1. cow milk	50. —
51. 1. eggs 2. — [23]	51. 1. ouum 2. acetosa	51. 1. egg –***bread*** 2. dock	51. —
52. 1. brains of chicken	52. 1. cerebellum gallinae	52. 1. chicken brains	52. —
53. 1. wine 2. mix it a little [with water]	53. 1. vinum 2. commisce ipsum parumper	53. 1. wine 2.mix it with a little water –***barley*** –***almond*** –***chicken soup*** –***wine*** –***yellow wine*** –***golden wine***	53. —

22 These if the bleeding is continuous, in order to keep patient strong.

23 The Latin text adds to this *cum succo acetose*, 'with the juice of dock,' which would be suitable, especially because of the following remark about sour things being potentially harmful (see p. 151, prescription #51, above).

Ibn Sīnā	Latin Translation	Despars	Gentile
		53a[24] *–cold water* *–oil*	
		53b[25] *–borage* *–blite* *–mercury* *–cyclamen* *–colocynth* *-hierapigra Galieni* *–dill oil* *–salt*	

24 For easifying the vomiting of the blood out of the stomach.
25 Enema to remove the blood quickly from the intestines.

APPENDIX 18

(See pp. 203, 205)

5.18. Identification of Drugs Recommended for Nosebleed by the Latin Commentators.[1]

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonymes
Acacia	*accatia*	1. *Acacia*[2] 2. *Prunus*[3]	AR: *qāqiyā* = *Acacia*[4] –**accatia** = prunellarum agrestium succus
Almond	*amigdalum*	1. *Prunus* = *Amygdalus*[5]	
Aloe	*aloe*	1. *Aloe*[6]	AR: *ṣabr* = *Aloe*[7]
Arsenic, red	*arsenicum rubeum*	1. red arsenic, As4S4[8]	
Barberry	*berberis*	1. *Berberis*[9] 2. *Cistus*[10]	
Barley	*hordeum*	1. *Hordeum*[11]	

[1] For methodology, see Ch. 5.3.5.2.

[2] André, 1956, pp. 14, 300; *ibid*., 1985, p. 2; Glare, 1982, p. 16; Berendes, 1902, p. 119, 1:133; Dragendorff, 1898, p. 290; Beck, 2005, I:101, p. 72.

[3] Daems, 1993, nos. 36, 513; Daems, 1967, p. 264; Thorndike and Benjamin, 1946, pp. 5, 257; André, 1956, p. 262.

[4] Variant of *aqāqiyā* (Schmucker, 1969, no. 61). Beck, 2005, I:101, p. 72; Dietrich, 1991, I:103, pp. 74–75; Dubler, 1953, I:113, pp. 86–87; Kahl, 2003, pp. 206, 232; *ibid*., 2007, pp. 323, 343; Lev and Amar, 2008, pp. 180, 325; Levey, 1966, p. 234; Schmucker, 1969, no. 61.

[5] André, 1985, pp. 14–15; Glare, 1982, p. 125; Liddell and Scott, 1977, p. 81; Riddle, 1987, p. 49; Berendes, 1902, p. 142, 1:176; Wimmer, 1964, p. 532; Beck, 2005, I:123, p. 87; see André, 1956, p. 29; Schmucker, 1969, no. 685.

[6] Daems, 1993, no. 17; *ibid*., 1967, p. 264; André, 1956, p. 24; *ibid*., 1985, p. 11; Glare, 1982, p. 106; Liddell and Scott, 1977, p. 68; Berendes, 1902, p. 277, 3:22 (25); Beck, 2005, III:22, p. 18.

[7] Dubler, 1953, III:23, pp. 279–280; Kahl, 2003, p. 207; *ibid*., 2007, pp. 328, 342; Lev and Amar, 2008, pp. 94–97; *ibid*., 2002, n. 19, p. 74; Levey, 1966, p. 297; Schmucker, 1969, no. 452; see Beck, 2005, III:22, p. 187. For a detailed description of aloe and its history, see Lev, 2003, pp. 33–34.

[8] Daems, 1993, no. 73.

[9] *Ibid*., no. 93.

[10] *berber, burbus* (Arab.) (Dragendorff, 1898, p. 447).

[11] Daems, 1993, nos. 56, 348; André, 1956, p. 165; *ibid*., 1985, p. 126; Daems, 1967, pp. 273, 289; Glare, 1982, p. 803.

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonymes
Basil	*albedarogi*	1. *Ocimum*[12]	AR: *bādharūj* = *Ocimum*[13] –**albedarogi** = basilicon (G.) –**albedarogi** = ozimum fluuiale/fluuiale ozimum
	basilicon	1. *Ocimum*[14]	–basilicon (G.) = **albedarogi**
	ozimum fluviale	1. *Ocimum*[15]	–ozimum fluuiale/fluuiale ozimum = **albedarogi**
Blite	*bletum*	1. *Amaranthus*[16] 2. *Beta*[17]	
Borage	*borago*	1. *Borago*[18] 2. *Anchusa*[19]	
Brains of chicken	*cerebellum gallinae, cerebrum gallinae*		AR: *dimāgh al-dajāj* = chicken brains[20]
Bramble	*batus*	1. *Rubus*[21]	–batus = **sentis** = rubus = dumus

[12] Daems, 1993, nos. 527, 350; Thorndike and Benjamin, 1946, p. 224; André, 1956, pp. 51, 224; Berendes, 1902, p. 229, 2:170; Liddell and Scott, 1977, pp. 309–310; Glare, 1982, p. 1237; Hort, 1961, p. 484; Riddle, 1987, p. 56. Note, however, the following: "Sie (= *Ocimum Basilicum* L.) entspricht nicht dem *Okinos* oder *Okimon* des Hipp., Gal., Diosc. (1), da sie erst im 16. Jahrhundert durch Rumph aus Indien eingeführt sein soll, und dann würde auch das Ocimum der Römer auf eine andere Pflanze gehen. Der Name *Basilica* kommt bei Simeon Sethi vor (1071–1078)." [n. 1: "Vielleicht überhaupt keine Labiate."] Dragendorff, 1898, p. 586.

[13] Dietrich, 1991, II:124, p. 131; Dubler, 1953, II:130, pp. 224–225; Kahl, 2003, pp. 201, 234; *ibid.*, 2007, pp. 324, 345; Lev and Amar, 2008, p. 108; Schmucker, 1969, no. 95; see Beck, 2005, II:141, p. 151.

[14] See p. 397, n. 12, above; André, 1985, pp. 33–34; Lev and Amar, 2008, p. 108 [Arabic bāsilīqūn = *Ocimum basilicum*].

[15] See p. 397, n. 12, above; see André, 1985, p. 175; see Beck, 2005, II:141, p. 151.

[16] Glare, 1982, p. 237; André, 1956, p. 55; *ibid.*, 1985, p. 36; Hort, 1961, p. 443; Riddle, 1987, p. 47; Wimmer, 1964, p. 534 (*Amarantus*); Dragendorff, 1898, p. 200; Löw, 1924–1934, Vol. I, p. 352; Berendes, 1902, p. 216, 2:143; Beck, 2005, II:117, p. 142.

[17] André, 1956, pp. 53, 55; *ibid.*, 1985, p. 36; Daems, 1993, nos. 89, 517.

[18] Daems, 1993, nos. 91, 518.

[19] Daems, 1967, p. 266; see Daems, 1993, no. 518; Lev and Amar, 2008, p. 116: *lisān al-thawr* = *Anchusa* sp. (*Anchusa italica* and *Anchusa officinalis*).

[20] See Kahl, 2007, p. 324; Lev and Amar, 2008, p. 141.

[21] Daems, 1993, no. 644; André, 1956, pp. 52, 275; *ibid.*, 1985, p. 34; Hort, 1961, p. 443; Riddle, 1987, p. 48; Berendes, 1902, p. 385, 4: 37; Wimmer, 1964, p. 534; Dragendorff, 1898, pp. 171, 279; Liddell and Scott, 1977, p. 311; Beck, 2005, IV:37, p. 264.

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonymes
	rubus	1. *Rubus*[22]	–rubus = **sentis** = dumus = batus –rubus vel spina alba (G.) = **sentis** –rubus = **sentis** –rubus (G.) = **sentis** = vitis alba (G.)
Bread	*panis*		
Briar bush	*dumus*	1. a thorn or briar bush[23]	–dumus = **sentis** = rubus = batus
Broom	*palma silvestris*		AR: *makānis* = brooms[24]
Bryony	*vitis alba*	1. *Bryonia*[25] 2. *Tamus*[26] 3. *Rubus*[27] 4. a thorny bush[28]	–vitis alba (G.) = **sentis** = rubus (G.)
Buckthorn	*sentis*	1. *Rubus*[29] 2. *Rhamnus*[30]	AR: *ʿawsaj* = *Lycium*[31] *Rhamnus*[32] –**sentis** = rubus = dumus = batus –**sentis** = rubus vel spina alba (G.) –**sentis** = rubus –**sentis** = rubus (G.) = vitis alba (G.)
	spina alba	1. thorny plants[33] 2. *Rhamnus*[34] 3. *Rubus*[35]	–rubus vel spina alba (G.) = **sentis**

22 Daems, 1993, nos. 644, 325; André, 1956, p. 275; *ibid.*, 1985, p. 220; Glare, 1982, p. 1664.
23 Glare, 1982, p. 580; André, 1956, p. 326.
24 See Lev and Amar, 2002, n. 43, p. 98: *makānis* = Egyptian millet = *Sorghum vulgare* var. *technicum*.
25 Daems, 1993, nos. 754, 58, 72, 82, 523; André, 1956, p. 333; *ibid.*, 1985, p. 273; Glare, 1982, p. 2079; Dragendorff, 1898, p. 650; see Beck, 2005, IV:182, p. 324.
26 Daems, 1993, no. 58; André, 1956, p. 333; *ibid.*, 1985, p. 273.
27 Based on the synonymity with *senticis* and *rubus*.
28 Based on the synonymity with *senticis* and *rubus*.
29 Daems, 1993, no. 644; André, 1956, pp. 290, 275; *ibid.*, 1985, p. 235.
30 On the basis of Arabic.
31 Dietrich, 1991, I:92, p. 68; Kahl, 2007, pp. 323, 343; Lev and Amar, 2008, p. 121; Levey, 1966, p. 308; Schmucker, 1969, no. 510.
32 Schmucker, 1969, no. 510; Dubler, 1953, I:98, pp. 72–73.
33 Daems, 1993, nos. 98, 407; see André, 1956, p. 300.
34 Daems, 1993, nos. 407, 701; André, 1956, pp. 300, 272; *ibid.*, 1985, p. 245.
35 On the basis of synonymity with *rubus* and *senticis*.

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonymes
Calcicheos	*calcicheos*	Possible identifications: 1. *Carlina* (*halkeios*)[36] 2. *Carthamus* (*chalkeios akanthudes*)[37] 3. chalcite, chalcopyrite, copper iron sulfide (*kalkitis*)[38] burned copper, copper burned white (*chalcitis*)[39] 4. copper sulfate, copper vitriol (*chalkites*)[40] 5. calcand, vitriol (*chalkitis*)[41] 6. *squama ferri (calciteos)*[42] 7. *calx (calcineus)*[43] *SEE calx*	
Camphor	*camphora*	1. *Dryobalanops*[44] 2. *Cinnamomum*[45]	AR: *kāfūr* = *Cinnamomum*[46]
Cassia fistula	*cassiafistula*	1. *Cassia*[47] 2. *Cinnamomum*[48]	
Cheese	*caseum*		AR: *jubn* = cheese[49]
Chicken	*capo*[50]		
	pullus[51]		

36 Hort, 1961, p. 483; Wimmer, 1964, p. 547.
37 Wimmer, 1964, p. 547.
38 Berthelot, 1893, Vol. 2, p. 4.
39 *Ibid*, p. 5.
40 *Ibid*., p. 7.
41 *Ibid*., p. 10.
42 Thorndike and Benjamin, 1946, p. 73.
43 Du Cange, 1937–1938, Vol. 2, p. 26.
44 Daems, 1967, p. 278.
45 Schmucker, 1969, no. 610.
46 Kahl, 2003, pp. 204, 233; *ibid*., 2007, pp. 326, 343; Lev and Amar, 2008, p. 123; Levey, 1966, p. 321; Schmucker, 1969, no. 610; see Lev and Amar, 2002, n. 149, p. 206. Schmucker suggests also *Dryobalanops aromatica* Gaertn.; *Blumea balsamifera* Dc.
47 Daems, 1993, no. 153; Kahl, 2003, pp. 204, 232.
48 "tube formé par. l'écorce détachée du Cannelier (casiae fistula)" (André, 1956, p. 139).
49 Lev and Amar, 2008, p. 132; see Lev and Amar, 2002, n. 197, p. 256: *jubn* = cheese (from the milk of cow *Bos taurus*).
50 *gallus castratus* (Battaglia, 1961–2000, Vol. 2, pp. 722–723; Du Cange, 1937–1938, Vol. 2, p. 143).
51 a young domestic fowl, a chicken, pullet (*Gallus domesticus* L.) (Glare, 1982, p. 1518).

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonymes
Clay[52]	*terra*		
Clay, Armenian	*bolus armenius*	1. Red clay composed of oxidized iron with lime chalk[53]	
Clay, pottery	*terra siguli*		
Clove	*gariofilus*	1. *Syzygium* = *Eugenia*[54]	AR: *qaranful* = *Syzygium*[55, 56]
Cobweb[57]	*tela araneae*		AR: *nasj al-ʿankabūt* = cobweb[58]
Colocynth	*colloquintis*	1. *Citrullus*[59] 2. *Cucurbita*[60] 3. *Cucumis*[61]	
Copper vitriol	*calcantum*	1. copper vitriol, CuSO4.5H2O[62]	
Coriander	*coriandrum*	1. *Coriandrum*[63]	AR: *kuzbara* = *Coriandrum*[64]
Cotton	*bombax*	1. *Gossypium*[65]	

[52] 1. clay, 2. earth.

[53] Lev and Amar, 2008, p. 149. "Armenischer Tonerde, Aluminiumsilikate oder Aluminiumoxide, durch Eisen- und Manganoxide braunrot gefärbt" (Daems, 1993, no. 100).

[54] Daems, 1993, nos. 69, 118; *ibid.*, 1967, pp. 273, 274; Glare, 1982, p. 280; Niermeyer, 1954–1976, p. 144; André, 1956, p. 75; *ibid.*, 1985, p. 52; Dragendorff, 1898, p. 472.

[55] = *Caryophyllus aromaticus* L. = *Jambosa caryophyllus* = *Eugenia caryophyllata* Thunb. (Schmucker, 1969, no. 572).

[56] Kahl, 2003, pp. 206, 235; *ibid.* 2007, pp. 327, 343; Lev and Amar, 2008, p. 151; Lev, 2003, pp. 48–49; Levey, 1966, pp. 315–316; Schmucker, 1969, no. 572; see Lev and Amar, 2002, n. 12, p. 66.

[57] Glare, 1982, pp. 159, 1911.

[58] Levey, 1966, p. 340; possible identifications of the spider: *Galeodes* sp. (Lev and Amar, 2008, p. 552); *Araneus* (*Epeira*) sp. (Dubler, 1953, II:56, pp. 156–157); *Araneus diadematus* Clerck. (Dietrich, 1991, II:51, p. 105).

[59] André, 1956, pp. 97, 108; *ibid.*, 1985, p. 71; Daems, 1993, no. 152; Beck, 2005, IV:176, p. 323.

[60] Hort, 1961, p. 458; Riddle, 1987, p. 48; *ibid.*, 1985b, p. 117; Berendes, 1902, p. 226, 2:161; Dragendorff, 1898, p. 652.

[61] Riddle, 1987, p. 53; Berendes, 1902, p. 468, 4:175 (178).

[62] Glare, 1982, pp. 308, 198; Daems, 1993, no. 139; Liddell and Scott, 1977, p. 1972; Berendes, 1902, p. 527, 5:114.

[63] Daems, 1993, nos. 121, 536; *ibid.*, 1967, p. 280; André, 1956, p. 100; *ibid.*, 1985, p. 75; Glare, 1982, p. 445; Dragendorff, 1898, p. 500; see Beck, 2005, III:63, p. 208.

[64] Dietrich, 1991, III:59, p. 176; Dubler, 1953, III:67, pp. 309–310; Kahl, 2003, pp. 204, 233; *ibid.*, 2007, pp. 326, 343; Lev and Amar, 2008, p. 156; Levey, 1966, pp. 326–327; Schmucker, 1969, no. 635; see Beck, 2005, III:63, p. 208; Lev and Amar, 2002, n. 37, p. 92.

[65] André, 1956, p. 178; Niermeyer, 1954–1976, p. 101.

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonymes
	coton	1. *Gossypium*[66]	AR: *quṭn sā'ir mā yakhruju mina al-nabāt* = coto reliquorum qui egrediuntur ex plantis = cotton-like substance from the rest of the plants[67]
Cucumber	*cucumis*	1. *Cucumis*[68] 2. *Citrullus*[69]	AR: *qithā'* = *Cucumis*[70]
Cyclamen	*ciclamen*	1. *Cyclamen*[71] 2. *Aristolochia*[72]	
Date palm	*palma*	1. *Phoenix*[73]	
Dates, unripe	*flos palmae*	1. *Phoenix*[74]	AR: *balaḥ* + *balaḥ al-nakhl* = *Phoenix*[75] –aqua **florum** = palmae (G.)
Diagredium	*diagredium*	Contains: 1. *Convolvulus*[76] 2. *Euphorbia*[77]	
Diaprunis	*diaprunis*	Contains: 1. *Prunus*[78]	

66 Niermeyer, 1954–1976, p. 278; André, 1956, p. 151.

67 *quṭn* = *Gossypium herbaceum* L. (Kahl, 2003, pp. 205, 233; *ibid*., 2007, pp. 328, 342; Lev and Amar, 2008, p. 391; Levey, 1966, p. 317; Schmucker, 1969, no. 584).

68 Daems, 1993, no. 174; André, 1956, pp. 107, 205; *ibid*., 1985, p. 80; Dragendorff, 1898, p. 650; Glare, 1982, p. 464.

69 Daems, 1993, no. 159; André, 1956, pp. 107, 242.

70 Dietrich, 1991, II:118, pp. 128–129; Dubler, 1953, I:124, pp. 217–220; Kahl, 2003, pp. 206, 233; *ibid*., 2007, pp. 327, 345; Lev and Amar, 2008, p. 138; Schmucker, 1969, no. 562; see Beck, 2005, II:135, p. 149; Lev and Amar, 2002, n. 99, p. 154.

71 André, 1956, p. 110; *ibid*., 1985, p. 82; Daems, 1993, nos. 151, 561, 13, 470; Hort, 1961, p. 460; Riddle, 1987, p. 54; Berendes, 1902, p. 242, 2:193; Dragendorff, 1898, p. 513; Glare, 1982, p. 480; Beck, 2005, II:164, p. 161.

72 André, 1956, pp. 41, 110; *ibid*., 1985, p. 83; Daems, 1993, no. 13.

73 Daems, 1993, no. 189; André, 1956, p. 235; *ibid*., 1985, p. 186; Dragendorff, 1898, p. 93; Glare, 1982, p. 1286.

74 Daems, 1993, no. 189; André, 1956, p. 235; *ibid*., 1985, p. 186; Dragendorff, 1898, p. 93; Glare, 1982, p. 1286.

75 Dubler, 1953, I:125–126, pp. 96–97; Kahl, 2007, pp. 324, 343; Lev and Amar, 2008, p. 397; Schmucker, 1969, no. 765, article *nakhl*; see Beck, 2005, I:109, p. 79.

76 André, 1956, pp. 118, 283.

77 Daems, 1993, nos. 29, 196, 241, 744.

78 André, 1956, p. 262; Glare, 1982, p. 1510; see André, 1956, pp. 95, 115.

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonymes
Dill	*anetum*	1. *Anethum*[79]	
Dock	*acedula*	1. *Rumex*[80] 2. *Sempervivum*[81]	
	acetosa[82]	1. *Sempervivum*[83] 2. *Sedum*[84] 3. *Rumex*[85]	
Dragon's blood	*sanguis draconis*	1. *Dracaena*[86] 2. *Calamus*[87] 3. *Daemonorops*[88]	
Egg[89]	*ovum*		AR: *bayḍ* = egg[90] –**oua** elixata = (oua) decocta in aqua donec aliqualiter indurari incipiant
Egg-white[91]	*albumen ovi*		AR: *bayāḍ al-bayḍ* = egg-white[92]
Excrement of donkey[93]	*faex asini*		

[79] Daems, 1993, no. 10; *ibid*., 1967, pp. 265, 269; André, 1956, p. 32; Glare, 1982, p. 128; Liddell and Scott, 1977, p. 125; Riddle, 1987, p. 57; Berendes, 1902, p. 302, 3: 60 (67); Wimmer, 1964, pp. 532–533; Beck, 2005, III:58, p. 207.

[80] Daems, 1993, nos. 14, 15, 498; André, 1956, pp. 16, 232; Thorndike and Benjamin, 1946, p. 6.

[81] *accidula* = *Aizon* (Greek) = *barba Iovis* (Thorndike and Benjamin, 1946, p. 6; André, 1956, pp. 21, 288; Daems, 1993, nos. 47, 54, 88, 428, 524, 733).

[82] Only in the translation of the text of *K. al-Qānūn*. The drug is missing from our Arabic text, but appears in Despars' prescription with the name *acedula*, indicating that the text he was reading would also have has it—or at least a commentary.

[83] Thorndike and Benjamin, 1946, p. 6; André, 1956, pp. 21, 288.

[84] Thorndike and Benjamin, 1946, p. 6; André, 1956, pp. 21, 169, 288.

[85] Battaglia, 1961–2000, Vol. 1, p. 120; Du Cange, 1937–1938, Vol. 1, p. 54.

[86] Daems, 1967, p. 270; Battaglia, 1961–2000, Vol. 17, p. 507.

[87] Battaglia, 1961–2000, Vol. 17, p. 507. Also Dragendorff, 1898, p. 96; not historical.

[88] Dragendorff, 1898, p. 96; not historical.

[89] Glare, 1982, p. 1278.

[90] Dubler, 1953, II:44, pp. 148–149; Kahl, 2007, pp. 324, 329; Lev and Amar, 2008, p. 141; Levey, 1966, pp. 248, 298.

[91] Niermeyer, 1954–1976, p. 33; Glare, 1982, p. 93.

[92] Kahl, 2003, p. 202.

[93] Glare, 1982, pp. 1018, 1818. For more information on the use of excrement for healing purposes, see Beck, 2005, II:80, pp. 124–125.

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonymes
	stercus asini		AR: *rawth al-ḥimār* = excrement of donkey[94] AR: *sirqīn al-ḥimār* = excrement of donkey
Excrement of pig[95]	*stercus porci recens*		
	porcina faex		
Fleawort	*psilium*	1. *Plantago*[96]	
Frankincense	*olibanum*	1. *Boswellia*[97]	AR: *kundur* = *Boswellia*[98]
	thus	1. *Boswellia*[99]	AR: *kundur* = *Boswellia*[100]
Frog[101]	*rana*		AR: *ḍafāḍiʿ* = frogs[102]
Galen's *hierapicra*[103]	*hierapigra Galieni*		
Gallnut	*galla*	1. *gall-nut*[104] 2. *Quercus*[105]	AR: *ʿafṣ* = gallnuts from *Quercus*[106] –**galla** = nux solida

[94] *ḥimār* = donkey, *Equus asinus* (Lev and Amar, 2008, p. 162).

[95] Glare, 1982, pp. 1018, 1818. For more information on the use of excrement for healing purposes, see Beck, 2005, II:80, pp. 124–125.

[96] Daems, 1993, no. 368; André, 1956, p. 263; *ibid.*, 1985, p. 210; Glare, 1982, p. 1511; Dragendorff, 1898, p. 618; Beck, 2005, IV:69, p. 277.

[97] Daems, 1993, nos. 352, 456; *ibid.*, 1967, p. 301; Dragendorff, 1898, p. 366; see Riddle, 1987, p. 59; André, 1985, p. 144; Beck, 2005, I:68, p. 49.

[98] Dietrich, 1991, I:58, p. 57; Kahl, 2003, pp. 204, 232; *ibid.*, 2007, pp. 326, 343; Lev and Amar, 2008, p. 168; see Beck, 2005, I:68, p. 49; Levey, 1966, pp. 328–330. Schmucker, 1969, no. 651, adds *Juniperus* L.

[99] Daems, 1993, nos. 456, 352; *ibid.*, 1967, p. 301, André, 1956, pp. 323, 37; *ibid.*, 1985, p. 266; Glare, 1982, pp. 1939, 1995; Daems.

[100] Dietrich, 1991, I:58, p. 57; Kahl, 2003, pp. 204, 232; *ibid.*, 2007, pp. 326, 343; Lev and Amar, 2008, p. 168; see Beck, 2005, I:68, p. 49; Levey, 1966, pp. 328–330. Schmucker, 1969, no. 651, adds *Juniperus* L.

[101] Glare, 1982, p. 1572.

[102] Several species of *Rana* (Dubler, 1953, II:25, pp. 139–140). See Lev and Amar, 2008, p. 551.

[103] *hiera* = "[remedy filled with or manifestlng] divine [power]" (Kahl, 2007, p. 220, n. 102; see Liddell and Scott, 1977, pp. 820, 822). *hiera picra* = lit. "divine bitter", an antidote (Kahl, 2007, p. 195. n. 41; see Liddell and Scott, 1977).

[104] André, 1956, p. 146; Glare, 1982, p. 753; Niermeyer, 1954–1976, p. 460; Daems, 1967, p. 273.

[105] André, 1956, p. 267; Daems, 1993, no. 242.

[106] Dubler, 1953, I:123, pp. 94–95; Kahl, 2003, pp. 201, 235; Lev and Amar, 2008, p. 225; Schmucker, 1969, no. 492; see Beck, 2005, I:107, p. 78; Lev and Amar, 2002, n. 16, p. 70.

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonymes
Grapes, unripe, or their juice	*agresta*	1. *Vitis* (unripe grapes or their juice)[107]	AR: *ḥiṣrim* = *Vitis*, unripe/sour fruit[108] –**agresta** = veriutum antiquum
	veriutum antiquum	1. *Vitis*[109]	–veriutum antiquum = **agresta**
Grapevine	*vitis*	1. *Vitis*[110]	AR: *karm* = *Vitis*[111]
Gum	*gummi*	1. gum[112] 2. resin[113]	
Gum arabic	*gummi arabicum*	1. *Acacia*[114]	
Hares, fur of	*pilus leporis*	1. fur of hare	AR: *wabar al-arnab* = fur of hare[115]
Hematite	*lapis sanguinaria*	1. hematite[116]	
Hen[117]	*gallina*		
Henbane	*iusquamus albus*	1. *Hyoscyamus*[118]	AR: *banj* = *Hyoscyamus*[119]
Ink,[120] scribes'	*encaustum scriptorum*		AR: *ḥibr* = ink[121] –**encaustum** = encaustum scriptorum[122]

[107] Dragendorff, 1898, p. 415; André, 1956, p. 21; Thorndike and Benjamin, 1946, p. 12; Schelenz, 1965, p. 99.
[108] Kahl, 2007, pp. 325, 343; Lev and Amar, 2008, p. 176; Lev, 2003, pp. 57–59; Schmucker, 1969, no. 245; see Beck, 2005, V:5, p. 332.
[109] *Omphax* et *Omphacium* (*verjutum*) (Du Cange, 1937–1938, Vol. 8, p. 282). Based also on synonymity with *agresta*.
[110] André, 1956, p. 333; *ibid*., 1985, p. 273; Glare, 1982, p. 2079; Daems, 1967, p. 302.
[111] Kahl, 2003, pp. 204, 235; *ibid*., 2007, pp. 326, 345; Lev, 2003, pp. 57–59; Schmucker, 1969, no. 632; see Beck, 2005, V:1, p. 330.
[112] André, 1956, p. 109; Glare, 1982, p. 470; Niermeyer, 1954–1976, p. 477.
[113] Niermeyer, 1954–1976, p. 477; André, 1956, p. 109.
[114] Daems, 1967, p. 275.
[115] Dietrich, 1991, II:18, p. 96; Kahl, 2003, pp. 204, 236; *ibid*., 2007, pp. 329.
[116] Battaglia, 1961–2000, Vol. 13, p. 428; see Daems, 1993, no. 299.
[117] *Gallus domesticus* L. (Glare, 1982, p. 753).
[118] Daems, 1993, nos. 260, 127, 609; *ibid*., 1967, pp. 277, 266; André, 1956, pp. 166, 25; *ibid*., 1985, p. 127; Glare, 1982, pp. 811, 108; Riddle, 1987, p. 60; see Beck, 2005, IV:68, p. 276.
[119] Dubler, 1953, IV:70, pp. 416–418; Kahl, 2003, pp. 201, 234; *ibid*., 2007, pp. 324, 343; Lev and Amar, 2008, p. 418; Levey, 1966, p. 246; Schmucker, 1969, no. 147; see Beck, 2005, IV:68, p. 276.
[120] Niermeyer, 1954–1976, p. 374.
[121] Kahl, 2007, p. 325. On the preparation of ink, see Beck, 2005, V:162, pp. 400–401.
[122] Despars; but not given as a synonyme.

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonymes
Jujube	*iuiuba*	1. *Zizyphus*[123]	AR: *ʿunnāb* = *Zizyphus*[124]
Knotgrass	*poligonium*	1. *Polygonum*[125] 2. *Dipsacus*[126]	–poligonium = **virga pastoris** = carduus fullonum –poligonium = **virga pastoris** = carduus fullonum
	virga pastoris	1. *Dipsacus*[127] 2. *Polygonum*[128]	AR: *ʿaṣā al-rāʿī* = *Polygonum*[129] **–virga pastoris** = poligonium = carduus fullonum **–virga pastoris** = poligonium = carduus fullonum
Leek	*porrum*	1. *Allium*[130]	AR: *kurrāth* = Allium[131]
Lemon	*citrus,* *acetositatum citri*	1. *Citrus*[132] 2. *Callitris*[133] 3. *Melissa*[134]	
	limon	1. *Citrus*[135] 2. *Citrullus*[136]	

[123] André, 1956, p. 341; *ibid.*, 1985, p. 280.

[124] Kahl, 2003, pp. 208, 235; *ibid.*, 2007, pp. 329, 344; Lev and Amar, 2008, p. 188; Levey, 1966, p. 236; Schmucker, 1969, no. 499; see Lev and Amar, 2002, n. 176, p. 232.

[125] Daems, 1993, nos. 142, 166, 384; André, 1956, pp. 257, 281; *ibid.*, 1985, p. 204; *polligonia* = *sanguinaria*: Thorndike and Benjamin, 1946, p. 253; Daems, 1993, no. 727; Beck, 2005, IV:4, p. 253.

[126] Because of the synonymy with *virga pastoris* and *carduum fullonum*.

[127] Daems, 1993, nos. 160, 474, 750; Löw, 1924–1934, Vol. 1, p. 587.

[128] Based on the Arabic term and the synonymy with *poligonium*.

[129] Dubler, 1953, IV:4, pp. 378–379; Kahl, 2003, pp. 201, 235; *ibid.*, 2007, pp. 323, 344; Schmucker, 1969, nos. 430, 490, 767; see Beck, 2005, IV:4, p. 253.

[130] Daems, 1993, nos. 355, 683; *ibid.*, 1967, pp. 282–283; André, 1956, p. 259; *ibid.*, 1985, p. 206; Glare, 1982, p. 1407; Dragendorff, 1898, p. 121.

[131] Dietrich, 1991, II:132, p. 134; Dubler, 1953, II:138, pp. 229–230; Kahl, 2003, pp. 204, 232; *ibid.*, 2007, pp. 326, 344; Lev and Amar, 2008, p. 433; Levey, 1966, pp. 323–324; Schmucker, 1969, no. 624; see Beck, 2005, II:149, p. 154.

[132] André, 1956, p. 93; *ibid.*, 1985, p. 68; Glare, 1982, pp. 329, 1069; Dragendorff, 1898, p. 359.

[133] André, 1956, p. 93; *ibid.*, 1985, p. 68; Glare, 1982, p. 329.

[134] André, 1956, pp. 34, 93; Daems, 1993, no. 318.

[135] Niermeyer, 1954–1976, p. 54; Battaglia, 1961–2000, Vol. 1, p. 608; see André, 1985, pp. 145–146.

[136] André, 1956, pp. 187, 242; *ibid.*, 1985, pp. 145–146.

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonymes
Lentil	*lens*	1. *Lens*[137]	AR: *ʿadas* = *Lens*[138]
Lettuce	*lactuca*	1. *Lactuca*[139]	AR: *khass* = *Lactuca*[140]
Lily / dog-rose	*lilium*	1. *Lilium*[141] 2. *Iris*[142]	AR: *nisrīn* = *Rosa*[143]
Lime, gypsum	*gypsum*	1. gypsum (hydrous calcium sulphate)[144]	AR: *jiṣṣ* = gypsum = $CaSO_4.2H_2O$, calcium sulphate[145] AR: *jiṣṣ mayyīt* = gypsum infusum aqua[146]
Lime(stone)	*calx*	1. lime, limestone[147]	–calx (G.) = **nora**
Linen, flax	*linum*	1. *Linum*[148]	AR: *kattān* = *Linum*[149]
Liver	*iecor*		
Lycium	*licium*[150]	1. *Rhamnus*[151]	–**licium** = succus cuiusdam arboris a qua egreditur storax (G.)

137 Daems, 1993, no. 297; André, 1956, p. 183; *ibid.*, 1985, p. 141.

138 Dietrich, 1991, II:92, p. 118; Dubler, 1953, II:98, pp. 192–193; Kahl, 2003, pp. 201, 234; *ibid.*, 2007, pp. 323, 344; Lev and Amar, 2008, p. 435; Levey, 1966, p. 302; Schmucker, 1969, no. 679; see Beck, 2005, II:107, p. 137.

139 Daems, 1993, nos. 275, 615; *ibid.*, 1967, p. 281; André, 1956, p. 176; *ibid.*, 1985, p. 136; Dragendorff, 1898, p. 691.

140 Dietrich, 1991, II:119, p. 129; Kahl, 2003, pp. 205, 234; *ibid.*, 2007, pp. 325, 344; Lev and Amar, 2008, p. 437; Schmucker, 1969, no. 270; see Beck, 2005, II:136, p. 150; Lev and Amar, 2002, n. 57, p. 112.

141 Daems, 1993, nos. 619, 273, 273*; *ibid.*, 1967, p. 281; André, 1956, p. 187; *ibid.*, 1985, p. 145; Glare, 1982, p. 1030; Dragendorff, 1898, p. 122.

142 Daems, 1993, nos. 273, 273*; André, 1956, pp. 187, 171; see *ibid.*, 1985, p. 145.

143 Dietrich, 1991, I:96, p. 70; Kahl, 2003, pp. 202, 235; Lev and Amar, 2008, pp. 261–262; Lev, 2003, pp. 52–54; Schmucker, 1969, no. 768.

144 Glare, 1982, p. 779; Riddle, 1985b, p. 158; Beck, 2005, V:116, p. 387.

145 Kahl, 2003, pp. 203, 236; Lev and Amar, 2008, p. 416; Schmucker, 1969, nos. 187, 197; see Beck, 2005, V:116, p. 387.

146 Schmucker, 1969, nos. 197, 187.

147 Glare, 1982, pp. 261–262.

148 André, 1956, p. 188; Hort, 1961, p. 462; Riddle, 1987, p. 50; Dragendorff, 1898, p. 342; Daems, 1967, p. 283; Glare, 1982, p. 1034; see Beck, 2005, II:103, p. 135.

149 Dietrich, 1991, II:88, p. 116; Dubler, 1953, I:94, pp. 189–190; Kahl, 2003, pp. 204, 234; *ibid.*, 2007, pp. 324, 344; Lev and Amar, 2008, p. 439; Schmucker, no. 620; see Beck, 2005, II:103, p. 135; Lev and Amar, 2002, n. 136, p. 190.

150 Or: both *licium indum* and *licium*, which is its *quid pro quo*, *Rhamnus*.

151 André, 1956, pp. 192, 266; *ibid.*, 1985, p. 149; Glare, 1982, p. 1055; Dragendorff, 1898, p. 413; Riddle 1985b, p. 50; Beck, 2005, I:100, p. 71. Also *Lonicera* suggested: Daems,

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonymes
Lycium, Indian	*licium indum*	1. *Acacia*[152] 2. *Berberis*[153] 3. *Rhamnus*[154]	AR: *ḥuḍaḍ hindī* = *Lycium*[155] *Rhamnus*[156]
Mandrake	*candela alcotrob*	(No information. The identification is based on the Arabic original.)	AR: *sirāj al-quṭrub* = *Mandragora*[157] –**alcotrob** = carduus fullonum –**candela alcotrob** = carduus fullonum: ramuli modicum politi cera circumuoluti cum modica pice
	mandragora	1. *Mandragora*[158]	
Manna, frankincense	*manna*	1. *Boswellia*[159]	
Marigold	*caput monachi*	1. *Calendula*[160] 2. *Taraxacum*[161]	
Mastic	*mastix*	1. *Pistacia*[162]	
Meat	*caro, carnis*	1. meat 2. pulp of fleshy substance of plants or their fruits, sap-wood	
Mercury	*mercurialis*	1. *Mercurialis*[163]	

1993, no. 551; *ibid.*, 1967, p. 279 (*mater silua*) *licium: "matersilve … de cuius suco fit licium et dicitur etiam caprifolium"* (Thorndike and Benjamin, 1946, p. 184; André, 1956, p. 294).

152 André, 1956, p. 192; *ibid.*, 1985, p. 149; Glare, 1982, p. 1055.

153 *lycium indicum* (Dragendorff, 1898, p. 232).

154 Because of the Arabic meaning of the word and *licium*'s translation.

155 Kahl, 2003, pp. 204, 234; *ibid.*, 2007, pp. 325, 344; Dubler, 1953, I:112, pp. 85–86; Levey, 1966, p. 259.

156 Schmucker, 1969, no. 246; see Beck, 2005, I:100, p. 71.

157 Dietrich, 1991, IV:69, pp. 243–244; Kahl, 2007, pp. 330, 344; Schmucker, 1969, no. 805; see Beck, 2005, IV:75, p. 280.

158 Daems, 1993, no. 313; *ibid.*, 1967, p. 284; André, 1956, p. 199; *ibid.*, 1985, pp. 153–154; Glare, 1982, p. 1072; Hort, 1961, p. 463; Riddle, 1987, p. 60; Dragendorff, 1898, p. 597; Beck, 2005, IV:75, p. 280.

159 Daems, 1993, no. 352; André, 1956, p. 200; *ibid.*, 1985, pp. 154, 266; Glare, 1982, p. 1074.

160 Daems, 1993, nos. 150, 180, 541.

161 Daems, 1993, no. 150.

162 André, 1956, p. 201, see p. 183; *ibid.*, 1985, p. 155; Glare, 1982, p. 1082; Dragendorff, 1898, p. 396; Daems, 1967, p. 285.

163 Glare, 1982, p. 1102; André, 1956, p. 207; *ibid.*, 1985, pp. 159–160; Daems, 1993, nos. 315, 632; *ibid.*, 1967, p. 287; Dragendorff, 1898, pp. 378–379 (*mercurialis herba*); Thorndike and Benjamin, 1946, p. 190.

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonymes
Milk	*lac*		AR: *laban, albān* (pl.) = milk[164]
Mill dust[165]	*pulvis molendinis*		AR: *ghubār al-raḥā* = mill dust[166] –pulvis **molendinis** = tenuissima farina que sua levitate a molendino elevata hincinde parietibus heret –pulveris **molendini** = tenuissima farina que sursum eleuata sua leuitate hincinde sparsa heret
Mint	*menta*	1. *Mentha*[167]	AR: *naʿnaʿ* = *Mentha*[168]
Mummy	*pura mumia*		AR: *al-mūmiyāʾ al-khāliṣ* = asphalt[169]
Musk[170]	*muschus*		AR: *misk* = *Moschus*[171]
Myrrh	*myrrha*	1. *Commiphora*[172]	AR: *murr* = *Commiphora*[173]

164 Dietrich, 1991, II:58, p. 1097; Kahl, 2003, p. 201; *ibid*., 2007, p. 326; Levey, 1966, p. 330.

165 See Glare, 1982, p. 1125; Niermeyer, 1954–1976, p. 700.

166 Dietrich, 1991, II:72, p. 111 and p. 111, n. 1: Finely ground flour, literally: grindstone dust.

167 Daems, 1993, nos. 304, 87, 356, 429, 639, 658; André, 1956, pp. 206, 207, 296; *ibid*., 1985, p. 159; Glare, 1982, p. 1100; Hort, 1961, p. 465; Daems, 1967, p. 286; Beck, 2005, III:34, p. 195.

168 Dietrich, 1991, III:32, p. 165; Dubler, 1953, III:37, p. 290; Kahl, 2003, pp. 206, 232; *ibid*., 2007, pp. 327, 344; Lev and Amar, 2008, p. 449; Schmucker, 1969, no. 772; see Beck, 2005, III:34, p. 195; Lev and Amar, 2002, n. 106, p. 160.

169 Dietrich, 1991, I:72, p. 61; Lev, 2003, pp. 96–97; Schmucker, 1969, no. 747; see Lev and Amar, 2002, n. 227, p. 292; for a comprehensive analysis, see Lev and Amar, 2008, p. 354.

170 musk: "Sekret in einem Beutel vom männlichen *Moschus moschiferus* L." (Daems, 1993, no. 310; see Niermeyer, 1954–1976, p. 712).

171 Kahl, 2003, pp. 206, 236; *ibid*., 2007, p. 327; Lev, 2003, pp. 15–16; see Lev and Amar, 2002, n. 194, p. 254. "Musk is a substance used as a perfume and medicine. Its source is the anal glands of the musk deer … The substance in its raw state is dark brown, but some time after extraction it turns black." Lev and Amar, 2008, p. 215.

172 André, 1956, p. 215; *ibid*., 1985, p. 167; Glare, 1982, p. 1147; Dragendorff, 1898, p. 367; Daems, 1967, p. 287; see Beck, 2005, I:64, p. 45.

173 Dietrich, 1991, I:55, p. 55; Kahl, 2003, pp. 206, 233; *ibid*., 2007, pp. 327, 344; Lev and Amar, 2008, p. 221; Lev, 2003, p. 71; Schmucker, 1969, no. 704; see Beck, 2005, I:64,

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonymes
Myrtle	*myrtus*	1. *Myrtus*[174]	AR: *ās* = *Myrtus*[175]
Nettle	*urtica*	1. *Urtica*[176]	AR: *qurrayṣ* = *Urtica*[177]
Nightshade	*solatrum*	1. *Atropa*[178] 2. *Solanum*[179] 3. *Physalis*[180]	
Olive (oil)	*olea*	1. *Olea*[181]	
Opium	*opium*	1. *Papaver*[182]	AR: *afyūn* = *Papaver*[183]
Orange	*arancium*	1. *Citrus*[184]	
Paper	*charta, carta*	1. Papyrus: 'Paper' made from papyrus, or a sheet of it[185] 2. material for writing[186]	AR: *qirṭās* = *Cyperus*[187] –**carta** = iuncosa palustris –**charta** = iuncosa plaustris (sic) SEE papyrus

p. 45; Lev and Amar, 2002, n. 95, p. 150. Also *Balsamodendron myrrha* Nees. suggested: Dubler, 1953, I:63, pp. 47–48; Levey, 1966, pp. 333–334; Schmucker, 1969, no. 704.

174 Daems, 1993, no. 638; André, 1956, p. 213; *ibid*., 1985, p. 165; Glare, 1982, p. 1153; Hort, 1961, p. 465; Dragendorff, 1898, pp. 468–469; see Beck, 2005, I:112, p. 82.

175 Dietrich, 1991, I:115, pp. 81–82; Dubler, 1953, I:128, pp. 99–100; Kahl, 2003, pp. 201, 234; *ibid*., 2007, pp. 323, 344; Lev and Amar, 2008, p. 223; Schmucker, 1969, no. 19; see Beck, 2005, I:112, p. 82.

176 Daems, 1993, nos. 468, 38; *ibid*., 1967, p. 288; André, 1956, p. 336; *ibid*., 1985, p. 276; Glare, 1982, p. 2108; Dragendorff, 1898, p. 179.

177 Dietrich, 1991, IV:75, pp. 249–250; Dubler, 1953, IV:95, pp. 436–437; Kahl, 2003, pp. 206, 235; Schmucker, 1969, no. 575; see Beck, 2005, IV:93, p. 288; Lev and Amar, 2002, n. 114, p. 168.

178 Daems, 1993, nos. 426/427, 718, 306, 472; *ibid*., 1967, p. 288; André, 1956, p. 306.

179 Daems, 1993, no. 426/427, 306, 472; *ibid*., 1967, p. 288; André, 1956, p. 305.

180 Daems, 1993, no. 426/427, 509; André, 1956, p. 306.

181 André, 1956, p. 225; *ibid*., 1985, pp. 176–177; Glare, 1982, p. 1244.

182 Daems, 1993, no. 347; André, 1956, p. 228; *ibid*., 1985, p. 179; Glare, 1982, p. 1254; Dragendorff, 1898, p. 249.

183 Dietrich, 1991, IV:59, p. 239; Kahl, 2003, pp. 201, 234; *ibid*., 2007, pp. 323, 344; Lev and Amar, 2008, pp. 231–232; Schmucker, 1969, nos. 60, 273; Tibi, 2006, p. 2.

184 Niermeyer, 1954–1976, p, 54; Du Cange, 1937–1938, Vol. 1, p. 350; Battaglia, 1961–2000, Vol. 1, p. 608.

185 Glare, 1982, p. 309.

186 *Ibid*.; see Niermeyer, 1954–1976, p. 174.

187 Dietrich, 1991, I:88, pp. 66–67; Kahl, 2003, pp. 206, 233; *ibid*., Kahl, 2007, pp. 327, 344; Lev and Amar, 2008, p. 461.

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonymes
Papyrus	*papyrus*	1. *Cyperus*[188]	AR: *bardī* = *Cyperus*[189] –iuncus = **papyrus**
Pea	*pisum*	1. *Pisum*[190]	
Pear	*pirum*	1. *Pyrus*[191]	AR: *kummathrā* = *Pyrus*[192]
Pig's trotters	*pedes porcini*		
Pitch	*pix, pix liquida*	1. pitch[193]	AR: *zift* = pitch[194] bitumen[195] asphalt[196]
Plantain	*arnoglossa*	1. *Plantago*[197]	AR: *lisān al-ḥamal* = *Plantago*[198] –**arnoglossa** = lingua agni –**arnaglossa** = plantago (G.)
	plantago lanceolata	1. *Plantago*[199]	

188 Daems, 1993, nos. 272, 272*; André, 1956, p. 238; *ibid.*, 1985, p. 188; Glare, 1982, p. 1292; Hort, 1961, p. 468; Dragendorff, 1898, p. 91; Beck, 2005, I:86, p. 64.

189 Dietrich, 1991, I:88, pp. 66–67; Dubler, 1953, I:95, p. 71; Lev and Amar, 2008, p. 461; Schmucker, 1969, no. 113; see Beck, 2005, I:86, p. 64.

190 André, 1956, p. 253; *ibid.*, 1985, p. 201; Glare, 1982, p. 1383; Riddle, 1987, p. 48; Hort, 1961, p. 470; Dragendorff, 1898, p. 331.

191 Dragendorff, 1898, pp. 275–276; Daems, 1967, p. 290; André, 1956, pp. 251, 253; *ibid.*, 1985, pp. 200–201; Glare, 1982, p. 1382; Niermeyer, 1954–1976, p. 798.

192 Dietrich, 1991, I:123, p. 84; Dubler, 1953, I:132, p. 107; Kahl, 2007, pp. 326, 344; Lev and Amar, 2008, p. 462; Schmucker, 1969, no. 648; see Beck, 2005, I:116, p. 85.

193 Obtained by distilling tar (Glare, 1982, p. 1384).

194 Dietrich, 1991, I:68–70, p. 60; Kahl, 2003, p. 209; *ibid.*, 2007, p. 330; Lev and Amar, 2008, p. 343; Lev, 2003, pp. 20–21; Levey, 1966, p. 276; Schmucker, 1969, no. 350.

195 Lev, 2003, pp. 20–21; Lev and Amar, 2008, p. 343; Levey, 1966, p. 276.

196 Lev, 2003, pp. 20–21. Lev and Amar, 2008, p. 343: "Asphalt (Pitch, Bitumen, Tar, Pix). A resinous mineral, solid or semi-solid, which consists of a mixture of hydrocarbon created naturally, probably due to a solidification or oxidizing process. Asphalt sometimes erupts from the earth along the shores of the Dead Sea, from springs in the Judean Desert, and all along the Mediterranean coast." On ancient and medieval asphalt trade, see Lev, 2003, pp. 20–21.

197 Daems, 1993, nos. 53, 506, 5; *ibid.*, 1967, p. 265; André, 1956, pp. 41, 254; *ibid.*, 1985, p. 26; Hort, 1961, p. 442; Liddell and Scott, 1977, p. 221; Berendes, 1902, p. 222, 2:152; Wimmer, 1964, p. 533; Dragendorff, 1898, p. 619; Beck, 2005, II:126, p. 145.

198 Dietrich, 1991, II:109, pp. 124–125; Dubler, 1953, II:115, pp. 208–210; Kahl, 2003, pp. 205, 235; *ibid.*, 2007, pp. 326, 345; Lev and Amar, 2008, p. 242; Schmucker, 1969, no. 677; see Beck, 2005, II:126, p. 145.

199 Daems, 1993, nos. 274, 626, 358, 670; André, 1956, pp. 178, 254.

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonymes
	lingua agni	1. *Plantago*[200]	AR: *lisān al-ḥamal* = *Plantago*[201] –lingua agni = **arnoglossa**
	plantago	1. *Plantago*[202]	AR: *lisān al-ḥamal* = *Plantago*[203]
	quonquenervia	1. *Plantago*[204]	
Platanus	*dulb, adulb*	1. *Platanus*[205]	AR: *dulb* = *Platanus*[206] –**dulb** = platanus
	platanus	1. *Platanus*[207]	–platanus = **dulb**
Pomegranate (wild)	*malum granatum (siluestre)*	1. *Punica*[208]	–malum granatum silvestre = **alkakile** –**cachille** = soldanella (G.) –**alchachille** = soldanella (G.)
Pomegranate flower	*balaustia*	1. *Punica*[209]	AR: *jullanār* = *Punica*[210] –**balaustia** = flos caducus malorum granatorum
Poppy	*papaver*	1. *Papaver*[211]	

200 Daems, 1993, nos. 274, 358; *ibid.*, 1967, p. 268; André, 1956, pp. 188, 254; *ibid.*, 1985, p. 146; see Beck, 2005, II:126, p. 145.

201 Dietrich, 1991, II:109, pp. 124–125; Dubler, 1953, II:115, pp. 208–210; Kahl, 2003, pp. 205, 235; *ibid.*, 2007, pp. 326, 345; Lev and Amar, 2008, p. 242; Schmucker, 1969, no. 677; see Beck, 2005, II:126, p. 145.

202 Daems, 1993, nos. 5, 53, 506, 274, 358, 401, 669, 670; *ibid.*, 1967, p. 268; André, 1956, p. 254; *ibid.*, 1985, p. 202; Glare, 1982, p. 1387; Dragendorff, 1898, p. 619.

203 Dietrich, 1991, II:109, pp. 124–125; Dubler, 1953, II:115, pp. 208–210; Kahl, 2003, pp. 205, 235; *ibid.*, 2007, pp. 326, 345; Lev and Amar, 2008, p. 242; Schmucker, 1969, no. 677; see Beck, 2005, II:126, p. 145.

204 Daems, 1993, nos. 401, 689, 5, 274, 626, 358, 670; see Daems, 1967, p. 268.

205 *dolb* (Arabic) (Dragendorff, 1898, p. 271).

206 Dubler, 1953, I:87, pp. 65–66; Schmucker, 1969, no. 303.

207 André, 1956, p. 255; *ibid.*, 1985, p. 202; Glare, 1982, p. 1388; Hort, 1961, p. 471; Dragendorff, 1898, p. 271; Beck, 2005, I:79, p. 62.

208 Daems, 1993, no. 330, see no. 104; *ibid.*, 1967, p. 284; André, 1956, pp. 197, 198; *ibid.*, 1985, p. 153; Glare, 1982, p. 1069.

209 Daems, 1993, no. 104; *ibid.*, 1967, p. 266; André, 1956, p. 50; Glare, 1982, p. 224; Schelenz, 1965, p. 165; see Thorndike and Benjamin, 1946, p. 52; see Beck, 2005, I:111, p. 81.

210 Dietrich, 1991, I:114, pp. 80–81; Dubler, 1953, I:127, pp. 97–98; Kahl, 2003, pp. 203, 235; *ibid.*, 2007, pp. 325, 345; Lev and Amar, 2008, p. 248; Levey, 1966, p. 253; Schmucker, 1969, no. 201; see Beck, 2005, I:111, p. 81.

211 Daems, 1993, nos. 361, 676/677, 677; *ibid.*, 1967, pp. 289, 284; André, 1956, p. 237; *ibid.*, 1985, p. 188; Glare, 1982, p. 1291.

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonymes
Poppy, black	*papaver nigrum*	1. *Papaver*[212]	
Prunes, wild	*prunella agrestis*	1. *Prunus*[213]	–prunellarum agrestium succus = **accatia**
Purslane	*portulaca*	1. *Portulaca*[214]	
Quicklime[215]	*calx viva*		–calx viua = **nora** puluerizata
	nora	1. quicklime[216] 2. lime[217]	AR: *nūra* = quicklime[218] lime[219] –**nora** puluerizata = calx viua –**nora** = calx (G.)
Quince	*citonium*	1. *Cydonia*[220]	AR: *safarjal* = *Cydonia*[221]
Reed	*arundo*	1. a reed[222] 2. *Bambusa*[223]	
	(caput) cannae	1. a (small) reed[224]	AR: *qaṣab* = reed/cane **Arundo*[225]

[212] Daems, 1993, nos. 361, 677; André, 1956, p. 238; *ibid.*, 1985, p. 188; Glare, 1982, p. 1291; Dragendorff, 1898, p. 249.
[213] *Prunella. Prunella agrestia* could not be found from literature. Daems, 1993, no. 36; André, 1956, p. 262; *ibid.*, 1985, p. 208.
[214] Daems, 1993, nos. 357, 661, 71; André, 1956, p. 259; *ibid.*, 1985, p. 206; Glare, 1982, p. 1408.
[215] Glare, 1982, p. 262.
[216] On the basis of Arabic and the synonyme *calx viva*.
[217] On the basis of Arabic and the synonyme *calx*.
[218] Schmucker, 1969, no. 776, n. 2; Levey, 1966, pp. 340–341.
[219] Kahl, 2007, p. 327; Lev and Amar, 2008, p. 553. Lime (*kils*) was produced by burning limestone marble. When slaked with water, it was known as *nūra*. See Hill, 1993, p. 91.
[220] Daems, 1993, no. 172; Glare, 1982, p. 1069; Niermeyer, 1954–1976, pp. 179, 183; Riddle, 1987, p. 49; André, 1985, p. 83.
[221] Dietrich, 1991, I:119, p. 83; Dubler, 1953, I:131, pp. 101–107; Kahl, 2003, pp. 207, 233; *ibid.*, 2007, pp. 328, 345; Lev and Amar, 2008, p. 255; Levey, 1966, pp. 282–283; Schmucker, 1969, no. 383.
[222] Glare, 1982, p. 786; André, 1956, p. 156.
[223] André, 1956, p. 156; Dragendorff, 1898, pp. 85–86; Löw, 1924–1934, Vol. 1, p. 665; see Glare, 1982, p. 786.
[224] André, 1956, p. 68; *ibid.*, 1985, p. 47; Glare, 1982, p. 266.
[225] Dubler, 1953, I:94, p. 70; Kahl, 2007, pp. 327, 345; Schmucker, 1969, no. 578; see Beck, 2005, I:85, p. 64. Also *Phragmites* spp. (Kahl, 2003, pp. 206, 234; Lev and Amar, 2008, p. 389).

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonymes
	cannula calami	1. reed[226] 2. *Bambusa*[227] 3. *Acorus*[228] 4. *Arundo*[229]	
Rhubarb	*reubarbarum*	1. *Rheum*[230]	
Rice	*risum*	1. *Oryza*[231]	
Rose	*rosa*	1. *Rosa*[232]	AR: *ward* = *Rosa*[233] –semen **rosae** = anthera
Rush	*iuncosa palustris*[234]	1. rush[235] 2. *Cyperus*[236]	–iuncosa palustris = **carta** –iuncosa plaustris (sic) = **charta**
	iuncus	1. *Scirpus*[237] 2. *Cyperus*[238] 3. *Juncus*[239]	–iuncus = papyrus
Salsify	*barba hircina*	1. *Tragopogon*[240]	AR: *liḥyat al-tays*[241] = *Tragopogon* –**barba hirci** = ypoquistidos –barba hircina = **herba hirci** = ypoquistidos

[226] André, 1956, pp. 65, 156; Glare, 1982, p. 255; Hort, 1961, p. 454; Riddle 1985b, p. 53.
[227] André, 1956, pp. 156, 65; see Hort, 1961, p. 454.
[228] Glare, 1982, p. 255; André, 1985, p. 45; see Hort, 1961, p. 454; Riddle, 1987, p. 55; Löw, 1924–1934, Vol. 1, p. 697.
[229] Löw, 1924–1934, Vol. 1, p. 665; André, 1985, p. 45; see Hort, 1961, pp. 454, 455; Dragendorff, 1898, p. 86; Beck, 2005, I:85, p. 64.
[230] Daems, 1993, no. 695; *ibid.*, 1967, p. 293; André, 1956, p. 271; *ibid.*, 1985, p. 216; Dragendorff, 1898, pp. 189–190.
[231] Niermeyer, 1954–1976, p. 921; Daems, 1967, p. 293; Glare, 1982, p. 1272.
[232] Daems, 1993, no. 404; *ibid.*, 1967, p. 293; André, 1956, pp. 274, 80, 102, 112, 300; *ibid.*, 1985, p. 219; Glare, 1982, p. 1661; see Beck, 2005, I:99, p. 70.
[233] Dietrich, 1991, I:101, p. 73; Dubler, 1953, I:110, pp. 83–84; Kahl, 2003, pp. 208, 235; *ibid.*, 2007, pp. 329, 345; Lev and Amar, 2008, pp. 261–262; Lev, 2003, pp. 52–54; Levey, 1966, pp. 344–345; Schmucker, 1969, no. 797; see Beck, 2005, I:99, p. 70; Lev and Amar, 2002, n. 47, p. 102.
[234] Not found in the sources at my use; following explains *juncos*.
[235] See Glare, 1982, p. 982, Niermeyer, 1954–1976, p. 566.
[236] Dragendorff, 1898, p. 112, see p. 90.
[237] Daems, 1993, no. 272; André, 1956, p. 173; *ibid.*, 1985, p. 134.
[238] Daems, 1993, no. 272; André, 1956, pp. 113, 173.
[239] Daems, 1993, no. 33; André, 1956, p. 173; *ibid.*, 1985, p. 134.
[240] Daems, 1993, nos. 105, 268, 268*; *ibid.*, 1967, p. 277; André, 1956, pp. 51, 319; see Beck, 2005, II:143, p. 152.
[241] Kahl, 2007, pp. 185 (n. 17), 326, 345; Schmucker, 1969, nos. 672, 795; see Beck, 2005, II:143, p. 152.

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonymes
	herba hirci	1. *Tragopogon*[242]	–**herba hirci** = barba hircina = ypoquistidos
	ypoquistidos	1. *Tragopogon*[243]	–ypoquistidos = **barba hirci** –ypoquistidos = **herba hirci** = barba hircina
Salt	*sal*	1. salt (sodium chloride)[244]	
Salt, bitter	*sal sapore amarum, sal amarum*	1. bitter-tasting salt	AR: *al-māʾ al-māliḥ al-murr* = bitter salt water[245]
Saltwort	*alchachille, cachille, alkakile*	(No information. The identification is based on the Arabic original.)	AR: *qāqullā* = *Bunias Salsola*[246] –**alchachille** = soldanella (G.) –**cachille** = soldanella (G.) –**alkakile** = malum granatum silvestre –**cachille** = camomilla[247]
Saltwort /chamomile	*camomilla*	1. *Chamomilla*[248] 2. *Chamaemelum*[249] 3. *Anthemis*[250] 4. *Matricaria*[251]	AR: *qāqullā* = *Salsola* spp.[252] *Bunias kakile*[253] –**cachille** = camomilla[254] –**soldanella** = camomilla[255]

[242] *herba hyrcina* = *tetrahit* (Thorndike and Benjamin, 1946, p. 153; Daems, 1993, nos. 105, 268, 268*; *ibid.*, 1967, p. 277; André, 1956, pp. 51, 319).
[243] Daems, 1993, no. 268; see Daems, 1967, p. 277.
[244] Glare, 1982, p. 1680.
[245] *milḥ* = salt, NaCl (Kahl, 2003, pp. 206, 237; see Lev and Amar, 2002, n. 220, p. 282).
[246] Schmucker, 1969, no. 561.
[247] Not said to be a synonym, but used as if it were.
[248] Daems, 1993, nos. 112, 552.
[249] *Ibid.*
[250] Daems, 1993, no. 112; *ibid.*, 1967, p. 278; see Beck, 2005, III:137, p. 241.
[251] André, 1956, pp. 67, 84; Daems, 1967, p. 278; Beck, 2005, III:137, p. 241.
[252] Kahl, 2007, pp. 327, 345; Schmucker, 1969, no. 561.
[253] Schmucker, 1969, no. 561.
[254] Not said to be a synonym, but used as if it were.
[255] Not said to be a synonym, but used as if it were.

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonymes
Sandalwood	*sandalum*	1. *Santalum*[256] 2. *Pterocarpus*[257]	AR: *ṣandal abyaḍ* (white sandalwood) = *Santalum album* L.[258] *ṣandal aḥmar* (red sandalwood) = *Pterocarpus santalinus* L.[259]
Sandalwood, red	*sandalum rubeum*	1. *Pterocarpus*[260]	AR: *ṣandal aḥmar* = *Pterocarpus*[261]
Shepherd's purse	*bursa pastoris*	1. *Capsella*[262]	
Silk [made of][263]	*sericinus*		
Soldanella	*soldanella*	1. *Calystegia*[264] 2. *Convolvulus*[265] 3. *Soldanella*[266]	–soldanella (G.) = **alchachille** –soldanella (G.) = **cachille**
Sponge[267]	*spongia*		AR: *isfanj* = *Spongia*[268]
Storax	*storax*	1. *Styrax*[269]	–succus cuiusdam arboris a qua egreditur storax (G.) = **licium**
Sumac	*sumach*	1. *Rhus*[270]	AR: *summāq* = *Rhus*[271]

[256] White sandalwood. Dragendorff, 1898, p. 183; Daems, 1967, pp. 294–295.

[257] Red sandalwood. Daems, 1967, p. 295.

[258] Kahl, 2003, pp. 207, 235; *ibid*., 2007, pp. 328, 345; Lev and Amar, 2008, pp. 476–477; Schmucker, 1969, no. 461.

[259] Kahl, 2003, pp. 207, 235; *ibid*., 2007, pp. 328, 345; Lev and Amar, 2008, pp. 476–477; Levey, 1966, p. 298; Schmucker, 1969, no. 461.

[260] Daems, 1967, p. 295. "Unter den Europäern scheint Marco Polo zuerst rothen Sandel gekannt zu haben und deutlich unterscheidet ihn vom weissen und gelben Garcia d'Orta (Mitte des 16. Jahrh)." Dragendorff, 1898, p. 327.

[261] Kahl, 2003, pp. 207, 235; *ibid*., 2007, pp. 328, 345; Lev and Amar, 2008, pp. 476–477; Levey, 1966, p. 298; Schmucker, 1969, no. 461.

[262] Daems, 1993, nos. 92, 430, 535, 727; *ibid*., 1967, pp. 268, 276; Thorndike and Benjamin, 1946, p. 63.

[263] Glare, 1982, p. 1743, Niermeyer, 1954–1976, p. 961.

[264] Battaglia, 1961–2000, Vol. 19, p. 304.

[265] *Ibid*.

[266] *Ibid*.; see Dragendorff, 1898, p. 512.

[267] A marine animal. See Beck, 2005, V:120, p. 389.

[268] Lev and Amar, 2008, p. 552; see Lev and Amar, 2002, n. 208, p. 268; Beck, 2005, V:120, p. 389.

[269] Glare, 1982, pp. 1832, 1825; Riddle, 1987, p. 59; Beck, 2005, I:66, p. 47.

[270] Dragendorff, 1898, pp. 397–398; Battaglia, 1961–2000, Vol. 19, pp. 377–378.

[271] Dietrich, 1991, I:110, p. 79; Dubler, 1953, I:124, pp. 95–96; Kahl, 2003, pp. 208, 235; *ibid*., 2007, pp. 329, 345; Lev and Amar, 2008, p. 490; Levey, 1966, p. 285; Schmucker, 1969, no. 401; see Beck, 2005, II:108, p. 78; Lev and Amar, 2002, n. 6, p. 60.

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonymes
Sweet flag /lemongrass	*calamus aromaticus*	1. *Acorus*[272]	AR: *qaṣab al-dharīra* = *Andropogon* (= *Cymbopogon*)[273]
Tamarind	*thamarindus*	1. *Tamarindus*[274]	
Teasel	*carduus fullonum*	1. *Dipsacus*[275]	–carduus fullonum = **alcotrob** –carduus fullonum: ramuli modicum politi cera circumuoluti cum modica pice = **candela alcotrob** –carduus fullonum = **virga pastoris** –carduus fullonum = **virga pastoris** = poligonium
Terebinth	*terbenthina*	1. *Pistacia*[276]	
Terra sigillata[277]	*terra sigillata*		AR: *ṭīn makhtūm* = *Terra sigillata*,[278] = a medicinal clay containing ferrous oxide[279] –**terra** testa = terra tenacis de qua fiunt testae = testea vasa desiccata & trita –**terra testa alba** = species terrae (G.)

[272] André, 1956, p. 65; Dragendorff, 1898, p. 102; Löw, 1924–1934, Vol. 1, p. 697; Beck, 2005, I:18, p. 18. Daems, 1967, p. 282. But: "Kalmoes wordt trouwens pas in de 16de eeuw in Midden-Europa ingevoerd" (see Daems, 1967, p. 282).

[273] Dubler, 1953, I:17, pp. 25–26; Kahl, 2003, pp. 206, 233; *ibid*., 2007, pp. 327, 344; Schmucker, 1969, no. 579. According to Lev and Amar, 2008, p. 369: *Acorus calamus*.

[274] André, 1956, p. 310; see Dragendorff, 1898, p. 299.

[275] Daems, 1993, no. 474; André, 1956, pp. 72, 175; Dragendorff, 1898, p. 645; Löw, 1924–1934, Vol. 1, p. 587.

[276] André, 1956, p. 311; Glare, 1982, p. 1924; Hort, 1961, p. 480; Riddle, 1987, p. 59; Dragendorff, 1898, pp. 395–396; Beck, 2005, I:71, p. 54.

[277] *terra sigillata*: 1. = "*Calx est odorifferra*" (Thorndike and Benjamin, 1946, p. 313); 2. = *terra argentaria* = *terra saracenica* (*ibid*., p. 314).

[278] Schmucker, 1969, no. 476.

[279] List and Horhammer, 1969–1979, Vol. 2, p. 1262. Cf. Kahl, 2003, p. 208: *ṭīn makhtūm* = sealing bole. *ṭīn* = clay, earth, bole (Lev and Amar, 2008, p. 149; see *ibid*., 2002, n. 223, p. 284).

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonymes
Thistle	*carduus: lanugine quorundam cardonum*	Possible identifications, exact identification impossible: 1. *Atractylis (carduus)*[280] 2. *Carlina*[281] 3. *Dipsacus*[282] 4. *Carduus*[283] 5. *Silybum*[284] 6. *Cardopatium*[285] 7. *Cnicus*[286]	
Tragacanth	*dragagantum*	1. *Astragalus*[287]	
Verdigris[288]	*flos (a)eris*		AR: *zanjār*[289]
Vinegar	*acetum*	1. vinegar[290]	AR: *khall* = vinegar[291] AR: *ḥall* = *Sesamum*[292] –acetum = acetum de vino[293]

[280] André, 1956, pp. 73, 84.
[281] Daems, 1993, no. 143.
[282] *Ibid*., no. 160.
[283] *Ibid*., no. 160.
[284] *Ibid*., no. 298.
[285] André, 1956, p. 84.
[286] Daems, 1993, no. 165.
[287] Daems, 1993, no. 187; *ibid*., 1967, p. 270; André, 1956, p. 319; Hort, 1961, p. 481; Berendes, 1902, p. 275, 3:20 (23); Beck, 2005, III:20, p. 186.
[288] = *Grünspan* = *basische Kupfer(II)-acetate* (Daems, 1993, no. 219). On preparing verdigris, see Beck, 2005, V:79, pp. 364–365.
[289] = copper sulphate CuSO4 = blue vitriol (Lev and Amar, 2008, p. 308); $Cu(OH)_2.2CuCO_3$ (Kahl, 2003, pp. 209, 236); "*Grünspan* = basisch essigsaures Kupfer" (Schmucker, 1969, no. 354). On the preparation of verdigris, see Beck, 2005, V:79, pp. 364–365.
[290] Daems, 1993, no. 70; Glare, 1982, p. 26.
[291] From *Vitis vinifera* L. (Kahl, 2003, p. 203; *ibid*., 2007, p. 325; Lev and Amar, 2008, p. 176). According to Waines, the medieval vinegar was genuine *vin aigre* or soured wine, as the term *khall khamr* indicates (Waines, 1989, p. 25). On medical uses of vinegar in the Middle Ages, see Lev, 2003, pp. 57–59.
[292] Seems to be a punctuation mistake. Dietrich, 1991, II:84, pp. 114–115; Kahl, 2003, pp. 202, 208, 235; *ibid*., 2007, pp. 325, 344–345; Lev and Amar, 2008, p. 286; Schmucker, 1969, nos. 402, 445; see Lev and Amar, 2002, n. 171, p. 228.
[293] Jacques Despars; but not given as a synonyme.

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonymes
Vitriol	*atramentum*	1. copper vitriol, $CuSO4.5H2O$[294] 2. zinc vitriol, $ZnSO4.7H2O$[295]	AR: *zāj* = a salt of sulphuric acid compounded with various metals such as iron, copper, lead, and zinc[296] *more specifically ferrous sulfate, $FeSO4$[297] –atramenta: quatuor species: = atramentum album, rubeum, citrinum, viride –species attrimenti (G.) = **colcotar**
	dragantum	1. copper vitriol, $CuSO4.5H2O$[298] 2. zinc vitriol, $ZnSO4.7H2O$[299]	AR: *zāj* = a salt of sulphuric acid compounded with various metals such as iron, copper, lead, and zinc[300] *more specifically ferrous sulfate, $FeSO4$[301] –**dragantum** = vitreolum –**dragantum** = species vitreoli –**dragantum** = vitreolum
	vitreolum	1. copper vitriol, $CuSO4.5H2O$ 2. zinc vitriol, $ZnSO4.7H2O$[302]	-species vitreoli = **dragantum** –vitreolum = **dragantum** –species vitreoli = vitreolum = **colcathar** –species vitreoli (G.) = **colcothar** –vitreoli species = **colcathar/colcatar** –species vitreoli = **colcathar** –vitreoli species = **colcathar**

[294] Daems, 1993, nos. 139, 139*; Glare, 1982, p. 198.
[295] Daems, 1993, nos. 139, 139*.
[296] Lev and Amar, 2008, p. 308; Schmucker, 1969, no. 336.
[297] Kahl, 2003, pp. 208, 237; Lev and Amar, 2002, n. 216, p. 278; Schmucker, 1969, no. 336.
[298] Daems, 1993, no. 139; see Thorndike and Benjamin, 1946, p. 112.
[299] *Ibid.*
[300] Lev and Amar, 2008, p. 308; Schmucker, 1969, no. 336.
[301] Kahl, 2003, pp. 208, 237; Lev and Amar, 2002, n. 216, p. 278; Schmucker, 1969, no. 336.
[302] Daems, 1993, no. 139; *dragantum* = *vitriolum*: Thorndike and Benjamin, 1946, p. 112.

English Name	**Latin Name**	**Latin (Scientific) Name**	**Arabic Name/ Latin Synonymes**
Vitriol, yellow	*colcathar /colcotar*	1. copper vitriol[303]	AR: *qalqaṭār* = yellow vitriol = $CoSO_4.7H_2O$[304] –**colcathar** = species vitreoli = vitreolum –**colcothar** = species vitreoli (G.) –**colcathar/colcatar** = vitreoli species –**colcotar** = species attrimenti (G.) –**colcathar** = species vitreoli –**colcathar** = vitreoli species
Water lily	*nenufar*	1. *Nymphaea*[305] 2. *Nuphar*[306]	
Wax, beeswax[307]	*cera*		
Willow	*salix*	1. *Salix*[308]	AR: *khilāf* = *Salix*[309]

[303] Battaglia, 1961–2000, Vol. 3, p. 275; Du Cange, 1937–1938, Vol. 2, p. 399; Daems, 1993, no. 139.

[304] Kahl, 2003, pp. 206, 236. Kahl, 2007, pp. 327: *qalqaṭār* = iron sulphate; Schmucker, 1969, no. 590: gelbes Vitriol = "das naturliche rote bis gelbe Atrament, das durch Feuersetzen aus den vitriolischen Gesteins massen entstand"; Levey, 1966, p. 318: *qalqaṭār* = burnt vitriol; an impure iron sulfate, sometimes yellow because of impurities (Levey, 1962, p. 16).

[305] Daems, 1993, nos. 338, 342, 652; *ibid*., 1967, p. 285; Thorndike and Benjamin, 1946, p. 205: *nenufar = flos nimphee*; André, 1956, pp. 223, 189, 190.

[306] *Ibid*.

[307] Glare, 1982, p. 300; Battaglia, 1961–2000, Vol. 2, pp. 981–982. On the preparation of wax, see Beck, 2005, II:83, pp. 128–129.

[308] Daems, 1993, no. 447; André, 1956, p. 279; Glare, 1982, p. 1681; Daems, 1967, pp. 294, 301.

[309] Dietrich, 1991, I:106, p. 77; Dubler, 1953, I:115, p. 89; Kahl, 2007, pp. 325, 345; Lev and Amar, 2008, p. 506; Schmucker, 1969, no. 279.

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonymes
Wine	*vinum*	1. wine[310] 2. an analogous drink made from other fruits or vegetable products[311]	AR: *sharāb* = wine from *Vitis vinifera* L.[312] wine (in general) juice (in general)[313]
Wine vinegar[314]	*acetum de vino*		–acetum de vino[315] = **acetum**

[310] Glare, 1982, p. 2067; see Niermeyer, 1954–1976, pp. 1109–1110.
[311] Glare, 1982, p. 2068.
[312] Fellmann, 1986, pp. 269–272; Kahl, 2003, p. 207; *ibid.*, 2007, p. 328. For a good overview of several products of grapevine and their medicinal uses, see Lev, 2003, pp. 57–59.
[313] Fellmann, 1986, pp. 269–272.
[314] See Daems, 1993, no. 70; Du Cange, 1937–1938, Vol. 8, p. 343.
[315] Means the same, but not given exactly as a synonyme.

APPENDIX 19

(See p. 208)

5.19. Frequencies of the Simple Drugs for Nosebleed in the Latin Commentaries.[1]

English Name	Latin Name	Ibn Sīnā	Gentile	Despars	JD–bS
Acacia + prunes, wild	*accatia* *+ prunella agrestis*	2		2	
Almond	*amigdalum*			1	1
Aloe	*aloe*	3		3	
Arsenic, red	*arsenicum rubeum*			1	1
Barberry	*berberis*			1	1
Barley	*hordeum*			1	1
Basil	*albedarogi* *+ basilicon* *+ ozimum fluviale*	5	2(S)	5	
Blite	*bletum*			1	1
Borage	*borago*			1	1
Brains of chicken	*cerebellum/cerebrum gallinae*	1		1	
Bramble + buckthorn + briar bush + bryony	*batus* *+ rubus* *+ sentis* *+ spina alba* *+ dumus* *+ vitis alba*	2	2(S)	5	3
Bread	*panis*			1	1
Broom	*palma siluestris*	1		1	
Calcicheos	*calcicheos*			1	1
Camphor	*camphora*	8		14	6
Cassia fistula	*cassiafistula*			1	1
Cheese	*caseum*	1		1	
Chicken	*pullus*			1	1
Chicken liver	*iecor caponis*			1	1

[1] JD–bS: drugs mentioned by Jacques Despars independently, not as mere repetition of Ibn Sīnā's prescriptions. S = mentioned as a synonyme of another drug name, (S) the drug name the synonyme of which is sought for.

English Name	Latin Name	Ibn Sīnā	Gentile	Despars	JD–bS
Clay + clay, Armenian + clay, pottery + *terra sigillata*	*terra* + *bolus armenius* + *terra siguli* + *terra sigillata* + *terra testa*	3	2(S)	9	5
Clove	*gariofilus*	1		1	
Cobweb	*tela araneae*	1		1	
Colocynth	*colloquintis*			1	1
Coriander	*coriandrum*	1		1	
Cotton[2]	*bombax* + *coton*	1		10	9
Cucumber	*cucumis*	1		1	
Cyclamen	*ciclamen*			1	1
Dates, unripe	*flos palmae* + *aqua florum*	4	1(S)	4	
Diagredium[3]	*diagredium*			1	1
Diaprunis[4]	*diaprunis*			1	1
Dill	*anetum*			1	1
Dock	*acedula* + *acetosa*	1		2	1
Dog-rose / lily	*lilium*	1		1	
Dracon's blood	*sanguis draconis*			4	4
Egg + egg-shell + egg-white	*ovum* + *cortex ovi* + *albumen ovi*	5		6	1
Excrement of donkey + excrement of pig	*stercus/faex asini* + *stercus/faex porci*	4		6	2
Frankincense + frankincense manna	*olibanum* + *thus* + *manna*	6		8	2
Frog	*rana*	1		1	
Gallnut	*galla*	3		3	
Grapes, unripe, juice of + grapevine	*agresta* + *veriutum antiquum* + *vitis*	3		5	2

[2] Or a cotton-like substance, as in *K. al-Qānūn*.
[3] Medication based on *Convolvulus* or *Euphorbia*.
[4] Medication based on plums.

English Name	Latin Name	Ibn Sīnā	Gentile	Despars	JD–bS
Gum	*gummi*			1	1
Gum arabic	*gummi arabicum*			1	1
Hares, fur of	*pilus leporis*	2		3	1
Hematite	*lapis sanguinaria*			1	1
Henbane	*iusquamus albus*	1		1	
Hierapicra, Galen's	*hierapigra galieni*			1	1
Ink, scribes'	*encaustum (scriptorum)*	2		2	
Jujube	*iuiuba*	1	1	1	
Knotgrass + mandrake + teasel	*poligonium* *+ virga pastoris* *+ candela alcotrob* *+ carduus fullonum*	4		6	2
Leek	*porrum*	3		3	
Lemon	*citrus* *+ limon*		1	1	1
Lemongrass/sweet flag	*calamus aromaticus*	1		1	
Lentil	*lens*	2		2	
Lettuce	*lactuca*	1		3	2
Lime(stone) + gypsum, lime + quicklime	*calx* *+ gypsum* *+ calx viva* *+ nora*	4	1(S)	6	2
Linen, flax	*linum*	1		2	1
Lycium + storax[5]	*licium + storax*		1(S)	1	1
Lycium, Indian	*licium indum*	2		2	
Mandrake	*mandragora*			3	3
Marigold	*caput monachi*			1	1
Mastic	*mastix*			1	1
Meat	*caro / carnis*			1	1
Mercury	*mercurialis*			1	1
Milk	*lac*	1		1	
Mill dust	*pulvis molendinis*	3		3	
Mint	*menta*	2		2	
Mummy	*mumia*	1		1	

[5] Synonymes. See Gentile's Prescription #22, p. 388, above.

English Name	Latin Name	Ibn Sīnā	Gentile	Despars	JD–bS
Musk	*muschus*	1		1	
Myrrh	*myrrha*	1		1	
Myrtle	*myrtus*	1		2	1
Nettle	*urtica*	1		1	
Nightshade	*solatrum*			1	1
Olive (oil)	*olea*			3	3
Opium + poppy + —	*opium* *+ papaver* *+ papaver nigrum*	3	1	9[6]	5
Orange	*arancium*		1		
Paper + papyrus + rush	*charta* *+ papyrus* *+ iuncosa palustris* *+ iuncus*	3		3	
Pea	*pisum*			1	1
Pear	*pirum*	2		4	2
Pig's trotters	*pedes porcini*			1	1
Pitch	*pix, pix liquida*	1		1	
Plantain + fleawort	*arnoglossa* *+ lingua agni* *+ plantago* *+ plantago lanceolata* *+ quonquenervia* *+ psilium*	3	1(S)	15	12
Platanus	*dulb, adulb, aldulb* *+ platanus*	1	1(S)	1	
Pomegranate flower	*balaustia*	2		3	1
Purslane	*portulaca*			2	2
Quince	*citonium*	2		5	3
Reed	*(caput) cannae*	1		1	
Reed	*arundo*			1	1
Reed	*cannula calami*			1	1
Rhubarb	*reubarbarum*			1	1
Rice	*risum*			1	1

[6] Poppy and black-seeded poppy appear once in the same prescription as opium (Despars' Prescription #2, p. 385, above), but as they appear under a different name (poppy) they are counted as separate appearances, poppy and black-seeded poppy as one, because they have the same name, and opium as one.

English Name	Latin Name	Ibn Sīnā	Gentile	Despars	JD–bS
Rose	*rosa*	4		11	8
Salsify	*barba hircina* + *herba hirci* + *ypoquistidos*	2		2	
Salt + salt, bitter	*sal* + *sal sapore amarum, sal amarum*	1		2	1
Saltwort + chamomile + wild pomegranate + —	*alkakile, alchachille, cachille* + *camomilla* + *malum granatum (siluestre)* + *soldanella*	2	2(S)	2	
Sandalwood	*sandalum*			1	1
Sandalwood, red	*sandalum rubeum*			2	2
Shepherd's purse	*bursa pastoris*			4	4
Silk cloth	*sericinus*			1	1
Sponge	*spongia*	1		1	
Sumac	*sumach*	1		1	
Tamarind	*thamarindus*			1	1
Terebinth	*terbenthina*			1	1
Thistle	*carduus*			1	1
Tragacanth	*dragagantum*			1	1
Verdigris	*flos (a)eris*	3		3	
Vinegar, wine vinegar	*acetum, acetum de vino*	6[7]	1	7	1
Vitriol + yellow vitriol + copper vitriol	*atramentum* + *colcathar/colcotar* + *dragantum* + *vitreolum* + *calcantum*	10	2(S)	16	6
Water lily	*nenufar*			2	2
Wax	*cera*			2	2
Willow	*salix*	3		4	1
Wine	*vinum*	1		2	1

[7] For the choice of vinegar instead of sesame oil in Ibn Sīnā's Prescription #17, see p. 144, n. 80, above.

APPENDIX 20

(See p. 209)

5.20a. Medical Qualities in the Latin Commentators' Drugs for Nosebleed.[1, 2]

#1	#2	Drugs	AA	BB	CC	DD	DDb	EE	FF	GG	HH	II	JJ	LL	NN	OO	QQ	RR
1	3	Acacia	+	+							+							
1	3	Aloe		+	+									+				
1	2	Basil		+			+											
1	2	Brains of chicken		+/–		+/+												
2	1	Buckthorn												+				
2	1	Camphor				+												
1	1	Cheese			+													
1	0	Clay																
1	1	Clove	+															
1	0	Cobweb																
1	5	Coriander		+		+							+		+	+		
1	0	Cucumber																
1	1	Date:																
		balaḥ																
		busr		+														
		nakhl[3]		+														
1	0	Dog-rose																
2	2	Eggs		+										+				
2	1	Excrement of donkey				+/–												
2	3	Frankincense		+		+								+				

[1] Column #1: number of texts (= *K. al-Qānūn* or Latin commentaries) in which the drug appears in prescriptions for nosebleed (of the drugs in Despars, only his independent additions to the ones mentioned in *K. al-Qānūn* are considered); column #2: number of therapeutically suitable qualities it embodies. AA = sharp remedies; BB = astringent remedies; CC = purging bile from the patient; DD = acting to stop the nosebleed; DDb = against nosebleed; EE = caustic remedies; FF = congealing remedies; GG = making the blood viscous; HH = cooling remedies; II = cooling the blood; JJ = cold remedies; LL = adhesive remedies; NN = anesthetizing remedies; OO = remedies with a special property; QQ = thickening remedies; RR = thickening the blood. (S) and S (= the synonymes) have not been included, as they seem to have been mentioned only in order to solve the problem caused by the difficulty of the term, not as a specific recommendation.

[2] The following drugs were not described in Book II of *K. al-Qānūn*: broom, saltwort, cotton-like substances from plants, juice of unripe grapes, pottery clay (*turāb al-fakhkhār*), and reed.

[3] See p. 354, n. 4, above.

#1	#2	Drugs	AA	BB	CC	DD	DDb	EE	FF	GG	HH	II	JJ	LL	NN	OO	QQ	RR
1	0	Frogs																
1	2	Gallnut		+									+					
2	2	Grapevine		+				+										
1	3	Gypsum		+		+								+				
2	0	Hare, fur of																
1	2	Henbane							+						+			
1	0	Ink[4]																
2	1	Jujube																+
2	2	Knotgrass		+							+							
1	3	Leek	+	+		+												
1	2	Lemongrass		+										+				
1	2	Lentil		+														+
2	1	Lettuce											+					
2	1	Lime (*nūra*)						+										
1	2	Lycium, Indian		+									+					
1	2	Mandrake		+		+												
1	2	Milk			+									+				
1	0	Mill dust																
1	2	Mint		+					+									
1	0	Mummy																
1	0	Musk																
1	2	Myrrh		+										+				
2	4	Myrtle		+		+					+		+					
1	2	Nettle				+		+										
3	3	Opium	+						+						+			
1	1	Paper				+												
1	0	Papyrus																
2	2	Pear		+					+									
1	0	Pitch																
2	3	Plantain		+							+		+					
1	0	Platanus																
2	1	Pomegranate flower												+				
2	1	Quince		+														
2	2	Rose		+				+										
1	0	Salsify																
2	2	Salt water		+	+													

[4] *Midād*. *Ḥibr* does not exist in Book II of *K. al-Qānūn*.

#1	#2	Drugs	AA	BB	CC	DD	DDb	EE	FF	GG	HH	II	JJ	LL	NN	OO	QQ	RR
1	0	Sponge																
1	1	Sumac		+														
2	2	*Terra sigillata*									+			+				
1	1	Verdigris	+															
3	2	Vinegar									+		+					
2	3	Vitriol		+			+	+										
1	3	Vitriol, yellow		+			+	+										
2	1	Willow		+														
2	1	Wine		+														
		#62	5	30	4	11	3	6	4	0	6	0	7	10	3	1	0	2
		%	8	48	6	18	5	10	6	0	10	0	11	16	5	2	0	3

5.20b. The Relationship between the Number of Latin Commentaries a Particular Drug Appears in for Nosebleed and the Qualities of the Drug. Number of Qualities *vs*. Number of Appearances.[5]

	3 app	2 ≤ app	Altogether	1 app
5 q			2 % (1)	3 % (1)
4 ≤ q		4 % (1)	3 % (2)	3 % (1)
3 ≤ q	50 % (1)	21 % (5)	18 % (11)	16 % (6)
2 ≤ q	100 % (2)	54 % (13)	50 % (31)	47 % (18)
1 ≤ q	100 % (2)	96 % (23)	76 % (47)	63 % (24)
Altogether	100 % (2)	100 % (24)	100 % (62)	100 % (38)
0 + 1 q		46 % (11)	50 % (31)	53 % (20)
0 q		4 % (1)	24 % (15)	37 % (14)
Drug #	2	24	62	38

[5] app = number of texts (= *K. al-Qānūn* or Latin commentaries) in which the drug appears in prescriptions for nosebleed; q = number of therapeutically suitable qualities it

5.20c. The Relationship between the Number of Latin Commentaries a Particular Drug Appears in for Nosebleed and the Qualities of the Drug. Number of Appearances *vs*. Number of Qualities.[6]

	5 q	**4 ≤ q**	**3 ≤ q**	**2 ≤ q**	**1 ≤ q**	**Altogether**	**0 + 1 q**	**0 q**
3 app			9 % (1)	6 % (2)	4 % (2)	3 % (2)		
2 ≤ app		50 % (1)	45 % (5)	42 % (13)	49 % (23)	39 % (24)	35 % (11)	7 % (1)
Altogether	100 % (1)	100 % (2)	100 % (11)	100 % (31)	100 % (47)	100 % (62)	100 % (31)	100 % (15)
1 app	100 % (1)	50 % (1)	55 % (6)	58 % (18)	51 % (24)	61 % (38)	65 % (20)	93 % (14)
Drug #	1	2	11	31	47	62	31	15

embodies; ≤ as much or more. Numbers in brackets = the number of drugs. Drugs # = the total number of drugs in the column.

6 app = number of texts (= *K. al-Qānūn* or Arabic commentaries) in which the drug appears in prescriptions for nosebleed; q = number of therapeutically suitable qualities it embodies; ≤ as much or more. Numbers in brackets = the number of drugs. Drugs # = the total number of drugs in the column.

APPENDIX 21

(See pp. 214–215)

5.21. Evaluation of the Medical Effect of the Drugs against Nosebleed.[1, 2]

Eff	Drug	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10
++	*Acacia*	++[3]			++[4]						
+	*Acorus*				+[5]						
+	*Allium*	+[6]		++[7]					+[8]		++[9]
++	*Aloe*				+[10]		+[11]			++[12]	++[13]
++	*Amaranthus*	+[14]		+[15]	++[16]		+[17]				
++	*Anchusa*				++[18]						
—	*Andropogon*										

[1] For methodology, see Ch. 5.4.

[2] Eff = level of medicinal effect; ++ = having a relevant medicinal effect, e.g. astringency; + = having a chemical constituent with a relevant medicinal effect, e.g. tannin; — = not having any known relevant medical effect or chemical constituent with it. #1 = hemostatic drugs; #2 = analgesic drugs; #3 = antiscorbutic drugs; #4 = astringent drugs; #5 = caustic drugs; #6 = blood coagulating drugs; #7 = drugs protecting the mucous membranes; #8 = drugs strengthening the blood vessels; #9 = vasoconstrictor drugs; #10 = wound-healing drugs.

[3] Watt and Breyer-Brandwijk, 1962, p. 548.

[4] List and Horhammer, 1969–1979, Vol. 2, p. 874; Hoppe, 1981, p. 5; Watt and Breyer-Brandwijk, 1962, pp. 542, 548.

[5] Tannin. Karwatzki *et al*., 1993.

[6] Pectin. Hoppe, 1981, pp. 14–15.

[7] Hoppe, 1981, pp. 14–15.

[8] Flavonoids. Hollman *et al*., 1997.

[9] Watt and Breyer-Brandwijk, 1962, p. 675, Hoppe, 1981, pp. 14–15.

[10] Tannin. Watt and Breyer-Brandwijk, 1962, p. 681.

[11] Calcium oxalate monohydrate. Watt and Breyer-Brandwijk, 1962, p. 686.

[12] Fulton, 1990.

[13] Hoppe, 1981, p. 16; Chithra *et al*., 1998; Davis *et al*., 1989.

[14] Pectin. Desalen' *et al*., 1997.

[15] Vitamin C. Watt and Breyer-Brandwijk, 1962, pp. 15–16; Prakash *et al*., 1995.

[16] List and Horhammer, 1969–1979, Vol. 3, p. 6.

[17] Calcium. Nordeide *et al*., 1996.

[18] Hoppe, 1981, p. 14.

Eff	Drug	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10
+	*Anethum*	+[19]	+[20]		+[21]		+[22]		+[23]		
++	*Anthemis*										++[24]
—	*Aristolochia*										
—	*Arundo*										
++	*Astragalus*	++[25]									
+	*Atropa*				+[26]						
—	*Bambusa*										
++	*Berberis*	++[27]	++[28]		+[29]		++[30]				
—	*Beta*										
++	*Borago*				++[31]						++[32]
++	*Boswellia*		++[33]								++
—	*Bryonia*										
—	*Bunias*										
—	*Calamus*										
++	*Calendula*							++[34]			++[35]
—	*Callitris*										
—	*Calystegia*										
++	*Capsella*	++[36]			+[37]						

[19] Pectin. Pitkänen *et al.*, 1996, p. 241.
[20] Isoeugenol. Baslas *et al.*, 1971.
[21] Tannin. Pitkänen *et al.*, 1996, p. 241.
[22] Calcium. Fiad and El-Hamidi, 1993.
[23] Flavonoids. Teuber and Herrmann, 1978.
[24] Accelerates wound healing in skin abrasions. Fleischner, 1985.
[25] Gong *et al.*, 1989.
[26] Tannin. Duke, 1992b.
[27] Hoppe, 1975–1987, p. 161.
[28] List and Horhammer, 1969–1979, Vol. 3, p. 418.
[29] Tannin. Hoppe, 1981, p. 40.
[30] Ziablitskii *et al.*, 1996.
[31] Hoppe, 1981, p. 43.
[32] Pitkänen *et al.*, 1996, p. 199.
[33] Menon and Kar, 1971.
[34] Dr. Duke's Phytochemical and Ethnobotanical Databases.
[35] *Ibid.*
[36] *Ibid.*; Budavari and Windholz, 1989.
[37] Tannin. Duke, 1992b.

Eff	Drug	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10
++	*Cassia*				++[38]		+[39]		+[40]		
—	*Chamaemelum*										
+	*Chamomilla*	+[41]									
++	*Cinnamomum*	++[42]			++[43]						
+	*Cistus*		+[44]								
+	*Citrullus*				+[45]						
++	*Citrus*	+[46]		+[47]	+[48]				++[49]		
++	*Commiphora*		+[50]		++[51]						++[52]
++	*Convolvulus*	++[53]	++[54]		+[55]		++[56]				
+	*Coriandrum*	+[57]			+[58]		+[59]		+[60]		
+	*Cucumis*			+[61]	+[62]						
—	*Cucurbita*										
—	*Cyclamen*										
+	*Cydonia*	+[63]			+[64]						

[38] Palanichamy and Nagarajan, 1990.
[39] Calcium. Barthakur *et al.*, 1995.
[40] Rutin. Rao *et al.*, 1979.
[41] Pectin. Duke, 1992b.
[42] Rosser *et al.*, 1989.
[43] Watt and Breyer-Brandwijk, 1962, p. 531.
[44] Eugenol. List and Horhammer, 1969–1979, Vol. 4, p. 78.
[45] Tannin. Watt and Breyer-Brandwijk, 1962, p. 498.
[46] Pectin. Hoppe, 1981, p. 75.
[47] Vitamin C. Hoppe, 1981, pp. 77–80.
[48] Tannin. Ebana *et al*, 1991.
[49] Pitkänen *et al.*, 1996, p. 196; Hoppe, 1981, p. 79.
[50] Eugenol. Hoppe, 1981, p. 84, Watt and Breyer-Brandwijk, 1962, p. 153.
[51] Zepernick *et al.*, 1983, pp. 149–151; Alanko *et al.*, 1982, p. 361; Hoppe, 1981, p. 84; Wagner, 1982, p. 80.
[52] Assists in granulation. Zepernick *et al.*, 1983, pp. 149–151.
[53] Hoppe, 1981, p. 86.
[54] List and Horhammer, 1969–1979, Vol. 4, p. 282.
[55] Tannin 6,8–8,5 %. Hoppe, 1981, p. 86.
[56] Hoppe, 1981, p. 86; Watt and Breyer-Brandwijk, 1962, p. 306.
[57] Pectin. Pitkänen *et al.*, 1996, p. 150.
[58] Tannin. Hoppe, 1981, p. 89; Pitkänen *et al.*, 1996, p. 150.
[59] Calcium. Fiad and El-Hamidi, 1993.
[60] Rutin. Kunzemann and Herrmann, 1977.
[61] Vitamin C. Watt and Breyer-Brandwijk, 1962, pp. 352–356.
[62] Tannin. Watt and Breyer-Brandwijk, 1962, p. 502.
[63] Pectin. Hoppe, 1981, p. 96; Watt and Breyer-Brandwijk, 1962, p. 888.
[64] Tannin. Hoppe, 1981, p. 96.

Eff	Drug	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10
+	*Cymbopogon*		+[65]								
++	*Cyperus*				++[66]						
++	*Daemonorops*						++[67]				
—	*Dipsacus*										
—	*Dracaena*										
+	*Dryobalanops*										
++	*Euphorbia*		++[68]		+[69]	++[70]					
++	*gallae*	++[71]	++[72]		++[73]						
+	*Gossypium*	+[74]			+[75]						
+	*Hordeum*						+[76]				
+	*Hyoscyamus*				+[77]				+[78]		
+	*Iris*			+[79]				+[80]			
+	*Juncus*		+[81]								
++	*Lactuca*										++[82]
—	*Lens*										
—	*Lilium*										
++	*Linum*	+[83]	++[84]					++[85]			

[65] Eugenol, methyleugenol. Guenther, 1948–1952.
[66] List and Horhammer, 1969–1979, p. 423.
[67] Gibbs *et al.*, 1983.
[68] Lanhers *et al.*, 1991; Szallasi and Blumberg, 1989.
[69] Tannin. Hoppe, 1981, p. 118.
[70] Watt and Breyer-Brandwijk, 1962, p. 408.
[71] Hoppe, 1981, p. 241.
[72] Dar *et al.*, 1976.
[73] Hoppe, 1981, p. 241; List and Horhammer, 1969–1979, Vol. 4, pp. 1091–1093.
[74] Pectin. Sepehri *et al.*, 1998.
[75] Tannin. Katterman and Shattuck, 1983.
[76] Vitamin K1. Lichtenthaler and Kleudgen, 1975.
[77] Tannin. Hoppe, 1981, p. 148.
[78] Rutin. Hoppe, 1981, p. 148.
[79] Vitamin C. Watt and Breyer-Brandwijk, 1962, p. 510.
[80] Mucilage. Hoppe, 1981, p. 154.
[81] Luteolin. Dr. Duke's Phytochemical and Ethnobotanical Databases.
[82] Hoppe, 1981, pp. 161, 296.
[83] Pectin. Hoppe, 1981, p. 168.
[84] List and Horhammer, 1969–1979, Vol. 5, p. 522.
[85] Hoppe, 1981, p. 167.

Eff	Drug	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10
++	*Lycium*	+[86]	+[87]	++[88]					+[89]	+[90]	
+	*Mandragora*		+[91]								
+	*Matricaria*	+[92]									
+	*Melissa*		+[93]		+[94]				+[95]		
++	*Mentha*	+[96]	++[97]		++[98]						
+	*Mercurialis*								+[99]		
++	*Myrtus*				++[100]						
—	*Nuphar*										
+	*Nymphaea*				+[101]						
+	*Ocimum*		+[102]		+[103]						
++	*Olea*				+[104]			++[105]			
—	*Oryza*										
++	*Papaver*	++[106]	++[107]		++[108]						
+	*Phoenix*	+[109]							+[110]		

[86] Rutin. Dr. Duke's Phytochemical and Ethnobotanical Databases.
[87] Rutin. *Ibid.*
[88] Toyoda-Ono *et al*, 2004; Toyada-Ono *et al.*, 2005.
[89] Rutin. Budavari and Windholz, 1989.
[90] Rutin. Duke, 1992b.
[91] Tannin. Hoppe, 1981, p. 176.
[92] Pectin. Duke, 1992b.
[93] Eugenol glycoside. Mulkens and Kapetanidis, 1988; see Pitkänen *et al.*, 1996, p. 235.
[94] Tannin, 4–5 %, rosmarinic acid, 4 %. Hoppe, 1981, p. 181; Peake *et al.*, 1991.
[95] Flavonoids. Pitkänen *et al.*, 1996, p. 235.
[96] Pectic substances. Maruyama *et al.*, 1996.
[97] Wagner, 1982, p. 48; Hoppe, 1981, p. 182; Hiltunen and Holm, 1994, p. 154.
[98] List and Horhammer, 1969–1979, Vol. 5, p. 776; Hoppe, 1981, p. 181; Zepernick *et al.*, 1983, pp. 268–272.
[99] Rutin. Duke, 1992b.
[100] List and Horhammer, 1969–1979, Vol. 5, p. 938; Hoppe, 1975–1987, p. 740; Alanko *et al.*, 1982, p. 170.
[101] Tannin. Saeed and Hamdy, 1996.
[102] Eugenol. Alanko *et al.*, 1982, p. 90; Hoppe, 1981, p. 193.
[103] Tannin. Hoppe, 1981, pp. 193, 198.
[104] Tannin. Hoppe, 1981, p. 195; Watt and Breyer-Brandwijk, 1962, p. 808.
[105] Zepernick *et al.*, 1983, p. 281.
[106] Duke, 1992a; Budavari and Windholz, 1989.
[107] Duke, 1992a.
[108] *Ibid.*; Martindale *et al.*, 1982.
[109] Pectin. List and Horhammer, 1969–1979, Vol. 6a, pp. 620–621.
[110] Rutin. Mahran *et al.*, 1976.

Eff	Drug	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10
—	*Physalis*										
++	*Pistacia*				++[111]						
—	*Pisum*										
++	*Plantago*	++[112]	++[113]		++[114]			+[115]			++[116]
—	*Platanus*										
++	*Polygonum*	++[117]			++[118]		++[119]		+[120]	++[121]	++[122]
+	*Portulaca*			+[123]							
++	*Prunus*	+[124]	++[125]		++[126]		++[127]				
++	*Pterocarpus*				++[128]		+[129]				
++	*Punica*				++[130]						
+	*Pyrus*	+[131]			+[132]						
++	*Quercus*	++[133]	++[134]		++[135]				+[136]	++[137]	

[111] Tannin 25 % (enough to be astringent!) Hoppe, 1981, p. 225.
[112] Hoppe, 1981, p. 226.
[113] Pitkänen *et al.*, 1996, p. 205.
[114] *Ibid.*
[115] Mucilage. Hiltunen and Holm, 1994, pp. 93–94; Pitkänen *et al.*, 1996, p. 205; List and Horhammer, 1969–1979, Vol. 6a, pp. 750–752.
[116] Epithelizes. Hoppe, 1981, p. 226.
[117] Hoppe, 1981, pp. 228–229; Alanko *et al.*, 1982, p. 191.
[118] Hoppe, 1981, pp. 228–229.
[119] *Ibid.*, p. 229.
[120] Rutin. Hoppe, 1981, p. 229.
[121] List and Horhammer, 1969–1979, Vol. 6a, pp. 813–815.
[122] Alanko *et al.*, 1982, p. 191.
[123] Vitamin C. Simopoulos *et al.*, 1992.
[124] Pectin. Hoppe, 1981, pp. 233, 235.
[125] Zepernick et al., 1983, p. 338.
[126] Pitkänen *et al.*, 1996, p. 118; Alanko *et al.*, 1982, p. 181.
[127] Dogasaki *et al.*, 1994.
[128] Hoppe, 1981, p. 236.
[129] Calcium. Akpanyung *et al.* 1995.
[130] Hoppe, 1981, p. 238; Watt and Breyer-Brandwijk, 1962, p. 876; List and Horhammer, 1969–1979, Vol. 6a, p. 981.
[131] Pectin. Hoppe, 1981, p. 175.
[132] Tannin 8,14 %. Watt and Breyer-Brandwijk, 1962, p. 894.
[133] Hoppe, 1981, p. 241.
[134] Dar *et al.*, 1976.
[135] Hoppe, 1981, p. 241; List and Horhammer, 1969–1979, Vol. 4, pp. 1091–1093; Zepernick et al., 1983, p. 341.
[136] Rutin. Sheu *et al.*, 1997.
[137] Zepernick *et al.*, 1983, p. 341.

Eff	Drug	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10
++	*Rhamnus*			+[138]	+[139]						++[140]
++	*Rheum*	++[141]			++[142]				+[143]		
++	*Rhus*	++[144]			++[145]						
++	*Rosa*	+[146]	++[147]	++[148]	++[149]		+[150]		+[151]		++[152]
++	*Rubus*				++[153]						
++	*Rumex*			++[154]	++[155]				+[156]		
++	*Salix*		++[157]		++[158]						
—	*Salsola*										
+	*Santalum*				+[159]						
+	*Scirpus*		+[160]								
—	*Sedum*										
—	*Sempervivum*										
—	*Solanum*										
—	*Soldanella*										
—	*Styrax*										

[138] Vitamin C. Kovacevic *et al.*, 1991.
[139] Tannin. Hoppe, 1975–1987, p. 915; Hiltunen and Holm, 1994, p. 97.
[140] Kostrikova, 1989.
[141] Zhou and Jiao, 1990; Wang and Jiao, 1985.
[142] Alanko *et al.*, 1982, p. 358.
[143] Rutin. Hoppe, 1981, p. 248.
[144] Zepernick *et al.*, 1983, pp. 340–341; List and Horhammer, 1969–1979, Vol. 6b, pp. 126–127.
[145] Hoppe, 1981, pp. 249–250.
[146] Pectin. Hoppe, 1981, p. 253; Zepernick *et al.*, 1983, p. 355.
[147] Eugenol. Hoppe, 1981, p. 254.
[148] Hiltunen and Holm, 1994, p. 116; Zepernick *et al.*, 1983, p. 355.
[149] Pitkänen *et al.*, 1996, pp. 138, 146; Hoppe, 1981, p. 254; Wagner, 1982, pp. 246, 250.
[150] Vitamin K. Hoppe, 1981, p. 253.
[151] Rutin. Hoppe, 1981, p. 253.
[152] Drying wounds. Wagner, 1982, pp. 246, 250.
[153] Duke, 1992a.
[154] Alanko *et al.*, 1982, p. 175.
[155] *Ibid.*, p. 263.
[156] Rutin. Hasan *et al.*, 1995.
[157] Hiltunen and Holm, 1994, pp. 21–22, 154–155; Alanko *et al.*, 1982, p. 267.
[158] Alanko *et al.*, 1982, p. 267.
[159] Tannin. Hoppe, 1981, p. 263.
[160] Betulinic acid. Dr. Duke's Phytochemical and Ethnobotanical Databases.

Eff	Drug	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10
++	*Syzygium*		++[161]		++[162]	++[163]					
++	*Tamarindus*	+[164]			++[165]						
—	*Tamus*										
+	*Taraxacum*							+[166]	+[167]		
+	*Tragopogon*				+[168]						
++	*Urtica*				+[169]		+[170]		+[171]		++[172]
++	*Vitis*				++[173]						
++	*Zizyphus*				++[174]						

161 Hoppe, 1981, p. 276, Alanko *et al.*, 1982, p. 360; Zepernick *et al.*, 1983, p. 405.
162 Hoppe, 1981, p. 277.
163 Weak. Zepernick *et al.*, 1983, p. 405.
164 Pectin. Hoppe, 1981, p. 282; Watt and Breyer-Brandwijk, 1962, p. 651.
165 Watt and Breyer-Brandwijk, 1962, pp. 651, 653.
166 Mucilage. Hiltunen and Holm, 1994, p. 61.
167 Flavonoids. Hiltunen and Holm, 1994, p. 61.
168 Tannin. List and Horhammer, 1969–1979, Vol. 6c, p. 219.
169 Tannin. Hoppe, 1981, p. 295.
170 Calcium. Pitkänen *et al.*, 1996, p. 183.
171 Rutin. See Obertreis *et al.*, 1996a; 1996b.
172 Hoppe, 1981, p. 296.
173 Martindale *et al.*, 1989.
174 Martindale *et al.*, 1982.

APPENDIX 22

(See p. 215)

5.22. Appearances of the Drugs for Nosebleed in the Texts and their Medical Effect.[1]

#1	#2	#3	#4	b.S.	b.N.	J	Sc.	GF	JD	JD-bS	#5
++ ++ ++	**Acacia** **+ prunes, wild** 1. *Prunus* 2. *Acacia*	*accatia* *+ prunella agrestis*	2	2	1				2		3
++ ++	**Almond** 1. *Prunus*	*amigdalum*	1						1	1	
++ ++	**Aloe** 1. *Aloe*	*aloe*	2	3			1		3		3
==	**Arsenic, red**	*arsenicum rubeum*	1						1	1	
++ ++ +	**Barberry** 1. *Berberis* 2. *Cistus*	*berberis*	2				1		1	1	0
± +	**Barley** 1. *Hordeum*	*hordeum*	1						1	1	
± +	**Basil** 1. *Ocimum*	*albedarogi* *+ basilicon* *+ ozimum fluviale*	2	5	1			2(S)	5		2

[1] Column #1: the effect of the plant in the therapy of nosebleed according to Appendix 21: the code written in bold underlined letters on the side of the English identification is the final result, the codes under it relate to the plant genuses in #2; column #2: the identification of the drug and its English name according to Chapters 5.1.5.3, 5.2.5.2 and 5.3.5.2; column #3: the Latin name of the plant in the translation of *K. al-Qānūn* and in the Latin commentaries; column #4: number of texts (= *K. al-Qānūn* or Arabic or Latin commentaries) in which the drug appears (column JD–bS is used instead of column JD); column #5: number of the medical qualities required by Ibn Sīnā for drugs for nosebleed that the drug embodies (acc. to Book II of *K. al-Qānūn*; if several drugs are combined, we choose the one with most qualities). b.S. = *K. al-Qānūn*; Lat. = the Latin translation of *K. al-Qānūn*; b.N. = Ibn al-Nafīs; J. = al-Jaghmīnī; sc. = supracommentary to *Qānūnja*; GF = Gentile da Foligno; JD = Jacques Despars; JD–bS = innovations by Jacques Despars. ++ = having a relevant medicinal effect, e.g. astringency; + = having an chemical constituent with a relevant medicinal effect, e.g. tannin; — = not having any known relevant medical effect or chemical constituent with it; === = not relevant (e.g. a mineral or animal product). S = synonym, (S) = name for which the synonym is given. Synonyms are not counted as independent entities.

#1	#2	#3	#4	b.S.	b.N.	J	Sc.	GF	JD	JD-bS	#5
<u>++</u> ++ —	**Blite** 1. *Amaranthus* 2. *Beta*	*bletum*	1						1	1	
<u>++</u> ++ ++	**Borage** 1. *Borago* 2. *Anchusa*	*borago*	1						1	1	
==	**Brains of chicken**	*cerebellum/cerebrum gallinae*	1	1					1		2
<u>++</u> ++ ++ == — — ++	**Bramble** **+ buckthorn** **+ briar bush** **+ bryony** 1. *Rubus* 2. *Rhamnus* 3. thorny plants 4. *Bryonia* 5. *Tamus* 6. *Lycium*	*batus* + *rubus* + *sentis* + *spina alba* + *dumus* + *vitis alba*	2	2				2(S)	5	3	1
==	**Bread**	*panis*	1						1	1	
==	**Broom**	*palma silvestris*	1	1					1		—
==	***Calcicheos***	*calcicheos*	1						1	1	
<u>++</u> + ++	**Camphor** 1. *Dryobalanops* 2. *Cinnamomum*	*camphora*	4	8	2	1			14	6	1
<u>++</u> ++ ++	**Cassia fistula** 1. *Cassia* 2. *Cinnamomum*	*cassiafistula*	1						1	1	
==	**Cheese**	*caseum*	1	1					1		1
==	**Chicken**	*pullus*	1						1	1	
==	**Chicken liver**	*iecor caponis*	1						1	1	
==	**Clay** **+ clay, Armenian** **+ clay, pottery** **+ *terra sigillata*** + —	*terra* + *bolus armenius* + *terra siguli* + *terra sigillata* + *testa*	2	3				2(S)	9	5	2
<u>++</u> ++	**Clove** 1. *Syzygium*	*gariofilus*	1	1					1		1
==	**Cobweb**	*tela araneae*	2	1	3				1		0

#1	#2	#3	#4	b.S.	b.N.	J	Sc.	GF	JD	JD-bS	#5
± + — +	**Colocynth** 1. *Citrullus* 2. *Cucurbita* 3. *Cucumis*	*colloquintis*	1						1	1	
± +	**Coriander** 1. *Coriandrum*	*coriandrum*	1	1					1		5
± + ==	**Cotton** 1. *Gossypium* 2. cotton-like substance from plants	*bombax* *+ coton*	2	1					10	9	—
± + +	**Cucumber** 1. *Cucumis* 2. *Citrullus*	*cucumis*	1	1					1		0
— — —	**Cyclamen** 1. *Cyclamen* 2. *Aristolochia*	*ciclamen*	1						1	1	
± +	**Date palm** **+ dates, unripe** 1. *Phoenix*	*[flos] palmae +* *aqua florum*	1	4				1(S)	4		1
++ ++ ++	***Diagredium*** 1. *Convolvulus* 2. *Euphorbia*	*diagredium*	1						1	1	
++ ++	***Diaprunis*** 1. *Prunus*	*diaprunis*	1						1	1	
± +	**Dill** 1. *Anethum*	*anetum*	1						1	1	
++ ++ — —	**Dock** 1. *Rumex* 2. *Sempervivum* 3. *Sedum*	*acedula* *+ acetosa*	2	1[2]					2	1	
++ — + ++	**Dog-rose / lily** 1. *Lilium* 2. *Iris* AR: *Rosa*	*lilium*	1	1					1		0
++ — — ++	**Dracon's blood** 1. *Dracaena* 2. *Calamus* 3. *Daemonorops*	*sanguis draconis*	1						4	4	

[2] Only in the Latin translation.

#1	#2	#3	#4	b.S.	b.N.	J	Sc.	GF	JD	JD-bS	#5
==	**Egg** **+ egg-shell** **+ egg-white**	*ovum* *+ cortex ovi* *+ albumen ovi*	2	5					6	1	2
==	**Excrement of donkey** **+ excrement of pig**	*stercus/faex asini* *+ stercus/faex porci*	3	4	2				6	2	1
++ ++	**Frankincense** **+ frankincense manna** 1. *Boswellia*	*olibanum* *+ thus* *+ manna*	4	6	1		1		8	2	3
==	**Frog**	*rana usta*	1	1					1		0
++ ++ ++	**Gallnut** 1. gall-nut 2. *Quercus*	*galla*	2	3	2				3		2
++ ++	**Grapes, unripe, juice of** **+ grapevine** 1. *Vitis*	*agresta* *+ veriutum antiquum* *+ vitis*	3	3		1			5	2	2
==	**Gum** 1. gum 2. resin	*gummi*	1						1	1	
++ ++	**Gum arabic** 1. *Acacia*	*gummi arabicum*	1						1	1	
==	**Hares, fur of**	*pilus leporis*	2	2					3	1	0
==	**Hematite**	*lapis sanguinaria*	1						1	1	
+ +	**Henbane** 1. *Hyoscyamus*	*iusquamus albus*	2	1	1				1		2
==	***Hierapicra*, Galen's**	*hierapigra Galieni*	1						1	1	
==	**Ink, scribes'**	*encaustum (scriptorum)*	2	2	1				2		0
++ ++	**Jujube** 1. *Zizyphus*	*iuiuba*	2	1				1	1		1

#1	#2	#3	#4	b.S.	b.N.	J	Sc.	GF	JD	JD-bS	#5
++ ++ — ++ +	**Knotgrass** **+ mandrake** **+ teasel** 1. *Polygonum* 2. *Dipsacus* AR: *Polygonum* (*Mandragora*)[3]	*poligonium* + *virga pastoris* + *candela alcotrob* + *carduus* *fullonum*	2	4					6	2	3
± +	**Leek** 1. *Allium*	*porrum*	1	3					3		3
++ ++ — + +	**Lemon** **+ orange** 1. *Citrus* 2. *Callitris* 3. *Melissa* 4. *Citrullus*	*citrus* + *limon* + *arancium*	2					2[4]	1	1	
± + — +	**Lemongrass** **/sweet flag** 1. *Acorus* AR: *Andropogon* = *Cymbopogon*	*calamus* *aromaticus*	1	1					1		2
— —	**Lentil** 1. *Lens*	*lens*	4	2	1	1	(1)[5]		2		2
++ ++	**Lettuce** 1. *Lactuca*	*lactuca*	3	1	1				3	2	1
==	**Lime(stone)** **+ gypsum, lime** **+ quicklime**	*calx* + *gypsum* + *calx viva* + *nora*	2	4				1(S)	6	2	4
++ ++	**Linen, flax** 1. *Linum*	*linum*	2	1					2	1	
++ ++ —	**Lycium + storax**[6] 1. *Rhamnus* + 1. *Styrax*	*licium + storax*	1					1(S)	1	1	

[3] On the basis of synonymy.

[4] Appears twice in the same prescription, but under different names (lemon and orange), and therefore is counted as 2 separate appearances.

[5] Not mentioned again in the Supracommentary, but clearly intended to be included (see p. 177, n. 175, above).

[6] Synonymes. See Gentile's Prescription #22, p. 388, above.

#1	#2	#3	#4	b.S.	b.N.	J	Sc.	GF	JD	JD-bS	#5
++ ++ ++ ++ ++	**Lycium, Indian** 1. *Acacia* 2. *Berberis* 3. *Rhamnus* 4. *Lycium*	*licium indum*	1	2					2		2
+ +	**Mandrake** 1. *Mandragora*	*mandragora*	1						3	3	
++ ++ +	**Marigold** 1. *Calendula* 2. *Taraxacum*	*caput monachi*	1						1	1	
++ ++	**Mastic + terebinth** 1. *Pistacia*	*mastix + terbenthina*	1						2[7]	2	
==	**Meat**	*caro, carnis*	1						1	1	
+ +	**Mercury** 1. *Mercurialis*	*mercurialis*	1						1	1	
==	**Milk**	*lac*	1	1					1		2
==	**Mill dust**	*pulvis molendinis*	2	3	3				3		0
++ ++	**Mint** 1. *Mentha*	*menta*	2	2	1				2		2
==	**Mummy**	*mumia*	1	1					1		0
==	**Musk**	*muschus*	1	1					1		0
++ ++	**Myrrh** 1. *Commiphora*	*myrrha*	1	1					1		2
++ ++	**Myrtle** 1. *Myrtus*	*myrtus*	2	1					2	1	4
++ ++	**Nettle** 1. *Urtica*	*urtica*	1	1					1		2
+ + — —	**Nightshade** 1. *Atropa* 2. *Solanum* 3. *Physalis*	*solatrum*	1						1	1	
++ ++	**Olive (oil)** 1. *Olea*	*olea*	1						3	3	

[7] Appears twice in the same prescription, but under different names (mastic and terebinth), and therefore is counted as 2 separate appearances.

#1	#2	#3	#4	b.S.	b.N.	J	Sc.	GF	JD	JD-bS	#5
++ ++	**Opium** **+ poppy** + — 1. *Papaver*	*opium* + *papaver* + *papaver nigrum*	4	3	2			1	9[8]	6	3
++ ++ + +	**Paper** **+ papyrus** **+ rush** 1. *Cyperus* 2. *Juncus* 3. *Scirpus*	*charta* + *papyrus* + *iuncosa palustris* + *iuncus*	1	3					3		1
— —	**Pea** 1. *Pisum*	*pisum*	1						1	1	
± +	**Pear** 1. *Pyrus*	*pirum*	2	2					4	2	2
==	**Pig's trotters**	*pedes porcini*	1						1[9]	1	
==	**Pitch**	*pix, pix liquida*	1	1					1		0
++ ++	**Plantain** **+ fleawort** 1. *Plantago*	*arnoglossa* + *lingua agni* + *plantago* + *plantago lanceolata* + *quonquenervia* + *psilium*	4	3	1	1		1(S)	15	12	3
— —	**Platanus** 1. *Platanus*	*dulb, adulb, aldulb* + *platanus*	1	1				1(S)	1		0
++ ++	**Pomegranate** **+ pomegranate flower** 1. *Punica*	— + *balaustia*	4	2	2		1		3	1	3
± +	**Purslane** 1. *Portulaca*	*portulaca*	1						2	2	

[8] Poppy and black-seeded poppy appear once in the same prescription as opium (Despars' Prescription #2, p. 385, above), but as they appear under a different name (poppy) they are counted as separate appearances, poppy and black-seeded poppy as one, because they have the same name, and opium as one.

[9] Here we see one of the few clear changes in the prescriptions caused by the change of the texts from one cultural milieu to another—although pork is sometimes described in the pharmacopoeias of Muslim and Jewish authors, undoubtedly as a part of the Greek medical heritage, it would not be actively recommended as a dietetic item. See, for example, Garcia Sánchez, 2002, p. 282/8. On the other hand, for Despars pork would be part of the ordinary Christian European diet, to be recommended if needed with no issue of conscience.

#1	#2	#3	#4	b.S.	b.N.	J	Sc.	GF	JD	JD-bS	#5
<u>+</u> +	**Quince** 1. *Cydonia*	*citonium*	2	2					5	3	1
<u>+</u> == — — +	**Reed** 1. reed 2. *Arundo* 3. *Bambusa* 4. *Acorus*	*(caput) cannae* + *arundo* + *cannula calami*	2	1					3[10]	2	—
<u>++</u> ++	**Rhubarb** 1. *Rheum*	*reubarbarum*	2			1			1	1	0
— —	**Rice** 1. *Oryza*	*risum*	1						1	1	
<u>++</u> ++	**Rose** 1. *Rosa*	*rosa*	4	4	2	3			11	8	2
<u>+</u> +	**Salsify** 1. *Tragopogon*	*barba hircina* + *herba hirci* + *ypoquistidos*	1	2					2		0
==	**Salt** **+ salt, bitter**	*sal* + *sal sapore amarum, sal amarum*	2	1					2	1	2
<u>??</u>[11] + — ++ + — — — ++ —	**Saltwort** **+ chamomile** **+ wild pomegranate** **+ soldanella** 1. *Chamomilla* 2. *Chamaemelum* 3. *Anthemis* 4. *Matricaria* 5. *Salsola* 6. *Bunias* 7. *Calystegia* 8. *Convolvulus* 9. *Soldanella*	*alkakile, alchachille, cachille* + *camomilla* + *malum granatum (silvestre)* + *soldanella*	1	2				2(S)	2		—
<u>++</u> + ++	**Sandalwood** **+ red sandalwood** 1. *Santalum* 2. *Pterocarpus*	*sandalum* + *sandalum rubeum*	3		2	1			3	3	0
<u>++</u> ++	**Shepherd's purse** 1. *Capsella*	*bursa pastoris*	1						4	4	

[10] Appears twice in the same prescription, but under different names, and is therefore counted twice.

[11] Due to the confusion in the identification of the drug, its evaluation is not possible.

#1	#2	#3	#4	b.S.	b.N.	J	Sc.	GF	JD	JD-bS	#5
==	**Silk cloth**	*sericinus*	1						1	1	
==	**Sponge**	*spongia*	1	1					1		0
++ ++	**Sumac** 1. *Rhus*	*sumach*	2	1			1		1		1
++ ++	**Tamarind** 1. *Tamarindus*	*thamarindus*	1						1	1	
==	**Thistle**[12]	*carduus*	1						1	1	
++ ++	**Tragacanth** 1. *Astragalus*	*dragagantum*	1						1	1	
==	**Verdigris**	*flos (a)eris*	1	3					3		1
==	**Vinegar, wine vinegar**	*acetum, acetum de vino*	4	6[13]			3	1	7	1	2
==	**Vitriol** **+ yellow vitriol** **+ copper vitriol**	*atramentum* + *colcathar /colcotar* + *dragantum* + *vitreolum* + *calcantum*	3	10	1			2(S)	16	6	3
+ + —	**Water lily** 1. *Nymphaea* 2. *Nuphar*	*nenufar*	1						2	2	
==	**Wax**	*cera*	1						2	2	
++ ++	**Willow** 1. *Salix*	*salix*	2	3					4	1	1
==	**Wine**	*vinum*	3	1			1		2	1	1

[12] No exact definition. See Appendix 18.

[13] For the choice of vinegar instead of sesame oil in Ibn Sīnā's Prescription #17, see p. 144, n. 80, above.

APPENDIX 23

(See pp. 231–232)

6.1. Medical Qualities Recommended for Cough by Ibn Sīnā.

Code	**Quality**	**Ibn Sīnā**
AA	Collecting the expectoration	Collecting the material [for expectoration] Collecting the expectoration
BB	Performing asthma therapy	Smokes mentioned in the chapter on asthma
CC	Astringent	Astringents which do not have any sour or acrid taste
DD	Antidotes[1]	Hot antidotes
EE	Performing catarrh therapy	Treating the catarrh (therapy for cough caused by catarrh)
FF	Performing a clearing effect	Clearing drug (but not for thin material) Clearing drugs Clearing of the thick expectorated material (but not the thin) Clearing thick material
GG	Coldness	Cold agents Formula of a cold poppy medicament (*diyāqūdhā bārid*)
HH	Cooling	Well-known cooling cerates
II	Cutting	Cutting [the material]
JJ	Acting as a desiccant	Desiccants
KK	Acting as a dissolving medication	Dissolving thick material
LL	Having a dry property	Dry drugs
MM	Emetic	Emetic
NN	Heating	Hot antidotes
OO	Rarefying	Rarefying drugs
PP	Maturating thin matter[2]	Maturating thin material
QQ	Moistening	Moistening drugs

[1] See Johnstone, 1981, pp. 207–208; Ullmann, 1970; Watson, 1966; Totelin, 2004.

[2] Maturation is a change in the superfluities making it possible for them to be easily discharged from the member containing them. This can happen in three ways: 1) by attenuating the materia, the thickness of which prevents the expulsion; 2) by thickening the materia, if the problem is its thinness; and 3) by breaking the superfluities up completely, if the cause is their viscidity. See Gruner, 1930, p. 115.

Code	Quality	Ibn Sīnā
RR	Anesthetic	Anesthetics Narcotic
SS	Acting to obstruct catarrh	Acting to obstruct catarrh (therapy for catarrh causing cough)
TT	Enabling the [expectorated] material to slide	Enabling [the material] to slide[3]
UU	Softening	Softening [the material]
VV	Soporific	Soporific

[3] E.g. more easily out of the bronchia.

APPENDIX 24

(See p. 253)

6.2. Identification of Drugs Recommended for Cough by Ibn Sīnā.[1]

English Name	Arabic Name	Latin (Scientific) Name
Almond Sweet almond Bitter almond	= *lawz*[2] = *lawz ḥilw* = *lawz murr*	 = *Amygdalus communis* L. var. *dulcis* = *A. communis* L. var. *amara*[3]
Aloe	*ṣabr*	*Aloe* L.[4] *A. vera* L.[5]
Alum	*shabb*	Alum; mostly a mixture of several sulphates, $Alk(SO_4)_2 . 12\ H_2O$[6]
Aniseed	*anīsūn*	*Pimpinella Anisum* L.[7]
Apricot	*mishmish*	*Prunus armeniaca* L.[8]
Arsenic	*zirnīkh*	Arsenic (Orpiment), As_4S_6[9]
Arsenic, red	*zirnīh aḥmar*	Arsenic (Realgar), As_4S_4[10]
Asarabacca	*asārūn*	*Asarum europaeum* L.[11]

[1] For methodology, see Ch. 5.1.5.3.

[2] *Amygdalus communis = Prunus amygdalus* (Dubler, 1953, I:139, pp. 112–113; Lev and Amar, 2002, n. 185, p. 242; Lev, 2003, pp. 32–33).

[3] Schmucker, 1969, no. 658; Lev and Amar, 2008, p. 91; see Dubler, 1953, I:139, pp. 112–113; Lev, 2003, pp. 32–33; Lev and Amar, 2002, n. 185, p. 242.

[4] Schmucker, 1969, no. 452; Lev and Amar, 2008, pp. 94–97; Lev and Amar, 2002, n. 19, p. 74; Lev, 2003, pp. 33–34; Dubler, 1953, III:23, pp. 279–280; Levey, 1966, p. 297.

[5] Schmucker, 1969, no. 452; Kahl, 2003, p. 207; Kahl, 2007, pp. 328, 342; Dubler, 1953, III:23, pp. 279–280; Levey, 1966, p. 297; see Beck, 2005, III:22, p. 187.

[6] Schmucker, 1969, no. 418; Lev and Amar, 2008, p. 99; see *ibid.*, 2002, n. 213, p. 274; Kahl, 2007, pp. 328. "Alum is a composition of different salts of metals with crystallization water. The prototype of this group of materials is natural alum saltpetre." (Lev, 2003, pp. 18–20; see *ibid.* also for medieval alum trade.)

[7] Schmucker, 1969, no. 85; Kahl, 2003, pp. 201, 234; *ibid.*, 2007, pp. 323, 342; Dubler, 1953, III:61, pp. 305–306; Dietrich, 1991, III:53, pp. 173–174; Levey, 1966, p. 237; Lev, 2003, pp. 34–35; Lev and Amar, 2008, p. 102; see *ibid.*, 2002, n. 74, p. 128; Beck, 2005, III:56, p. 206.

[8] Schmucker, 1969, no. 729; Dubler, 1953, I:131, pp. 101–107; Dietrich, 1991, I:121, pp. 83–84; Kahl, 2007, pp. 327, 344.

[9] Schmucker, 1969, no. 346; Kahl, 2003, pp. 209, 236; *ibid.*, 2007, p. 330; see Lev and Amar, 2008, p. 104.

[10] Schmucker, 1969, no. 346; Kahl, 2003, pp. 209, 236; *ibid*, 2007, p. 330; Levey, 1966, pp. 274–275; see Lev and Amar, 2008, p. 104.

[11] Schmucker, 1969, no. 20; Lev and Amar, 2008, p. 504; Beck, 2005, I:10, p. 11; Kahl, 2003, pp. 201, 232; *ibid.* 2007, pp. 323, 342; Dubler, 1953, I:9, pp. 18–19; Dietrich, 1991, I:10, p. 42; Levey, 1966, p. 227.

English Name	Arabic Name	Latin (Scientific) Name
Ash water	*māʾ al-ramād*	[plant] ash water[12]
Balsam	*balasān*	*Commiphora opobalsamum* Engl.[13] = *Amyris gileadense* L.[14]
Banana	*mawz*	*Musa paradisiaca* L.[15]
Barley	*shaʿīr*	*Hordeum* L.[16] *H. vulgare* L.[17]
Basil	*ḥabaq*	*Ocimum basilicum* L.[18]
Birthwort	*zarāwand*	*Aristolochia longa* L.[19] *Aristolochia rotunda* L.[20] *Aristolochia clematitis* L.[21] *Aristolochia sp.*[22]
Bran[23]	*nukhāla*	
Butter[24]	*samn*	
Castoreum	*jundbādastar*	castoreum[25] from *Castor fiber* L.[26]

[12] Schmucker, 1969, no. 328; Dietrich, 1991, I:141, p. 91: *māʾ al-ramād* = lye; Kahl, 2007, pp. 328: *ramād* = ashes.

[13] Schmucker, 1969, no. 139; Lev and Amar, 2008, p. 349; Dubler, 1953, I:18, pp. 26–27; Kahl, 2007, pp. 324, 342; Levey, 1966, p. 245; Lev, 2003, pp. 36–37.

[14] List and Horhammer, 1969–1979, Vol. 3, p. 260.

[15] Schmucker, 1969, no. 746; Lev and Amar, 2008, p. 352; see *ibid.*, 2002, n. 33, p. 88.

[16] Schmucker, 1969, no. 431; Lev and Amar, 2008, p. 353; see Beck, 2005, II:86, p. 130.

[17] Schmucker, 1969, no. 431; Kahl, 2003, pp. 207, 234; *ibid.*, 2007, pp. 328, 342; Dubler, 1953, II:78, pp. 181–182; Dietrich, 1991, II:73, p. 111; see Lev and Amar, 2002, n. 184, p. 240.

[18] Schmucker, 1969, no. 227; Lev and Amar, 2008, p. 108; Lev, 2003, p. 37; Levey, 1966, p. 257.

[19] Dubler, 1953, III:4, pp. 265–266; Kahl, 2003, pp. 209, 232; Lev and Amar, 2008, p. 359; Levey, 1966, pp. 273–274; Schmucker, 1969, no. 341; see Beck, 2005, III:4, p. 177.

[20] Dubler, 1953, III:4, pp. 265–266; Kahl, 2003, pp. 209, 232; Lev and Amar, 2008, p. 359; Levey, 1966, pp. 273–274; Schmucker, 1969, no. 341; see Beck, 2005, III:4, p. 177.

[21] Dubler, 1953, III:4, pp. 265–266; Kahl, 2003, pp. 209, 232; *ibid.*, 2007, pp. 330, 343; see Beck, 2005, III:4, p. 177.

[22] Dubler, 1953, III:4, pp. 265–266; Lev and Amar, 2008, p. 359; Schmucker, 1969, no. 341.

[23] *Ibid.*, no. 764; Kahl, 2003, p. 206.

[24] Bos, 1989; Kahl, 2003, p. 207; *ibid.*, 2007, p. 328; Levey, 1966, p. 285; see Lev and Amar, 2008, p. 132: *samn* = sour cream.

[25] Strong-smelling substance obtained from inguinal glands of the beaver (*Castor fiber*) and used medicinally by the ancients, castor (Glare, 1982, p. 282; Battaglia, 1961–2000, Vol. 2, p. 862; see Renaud and Colin, 1934, p. 103; Beck, 2005, I:24, pp. 99–100).

[26] Dubler, 1953, II:23, pp. 137–138; Dietrich, 1991, II:23, p. 97; Kahl, 2003, pp. 203, 236; Levey, 1966, p. 254; Lev, 2003, pp. 12–13; Lev and Amar, 2008, p. 354; see *ibid.*, 2002, n. 196, p. 256. On the confusion between beaver and otter, see Lev, 2003, pp. 12–13.

English Name	Arabic Name	Latin (Scientific) Name
Cinnamon	*dār ṣīnī*	*Cinnamomum ceylanicum* Nees.[27] *Cinnamomum cassia* Bl.[28]
Clay, Armenian[29]	*ṭīn armanī*	the better type of *ṭīn makhtūm*,[30] i.e., *terra sigillata*[31]
Costus, Indian	*qusṭ hindī*	*qusṭ*: = *Aucklandia costus* Falc.[32] = *Saussurea lappa* Clarke[33]
Cotton	*quṭn*	*Gossypium herbaceum* L.[34]
Crab	*saraṭān*	*Astacus fluviatilis* Fabr.[35]
Cucumber	*khiyār*	*Cucumis sativus*[36] *Cucumis* L.[37]

[27] Dietrich, 1991, I:14, p. 43; Dubler, 1953, I:13, pp. 22–23; Kahl, 2003, pp. 202, 233; *ibid.*, 2007, pp. 324, 343; Levey, 1966, pp. 265–266; Schmucker, 1969, no. 292; Lev and Amar, 2008, p. 143; see *ibid.*, 2002, n. 150, p. 206.

[28] Dubler, 1953, I:13, pp. 22–23; Levey, 1966, pp. 265–266; Schmucker, 1969, no. 292; see Lev and Amar, 2002, n. 148, p. 206. On the confusion between the two species, see Lev, 2003, pp. 46–48.

[29] Kahl, 2003, p. 208; *ibid.*, 2007, p. 329. Lev and Amar, 2008, p. 149: *ṭīn armanī* = "composed of oxidized iron with lime chalk. Red substance . . ."; Daems, 1993, no. 100: "Armenischer Tonerde, Aluminiumsilikate oder Aluminiumoxide, durch Eisen- und Manganoxide braunrot gefärbt."

[30] Schmucker, 1969, no. 476.

[31] Schmucker, 1969, no. 476. *Terra sigillata* = a medicinal clay containing ferrous oxide (List and Horhammer, 1969–1979, Vol. 2, p. 1262). Cf. Kahl, 2003, p. 208: *ṭīn makhtūm* = sealing bole.

[32] Dubler, 1953, I:15, p. 24; Levey, 1966, p. 316; Schmucker, 1969, no. 576.

[33] Dietrich, 1991, I:16, p. 43; Dubler, 1953, I:15, p. 24; Schmucker, 1969, no. 576. Other identifications: *Chrysanthemum balsamita* (Kahl, 2003, p. 206); *Costus speciosus* (Lev and Amar, 2008, p. 157); *Tanacetum balsamita* (Kahl, 2007, pp. 328, 342).

[34] Kahl, 2003, pp. 205, 233; *ibid.*, 2007, pp. 328, 342; Lev and Amar, 2008, p. 391; Levey, 1966, p. 317; Schmucker, 1969, no. 584.

[35] Schmucker, 1969, no. 375; Kahl, 2003, pp. 207, 236. Lev and Amar, 2008, p. 392: *saraṭān* = crab = *Decapoda*; Kahl, 2007, pp. 328: *saraṭān baḥrī* = lobster; Levey, 1966, p. 281: *saraṭān baḥrī* = shrimp, sea crab.

[36] Lev and Amar, 2008, p. 394; Kahl, 2003, pp. 204, 233; *ibid.*, 2007, pp. 325, 343; see Lev and Amar, 2002, n. 101, p. 156.

[37] Schmucker, 1969, no. 286. On the general difficulty of the terminology of *Cucumis* and *Cucurbita*, see Savage-Smith, 1980, p. 139, n. 19.

English Name	Arabic Name	Latin (Scientific) Name
Cucumber	*qithā'*	*Cucumis flexuosus*[38] *Cucumis melo* var. *chate*[39] *Cucumis sativus* L.[40]
Cucumber	*qathad*	*Cucumis* L.[41]
Date	*tamr*	*Phoenix dactylifera* L.[42]
Dill	*shibitt*	*Anethum graveolens* L.[43]
Egg[44]	*bayḍa*	
Egg yolk[45]	*ṣufrat al-bayḍa*	
Egg, poached[46]	*nimbirisht*	
Excrement of hare[47]	*khur' al-arnab*	*arnab* = *Lepus* spp.[48]
Fava bean	*bāqillā*	*Vicia faba* L.[49]
Fennel	*rāziyānaj*	*Foeniculum vulgare* Mill.[50]
Fenugreek	*ḥulba*	*Trigonella foenum-graecum* L.[51]

[38] Schmucker, 1969, no. 562; Kahl, 2003, pp. 206, 233; *ibid.*, 2007, pp. 327, 345. On the difficulty of identifying the plant, see Savage-Smith, 1980, p. 139, n. 19.

[39] Lev and Amar, 2008, p. 138; see Lev and Amar, 2002, n. 99, p. 154.

[40] Dubler, 1953, I:124, pp. 217–220; Dietrich, 1991, II:118, pp. 128–129; see Beck, 2005, II:135, p. 149.

[41] Identified through the Latin translation. See Savage-Smith, 1980, p. 139, n. 19.

[42] Schmucker, 1969, no. 172; Lev and Amar, 2008, p. 397; Kahl, 2003, p. 208, *ibid.*, 2007, pp. 329, 343.

[43] Schmucker, 1969, no. 420; Kahl, 2003, pp. 207, 232; *ibid.*, 2007, pp. 329, 343; Dubler, 1953, III:63, p. 307; Dietrich, 1991, III:55, p. 174; Lev and Amar, 2008, p. 398; see *ibid*, 2002, n. 168, p. 224; see Beck, 2005, III:58, p. 207. "The anise of ancient times (*Pimpinella anisum* L.) was frequently confused with the dill. Both are abundant in the Levant." Levey, 1966, p. 292.

[44] Dubler, 1953, II:44, pp. 148–149; Kahl, 2007, pp. 324, 329; Lev and Amar, 2008, p. 141; Levey, 1966, pp. 248, 298.

[45] Kahl, 2003, p. 208; *ibid.*, 2007, pp. 329; Levey, 1966, p. 298.

[46] Bos, 1989.

[47] Kahl, 2003, p. 203. For more information on the use of excrement for healing purposes, see Beck, 2005, II:80, pp. 124–125.

[48] Dietrich, 1991, II:18, p. 96; Kahl, 2003, pp. 204, 236; *ibid.*, 2007, p. 329.

[49] Schmucker, 1969, no. 102; Lev and Amar, 2008, p. 110; Dubler, 1953, II:96, p. 191; Kahl, 2003, pp. 201, 235; *ibid.*, 2007, pp. 324, 343; Levey, 1966, pp. 240–241; see Beck, 2005, II:105, p. 136.

[50] Schmucker, 1969, no. 318; Lev and Amar, 2008, p. 166; Kahl, 2003, pp. 207, 233; *ibid.*, 2007, pp. 328, 343; Dietrich, 1991, III:66, p. 179; Dubler, 1953, III:77, pp. 316–317; see Beck, 2005, III:70, p. 211.

[51] Schmucker, 1969, no. 247; Dubler, 1953, I:93, pp. 188–189; Dietrich, 1991, II:87, p. 116; Kahl, 2003, pp. 204, 235; *ibid.*, 2007, pp. 325, 343; Levey, 1966, pp. 259–260; Lev and Amar, 2008, p. 406; see *ibid.*, 2002, n. 42, p. 96.

English Name	Arabic Name	Latin (Scientific) Name
Fig	*ṭīn*	*Ficus carica*[52]
Flax	*kattān*	*Linum usitatissimum* L.[53]
Fleawort	*bizr qaṭūnā*	*Plantago psyllium* L.[54]
Galbanum	*qinna*	*Ferula galbaniflua* Boiss. and Buhse.[55] *Ferula rubricaulis* Boiss.[56] *Ferula* sp.[57]
Grape syrup	*maybukhtaj*	the condensed juice of *ʿinab* (*Vitis*)[58]
Gum	*ṣamgh*	resin gum[59]
Gum Arabic	*ṣamgh ʿarabī*	*Acacia arabica*[60] *Acacia senegal*[61] *Acacia* spp.[62]

[52] Schmucker, 1969, no. 180; Kahl, 2003, pp. 208, 233; *ibid*., 2007, pp. 329, 343; Dubler, 1953, I:145, pp. 118–121; Dietrich, 1991, I:140, pp. 90–91; Levey, 1966, p. 250; see Beck, 2005, I:128, p. 91.

[53] Dietrich, 1991, II:88, p. 116; Dubler, 1953, I:94, pp. 189–190; Kahl, 2003, pp. 204, 234; *ibid*., 2007, pp. 324, 344; Lev and Amar, 2008, p. 439; Schmucker, 1969, no. 620; see Beck, 2005, II:103, p. 135; Lev and Amar, 2002, n. 136, p. 190.

[54] Schmucker, 1969, no. 121; Kahl, 2003, pp. 202, 235; *ibid*., 2007, pp. 324, 343; Levey, 1966, p. 317; Dubler, 1953, IV:71, p. 418; Dietrich, 1991, IV:64, p. 241; Lev and Amar, 2008, p. 242; see *ibid*., 2002, n. 84, p. 138.

[55] Dietrich, 1991, III:79, p. 184; Dubler, 1953, III:91, pp. 328–329; Kahl, 2003, pp. 206, 233; *ibid*., 2007, pp. 327, 343; Lev and Amar, 2008, p. 171; Levey, 1966, pp. 239–240, 319; Schmucker, 1969, no. 603; see Beck, 2005, III:83, p. 221.

[56] Dubler, 1953, III:91, pp. 328–329; Levey, 1966, pp. 239–240, 319; Schmucker, 1969, no. 603.

[57] Dubler, 1953, III:91, pp. 328–329; Levey, 1966, pp. 239–240, 319; Schmucker, 1969, no. 603. Identified also as *Dorema Aucheri* (Schmucker, 1969, no. 603).

[58] Schmucker, 1969, no. 749. Levey, 1966, p. 338: "*maibakhtaj* = concentrated must.—Maim. (84) gives *jamhuri* as the juice of the grape boiled until half of it has evaporated. If only a quarter of it remains, then it is called *maibakhtaj*."

[59] Schmucker, 1969, no. 457. Used also instead of *ṣamgh ʿarabī* = gum from *Acacia* spp. Schmucker, 1969, no. 460; Lev and Amar, 2008, p. 180; Kahl, 2003, pp. 207, 232; *ibid*., 2007, pp. 328, 343; Levey, 1966, p. 234; Lev, 2003, pp. 59–60; see Lev and Amar, 2002, n. 178, p. 234.

[60] Kahl, 2003, pp. 207, 232; *ibid*., 2007, pp. 328, 343; Levey, 1966, p. 234; Lev, 2003, pp. 59–60.

[61] Lev and Amar, 2002, n. 178, p. 234; Schmucker, 1969, no. 460.

[62] Lev and Amar, 2008, p. 180; Schmucker, 1969, no. 460. For more information on Gum Arabic, see Lev, 2003, pp. 59–60.

English Name	Arabic Name	Latin (Scientific) Name
Henbane	*banj*	*Hyoscyamus albus L.*[63] *Hyoscyamus niger* L.[64]
Honey	*ʿasal*	honey, often bee honey, *ʿasal al-naḥl*[65] fluid or viscose plant exudate[66]
Honey, bee	*ʿasal al-naḥl*	bee honey[67]
Horehound	*farāsiyūn*	*Marrubium vulgare* L.[68]
Hydromel	*māʾ ʿasal*	drink made of honey and water
Hyssop	*zūfā*	*zūfā yābis*: = *Hyssopus officinalis* L.[69] other *Labiatae*[70]
Leek, Damascene	*kurrāth shāmī*	*Allium porrum* L.[71]
Lettuce	*khass*	*Lactuca sativa* L.[72]
Licorice	*sūs*	*Glycyrrhiza glabra*.L.[73]

63 Schmucker, 1969, no. 147; Lev and Amar, 2008, p. 418; Dubler, 1953, IV:70, pp. 416–418; Levey, 1966, p. 246.

64 Schmucker, 1969, no. 147; Lev and Amar, 2008, p. 418; Kahl, 2003, pp. 201, 234; *ibid*., 2007, pp. 324, 343; Dubler, 1953, IV:70, pp. 416–418; Levey, 1966, p. 246.

65 Dietrich, 1991, II:65, p. 109; Kahl, 2003, p. 201; *ibid*., 2007, p. 323; Levey, 1966, p. 304; Schmucker, 1969, no. 486; Lev and Amar, 2008, p. 185; see *ibid*., 2002, n. 198, p. 258.

66 Schmucker, 1969, no. 486. On different kinds of honey, see Lev, 2003, pp. 13–15.

67 Lev and Amar, 2008, p. 185; Kahl, 2003, p. 201; see Lev and Amar, 2002, n. 198, p. 258: *ʿasal al-naḥl* = honey (produced by *Apis mellifica*).

68 Schmucker, 1969, no. 523; Dubler, 1953, III:113, p. 339; Lev and Amar, 2008, p. 419; Kahl, 2003, pp. 202, 234; *ibid*., 2007, pp. 324, 344; see Beck, 2005, III:105, p. 229.

69 Dietrich, 1991, III:26, pp. 161–162; Dubler, 1953, III:28, pp. 283–284; Kahl, 2003, pp. 209, 234; *ibid*., 2007, pp. 329, 344; Lev, 2003, pp. 62–63; Levey, 1966, p. 277; Schmucker, 1969, no. 356; see Lev and Amar, 2002, n. 31, p. 86.

70 Dubler, 1953, III:28, pp. 283–284; Schmucker, 1969, no. 356; see Lev and Amar, 2002, n. 48, p. 102. On the historical uses of hyssop, see Lev, 2003, pp. 62–63.

71 Dietrich, 1991, II:132, p. 134. *kurrāth* = *Allium porrum* L. (Dubler, 1953, II:138, pp. 229–230; Kahl, 2003, pp. 204, 232; *ibid*., 2007, pp. 326, 344; Lev and Amar, 2008, p. 433; Levey, 1966, pp. 323–324; Schmucker, 1969, no. 624; see Beck, 2005, II:149, p. 154).

72 Dietrich, 1991, II:119, p. 129; Kahl, 2003, pp. 205, 234; *ibid*., 2007, pp. 325, 344; Lev and Amar, 2008, p. 437; Schmucker, 1969, no. 270; see Beck, 2005, II:136, p. 150; Lev and Amar, 2002, n. 57, p. 112.

73 Schmucker, 1969, no. 409; Dubler, 1953, III:5, pp. 266–268; Kahl, 2003, pp. 208, 233; *ibid*., 2007, pp. 329, 344; Levey, 1966, pp. 288–289; Lev and Amar, 2008, p. 205; see *ibid*., 2002, n. 172, p. 228; Beck, 2005, III:5, p. 178.

English Name	Arabic Name	Latin (Scientific) Name
Lily	*sawsan*	*Iris* spp.[74] *Lilium candidum* L.[75]
Maidenhair	*barshāwshān*	*Adiantum capillus veneris* L.[76]
Mallow	*khubbāzā* = *mulūkhiyya*[77]	*Malva* spp.[78]
Milk[79]	*laban*	
Mithridatium[80]	*al-mithrūdīṭūs*	
Mucilage	*lu'āb*	
Mustard	*khardal* *khardal aswad* *khardal abyaḍ*	 = *Brassica nigra* Koch. *Sinapis nigra* L.[81] = *B. alba* L. *S. alba* L.[82]
Myrrh	*murr*	*Commiphora myrrha* Engl.[83]
Myrtle	*ās*	*Myrtus communis* L.[84]

---

74 Dietrich, 1991, IV:77, pp. 246–247; Kahl, 2003, pp. 207, 234; *ibid.*, 2007, pp. 328, 344; Lev and Amar, 2008, p. 423; Schmucker, 1969, no. 410.

75 Dietrich, 1991, III:97, p. 191; Dubler, 1953, III:110, p. 337; Lev, 2003, pp. 66–67.

76 Lev and Amar, 2008, p. 443; Kahl, 2003, pp. 201, 232; *ibid.*, 2007, pp. 324, 344; Dubler, 1953, IV:137, pp. 458–459; see Beck, 2005, IV:134, p. 299.

77 Schmucker, 1969, no. 225.

78 *Ibid.*, no. 738; Dubler, 1953, II:109, pp. 201–202; Lev and Amar, 2002, n. 52, p. 106; see Beck, 2005, II:118, p. 142. Other identifications: *Corchorus olitorius* (Lev and Amar, 2002, n. 97, p. 152); *Althaea rosea* (Kahl, 2007, pp. 325, 343).

79 Dietrich, 1991, II:58, p. 1097; Kahl, 2003, p. 201; *ibid.*, 2007, p. 326; Levey, 1966, p. 330.

80 "Mithradatium was a notable antidote attributed to Mithridates VI, King of Pontus in Asia Minor from 114 to 63 BC Specifically, it included lizard (skink) as an ingredient and was intended initially to be used against poisons. Galen is unclear about the composition of Mithridatium but advised the use of a number of theriacs for internal use against poisons, venoms, and general ailments." Dols, 1984, pp. 140–141, n. 4. See also Totelin, 2004; Glare, 1982, p. 1119; Battaglia, 1961–2000, Vol. 10, p. 617.

81 Dubler, 1953, II:143, pp. 233–234; Kahl, 2003, pp. 203, 232; *ibid.*, 2007, pp. 325, 344; Schmucker, 1969, no. 265.

82 Kahl, 2003, pp. 203, 232; *ibid.*, 2007, pp. 325, 344; Schmucker, 1969, no. 265; Lev and Amar, 2008, p. 454; see *ibid.*, 2002, n. 59, p. 114; see Beck, 2005, II:154, p. 156.

83 Kahl, 2003, pp. 206, 233; *ibid.*, 2007, pp. 327, 344; Lev and Amar, 2008, p. 221; Lev, 2003, p. 71; Schmucker, 1969, no. 704; see Beck, 2005, I:64, p. 45; Lev and Amar, 2002, n. 95, p. 150. Also *Balsamodendron myrrha* Nees. suggested: Dubler, 1953, I:63, pp. 47–48; Levey, 1966, pp. 333–334; Schmucker, 1969, no. 704.

84 Dietrich, 1991, I:115, pp. 81–82; Dubler, 1953, I:128, pp. 99–100; Kahl, 2003, pp. 201, 234; *ibid.*, 2007, pp. 323, 344; Lev and Amar, 2008, p. 223; Schmucker, 1969, no. 19; see Beck, 2005, I:112, p. 82.

English Name	Arabic Name	Latin (Scientific) Name
Narciss	*narjis*	*Narcissus* spp.[85]
Nettle	*anjura*	*Urtica pilulifera* L.[86] *U. dioica* L.[87] *U. urens* L.[88]
Nut	*jawz*	*Juglans regia* L.[89] "nut" in general[90]
Nut grass, yellow	*suʿd*	*Cyperus longus* L.[91] *C. rotundus* L.[92]
Opium	*afyūn*	opium from *Papaver somniferum* L.[93]
Opoponax	*jāwshīr*	resin (mostly) from *Opopanax chironium* Koch.[94] *Ferula opopanax* Spr.[95]
Pasta	*iṭriya*	type of vermicelli[96]
Pepper	*filfil*	*Piper nigrum* L.[97]

[85] Schmucker, 1969, no. 766; Dietrich, 1991, I:45, p. 53; Kahl, 2007, pp. 327, 344; see Beck, 2005 IV:158, p. 310.

[86] Dietrich, 1991, IV:75, pp. 249–250; Dubler, 1953, IV:95, pp. 436–437; Kahl, 2003, pp. 201, 235; *ibid*., 2007, pp. 323, 345; Schmucker, 1969, no. 73.

[87] Dubler, 1953, IV:95, pp. 436–437; Schmucker, 1969, no. 73.

[88] Schmucker, 1969, no. 73; see Lev and Amar, 2002, n. 115, p. 170.

[89] Schmucker, 1969, no. 208, n. 1; Dietrich, 1991, I:135, p. 88; Dubler, 1953, I:141, pp. 113–114; Kahl, 2003, pp. 203, 234; *ibid*., 2007, pp. 325, 334; Levey, 1966, pp. 255–256; Lev and Amar, 2008, p. 310; see *ibid*., 2002, n. 3, p. 58; Beck, 2005, I:125, p. 88.

[90] Schmucker, 1969, no. 208, n. 1.

[91] Dietrich, 1991, I:39, p. 4; Dubler, 1953, I:4, pp. 14–15; Kahl, 2003, pp. 208, 233; Lev and Amar, 2008, p. 284; Levey, 1966, p. 282.

[92] Kahl, 2007, pp. 329, 343; Schmucker, 1969, no. 381.

[93] Dietrich, 1991, IV:59, p. 239; Kahl, 2003, pp. 201, 234; *ibid*., 2007, pp. 323, 344; Schmucker, 1969, nos. 60, 273. Opium is the brown latex obtained from incisions made in the unripe seed-capsules of *Papaver somniferum* L. The poppy heads are split two weeks before ripening, and during the night the milky white resin flows out. The gummy sap that oozes from the cuts is collected immediately and again on the following day, a technique that has not changed for millennia. The exuded latex is then dried, and manipulated to form cakes. See Tibi, 2006, p. 2; Lev and Amar, 2008, pp. 231–232.

[94] Dubler, 1953, III:51–53, pp. 300–302; Kahl, 2003, pp. 203, 234; *ibid*., 2007, pp. 325, 344; Lev and Amar, 2008, p. 458; Levey, 1966, pp. 254–255; Schmucker, 1969, no. 186.

[95] Dubler, 1953, III:51–53, pp. 300–302; Schmucker, 1969, no. 186. Also suggested *Heracleum Panaces* L. (Dubler, 1953, III:51–53, pp. 300–302).

[96] Lane, 1886–1893, p. 1852; Dozy, 1881, Vol. 1, p. 529; Lev and Amar, 2008, p. 570; for additional information, see Tibi, 2006, p. 22, n. 76 and p. 191.

[97] Dietrich, 1991, II:141, p. 138; Dubler, 1953, II:148, pp. 237–238; Schmucker, 1969, no. 538; Kahl, 2003, pp. 202, 234; Kahl, 2007, pp. 324, 344; Levey, 1966, pp. 311–312; Lev and Amar, 2008, p. 236; see Lev and Amar, 2002, n. 128, p. 182; Beck, 2005, II:159, p. 159.

English Name	Arabic Name	Latin (Scientific) Name
Peppermint	*fūdhanj*	*Mentha pulegium* L.[98] *Mentha* spp.[99] other *Lamiaceae*[100]
Pine	*ṣanawbar*	*Pinus pinea* L.[101] *Pinus* spp.[102]
Pistachio	*fustuq*	*Pistacia vera*[103]
Pistachio resin	*ʿilk al-anbāṭ*	*Pistacia* L. turpentine[104]
Pomegranate	*rummān*	*Punica granatum*[105]
Poppy	*khashkhāsh*	*Papaver somniferum* L.[106]
Poppy medicament, simple	*al-diyāqūdh al-sādhaj*	Contains: *Papaver somniferum* L.[107]

[98] Kahl, 2003, pp. 202, 234; *ibid*., 2007, pp. 324, 344; Levey, 1966, pp. 312–313; Schmucker, 1969, no. 553.

[99] Schmucker, 1969, no. 553; see Lev and Amar, 2002, n. 104, p. 158; Levey, 1966, pp. 312–313; Dietrich, 1991, III:33, p. 165.

[100] Dietrich, 1991, III:33, p. 165; Dubler, 1953, III:31, pp. 286–287; Levey, 1966, pp. 312–313; Schmucker, 1969, no. 553; see Beck, 2005, III:35, p. 195. For *fūdhanj* as a collective name for various species of aromatic plants, mainly of the Lamiaceae family, see Lev and Amar, 2008, p. 30.

[101] Levey, 1966, pp. 299–300; Schmucker, 1969, no. 462; Lev and Amar, 2008, p. 466; see Lev and Amar, 2002, n. 7, p. 62.

[102] Dubler, 1953, I:70, pp. 51–54; Kahl, 2003, pp. 207, 234; *ibid*., 2007, pp. 328, 345; Levey, 1966, pp. 299–300; Schmucker, 1969, no. 462; see Beck, 2005, I:69, p. 50, for a good discussion on the difficulties of identifying pine trees.

[103] Dietrich, 1991, I:134, p. 88; Dubler, 1953, I:140, p. 113; Schmucker, 1969, no. 530; Kahl, 2003, pp. 203, 235; *ibid*., 2007, pp. 324, 345; Lev and Amar, 2008, p. 468; see *ibid*., 2002, n. 18, p. 72; see Beck, 2005, I:124, p. 88.

[104] Schmucker, 1969, no. 493; Dietrich, 1991, I:67, pp. 59–60; see Lev and Amar, 2002, n. 17, p. 72.

[105] Dietrich, 1991, I:113, p. 80; Kahl, 2003, pp. 207, 235; *ibid*., 2007, pp. 328, 345; Schmucker, 1969, no. 329; Lev and Amar, 2008, p. 248; see *ibid*., 2002, n. 165, p. 222; Beck, 2005, I:110, p. 82.

[106] Schmucker, 1969, no. 273; Kahl, 2003, p. 203; Dietrich, 1991, IV:59, p. 239; see Lev and Amar, 2002, n. 133, p. 188; Beck, 2005, IV:64, p. 273.

[107] Includes *diyāqūdh al-sādhaj, al-diyāqūdh, diyāqūdhā bārid. diyāqūdh* comes from the Greek *(e) dia kodion* = "[remedy made] with poppy capsules" (Kahl, 2007, p. 229, n. 119; see Liddell and Scott, 1977, p. 1016; Dozy, 1881, Vol. I, p. 480). For the identification of poppy, see n. 106, above.

English Name	Arabic Name	Latin (Scientific) Name
Pumpkin	*qarʿ*	*Cucurbita maxima* Duch.[108] *Cucurbita pepo* L.[109] *Lagenaria vulgaris* Ser.[110]
Qūfī		*kufi*, a compound incense of Egyptian origin[111]
Quince	*safarjal*	*Cydonia oblonga* Mill.[112] *Cydonia vulgaris*[113]
Raisin	*zabīb*	dried grapes from *Vitis vinifera* L. etc.[114]
Resin	*qiṭrān*	tar from: *Cedrus libani*[115] *Cupressus* spp.[116] *Coniferae*[117]
Resin dregs	*durdī al-qiṭrān*	
Rose	*ward*	*Rosa gallica* L.[118] *Rosa* spp.[119]
Rose honey[120]	*julunjubīn ʿasalī*	

[108] Dubler, 1953, II:123, p. 217; Levey, 1966, pp. 314–315; Schmucker, 1969, no. 569.

[109] Dietrich, 1991, II:117, p. 128; Dubler, 1953, II:123, p. 217; Levey, 1966, pp. 314–315; Schmucker, 1969, no. 569.

[110] Kahl, 2007, pp. 327, 343; Lev and Amar, 2008, p. 120; Levey, 1966, pp. 314–315; Schmucker, 1969, no. 569. On the nomenclature of *Cucurbitaceae*, see Savage-Smith, 1980, p. 139, n. 19.

[111] Dozy, 1881, Vol. 2, p. 420; Beck, 2005, I:25, pp. 22–23, n. 43; Dietrich, 1991, I:24, p. 47. For a recipe, see also *K. al-Qānūn*, Vol. 3, p. 331.

[112] Dietrich, 1991, I:119, p. 83; Kahl, 2003, pp. 207, 233; *ibid*., 2007, pp. 328, 345; Lev and Amar, 2008, p. 255.

[113] Dubler, 1953, I:131, pp. 101–107; Levey, 1966, pp. 282–283; Schmucker, 1969, no. 383.

[114] Dubler, 1953, V:4, p. 506; Schmucker, 1969, no. 339; Lev and Amar, 2008, p. 176; Lev, 2003, pp. 57–59; Kahl, 2003, pp. 208, 235; Kahl, 2007, pp. 330, 345.

[115] Dietrich, 1991, I:77, p. 62; Lev and Amar, 2008, pp. 134, 497; Schmucker, 1969, no. 582; see Lev and Amar, 2002, n. 231, p. 296.

[116] Lev and Amar, 2008, pp. 396, 497; Schmucker, 1969, no. 582.

[117] Kahl, 2003, pp. 206, 233; *ibid*., 2007, p. 327; Lev and Amar, 2008, pp. 466, 497; Levey, 1966, p. 316; Schmucker, 1969, no. 582.

[118] Dubler, 1953, I:110, pp. 83–84; Levey, 1966, pp. 344–345; Schmucker, 1969, no. 797.

[119] Dietrich, 1991, I:101, p. 73; Dubler, 1953, I:110, pp. 83–84; Kahl, 2003, pp. 208, 235; *ibid*., 2007, pp. 329, 345; Lev and Amar, 2008, pp. 261–262; Schmucker, 1969, no. 797; see Beck, 2005, I:99, p. 70; Lev and Amar, 2002, n. 47, p. 102. On the importance of rose in the medieval Middle East, see Lev, 2003, pp. 52–54.

[120] *julunjubīn* = rose honey (Schmucker, 1969, no. 202). *ʿasal* = honey: Dietrich, 1991, II:65, p. 109; Kahl, 2003, p. 201; *ibid*., 2007, p. 323; Levey, 1966, p. 304; Schmucker, 1969, no. 486; Lev and Amar, 2008, p. 185; see *ibid*., 2002, n. 198, p. 258.

English Name	Arabic Name	Latin (Scientific) Name
Safflower	*qurṭum*	*Carthamus tinctorius* L.[121]
Saffron	*zaʿfarān*	*Crocus sativa* L.[122]
Sagapenum	*sakabīnaj*	*Ferula Persica* Willd.[123] *Ferula Scowitziana* DC.[124]
Sebesten	*sabistān*	*Cordia myxa*[125]
Silk[126]	*ḥarīra*	
Starch	*nashā*	amylum, starch[127]
Storax	*ʿasal al-lubnā*[128] *lubnā*	 = *Liquidambar orientalis* Mill.[129] *Styrax officinalis* L.[130]
Storax	*mayʿa*	*Liquidambar orientalis* Mill.[131] *Styrax* spp.[132]
Sugar	*sukkar*	sugar, saccharum *Saccharum officinarum*[133]

[121] Schmucker, 1969, no. 568; Kahl, 2003, pp. 206, 232; *ibid*., 2007, pp. 328, 345; Lev and Amar, 2008, p. 474; see *ibid*., 2002, n. 158, p. 214; Beck, 2005, IV:188, p. 327.

[122] Dubler, 1953, I:25, pp. 31–32; Schmucker, 1969, no. 349; Kahl, 2003, pp. 208, 233; *ibid*., 2007, pp. 330, 345; Levey, 1966, pp. 275–276; Lev, 2003, pp. 77–78; Dietrich, 1991, I:25, p. 47; Lev and Amar, 2008, p. 270; see *ibid*., 2002, n. 79, p. 134; Beck, 2005, I:26, p. 23. According to Levey, sometimes also the root of *Curcuma longa* L. (Levey, 1966, pp. 275–276).

[123] Dubler, 1953, III:89, p. 327; Kahl, 2003, pp. 207, 233; *ibid*., 2007, pp. 328, 345; Lev and Amar, 2008, p. 472; Schmucker, 1969, no. 390; see Beck, 2005, III:81, p. 219; Levey, 1966, pp. 283–284.

[124] Dietrich, 1991, III:77, pp. 183–184; Dubler, 1953, III:89, p. 327; see Levey, 1966, pp. 283–284.

[125] Levey, 1966, p. 279; Schmucker, 1969, no. 364; Lev and Amar, 2008, p. 282; see Kahl, 2003, pp. 207, 233; *ibid*., 2007, pp. 328, 345; Lev and Amar, 2002, n. 120, p. 174.

[126] Schmucker, 1969, no. 241; Lev and Amar, 2008, p. 481: *ḥarīr* = silkworm = *Bombyx mori*, cocons and product.

[127] Schmucker, 1969, no. 769; Lev and Amar, 2008, p. 293; Kahl, 2007, p. 327. For the preparation and use of starch in medicine, see Tibi, 2006, p. 202.

[128] *ʿasal* = 1. honey, often bee honey; 2. fluid or viscose plant exudate (Schmucker, 1969, no. 486).

[129] Dietrich, 1991, I:56, pp. 55–56; Kahl, 2007, pp. 323, 345; Schmucker, 1969, no. 671.

[130] Dietrich, 1991, I:56, pp. 55–56; Schmucker, 1969, no. 671; see Lev and Amar, 2002, n. 82, p. 136.

[131] Dietrich, 1991, I:56, pp. 55–56; Schmucker, 1969, no. 753; see Lev and Amar, 2002, n. 86, p. 140.

[132] Dietrich, 1991, I:56, pp. 55–56; Kahl, 2003, pp. 205, 235; *ibid*., 2007, pp. 326, 345; Schmucker, 1969, no. 753.

[133] Schmucker, 1969, nos. 391, 580; Dietrich, 1991, II:66, p. 109; Lev, 2003, pp. 84–86; Lev and Amar, 2008, p. 294; Kahl, 2003, p. 208; *ibid*., 2007, p. 329; Levey, 1966, p. 284; see Lev and Amar, 2002, n. 147, p. 204. *Sukkar* is the general term for the sap of the sugar cane which becomes solid upon boiling (Savage-Smith, 1980, pp. 142–143, n. 30).

English Name	Arabic Name	Latin (Scientific) Name
Sugar cane	*qaṣab al-sukkar*	*Saccharum officinarum*[134]
Sugar, crystalline[135]	*sukkar ṭabarzadh*	
Sugar, *fānīdh*	*fānīdh*	sweets, candy[136]
Sulphur[137]	*kibrīt*	
Tabasheer	*ṭabāshīr*	chalk[138] *Bambusa arundinacea*, ashes[139]
Tamarind	*tamr hindī*	*Tamarindus indica* L.[140]
Terebinth resin	*ʿilk al-buṭm*	See *ʿilk al-anbāṭ* *buṭm* = *Pistacia terebinthus* L.[141]
Terebinth resin	*ṣamgh al-buṭm*	See *ʿilk al-anbāṭ* *buṭm* = *Pistacia terebinthus* L.[142]

[134] Schmucker, 1969, nos. 391, 580; Dietrich, 1991, II:66, p. 109; Lev, 2003, pp. 84–86; Lev and Amar, 2008, p. 294; Kahl, 2003, p. 208; *ibid*., 2007, pp. 329; Levey, 1966, p. 284; see Lev and Amar, 2002, n. 147, p. 204.

[135] Bos, 1989; Kahl, 2003, p. 208: *sukkar ṭabarzadh* = white sugar candy. "When *sukkar* has been boiled twice and purified by being poured into a vessel in which the impurities are separated out, it is called Sulaymani sugar, a name probably deriving from a trade name associated with the town of Sulayman in Khuzistan. When *sukkar* is boiled a third time, after fresh milk equal in quantity to one-tenth its volume has been added to it, and it is boiled until is solidified, it is called *ṭabarzadh*, from the Persian meaning literally 'chopped with an axe'. Sugar prepared in this manner was apparently so hard that it had to be smashed into smaller pieces." (Savage-Smith, 1980, pp. 142–143, n. 30).

[136] Lev and Amar, 2008, p. 571; Kahl, 2003, p. 202. Schmucker, 1969, no. 520: "weiche Zuckermasse, Feinzucker, Art Pflanzenzucker, den man hauptsachlich aus dem Sussholz zu gewinnen pflegte."

[137] Schmucker, 1969, no. 618; Lev and Amar, 2008, p. 297; Kahl, 2003, p. 204; see Lev and Amar, 2002, n. 215, p. 276.

[138] Schmucker, 1969, no. 464; see also Levey, 1966, p. 300.

[139] Schmucker, 1969, no. 464; Kahl, 2003, pp. 208, 232; *ibid*., 2007, pp. 329, 345; see Lev and Amar, 2008, pp. 106–107: Chalk, tabashir, *Bambusa vulgaris* (Poaceae): "Bamboo contains a large amount of silica and in medieval times it was burned as part of the extraction process. The ashes, which form crystals of a bluish white, hard light substance, were called *ṭabāshīr*." Silicic acid was also prepared of bamboo (Hill, 1993, p. 89).

[140] Schmucker, 1969, no. 173; Kahl, 2003, pp. 208, 235; *ibid*., 2007, pp. 329, 345; Levey, 1966, p. 251; Lev and Amar, 2008, p. 301; see *ibid*., 2002, n. 190, p. 246.

[141] Schmucker, 1969, no. 130; Kahl, 2003, pp. 204, 235; *ibid*., 2007, pp. 324, 345; Dietrich, 1991, I:67, pp. 59–60.

[142] Schmucker, 1969, no. 130; Kahl, 2003, pp. 204, 235; *ibid*., 2007, pp. 324, 345; Dietrich, 1991, I:67, pp. 59–60.

English Name	Arabic Name	Latin (Scientific) Name
Thistle	*bādhāward*	*Cirsium* ferox (L.) Scorp.[143] *Onopordum* spp.[144] several kinds of thistles, *Carduaceae*[145]
Thyme	*ḥāshā*	*Satureja* spp.[146] *Thymus* spp.[147] other *Labiatae*[148]
Tragacanth	*kathīrāʾ*	*Astragalus gummifer* Lab.[149] *Astragalus* spp.[150]
Valerian	*sunbul al-ṭīb* = *sunbul*[151]	*Valeriana jatamansi* Roxb. = *Nardostachys jatamansi* DC.[152]
Vegetables[153]	*buqūl*	
Vetch	*kirsinna*	*Vicia ervilia* (L.) Willd.[154] *Vicia* L.[155]
Vinegar	*khall*	vinegar from *Vitis vinifera* L.[156]
Violet	*banafsaj*	*Viola odorata* L.[157]

143 Dietrich, 1991, III:12, p. 155; Kahl, 2003, pp. 201, 233.
144 Dietrich, 1991, III:12, p. 155; Kahl, 2007, pp. 324, 343; Schmucker, 1969, no. 97.
145 Schmucker, 1969, no. 97.
146 Lev, 2003, pp. 78–80; Schmucker, 1969, no. 219; see Beck, 2005, III:36, p. 196.
147 Dubler, 1953, III:40, pp. 292–293; Lev, 2003, pp. 60–61, 78–80; Levey, 1966, p. 256; Schmucker, 1969, no. 219.
148 Kahl, 2003, pp. 203, 232; *ibid*., 2007, pp. 325, 343; Schmucker, 1969, no. 219. On difficulties of identification of thyme and other Labiatae, see Lev, 2003, pp. 60–61, 78–80.
149 Lev, 2003, pp. 89–90; Levey, 1966, p. 323; Schmucker, 1969, no. 621; Lev and Amar, 2008, p. 302; see *ibid*., 2002, n. 140, p. 196; see Beck, 2005, III:20, p. 186.
150 Dietrich, 1991, III:20, p. 158; Dubler, 1953, III:21, p. 278; Kahl, 2003, pp. 204, 232; *ibid*., 2007, pp. 326, 345; Levey, 1966, p. 323; Schmucker, 1969, no. 621; see Beck, 2005, III:20, p. 186. For further information on tragacanth, see Lev, 2003, pp. 89–90.
151 Schmucker, 1969, no. 403.
152 Dubler, 1953, I:6, pp. 16–17; Dietrich, 1991, I:6, p. 40; Schmucker, 1969, no. 403; Lev and Amar, 2008, p. 289; Kahl, 2003, pp. 208, 234; Kahl, 2007, pp. 329, 344, 224, n. 111; see Lev and Amar, 2002, n. 107, p. 162; Levey, 1966, pp. 286–287.
153 Schmucker, 1969, no. 135.
154 Dietrich, 1991, II:93, p. 118; Dubler, 1953, II:100, pp. 194–195; Levey, 1966, p. 324; Schmucker, 1969, no. 626; Lev and Amar, 2008, p. 360; see *ibid*., 2002, n. 35, p. 90.
155 Kahl, 2003, pp. 202, 235; *ibid*., 2007, pp. 326, 345; Schmucker, 1969, no. 626.
156 Kahl, 2003, p. 203; *ibid*., 2007, p. 325; Lev and Amar, 2008, p. 176. According to Waines, the medieval vinegar was genuine *vin aigre* or soured wine, as the term *khall khamr* indicates (Waines, 1989, p. 25). On medical uses of vinegar in the Middle Ages, see Lev, 2003, pp. 57–59.
157 Schmucker, 1969, no. 151; Dubler, 1953, IV:122, pp. 452–453; Levey, 1966, p. 247; Lev, 2003, pp. 87–88; Kahl, 2003, pp. 201, 235; *ibid*., 2007, pp. 324, 345; Lev and Amar, 2008, p. 299; see *ibid*., 2002, n. 108, p. 162; see Beck, 2005, IV:121, p. 296.

English Name	Arabic Name	Latin (Scientific) Name
Water mint	*fūdhanj nahrī*	*Mentha aquatica* L.[158]
Wax,[159] red	*shamʿ aḥmar*	
Wheat	*ḥinṭa*	*Triticum* L.[160]
Wheat	*qamḥ*	*Triticum* spp.[161]
Wine; juice[162]	*sharāb*	wine from *Vitis vinifera* L.[163] wine (in general) juice (in general)[164]

[158] Schmucker, 1969, no. 553; Kahl, 2003, pp. 202, 234; *ibid*., 2007, pp. 324, 345; Levey, 1966, pp. 312–313.
[159] *shamʿ* = cire (Renaud and Colin, 1934, p. 260); Lev and Amar, 2008, p. 315: *shamʿ* = wax (from bees); Kahl, 2003, p. 207: *shamʿ* = beeswax.
[160] Schmucker, 1969, no. 257; Dietrich, 1991, II:69, p. 110; Kahl, 2007, pp. 325, 345; Lev and Amar, 2008, p. 502; see Beck, 2005, II:85, p. 129.
[161] Schmucker, 1969, no. 595; Lev and Amar, 2008, p. 502; see Lev and Amar, 2002, n. 51, p. 106.
[162] Fellmann, 1986, pp. 269–272; Kahl, 2003, p. 207.
[163] Fellmann, 1986, pp. 269–272; Kahl, 2003, p. 207; *ibid*., 2007, p. 328. For a good overview of several products of grapevine and their medicinal uses, see Lev, 2003, pp. 57–59.
[164] Fellmann, 1986, pp. 269–272.

APPENDIX 25

(See p. 253)

6.3a. The Frequencies of the Simple Drugs in the Prescriptions for Cough by Ibn Sīnā.

Drug	**Frequency**
Almond	7
Aloe	1
Alum	1
Aniseed	1
Apricot	1
Arsenic	1
Arsenic, red	1
Asarabacca	2
Ash water	1
Balsam	2
Banana	1
Barley	8
Basil	1
Birthwort	1
Bran (*nukhāla*)	1
Butter	3
Castoreum	1
Cinnamon	1
Clay, Armenian	1
Costus, Indian	1
Cotton	1
Crab	1
Cucumber (*khiyār*)	1
Cucumber (*qathad*)	1
Cucumber (*qithāʾ*)	2
Date	2
Dill	2
Egg	3
Excrement of hare	1
Fava bean	2
Fennel	1
Fenugreek	2
Fig	6
Flax	2
Fleawort	2
Galbanum	1

Drug	**Frequency**
Grape syrup (*maybukhtaj*)[1]	1
Gum	1
Gum Arabic	2
Henbane	2
Honey	20[2]
Horehound	1
Hyssop	5
Leek, Damascene	2
Lettuce	1
Licorice	5
Lily	3
Maidenhair	2
Mallow (*khubbāzā*)	1
Milk	2
Mucilage	2
Mustard	1
Myrrh	6
Myrtle	1
Narciss	1
Nettle	1
Nut	1
Nut grass, yellow	1
Opium	3
Opoponax	1
Pasta (*iṭriya*)	2
Pepper	5
Peppermint	3[3]
Pine	6
Pistachio	3
Pistachio resin	1
Pomegranate	2
Poppy	8[4]
Pumpkin	3
Quince	2
Raisin	3
Resin (*qiṭrān*)	2[5]

[1] Not counted as a compound drug, as its only ingredient are grapes. See Despars' Prescription #78 on p. 528, below.

[2] Including rose honey, *al-julunjīn* [sic] *al-ʿasalī*, and hydromel, *māʾ al-ʿasal*.

[3] Includes also water mint.

[4] Includes also "poppy medicament" (*al-diyāqūdh*). See p. 457, n. 107, above. Appears three times in Prescriptions #36a, #36b and #37 (see pp. 242–243, above) that supplement each other, therefore counted only once; appears twice in Prescription #46, p. 245, above, counted only once.

[5] Includes resin and resin dregs.

Drug	Frequency
Rose	1
Safflower	1
Saffron	6[6]
Sagapenum	1
Sebesten	1
Silk	1
Starch	5
Storax (*lubnā*)	1
Storax (*mayʿa*)	5
Sugar	5[7]
Sugar, *fānīdh*	3
Sulphur	1
Tabasheer	1
Tamarind	1
Terebinth resin	2
Thistle (*bādhāward*)	1
Thyme	1
Tragacanth	6
Valerian	1
Vetch	2
Vinegar	1
Violet	1[8]
Wax	1
Wheat (*ḥinṭa*)	1[9]
Wheat (*qamḥ*)	1
Wine	1

[6] Appears twice in the same prescription, counted only once.

[7] Includes sugar, crystalline sugar, and sugar cane. Appears twice in the same prescription, counted only once.

[8] Includes also violet jam (both are in the same prescription).

[9] In *ḥinṭiyya*, a wheat dish.

6.3b. Compound Drugs in the Prescriptions for Cough by Ibn Sīnā.

Drug	**Frequency**
Hydromel[10]	1
Mithridatium[11]	1
Poppy medicament (*al-diyāqūdh*)	4[12]
Qūfī[13]	1
Rose honey[14]	1[15]

[10] See p. 454, above. Counted also as honey.

[11] See p. 455, n. 80, above.

[12] Includes *diyāqūdh al-sādhaj, al-diyāqūdh, diyāqūdhā bārid. diyāqūdh* comes from the Greek *(e) dia kodion* = "[remedy made] with poppy capsules" (Kahl, 2007, p. 229, n. 119; see Liddell and Scott, 1977, p. 1016; Dozy, 1881, Vol. I, p. 480). Counted also as poppy.

[13] See p. 458 and n. 111, above, and p. 513, n. 10, p. 536 and ns. 66–67, below.

[14] See p. 237, n. 45, p. 458, n. 120, above.

[15] Counted also as honey.

APPENDIX 26

(See p. 254)

6.4a. Medical Qualities in Ibn Sīnā's Drugs for Cough.[1, 2]

Drug	AA	BB	CC	DD	EE	FF	GG	HH	II	JJ	KK	LL	MM	NN	OO	PP	QQ	RR	SS	TT	UU	VV	XX
Almond		+	+			+									+							+	+
Aloe			+							+												+	
Alum			+							+													
Aniseed			+								+												
Apricot																							
Arsenic[3]		+																					+
Asarabacca						+					+				+								
Ash water[4]																							
Balsam		+				+				+													+
Banana																					+		
Barley (*sha'īr*)						+		+									+						
Birthwort		+				+									+								
Bran (*nukhāla*)						+					+										+		
Butter			+							+	+					+					+		+
Castoreum											+												
Cinnamon					+					+	+			+									+
Clay, Armenian		+			+					+													
Costus						+				+				+			+						
Cotton																					+		+
Crab[5]						+				+	+												
Cucumber (*qithā'*)						+							+								+		

[1] AA = collecting the expectoration; BB = performing asthma therapy; CC = astringent; DD = antidotes; EE = performing catarrh therapy; FF = performing a clearing effect; GG = coldness; HH = cooling; II = cutting; JJ = acting as a desiccant; KK = acting as a dissolving medication; LL = having a dry property; MM = emetic; NN = heating; OO = rarefying; PP = maturating; QQ = moistening; RR = anesthetics; SS = acting to obstruct catarrh; TT = enabling [expectorated] matter to slide; UU = softening; VV = soporific; XX = for cough.

[2] The following drugs were not described in Book II of *K. al-Qānūn*: basil (*ḥabaq*), cucumber (*qathad*), cucumber (*khiyār*), and plant mucilages.

[3] Includes arsenic and red arsenic.

[4] Taken from the article on ashes.

[5] Taken from articles on river crab and sea crab.

Drug	AA	BB	CC	DD	EE	FF	GG	HH	II	JJ	KK	LL	MM	NN	OO	PP	QQ	RR	SS	TT	UU	VV	XX
Date																							
Dill									+	+	+		+			+					+	+	
Egg		+	+		+																+		+
Excrement, Hare				+		+				+	+			+									
Fava bean			+			+	+						+										+
Fennel[6]																							
Fenugreek		+									+	+	+	+		+	+				+		+
Fig[7]						+			+		+				+	+					+		+
Flax			+		+	+										+	+				+		+
Fleawort			+																		+		
Galbanum		+							+		+										+		+
Grape syrup																							
Gum			+							+											+		+
Gum arabic[8]			+							+											+		+
Henbane											+						+	+					+
Honey						+				+	+		+								+		
Horehound						+			+		+												
Hyssop[9]		+				+					+												+
Leek		+	+													+							
Lettuce						+	+			+												+	
Licorice[10]																	+				+		
Lily			+			+				+	+				+						+	+	+
Maidenhair[11]		+	+								+				+								+
Mallow (*khubbāzā*)[12]			+								+		+				+				+		+
Milk		+				+									+	+	+				+		+
Mustard						+			+	+	+												
Myrrh		+	+			+				+	+					+					+	+	+
Myrtle			+			+	+	+		+				+									+
Narciss						+				+	+		+										

[6] See also Chipman, 2002, pp. 146–147.
[7] *Ibid.*, pp. 147–148.
[8] Taken from the article on gum. *Ibid.*, p. 148.
[9] *Ibid.*, pp. 149–150.
[10] *Ibid.*, pp. 150–151.
[11] *Ibid.*, p. 151.
[12] *Ibid.*, p. 152.

Drug	AA	BB	CC	DD	EE	FF	GG	HH	II	JJ	KK	LL	MM	NN	OO	PP	QQ	RR	SS	TT	UU	VV	XX
Nettle		+				+					+										+		
Nut (*jawz*)			+			+				+				+			+						
Nut grass, yellow			+																				
Opium										+								+				+	+
Opoponax						+					+										+		+
Pasta (*iṭriya*)																					+		+
Pepper						+				+	+			+			+						+
Peppermint						+			+	+	+		+		+								
Pine[13]			+			+				+	+					+	+				+		+
Pistachio (*ʿilk*) + terebinth[14]			+			+		+		+	+					+							+
Pistachio nut			+																				
Pomegranate			+			+								+							+		
Poppy[15]					+	+		+	+	+			+					+			+	+	+
Pumpkin																				+	+		+
Quince[16]		+	+														+				+		
Raisin[17]			+																				
Resin (*qiṭrān*)						+																	+
Rose			+			+			+	+				+									
Safflower (*qurṭum*)											+												
Saffron			+			+					+		+	+		+		+				+	
Sagapenum		+				+					+				+						+		+
Sebesten[18]																					+		
Silk[19]										+		+			+								
Starch																					+		
Storax (*lubnā*)					+						+					+		+			+		+
Storax (*mayʿa*)			+							+													
Sugar						+							+								+		

13 Taken from articles on pine and pine seed.
14 Taken from articles on resin (*ʿilk*), terebinth (*buṭm*) and pistachio (*al-ḥabba al-khaḍrāʾ*) See *K. al-Qānūn*, Vol. 1, p. 280.
15 See also Chipman, 2002, pp. 153–154.
16 *Ibid.*, p. 154.
17 Taken from articles on raisins and grapes. See also Chipman, 2002, pp. 154–155.
18 *Ibid.*, pp. 155–156.
19 Silk, *ḥarīra*, does not exist in Book II of *K. al-Qānūn*, and therefore the information is taken from the article on *ibrīsam*, silk (*K. al-Qānūn*, Vol. 1, p. 261). Lev and Amar, 2008, p. 481: *abrīsim*, *ibrīsim*, *ḥarīr* = silkworm = *Bombyx mori*, cocons and product.

Drug	AA	BB	CC	DD	EE	FF	GG	HH	II	JJ	KK	LL	MM	NN	OO	PP	QQ	RR	SS	TT	UU	VV	XX
Sugar, *fānīdh*														+							+		+
Sulphur						+					+				+				+				
Tabasheer			+					+		+	+												
Tamarind			+														+				+		
Thistle (*bādhāward*)			+								+												
Thyme									+	+	+	+											
Tragacanth (*kathīrāʾ*)[20]										+													+
Valerian (*sunbul*)			+							+	+			+									
Vetch (*kirsinna*)						+						+									+		
Vinegar							+	+	+	+	+			+	+								+
Violet																					+		+
Wax (*shamʿ*)											+					+	+				+		
Wheat																							
Wine	+		+			+					+		+								+	+	
#	1	16	33	1	6	41	4	6	10	34	40	4	12	13	12	13	14	5	1	1	39	10	37
%	1	18	36	1	7	45	4	7	11	37	44	4	13	14	13	14	15	5	1	1	43	11	41

6.4b. The Frequency of the Different Therapeutic Qualities in Drugs for Cough by Ibn Sīnā.

Code	**Quality**	**Frequency**
FF	Performing a clearing effect	45 %
KK	Dissolving	44 %
UU	Softening	43 %
XX	For cough	41 %
JJ	Acting as a desiccant	37 %
CC	Astringent	36 %
BB	Performing asthma therapy	18 %
QQ	Moistening	15 %
NN	Heating	14 %
PP	Maturating the materia[21]	14 %
MM	Emetic	13 %
OO	Rarefying	13 %
VV	Soporific	11 %
II	Cutting	11 %
EE	Performing catarrh therapy	7 %
HH	Cooling	7 %

[20] See also Chipman, 2002, pp. 148–149.
[21] See p. 447, n. 2, Appendix 23, above.

Code	Quality	Frequency
RR	Anesthetic	5 %
GG	Coldness	4 %
LL	Having a dry property	4 %
AA	Collecting the expectoration	1 %
DD	Antidotes	1 %
SS	Acting to obstruct catarrh	1 %
TT	Enabling materia to slide	1 %

6.4c. The Frequency of the Different Therapeutic Qualities or Quality Clusters in Drugs for Cough by Ibn Sīnā.

Code	Quality or Quality Cluster	Frequency	
FF	Performs a clearing effect		**45 %**
KK	Acting as a dissolving medication		**44 %**
UU	Softening		**43 %**
XX	For cough		**41 %**
JJ	Acting as a desiccant	37 %	
LL	Having a dry property	4 %	= **40 %**
CC	Astringent		**36 %**
BB	Performing asthma therapy		**18 %**
QQ	Moistening		**15 %**
NN	Heating		**14 %**
PP	Maturating the materia[22]		**14 %**
VV	Soporific	11 %	
RR	Anesthetic	5 %	= **13 %**
MM	Emetic		**13 %**
OO	Rarefying		**13 %**
II	Cutting		**11 %**
HH	Cooling	7 %	
GG	Coldness	4 %	= **9 %**
EE	Performing catarrh therapy	7 %	
SS	Acting to obstruct catarrh	1 %	= **8 %**
AA	Collecting the expectoration		**1 %**
DD	Antidotes		**1 %**
TT	Enabling materia to slide		**1 %**

[22] See p. 447, n. 2, Appendix 23, above.

APPENDIX 27

(See p. 255)

6.5a. The Connection between Ibn Sīnā's Frequency of Use of Drugs for Cough and their Qualities.[1, 2]

#1	**Drug**	#2	AA	BB	CC	DD	EE	FF	GG	HH	II	JJ	KK	LL	MM	NN	OO	PP	QQ	RR	SS	TT	UU	VV	XX
7	Almond	6		+	+			+									+							+	+
1	Aloe	3			+							+												+	
1	Alum	2			+							+													
1	Aniseed	2			+								+												
1	Apricot	0																							
2	Arsenic[3]	2		+																					+
2	Asarabacca	3						+					+				+								
1	Ash water[4]	0																							
2	Balsam	4		+				+				+													+
1	Banana	1																					+		
8	Barley (*sha'īr*)	3						+		+									+						
1	Birthwort	3		+				+									+								
1	Bran (*nukhāla*)	3						+					+										+		
3	Butter	6			+							+	+					+					+		+
1	Castoreum	1											+												
1	Cinnamon	5					+					+	+			+									+
1	Clay, Armenian	3		+			+					+													
1	Costus	4						+				+				+			+						
1	Cotton	2																					+		+
1	Crab[5]	3						+				+	+												

[1] Column #1: number of times the drug appears in the prescriptions; column #2: number of therapeutically suitable qualities it embodies. AA = collecting the expectoration; BB = performing asthma therapy; CC = astringent; DD = antidotes; EE = performing catarrh therapy; FF = performing a clearing effect; GG = coldness; HH = cooling; II = cutting; JJ = acting as a desiccant; KK = acting as a dissolving medication; LL = having a dry property; MM = emetic; NN = heating; OO = rarefying; PP = maturating; QQ = moistening; RR = anesthetic; SS = acting to obstruct catarrh; TT = enabling materia to slide; UU = softening; VV = soporific; XX = for cough.

[2] The following drugs were not described in Book II of *K. al-Qānūn*: basil (*ḥabaq*), cucumber (*qathad*), cucumber (*khiyār*), and plant mucilages.

[3] Includes arsenic and red arsenic.

[4] Taken from the article on ashes.

[5] Taken from articles on river crab and sea crab.

#1	Drug	#2	AA	BB	CC	DD	EE	FF	GG	HH	II	JJ	KK	LL	MM	NN	OO	PP	QQ	RR	SS	TT	UU	VV	XX
2	Cucumber (*qithā'*)	3						+							+								+		
2	Date	0																							
2	Dill	7									+	+	+		+			+					+	+	
3	Egg	5		+	+		+																+		+
1	Excrement, Hare	5				+		+				+	+			+									
2	Fava bean	5			+			+	+						+										+
1	Fennel	0																							
2	Fenugreek	9		+									+	+	+	+		+	+				+		+
6	Fig	7						+			+		+				+	+					+		+
2	Flax	7			+		+	+										+	+				+		+
2	Fleawort	2			+																		+		
1	Galbanum	5		+							+		+										+		+
1	Grape syrup	0																							
1	Gum	4			+							+											+		+
2	Gum arabic[6]	4			+							+											+		+
2	Henbane	4											+						+	+					+
20	Honey	5						+				+	+		+								+		
1	Horehound	3						+			+		+												
5	Hyssop	4		+				+					+												+
2	Leek	3		+	+													+							
1	Lettuce	4						+	+			+												+	
5	Licorice	2																	+				+		
3	Lily	8			+			+				+	+				+						+	+	+
2	Maidenhair	5		+	+								+				+								+
1	Mallow (*khubbāzā*)	6			+								+		+				+				+		+
2	Milk	7		+				+									+	+	+				+		+
1	Mustard	4						+			+	+	+												
6	Myrrh	9		+	+			+				+	+					+					+	+	+
1	Myrtle	7			+			+	+	+		+				+									+
1	Narciss	4						+				+	+		+										
1	Nettle	4		+				+					+										+		
1	Nut (*jawz*)	5			+			+				+				+			+						
1	Nut grass, yellow	1			+																				

[6] Taken from the article on gum.

#1	Drug	#2	AA	BB	CC	DD	EE	FF	GG	HH	II	JJ	KK	LL	MM	NN	OO	PP	QQ	RR	SS	TT	UU	VV	XX
3	Opium	4										+								+				+	+
1	Opoponax	4						+					+										+		+
2	Pasta (*iṭriya*)	2																					+		+
5	Pepper	6						+				+	+			+			+						+
3	Peppermint	6						+			+	+	+		+		+								
6	Pine[7]	8			+			+				+	+					+	+				+		+
3	Pistachio (*ʿilk*) + terebinth[8]	7			+			+		+		+	+					+							+
3	Pistachio nut	1			+																				
2	Pomegranate	4			+			+								+							+		
8	Poppy	10					+	+		+	+	+			+					+			+	+	+
3	Pumpkin	3																				+	+		+
2	Quince	4		+	+														+				+		
3	Raisin[9]	1			+																				
2	Resin (*qiṭrān*)	2						+																	+
1	Rose	5			+			+			+	+				+									
1	Safflower (*qurṭum*)	1											+												
6	Saffron	8			+			+					+		+	+		+		+				+	
1	Sagapenum	6		+				+					+				+						+		+
1	Sebesten	1																					+		
1	Silk[10]	3										+		+			+								
5	Starch	1																					+		
1	Storax (*lubnā*)	6					+						+					+		+			+		+
5	Storax (*mayʿa*)	2			+							+													
5	Sugar	3						+							+								+		
3	Sugar, *fānīdh*	3														+							+		+
1	Sulphur	4						+					+				+				+				
1	Tabasheer	4			+					+		+	+												
1	Tamarind	3			+														+				+		
1	Thistle (*bādhāward*)	2			+								+												
1	Thyme	4									+	+	+	+											

[7] Taken from articles on pine and pine seed.

[8] Taken from articles on resin (*ʿilk*), terebinth (*buṭm*) and pistachio (*al-ḥabba al-khaḍrāʾ*). See *K. al-Qānūn*, Vol. 1, p. 280.

[9] Taken from articles on raisins and grapes.

[10] Silk, *ḥarīra*, does not exist in Book II of *K. al-Qānūn*, and therefore the information is taken from the article on *ibrīsam*, silk (*K. al-Qānūn*, Vol. 2, p. 261).

#1	Drug	#2	AA	BB	CC	DD	EE	FF	GG	HH	II	JJ	KK	LL	MM	NN	OO	PP	QQ	RR	SS	TT	UU	VV	XX
6	Tragacanth (*kathīrā*ʾ)	2										+													+
1	Valerian (*sunbul*)	4			+							+	+			+									
2	Vetch (*kirsinna*)	3						+						+									+		
1	Vinegar	8							+	+	+	+	+			+	+								+
1	Violet	2																					+		+
1	Wax (*sham*ʿ)	4											+					+	+				+		
1	Wheat	0																							
1	Wine	7	+		+			+					+		+								+	+	
	#91		1	16	33	1	6	41	4	6	10	34	40	4	12	13	12	13	14	5	1	1	39	10	37
	%		1	18	36	1	7	45	4	7	11	37	44	4	13	14	13	14	15	5	1	1	43	11	41

6.5b. The Relationship between Ibn Sīnā's Frequency of Use of Drugs for Cough and their Qualities. Number of Qualities *vs*. Number of Appearances.[11]

	20 app	**8 ≤ app**	**7 ≤ app**	**6 ≤ app**	**5 ≤ app**	**4 ≤ app**	**3 ≤ app**	**2 ≤ app**	**All app**	**1 app**
10 q ≤		33 % (1)	25 % (1)	11 % (1)	7 % (1)	7 % (1)	4 % (1)	2 % (1)	1 % (1)	
9 q ≤		33 % (1)	25 % (1)	22 % (2)	13 % (2)	13 % (2)	8 % (2)	7 % (3)	3 % (3)	
8 q ≤		33 % (1)	25 % (1)	44 % (4)	27 % (4)	27 % (4)	20 % (5)	13 % (6)	8 % (7)	2 % (1)
7 q ≤		33 % (1)	25 % (1)	56 % (5)	33 % (5)	33 % (5)	28 % (7)	24 % (11)	15 % (14)	7 % (3)
6 q ≤		33 % (1)	50 % (2)	67 % (6)	47 % (7)	47 % (7)	44 % (11)	33 % (15)	23 % (21)	13 % (6)
5 q ≤	100 % (1)	67 % (2)	75 % (3)	78 % (7)	53 % (8)	53 % (8)	52 % (13)	42 % (19)	33 % (30)	24 % (11)
4 q ≤	100 % (1)	67 % (2)	75 % (3)	78 % (7)	60 % (9)	60 % (9)	60 % (15)	58 % (26)	54 % (49)	50 % (23)
3 q ≤	100 % (1)	100 % (3)	100 % (4)	89 % (8)	73 % (11)	73 % (11)	76 % (19)	76 % (34)	71 % (65)	67 % (31)

[11] app = number of appearances of the drug in prescriptions for cough in *K. al-Qānūn*; q = number of therapeutically suitable qualities it embodies; ≤ as much or more; All app = all the appearances counted together; All q = all the qualities counted together. Numbers in brackets = the number of drugs. Drug # = the total number of drugs in the column.

	20 app	8 ≤ app	7 ≤ app	6 ≤ app	5 ≤ app	4 ≤ app	3 ≤ app	2 ≤ app	All app	1 app
2 q ≤	100 % (1)	100 % (3)	100 % (4)	100 % (9)	93 % (14)	93 % (14)	88 % (22)	91 % (41)	85 % (77)	78 % (36)
1 q ≤	100 % (1)	100 % (3)	100 % (4)	100 % (9)	100 % (15)	100 % (15)	100 % (25)	98 % (44)	93 % (85)	89 % (41)
All q	100 % (1)	100 % (3)	100 % (4)	100 % (9)	100 % (15)	100 % (15)	100 % (25)	100 % (45)	100 % (91)	100 % (46)
0 + 1 q								9 % (4)	15 % (14)	22 % (10)
0 q								2 % (1)	7 % (6)	11 % (5)
Drug #	1	3	4	9	15	15	25	45	91	46

6.5c. The Relationship between Ibn Sīnā's Frequency of Use of Drugs for Cough and their Qualities. Number of Appearances *vs*. Number of Qualities.[12]

	10 q	9 ≤ q	8 ≤ q	7 ≤ q	6 ≤ q	5 ≤ q	4 ≤ q	3 ≤ q	2 ≤ q	1 ≤ q	All q	0 + 1 q	0 q
20 app						3 % (1)	2 % (1)	2 % (1)	1 % (1)	1 % (1)	1 % (1)		
8 ≤ app	100 % (1)	33 % (1)	14 % (1)	7 % (1)	5 % (1)	7 % (2)	4 % (2)	5 % (3)	4 % (3)	4 % (3)	2 % (2)		
7 ≤ app	100 % (1)	33 % (1)	14 % (1)	7 % (1)	10 % (2)	10 % (3)	6 % (3)	6 % (4)	5 % (4)	5 % (4)	3 % (3)		
6 ≤ app	100 % (1)	67 % (2)	57 % (4)	36 % (5)	29 % (6)	23 % (7)	14 % (7)	12 % (8)	12 % (9)	11 % (9)	10 % (9)		
5 ≤ app	100 % (1)	67 % (2)	57 % (4)	36 % (5)	33 % (7)	27 % (8)	18 % (9)	17 % (11)	18 % (14)	18 % (15)	16 % (15)	7 % (1)	
4 ≤ app	100 % (1)	67 % (2)	57 % (4)	36 % (5)	33 % (7)	27 % (8)	18 % (9)	17 % (11)	18 % (14)	18 % (15)	16 % (15)	7 % (1)	
3 ≤ app	100 % (1)	67 % (2)	71 % (5)	50 % (7)	52 % (11)	43 % (13)	31 % (15)	29 % (19)	29 % (22)	29 % (25)	27 % (25)	21 % (3)	
2 ≤ app	100 % (1)	100 % (3)	86 % (6)	79 % (11)	71 % (15)	63 % (19)	53 % (26)	52 % (34)	53 % (41)	52 % (44)	49 % (45)	29 % (4)	17 % (1)
All app	100 % (1)	100 % (3)	100 % (7)	100 % (14)	100 % (21)	100 % (30)	100 % (49)	100 % (65)	100 % (77)	100 % (85)	100 % (91)	100 % (14)	100 % (6)
Drug #	1	3	7	14	21	30	49	65	77	85	91	14	6

12 app = number of appearances of the drug in prescriptions for cough in *K. al-Qānūn*; q = number of therapeutically suitable qualities it embodies; ≤ as much or more; All app = all the appearances counted together; All q = all the qualities counted together. Numbers in brackets = the number of drugs. Drug # = the total number of drugs in the column.

APPENDIX 28

(See p. 257)

6.6. Causes of Cough in the Arabic and Latin Commentaries to *K. al-Qānūn*.[1]

Ibn Sīnā	Ibn al-Nafīs	al-Jaghmīnī	Supracomm.	Gentile	Despars
Acrid food, taste of					Acrid taste
Biliary matter changing the temperament					Biliary matter Thin hot choleric matter
Non-material causes that change the temperament					Bad complexion, simple or complex, without material [causes]
Parching material: material flowing from head to trachea with a parching effect					
Catarrh	Catarrh		Catarrh	Catarrh	Cold catarrh Hot catarrh
Thickening agent				Thickening agents Thickening coldness **Thickening dryness**	
Cold that hits the lung			Cold air which has afflicted the lung	Thickening coldness	Cold attacking the lung Strong cold hitting the lungs
Cold that hits the muscles in the chest	Coldness which has afflicted the chest		Cold air which has afflicted the chest		Strong cold hitting the chest muscles Cold overpowering the chest

[1] Supracomm. = Supracommentary to *Qānūnja*.

Ibn Sīnā	Ibn al-Nafīs	al-Jaghmīnī	Supracomm.	Gentile	Despars
Cold dyscrasia, simple[2]				Cold temperament Cold temperament without material	Coldness caused by an external cause
Causes that cool the temperament				Cooling agents	
Causes that dry				Drying agents	
Causes that dry the temperament					
Dry dyscrasia, simple[3]					Dry dyscrasia Dry temperament
Dust			Dust		Dust
Alien particles lodged in channels designed to filter only air					
Problem of the lung itself			Harmful factors in the lung	Harmful factors in lung	
Problem of the organs connected with the lung			Harmful factors in the chest	Harmful factors in the chest Harmful factors in organs connected with the lung	The descent of humors from the brain to the chest
Hot dyscrasia, simple[4]					
Matter [flowing from the head/trachea and] getting stuck			Something that has collected in the lung		
Matter flowing down from the head and gliding along the sides of the trachea				Material flowing from the head	
Matter flowing in the central hollow of the trachea	Descending of matter to the trachea				

2 *I.e.*, the only primary quality in excess is coldness.
3 See p. 478, n. 2, above.
4 *Ibid.*

Ibn Sīnā	Ibn al-Nafīs	al-Jaghmīnī	Supracomm.	Gentile	Despars
Matter flowing from some of the organs of the chest to others					
Matter issuing from the liver				Material flowing from the liver	
Matter flowing from the stomach				Material flowing from the stomach	
Melancholic material changing the temperament (rare)				Melancholic material (rare)	Melancholic material
Causes that moisten the temperament			Moistness of temperament		Moist temperament
Moisture in the lung			Moisture of the lung		Excess of moisture of the chest and the lungs
Obstruction of the diaphragm					
Obstruction of the throat					
Obstruction of the lung					
Thick phlegmatic material changing the temperament	Thick phlegm		Non-maturated thick phlegmatic humor	Thick phlegmatic matter	Phlegmatic matter
Thin phlegmatic material changing the temperament					
Plethora [of stomach]					
Pungent food, taste of					Pungency
Pus clogging the hollow of the chest					
Parchedness of the chest[5]					**Parchedness of the trachea** or the chest

[5] Latin favors 'disease'.

Ibn Sīnā	Ibn al-Nafīs	al-Jaghmīnī	Supracomm.	Gentile	Despars
Sanguinary material changing the temperament					Sanguinary materia
Problem of the condition of the organs of chest				The condition of parts of the organs of the chest	
Sour food, taste of					Sour taste
Emptiness [of stomach]					
Condition in the stomach causing cough					
Suppuration[6]					
Problem of the temperament of the organs of chest					
Apostemas and the like				Apostema	Apostema
Apostemas of the lung			Apostemas of the lung		Apostemas of the lung
Apostemas of the chest					Apostemas of the chest
Apostemas of the diaphragm					
Apostemas of the throat					
Apostemas of the spleen					
Apostemas of the liver	Apostema of the liver		Apostemas of the liver		Apostemas of the liver
Abscesses					Abscesses
Abscesses of the chest					Abscesses of the chest
Abscesses of the lung					Abscesses of the lungs Abscesses in the region of lungs
Smoke			Smoke		Smoke
Causes that warm the lung					

[6] Latin translation: "inflation of the lungs".

Ibn Sīnā	Ibn al-Nafīs	al-Jaghmīnī	Supracomm.	Gentile	Despars
Causes that warm the temperament				Warming things	
Weakness of the body's faculty of expulsion preventing it from cleansing itself of extraneous matter[7]					
General condition of the whole body [without fever]					
General condition of the whole body when affected by fever					Fever
	Dryness	**Dryness**	**Dryness**[8]		**Dryness**
	Heat				**Hot thin [choleric] material Thin hot material Hotness**
	Pleurisy				**Pleurisy**
		Moisture	**Moisture**[9]		
			Sharp thin humor descending from the brain [like in catarrh]		**Descending of humors from brain to the chest**
			Superfluities in the brain (in old people)		**Descending of humors from brain to the chest**
					cacexia
					Simple dyscrasia without material

[7] It is difficult to understand why this in itself very relevant issue has been ignored by the commentators.
[8] Repeated from al-Jaghmīnī's text.
[9] Repeated from al-Jaghmīnī's text.

Ibn Sīnā	Ibn al-Nafīs	al-Jaghmīnī	Supracomm.	Gentile	Despars
					Composite dyscrasia without material
					Composite, cold and moist, temperament
					Composite, hot and dry, temperament
					Composite, hot and moist, temperament
					Thick material Thick humors
					Hydropsy
					Inflation
					Winds inflating the lungs
					Winds inflating the stomach
					Pustules Pustules of measles Pustules of smallpox
					Obstruction in the liver
					Salty phlegm
					Thin material Hot thin material

APPENDIX 29

(See p. 257)

6.7. Possible Symptoms of Cough in the Arabic and Latin Commentaries to *K. al-Qānūn*.[1]

Ibn Sīnā	**Ibn al-Nafīs**	**al-Jaghmīnī**	**Supracomm.**	**Gentile**	**Despars**
Alleviated during bathing (dry cough)					
Burning sensation (hot cough)					Burning sensation felt especially around the chest
Catarrh (cold cough)				Catarrh	Catarrh Signs of catarrh
Children's cough					Children's cough
Chronic cough caused by cold temperament Chronic cough Chronic painful cough Chronic moist cough					Chronic cough Chronic cough caused by thick humors Chronic moist cough
Lessens in response to cold air more than in response to water (hot cough)		[The patient] takes pleasure in cold breeze (cough caused by dryness)			Calming of thirst as a result of breathing sufficiently cold air.
Cold cough				Cold cough	Cold cough
Simple cold cough					Simple cold cough Cold cough without material
					Cold spreading into the whole body **Thick cold material**

[1] Supracomm. = Supracommentary to *Qānūnja*.

Ibn Sīnā	Ibn al-Nafīs	al-Jaghmīnī	Supracomm.	Gentile	Despars
The patient's body temperature cooling down when exposed to cold temperatures (cold cough)					Exposure to increasingly cold temperature increases the cough (cold cough)
Lessening of the cough with the rising of external temperature (cold cough)			Being harmed by cold, moist things (cough caused by moisture)	Cough lessens with the rising of external temperature (cold cough)	
Sensation of something descending to the chest and distending in the pharynx (catarrh in cold cough)	Matter descending to the trachea (cough caused by catarrh)			Sensation of distension with sensation of fullness of the throat	Sensation of something descending to the chest Sensation of distension in the throat
Cough is aroused during the digestive process (cough connected with stomach problems)					Cough is aroused during the digestive process
Found in patients whose nature tends towards dissolution (hot cough)				Dissolution	
Sensation of distension near the forehead (catarrh in cold cough)					Sensation of distension by the temples and near the eyes and nostrils
Dry cough				Dry cough	Dry cough Dry cough without fever

Ibn Sīnā	Ibn al-Nafīs	al-Jaghmīnī	Supracomm.	Gentile	Despars
Simple dry cough					Dry cough without material Dry cough without material, with fever Dry cough without material, without fever Dry cough without expectoration
Dryness (cough caused by suppuration)				Dryness causing thickening of matter	Dryness
Occurs to the elderly (moist cough)			Occurs to the old (cough caused by moisture of lung itself)		Occurs to elderly
Cough increases with the emptying of stomach (cough connected with stomach problems)				Cough increases with the increasing of the bad condition of the stomach	
Expectoration (cough with material)					Expectoration
The type of the expectoration indicates the type of the material (symp. of cough with material)				Expectoration of yellow material (choleric cough) Signs showing the differences in the type of the material causing the cough	Expectoration showing the type of material causing the cough Expectoration of red material (sanguinary cough) Expectoration of yellow material (choleric cough) Expectoration of whitish material (phlegmatic cough) Expectoration of dark material (melancholic cough)

Ibn Sīnā	Ibn al-Nafīs	al-Jaghmīnī	Supracomm.	Gentile	Despars
Non-maturated expectoration (catarrh in cold cough)					Non-maturated matter flowing due to the catarrh
Yellowish and greenish expectoration (catarrh in cold cough)				Yellow expectoration (cough with choleric materia)	Expectoration tending to yellowness and greenness due to cold catarrh (cold cough with catarrh) Yellow expectoration (cough caused by choleric materia) Yellow or green expectoration (cold cough with catarrh)
				Difficulty in expectorating (dry cough)	
					Expectoration of humor (moist cough)
					Expectoration of pus (moist cough) **Pus exiting with sputum**
Does not cause expectoration at first (catarrh in cold cough)					Causes only a little expectoration, or not at all (cold cough with catarrh)
Without expectoration (simple cold, dry, hot, moist cough) No expectoration, neither thin nor thick (cough caused by parchedness of chest)				No expectoration	No expectoration No expectoration of any material or any humor
					Not much expectoration **No emission of vapor** **No emission of smoke**

Ibn Sīnā	Ibn al-Nafīs	al-Jaghmīnī	Supracomm.	Gentile	Despars
Fever (sometimes) (catarrh in cold cough) Fever (cough caused by a hot apostema) Fever [or without it] (cough caused by dry temperament)			Fever (cough caused by dryness) (implied)	Fever	Fever: dry cough with no material, with fever
				Passing fever	**Passing fever** Passing fever caused by tiredness Passing fever caused by heavy work
				Putrid fever	**Putrid fever** **Continuous putrid fever**
					Burning fever
					Pestilential fevers
Without fever [or with it] (cough caused by dry temperament)			Without fever (cough caused by dryness)		Dry cough without fever Dry cough without material, without fever
Dull grey color of the face (cold cough)					Grey facial color Paleness
Cough lessens with external heat (cold cough)					Cough lessens with the increase of external heat (cold cough)
Heaviness/sediments[2] (cough caused by a non-hot apostema)					Sensation of heaviness in the right hypochondrium
Hot cough					Hot cough
Simple hot cough					

[2] Difference in diacritical points. See p. 230, n. 18, above.

Ibn Sīnā	**Ibn al-Nafīs**	**al-Jaghmīnī**	**Supracomm.**	**Gentile**	**Despars**
					Hot material in the chest **Vapors of hot humors** **Thin hot material**
					Heat in the heart
					Heat in the lungs
Cough increases with hunger (dry cough)			Cough increases with hunger (cough caused by dryness)		Cough increases with strong hunger (dry cough)
Liver symptoms (cough connected with liver problems)					**Signs of apostemas of the liver** **Signs of other liver diseases that cause cough**
				Cough increases with the increase of the apostema	
Cough with material	Material (cough caused by catarrh)			Material Excess of material	Material flowing with catarrh Cough with material
				Without material Bad temperament without material	Pure cough, i.e. cough without material Immaterial cough Cold cough without material
Maturing (stage of hot cough)					
Moist cough				Moist cough	Moist cough Chronic moist cough
Simple moist cough					
Often moist (cough caused by suppuration)					

Ibn Sīnā	Ibn al-Nafīs	al-Jaghmīnī	Supracomm.	Gentile	Despars
Occurs to those having a moist temperament (moist cough)			Occurs to those having a moist temperament (cough caused by moisture of lung itself)		Occurs in excessively moist bodily state
Alleviated by drinking moistening drinks (dry cough)			Alleviated by drinking moistening drinks (cough caused by dryness)		Alleviated by quietness
Moistness of the substance of the lung (moist cough)				Moistness of the substance of the lung	Moistness of the substance of the lung Moist and watery lungs Excessive moistness of chest and lungs
					Moistness and wateriness of the chest[3] **Excessive moistness of chest and lungs**
					Moist watery mouth
Moisture in too great a measure (in chronic moist cough; sometimes)					Moisture
Cough increases with movement (dry cough)					Cough increases with strong movement

[3] Possibly pleurisy. Oral communication from Prof. S. Kottek, 10.6.2002.

Ibn Sīnā	Ibn al-Nafīs	al-Jaghmīnī	Supracomm.	Gentile	Despars
Lessens when the materia [that descends to the chest and distends in the throat] is drawn to the nose (catarrh in cold cough)					Sensation of heaviness in throat and nostrils Attraction of the material to the nose and the throat Sensation of something flowing in the nostrils Sensation of something descending to the nose Material flowing to the nose and the throat
Obstruction in the nostrils (catarrh in cold cough)				Sensation of distension caused by fullness of the nostrils	Obstructions in the nostrils
					Obstructions preventing free breathing
Pain (cough caused by suppuration) Painful: chronic painful cough					Pain Wide-spread pain without sensation of heaviness
Persistent cough					
Phlegmatic expectoration (catarrh in cold cough)	Thick phlegm [which has afflicted the chest] (actually a cause)				Expectoration of something phlegmatic due to cold catarrh Rheum descending from the head Much phlegmatic watery sputum
					Phlegmatic cough

Ibn Sīnā	**Ibn al-Nafīs**	**al-Jaghmīnī**	**Supracomm.**	**Gentile**	**Despars**
Cough increases with the filling of the stomach (cough connected with stomach problems) Cough is aroused during repletion (cough connected with stomach problems)					Cough is aroused by fullness of stomach
Symptoms of cold pleurisy (cough occurring because of apostemas and the like)					Signs of cold pleurisy
Symptoms of hot pleurisy (cough occurring because of apostemas and the like)					Signs of hot pleurisy
Symptoms of [hot and cold] pneumonia (cough occurring because of apostemas and the like)					Signs of hot or cold pneumonia
Symptoms similar to hot and cold pleurisy and pneumonia (cough occurring because of apostemas and the like)					**Fevers caused by apostemas of the chest**
				Signs of tumors	
				Signs of apostemas	
Strongness of pulse (hot cough)					Strongness of pulse

Ibn Sīnā	**Ibn al-Nafīs**	**al-Jaghmīnī**	**Supracomm.**	**Gentile**	**Despars**
Redness of face (hot cough)					Redness of face Redness of cheeks
Alleviated by rest (dry cough)			Alleviated by rest (cough caused by dryness)		Alleviated by quietness
Alleviated by satiety (dry cough)			Alleviated by satiety (cough caused by dryness)		Alleviated by moderate fullness of stomach
Snoring, especially during and after sleep (moist cough)			Snoring, especially at night and during sleep (cough caused by moisture)		Excess of snoring[4]/sneezing esp. while sleeping (*multitudo sternutationis*)
Symptoms of stomach diseases (cough connected with stomach problems)					Diseases of stomach causing pressure on the diaphragm Hard apostemas [in the stomach]
					Signs of excessive fullness of stomach
Cough increases with the increase of the stomach condition causing it (cough connected with stomach problems)				Cough increases with the increase of the bad stomach condition causing it	Cough increases with the increase of the stomach condition causing it
A stone-like particle resembling a chick-pea or a hailstone exiting during the cough					Expectoration of a stone

[4] In Arabic, ‘snoring’.

Ibn Sīnā	**Ibn al-Nafīs**	**al-Jaghmīnī**	**Supracomm.**	**Gentile**	**Despars**
Symptoms of suppuration (cough caused by suppuration)				Signs of tumors Signs of apostemas Putrefaction	Signs of inflation[5] Materia putrefying [in the chest]
Thick expectorated material					Thick material **Thick and viscous humors** **Thick and cold material**
Thin expectorated matter				Thin material	Thin **hot** material
Thirst (hot cough)		Thirst (cough caused by dryness)			Thirst
Thirst, littleness of (cold cough)		No thirst (cough caused by moisture)			Littleness of thirst (cold cough)
					Alleviation of thirst due to breathing of air that is sufficiently cold
Tickling in the upper respiratory channels (catarrh in cold cough)					Tickling in the upper respiratory channels through which the catarrhal matter descends from the brain to the chest Sensation of something flowing in the nostrils Tickling of nostrils Sensation of something descending [from the brain] to the nose
	Diarrhoea (connected with cough)				

[5] This translation is difficult to explain.

Ibn Sīnā	Ibn al-Nafīs	al-Jaghmīnī	Supracomm.	Gentile	Despars
	Strong heat connected with the cough (sometimes)				Strong heat connected with the cough
			Being harmed by cold, moist things (cough caused by moisture)		
			Emaciation of the body (cough caused by dryness)	Drying (*arefactio*) of the body	
			Removal of the moisture through expectoration (cough caused by moisture)		
			Cough increases with tiredness (cough caused by dryness)		
				Asthma	Asthma (type of cough)
				Constriction of breath	
				Nearly no saliva	
				Existence of putrefying material	
				Remaining of the material in the chest	
				Insomnia	Insomnia
				Moist humor	
					Noisy cough
				Fear of suffocation because of the great amount of the matter	Fear of suffocation
					Scabs from the abscesses exiting with sputum

Ibn Sīnā	Ibn al-Nafīs	al-Jaghmīnī	Supracomm.	Gentile	Despars
					Parts of lungs exiting with sputum Parts of the trachea exiting with sputum
					Abscesses
					The sputum remains in the chest causing the patient fever
					Tiredness
					Restlessness

APPENDIX 30

(See p. 257)

6.8. Consequences of Cough in the Arabic and Latin Commentaries to *K. al-Qānūn*.[1]

Ibn Sīnā	**Ibn al-Nafīs**	**al-Jaghmīnī**	**Supracomm.**	**Gentile**	**Despars**
Expectoration of blood	NOTHING	NOTHING			Expectoration of blood
Fever returns to its initial stages instead of abating (in fever in conjunction with cough)				Fever begins anew Causes weakness in convalescents from fever Causes badness of digestion during fever	
Nature expels harmful matter from the lung			Repelling of harmful agents from the lung		
Nature expels harmful matter from the chest			Repelling of harmful agents from the chest		
Nature expels harmful matter from the organs with which the lung is connected					
Nature protects the chest, lungs and connected organs from the harmful factors n the surroundings[2]					
Consuming fever (if expectoration is obstructed and there is fever)				*Febris effimera*	
Putrefying of matter (if expectoration is obstructed and there is fever)				(Putrefying of matter)	

[1] Supracomm. = Supracommentary to *Qānūnja*.
[2] Such as cold hitting the lung or the chest muscles.

Ibn Sīnā	Ibn al-Nafīs	al-Jaghmīnī	Supracomm.	Gentile	Despars
Putrid fever (if expectoration is obstructed and there is fever)				Putrid fever	
			Removal of moisture through expectoration		
					Death
					Hemoptysis
					Rupture of the veins of the lungs or of the chest

APPENDIX 31

(See p. 257)

6.9. Medical Qualities Recommended for Cough by the Arabic and Latin Commentators.[1]

Quality	Ibn Sīnā	Ibn al-Nafīs	Supracomm.	Gentile	Despars
AA Collecting the expectoration	Collecting the expectoration			Collecting material	Collecting thin materials Collecting thin expectoration
BB Performing asthma therapy	Asthma therapy: smokes mentioned in the chapter on asthma	Treatment for asthma		Asthma therapy Asthma regimen	Asthma therapy
CC Astringent	Astringents which do not have any sour or acrid taste			Styptic [but not sour] drugs Styptics	Styptic drugs which do not have any sour or acrid taste Styptics
DD Antidotes	Antidotes, hot			Antidotes (*bezaharticae*) = theriacs	Hot antidotes (*bedzahariae calidae*) = theriacs (in therapy against bad effects of narcotics)
EE Performing catarrh therapy	Treating the catarrh (therapy for cough caused by catarrh)			Treating the catarrh Catarrh medications	Treating the catarrh that causes the cough Preventing the catarrh
FF Performing a clearing effect	Clearing drug (but not for thin material) Clearing drugs (therapy for the moist temperament and moisture in the lung itself)	Clearing (asthma)	Clearing quality	Clearing	Clearing
FF Performing a clearing effect	Clearing of the thick expectorated material (but not the thin)			Clearing of the materia Preparing the material for clearing	Clearing the material

[1] Supracomm. = Supracommentary to *Qānūnja*.

Quality	Ibn Sīnā	Ibn al-Nafīs	Supracomm.	Gentile	Despars
FF Performing a clearing effect	Clearing thick material				Clearing the collected thick and viscous humors
FF Performing a clearing effect				**Clearing the expectoration**	
FF Performing a clearing effect					**Clearing of viscous humors** **Clears the breathing channels of viscous humors**
GG Coldness	Cold agents	(Ice water) (because of its thickening effect; cough caused by catarrh)		Cold (softening) drugs	Cold agents Cold juices (extinguishing the heat) Cold oils [on the chest] Cold unguents Cold mucilages Cold vegetables Cold [drugs] in action or in potential Materials cold *in actu* administered on the head
HH Cooling	HH Cooling: well-known cooling cerates (therapy for dry temperament with fever)	Cooling with cooling drinks and infusions (asthma)		Cooling	Cooling Cooling, not in action but in potential [cerates on the chest] Cooling oils Cooling Cooling drugs
HH Cooling					**Cooling the chest**
II Cutting	Cutting [the material]			Cutting	Cutting the material Cutting the thick and viscous humors
JJ Acting as a desiccant	Desiccants (therapy for the moist temperament and moisture in the lung itself)			Drying the material Desiccants	Drying Desiccants
JJ Acting as a desiccant					**Consuming excessive moisture**

Quality	Ibn Sīnā	Ibn al-Nafīs	Supracomm.	Gentile	Despars
KK Acting as a dissolving medication	Dissolving thick material		Dissolving	Preparing the materia to dissolution Dissolving	Dissolving the material Dissolvent
LL Having a dry property	Dry drugs (therapy for the moist temperament and moisture in the lung itself)				Dry drugs
MM Emetic	Emetics	Making patient vomit (asthma)			Emetics Causing vomiting
NN Heating	Hot (antidotes)	(Hotness: chicken soup, seasoned with hot spices [asthma])		Warming drugs Hot drugs	Hot mucilages Hot drugs
OO Rarefying	Rarefying drugs	Rarefying drugs (asthma)		Rarefying quality	Rarefying the material
PP Maturating[2]	Maturating the thin material	Maturating (asthma)		Maturating thin material **Changing the material to right consistency for expectoration**	Maturating drugs Maturating the material **Preparing thin materials to easy expectoration**
PP Maturating					**Maturating thick and viscous humors**
				Preparing materials for evacuation	
QQ Moistening	Moistening drugs (therapy for dry temperament with fever)		Moistening pills Moistening drinks (alleviating cough)		Moist unguents The moistening regimen through the six non-naturals Moistening foods and drinks Moistening drugs Moistening, not in action but in potential [cerates on the chest]

[2] See p. 447, n. 2, Appendix 23, above.

Quality	Ibn Sīnā	Ibn al-Nafīs	Supracomm.	Gentile	Despars
QQ Moistening				**Moist softening drugs**	**Moist oils**
QQ Moistening					**Moistening the chest**
RR Anesthetic	Anesthetics Narcotic			Stupefacient drugs	Narcotics Stupefying the senses
SS Acting to obstruct catarrh	Acting to obstruct catarrh (therapy for catarrh causing cough)	Acting to obstruct the descending of materials to the trachea (cough caused by catarrh)			Preventing the descent of catarrhal matter from brain to throat and chest Preventing the descent of humors from brain to chest Preventing salty catarrhal matter from flowing to the chest
SS Acting to obstruct catarrh					**Drawing the humors that flow into the chest to another direction**
TT Enabling the [expectorated] material to slide[3]	Enabling [the expectorated material] to slide				Enabling the [expectorated] material to slide
TT Enabling the [expectorated] material to slide					**Making the surfaces of the respiratory channels slippery**
UU Softening	Softening	Softening (asthma)		Softening	Softening Softening thick and viscous humors Softening the matter causing coughing Softening drugs
UU Softening					**Softening the chest**
UU Softening					**Softening the surfaces of the bronchia[4]**

3 *E.g.* more easily out of the bronchia.
4 Lit. “ways of breath”.

Quality	Ibn Sīnā	Ibn al-Nafīs	Supracomm.	Gentile	Despars
VV Soporific	Soporific			Soporific	Soporific Somniferant
		nAA Cleaning of extraneous matter (asthma)			
		nBB Thickening[5] drugs (for obstructing the descending of materials to the trachea; cough caused by catarrh) Thickening effect		**Thickening thin materia Thickening the catarrhal matter Thickening the material**	**Thickening thin materials Thickening thin expectoration Thickening thin humors Drugs with thickening effect**
		nCC Evacuating the material [causing the cough] from the chest (asthma)		**Evacuation of the material from the chest**	**Evacuation of residues, fumes and vapors from chest**
					Diverting residues from chest Diverting fumes from chest Diverting vapors from chest Diverting the catarrh
		nDD Evacuating of the material (asthma)		**Evacuation of material General and particular evacuations**	**Purgations**
					Laxative Purging thin humors that cause the cough Purging thick humors that cause the cough

[5] In fact, making more viscous.

Quality	Ibn Sīnā	Ibn al-Nafīs	Supracomm.	Gentile	Despars
		nEE Evacuating black bile (asthma)			
		nFF Evacuating phlegmatic materia (asthma)			
	(Ibn Sīnā mentions this as helpful but not as a treatment)	nGG Drawing the material to the nose with sternutatories (cough caused by catarrh)		Diverting the material to opposite direction Diverting effect	
		nHH Drugs with opening quality (asthma)	Opening quality	Opening the channels	
		nII Treatment of other diseases causing cough (i.e., other than pleurisy and apostema of liver)			Pneumonia treatment Phthisis therapy
		nJJ Treatment of pleurisy (cough caused by pleurisy)			Pleurisy therapy Treating abscesses in chest and lungs and apostemas
		nKK Treatment of the original disease (cough caused by pleurisy or an apostema of the liver and the like)			Pleurisy treatment Pneumonia treatment Therapy for apostemas of the liver Phthisis therapy Treating abscesses in chest and lungs and apostemas Treating strong fevers
		nLL Treatment of an apostema of the liver (cough caused by apostema of liver)			Therapy for apostemas of the liver

Quality	Ibn Sīnā	Ibn al-Nafīs	Supracomm.	Gentile	Despars
		nMM Warming effect on the organs of the chest (asthma)			Warming the lungs
				Facilitating expectoration	Facilitating expectoration
				Increasing the patient's strength for expectoration	
				Evacuation of the material from the chest by expectoration	
					Strengthening
				Strengthening the lungs so that material which would later cause cough cannot enter them	
				Therapy for bad temperament without material (causing cough)	
				Therapy for a simple temperament (causing cough)	
				Therapy for a complex temperament (causing cough)	
				Digestion of the material	Digestion of thin hot material
				Preparing of the material for evacuation	
				Diverting of the material with general evacuations	

Quality	Ibn Sīnā	Ibn al-Nafīs	Supracomm.	Gentile	Despars
				Expectorant	Assisting in the expectoration of the material
				Drugs dilating the chest cavity	
				Sedatives	
				Calming the cough	Calming the cough
				Assisting in the expectoration of thick material	
				Softening the channels	
				Softening the chest	Softening the organs of the chest
				Softening the lungs	
					Eliminating the dryness of the throat [causing cough]
					Preparing thin materials for an easy expulsion
					Eliminating the parchedness of the throat [causing cough]
					Extinguishing the heat [causing cough]
					Helping to move the maturated material
					Repressing the heat of the humors
					Rubefacient
					Vesicant

Quality	Ibn Sīnā	Ibn al-Nafīs	Supracomm.	Gentile	Despars
					Altering the temperament by using medicinal qualities opposite to it
				Cleaning the material away Cleaning the chest	Cleansing drugs

APPENDIX 32

(See pp. 265, 269)

6.10. Identification of Drugs Recommended for Cough by the Arabic Commentators.[1]

Ibn al-Nafīs

English Name	Arabic Name	Latin (Scientific) Name
Amaranth	*baqla yamāniyya*	*Amaranthus blitum* L.[2]
Egg: yolk of poached egg[3]	*mukhkh bayḍ nimbirisht*	
Grape	*ʿinab*	*Vitis vinifera* L.[4]
Henna	*ḥinnāʾ*	*Lawsonia alba* Lam. *Lawsonia inermis*[5]
Jujube	*ʿunnāb*	*Zizyphus jujuba*[6] *Zizyphus vulgaris* Lam.[7]
Lentil	*ʿadas*	*Lens esculenta* Moench[8]
Mallow	*mulūkhiyya*	*Malva* spp.[9]
Malva	*khaṭmī*	*Althaea ficifolia*[10] *A. officinalis* L.[11]

[1] For methodology, see Chapters 5.1.5.3 and 5.2.5.2. Only those simple drugs which do not appear in the treatments recommended in *K. al-Qānūn* are given. For the identification of the rest of the drugs, see Appendix 24.

[2] Schmucker, 1969, no. 134; Dietrich, 1991, II:102, p. 122; see Lev and Amar, 2002, n. 66, p. 120; Beck, 2005, II:117, p. 142.

[3] See Dubler, 1953, II:44, pp. 148–149; Kahl, 2007, pp. 324, 329; Lev and Amar, 2008, p. 141; Levey, 1966, pp. 248, 298.

[4] Kahl, 2003, pp. 201, 235; *ibid*., 2007, pp. 326, 345; Levey, 1966, p. 326; Schmucker, 1969, no. 500; see Lev and Amar, 2002, n. 41, p. 96; Beck, 2005, V:3, p. 331.

[5] Schmucker, 1969, no. 255a; Lev, p. 157; Lev and Amar, 2002, n. 68, p. 122.

[6] Kahl, 2003, pp. 208, 235; Kahl, 2007, pp. 329, 344.

[7] Schmucker, 1969, no. 499; see Lev and Amar, 2002, n. 176, p. 232.

[8] Dietrich, 1991, II:92, p. 118; Dubler, 1953, II:98, pp. 192–193; Kahl, 2003, pp. 201, 234; *ibid*., 2007, pp. 323, 344; Lev and Amar, 2008, p. 435; Levey, 1966, p. 302; Schmucker, 1969, no. 679; see Beck, 2005, II:107, p. 137.

[9] Schmucker, 1969, no. 738; Dubler, 1953, II:109, pp. 201–202; Lev and Amar, 2002, n. 52, p. 106; see Beck, 2005, II:118, p. 142. Other identifications: *Corchorus olitorius* (Lev and Amar, 2002, n. 97, p. 152); *Althaea rosea* (Kahl, 2007, pp. 325, 343).

[10] Schmucker, 1969, no. 278.

[11] Schmucker, 1969, no. 278; Kahl, 2003, pp. 203, 232.

English Name	Arabic Name	Latin (Scientific) Name
Pasta	*rishta*	type of pasta[12]
Purslane	*baqla*	Does not exist alone. Possibilities: *baqla yamāniyya*: = *Amaranthus blitum* L.[13] *baqla al-ḥamqā'*:[14] = *Portulaca oleracea* L.[15] *baqla yahūdiyya:* = *Corchorus olitorius* L.[16]
Purslane	*baqla al-ḥamqā'*	*Portulaca oleracea* L.[17]
Sandalwood	*ṣandal*	*ṣandal abyaḍ* = *Santalum album* L.[18] *ṣandal aḥmar* = *Pterocarpus santalinus* L.[19]
Squill	*'unṣul*	*Scilla maritima* L. = *Urginea maritima*[20]
Sweets[21]	*ḥalwā'*	
Theriac[22]	*tiryāq*	

12 Dozy, 1881, Vol. 1, p. 529. See also Lane, 1886–1893, p. 1852; Lev and Amar, 2008, p. 570; for additional information, see Tibi, 2006, p. 22, n. 76 and p. 191.

13 Schmucker, 1969, no. 134; Dietrich, 1991, II:102, p. 122; see Lev and Amar, 2002, n. 66, p. 120; Beck, 2005, II:117, p. 142.

14 Schmucker, 1969, no. 133.

15 Schmucker, 1969, no. 133; Kahl, 2003, p. 201; *ibid*., 2007, pp. 324, 345; Dubler, 1953, I:113, pp. 206–207; Dietrich, 1991, II:107, p. 124; Levey, 1966, pp. 244–245; Lev, 2003, pp. 74–75.

16 Levey, 1966, p. 245.

17 Schmucker, 1969, no. 133; Kahl, 2003, p. 201; *ibid*., 2007, pp. 324, 345; Dubler, 1953, I:113, pp. 206–207; Dietrich, 1991, II:107, p. 124; Levey, 1966, pp. 244–245; Lev, 2003, pp. 74–75.

18 Kahl, 2003, pp. 207, 235; *ibid*., 2007, pp. 328, 345; Lev and Amar, 2008, pp. 476–477; Schmucker, 1969, no. 461.

19 Kahl, 2003, pp. 207, 235; *ibid*., 2007, pp. 328, 345; Lev and Amar, 2008, pp. 476–477; Levey, 1966, p. 298; Schmucker, 1969, no. 461.

20 Schmucker, 1969, no. 504; Dubler, 1953, II:162, p. 247; Lev and Amar, 2008, p. 479; Kahl, 2003, pp. 208, 235; *ibid*., 2007, pp. 329, 344; see Beck, 2005, II:171, p. 166.

21 See p. 264, n. 103, above.

22 See p. 262, n. 100, above.

Al-Jaghmīnī

English Name	Arabic Name	Latin (Scientific) Name
Cassia fistula	*khiyār shanbar*	*Cassia fistula* L.[23]
Dragon's blood	*dam al-akhawayn*	*Dracaena draco*[24] *Calamus Drago*[25]
Jujube	*ʿunnāb*	*Zizyphus jujuba*[26] *Zizyphus vulgaris* Lam.[27]

Supracommentary

English Name	Arabic Name	Latin (Scientific) Name
Coriander	*kuzbara*	*Coriandrum sativum* L.[28]
Julep[29]	*julāb*	
Musk melon	*bittīkh*	*Cucumis melo* L.[30]
Plum	*ijjāṣ*	*Prunus domestica* L.[31] *Prunus* spp.[32]
Wax, white[33]	*al-shamʿ al-abyaḍ*	

[23] Schmucker, 1969, no. 287; Kahl, 2003, p. 204; *ibid.*, 2007, pp. 325, 344; Lev and Amar, 2008, p. 130; see Lev and Amar, 2002, n. 76, p. 130.

[24] Kahl, 2003, pp. 202, 233; *ibid.*, 2007, pp. 324, 343; Levey, 1966, p. 268; Lev and Amar, 2008, p. 400; see Schmucker, 1969, no. 304.

[25] Levey, 1966, p. 268; Schmucker, 1969, no. 304.

[26] Kahl, 2003, pp. 208, 235; *ibid.*, 2007, pp. 329, 344.

[27] Schmucker, 1969, no. 499; see Lev and Amar, 2002, n. 176, p. 232.

[28] Dietrich, 1991, III:59, p. 176; Dubler, 1953, III:67, pp. 309–310; Kahl, 2003, pp. 204, 233; *ibid.*, 2007, pp. 326, 343; Lev and Amar, 2008, p. 156; Levey, 1966, pp. 326–327; Schmucker, 1969, no. 635; see Beck, 2005, III:63, p. 208; Lev and Amar, 2002, n. 37, p. 92.

[29] A combined drug, in most cases a sugar decoction, often sweetened rose water (Schmucker, 1969, no. 200); general name of refined and fragrant liquid, and specific name for rose water or sweets mixed with rose water (Lev and Amar, 2008, p. 562); *julāb* = julep (Kahl, 2003, p. 203; *ibid.*, 2007, p. 325).

[30] Kahl, 2003, pp. 202, 233; *ibid.*, 2007, pp. 324, 344; Schmucker, 1969, no. 131. Also *Citrullus lanatus* suggested (Lev and Amar, 2008, p. 313). See also Kuhne Brabant, 2002, p. 321/168, n. 18.

[31] Schmucker, 1969, no. 7; Kahl, 2003, pp. 204, 235; *ibid.*, 2007, pp. 325, 345; Dubler, 1953, I:137, pp. 110–111; Dietrich, 1991, I:130, p. 87; Levey, 1966, p. 225; Lev, 2003, pp. 73–74.

[32] Schmucker, 1969, no. 7; Levey, 1966, p. 225. "Identification of the plum in medieval sources is a complicated matter because of the large number of species and the alternate names given for similar varieties such as: peach, pear, apricot, and bear's plum." Lev, 2003, p. 73.

[33] Kahl, 2003, p. 207: *shamʿ abyaḍ* = white beeswax; see Renaud and Colin, 1934, p. 260. On the preparation of white wax, see Beck, 2005, II:83, pp. 128–129.

APPENDIX 33

(See p. 269)

6.11. The Prescriptions for Cough by the Latin Commentators.[1]

Ibn Sīnā	Latin Translation	Despars	Gentile
1. 1. poppy 2. silk (*al-ḥarīra*)[2]	1. 1. papauer 2. puls	1. 1. poppy 2. thick porridge made of ***–barley*** ***–rice*** ***–wheat/cereals*** (*frumentum*)	1.-2. 1. hyssop[3] ***–horehound*** 1. poppy
2. 1. hyssop	2. 1. hysopus	2. 1. hyssop	See Prescription #1.
3. 1. electuaries	3. 1. electuaria mollia que lambuntur	3. 1. electuaries ***–tragacanth medicament*** (*diadragagantum*) OR ***–fānīdh sugar*** *(penidium)* ***–violet***	3. ***–plum*** ***–sweet almond*** ***–tragacanth*** ***–gum Arabic*** ***–similar ones***

[1] Latin translation = the Latin translation of *K. al-Qānūn* by Gerard of Cremona as it appears in *Liber Canonis Avicenne* (Venetiis, 1507); M = amount; Q = substitute drug; = = synonym; drugs in bold italics = additions by the commentators. The numbering of the prescriptions corresponds to that of the prescriptions from *K. al-Qānūn* in Ch. 6.1.5.3, above. Additions by the commentators are numbered according to the prescription they follow, with an additional lower-case letter. The same procedure is followed if Ibn Sīnā's original prescription is divided into several prescriptions by the Latin commentators. Asterisk after the list of ingredients gives the way of application of the drug. The drug names connected with 'OR' are alternative choices for the same prescription.

[2] Note the Latin translation as *puls*, presumably based on a confusion with the Arabic *ḥarīra* = porridge(?) (Garcia Sánchez, 2002, p. 282/8). Despars follows *puls*, Gentile does not mention the ingredient at all.

[3] From Prescription #2. Gentile combines Prescriptions #1 and #2.

Ibn Sīnā	Latin Translation	Despars	Gentile
		3a –***barley water*** *(ptisana)* –***violet*** –***tragacanth medicament*** *(diadragagantum)*	
4. 1. barley water	4. 1. aqua hordei	4. 1. barley water (*aqua hordei*) = barley water (*ptisana*)	4. –"***fox's lungs***"[4] –***myrtle*** 1. barley water (*aqua hordei*) = barley water (*ptisana*)
5. 1. myrrh 2. storax (*mayʿa*) 3. honey	5. 1. myrrha 2. storax 3. mel	5a 1. myrrh 3. honey 5b 2. storax (*storax calamita*) 3. honey[5]	5. —
6. 1. resin dregs (*durdī al-qiṭrān*)[6]	6. 1. faex alkitran	6. 1. resin dregs (*faex alkitran*) = cedar resin –***hydromel*** *(aqua mellis)*	6. 1. resin (*alkitran*) = fluid pitch
7. 1. terebinth resin (*ʿilk al-buṭm*) 2. honey	7. 1. glutinum album = teribinthina 2. mel	7. 1. terebinth resin (*gluten albotin*) = terebinth (*terebinthina*) 2. honey	7. 1. terebinth resin (*gluten albotim*) = terebinth (*terbenthina*) –***frankincense*** *(thus)* –***myrrh*** –***kelim*** = ***safflower*** (*crocus ortensis*)

[4] Probably vegetable drug. For a similar case, dragon's blood, see Appendix 12, above. However, see also Beck, 2005, II:39, p. 103, where dried lung of the fox is mentioned among animal drugs and recommended, taken in drink, for asthma.

[5] Despars divides Prescription #5 to two, here Prescriptions #5a and #5b.

[6] Prescriptions #6 and #7 may also be one prescription.

Ibn Sīnā	Latin Translation	Despars	Gentile
8. 1. balsam 2. sagapenum	8. 1. balsamum 2. serapinum	8. 1. balsam –***hydromel*** *(hydromel)* 2. sagapenum	8. —
9. 1. sulphur 2. poached egg (*al-nimbirisht*)	9. 1. sulphur 2. ovum sorbilis	9. 1. sulphur 2. fresh egg yolk	9. —
10. 1. hot electuaries of mucilage	10. 1. electuaria que lambuntur facta ex muscilaginibus calidis	10. 1. electuaries made of hot mucilages –***flax mucilage*** –***fenugreek*** –***honey*** –***fānīdh medicament with spices*** (*diapenidion cum speciebus*)	10. —
11. 1. vetch 2. honey[7]	11. 1. herbum 2. mel 1. granatum dulce 2a mel 2b penith	11. 1. sweet pomegranate 2. honey OR –***fānīdh sugar*** *(penidium)* 1. vetch (*orobum*)	11. —
12. 1. sweet pomegranate 2a honey 2b *fānīdh* sugar	See Prescription #11.	See Prescription #11.	12. —
13. 1. lily 2. narciss 3. red wax 4. tragacanth	13. 1. lilium 2. narciscus 3. cera rubea 4. dragagantum	13. 1. lily 2. narciss 3. red wax 4. tragacanth medicament (*diadragantum*)	13. —

[7] In the Latin translation Prescriptions #11 and #12 are one. Also Despars follows that.

Ibn Sīnā	Latin Translation	Despars	Gentile
14. 1. rose honey (*al-julunjubīn al-ʿasalī*) 2. fig 3. raisin 4. licorice[8] 5. maidenhair	14. 1. mel rosarum 2. ficus 3. passula 4. lilium 5. capillus veneris	14. 2. fig 3. raisins 5. maidenhair 4. lily –***sweet water*** 1. rose honey	14. —
15. 1. almond 2. *qūfī*[9]	15. 1. amigdala 2. cochium	15. 1. sweet almond –***hydromel*** 2. *cochium*[10]	15. —
16. 1. [decoction of] hyssop 2. hyssop 3. asarabacca 4. fig and the like	16. 1. decoctio hysopi 2. — 3. asarum 4. ficus & aliis	16. 2. hyssop 3. asarabacca 4. fig –***raisins*** –***maidenhair*** 1. A decoction is made with –***sugar***	16. —

[8] Arabic *sūs*, 'licorice', is translated in the Latin version *lilium*, 'lily', which in Arabic would be *sawsan*. In the consonant text the difference is that of one letter, the final n. Despars follows the Latin translation.

[9] See Appendix 24, above.

[10] *Et est cochium seu cokion trociscus quodam intrans in confectione mithrudati qui describit quanti prima trac. I. ca. vij/xij. statim post mithridatum*. Beck, 2005, I:25, pp. 22–23, n. 43: "A compound incense which the Egyptians used as a drink to clean the inner parts of the body and as an ointment. Plutarch, *Moralia. Isis and Osiris*, 80, describes the composition of Egyptian *cyphi* (16 ingredients) and describes the ritual associated with its preparation." See also, however, Kahl, 2007, p. 197, n. 46: *qūqāyā* < Syriac < κοκκία (dim.[?] of κόκκος) "pill" (see Liddell and Scott, 1977, p. 971; Dozy, 1881, Vol. II, p. 428). "… an isolated reference to the actual use of the term κοκκία "[little] pill" in Greek is a prescription against coughing given by Alexander of Tralleis (d. 605 CE) under the heading Βηχικά κοκκία 'Hustenpillen'" (Kahl, 2007, p. 197, n. 46; see Puschmann, 1878–1879, Vol. 2, pp. 182 f.).

Ibn Sīnā	**Latin Translation**	**Despars**	**Gentile**
17. 1. wheat soup 2. fenugreek 3. butter	17. 1. sorbitio frumentalis 2. fenugrecum 3. butyron	17. 1. wheat/cereal soup (*sorbitio frumentalis*) = wheat/cereal dishes (*frumentaria*) made of ***–wheat/cereals*** ***–cow milk*** 2. fenugreek 3. butter	17. —
18. 1. fig 2. date 3. Damascene leek	18. 1. ficus 2. dactilus 3. porrum de scenij	18a.[11] 1. fig 2. date 18b. 3. leek = leek from the region of Damascus ***–meat water/juice*** (*aqua carnis*)	18. —
19. 1. pistachio	19. 1. fisticum	19. 1. pistachio ***–meat broth***	19. —
20. 1. pine 2. pasta (*iṭriya*) 3. *fānīdh* sugar	20. 1. pinus 2. tri 3. penith	20. 1. pine 3. *fānīdh* sugar (*penith*) = *fānīdh* sugar (*penidium*) made of ***–sugar*** ***–starch*** OR ***–honey*** ***–starch*** 2. pasta (*tri*)[12]	20. 2. pasta (*tri*) = food made of pasta: like thread

[11] Despars divides Prescription #18 into two prescriptions.
[12] = *fila gracilia oblonga que de pasta azima fiunt ex quibus decoctis in aqua carnium pultes componuntur fatis delectabiles & hispanis grate.*

Ibn Sīnā	Latin Translation	Despars	Gentile
21. Meats: 1. meat of young birds 2. meat of cocks 3. meat soups (*al-isfīdbājāt*)[13] 4. meat of yearlings of sheep[14]	21. Carnes: 1. caro pullorum 2. caro gallorum 3. aliffidabegi 4. caro agnorum annualium	21. Meats: 1. meat of chicken 2. cocks 4. yearlings of sheep 3. meat soup (*alisfidabegi*) made of –***meat juice*** –***salt*** –***apple/fruit*** *(pomum)* –***oil*** –***pepper***	21. 3. meat soup (*alisfidabegi*) = a way of preparing food = meat dish (*tafea*)
22. 1. pistachio 2. pine 3. raisin 4. fenugreek 5. sugar cane 6. fig 7. apricot 8. banana	22. 1. fisticum 2. pinus 3. [uvae] passae 4. fenugrecum 5. canna zuccari 6. ficus 7. chrysomilum 8. musa	22. 1. pistachio 2. pine –***sugar*** 3. raisins 4. fenugreek 5. sugar cane 6. figs 7. apricot = a small golden peach 8. banana/hydromel (*musa*)[15] = a sweet apple/fruit (*pomum*)	22. 8. banana/hydromel[16] (*musa*) = hydromel (*mulsum*) = hydromel (*aqua mellis*) musa = name of a drug
23. 1. figs 2. nut 3. almond	23. 1. ficus siccus 3. amigdala 2. nucibus	23. 1. fig (*carica*) = fig (*ficus*) 3. sweet almond 2. nuts	23. 2. nuts 1. figs etc.

[13] See p. 239, n. 48, above.
[14] Lev and Amar, 2008, p. 552: *kharūf; ḥamal; ḍa'n* = sheep = *Ovis aries*.
[15] In this case 'banana' and 'fruit' seem more appropriate.
[16] Here 'hydromel' seems clearly more appropriate.

Ibn Sīnā	Latin Translation	Despars	Gentile
24. 1. wine 2. hydromel (*mā’ al-‘asal*)	24. 1. vinum 2. aqua mellis	24a. 1. wine like –***malvoisie*** –***Greek wine*** –***Romanian wine*** 24b.[17] 2. hydromel (*hydromel*) = hydromel (*aqua mellis*)	24. —
		24c. –***melon*** –***cucumber/melon*** –***cucumber*** –***pumpkin*** –***sugar*** –***violet*** –***water lily*** –***poppy*** –***fleawort*** –***poplar*** –***nightshade*** –***houseleek*** –***lettuce*** –***wax***	24c. –***hyssop*** –***opium electuary***
25. 1. simple poppy medicament (*al-diyāqūdh al-sādhaj*)	25. 1. aldeicur[18] purum	25. 1. poppy medicament –***barley water*** *(ptisana)*	25. —
26. R. poppy electuary 1. poppy 2a spring water 2b rain water 3a honey 3b sugar	26. R. electuarium de papauere 1. papauer 2a aqua funtium 2b aqua pluuialis 3a mel 3b zuccarum	26. R. poppy electuary –***barley water*** *(aqua hordei)* 1. white poppy[19] 2a sweet spring water 2b rain water 3a honey 3b sugar	26. —

[17] Despars divides Prescription #24 into two prescriptions.
[18] Also written *aldeicur, aldeiacur, deuico(r)*, and *deuicor/deiacor simplici*.
[19] Note the more detailed identification than the one in *K. al-Qānūn*.

Ibn Sīnā	Latin Translation	Despars	Gentile
27. 1. barley water 2. sebesten 3. violet potion 4. violet jam 5. hyssop	27. 1. aqua hordei 2. sebesten 3. [sirupus] violarum 4. violatum [nutritum] 5. hysopus	27a.[20] 1. barley water (*aqua hordei*) = barley water (*ptisana*) –***barley*** 2. sebesten 27b. 3. violet –***barley water (ptisana)*** 27c. 4. candied violet = violet candied with sugar = violet preserve 27d. 5. hyssop	27. 4. candied violet = violet candied in sugar
28. 1. pomegranate 2. crystalline sugar (*al-sukkar al-ṭabarzadh*) 3. sugar cane	28. 1. granatum 2. zuccarum tabarzet 3. canna zuccari	28. 1. pomegranate 2. crystalline sugar (*zuccarum tabarzed*) = most white sugar (*zuccarum albissimum*) 3. sugar cane	28. 1. pomegranate water = juice or wine, especially sweet one
29. 1. fleawort 2. quince 3. starch 4. gum Arabic 5. seeds 6. kernels	29. 1. psilium 2. cytonium 3. amilum 4. gummi arabicum 5. grana 6. medullae	29a. –***cold mucilages*** 1. fleawort 2. quince 3. starch 4. gum Arabic 29b.[21] 5. seeds 6. kernels mentioned afterwards. –***quince*** –***poppy*** –***cucumber*** –***cucumber/melon*** –***pumpkin*** –***melon***	29. —

[20] Despars divides Prescription #27 to 4 prescriptions.
[21] Despars divides Prescription #29 to two prescriptions.

Ibn Sīnā	Latin Translation	Despars	Gentile
30. (Addition to #29)	30. —	30. –***poppy*** –***henbane***	30. —
31. 1. cold vegetables 2. cucumber (*qithā'*) 3. pumpkin 4. cucumber (*khiyār*) 5. almond	31. 1. olera frigidae (medullae): 2. cucumis 3. cucurbita 4. citrulus 5. amigdala	31. 1. cold vegetables –***lettuce*** –***spinach*** –***dock*** –***cichory*** 4. cucumber/melon 2. cucumber 3. pumpkin 5. sweet almond	31. —
32. 1. Fava bean 2. almond 3. pumpkin 4. barley water	32. 1. faba 2. amigdala 3. cucurbita 4. aqua hordei	32. 1. Fava bean 2. almond 3. pumpkin 4. (see next prescription)	32. —
33. soups made of 1. barley (*sha'īr*) 2. Fava bean 3. vegetables 4. starch 5. bran water (*mā' al-nukhāla*)	33. sorbitiones facte (no other text)	33. 4. barley water (*aqua hordei*) –soups 1. barley 2.–5. —	33. —
34. 1. barley gruel 2. sugar 3. pasta (*al-iṭriya*)	34. 1. fanich [= sauich?] hordei 2. zuccarum 3. tri	34. 1. barley gruel (*sauich hordei*) = barley crushed and dried, boiled in much water 2. white sugar 3. pasta (*tri*)	34. 1. gruel (*sauic*) is made of 1. unripe barley a little dried
35. 1. barley water 2. crabs 3. [washed in] salted ash water	35. 1. aqua hordei 2. cancri 3. [abluti cum] aqua cineris salsa	35. 1. barley water (*aqua hordei*) 2. crabs 3. (washed with) ash water (*aqua cineris*) = lye (*lixiuium*)	35. 1. barley water (*aqua hordei*)

Ibn Sīnā	Latin Translation	Despars	Gentile
36a. cold poppy medicament (*diyāqūdhā bārid*) 1. poppy 2. water 3. sugar	36a. medicaminis deuicor[22] 1. papauer 2. aqua 3. zuccarum	36a –poppy medicament (*medicamen deuico*): 1. poppy 2. water 3. sugar ***–poppy medicament (deiacur)*** = ***poppy medicament*** (*diacodion purum*) ***–poppy***	36a ***–anathari*** ***= name of a drug*** ***= poppy medicament (deiacur)***
		36b. ***–water*** ***–poppy*** ***–sugar***	
37. (Addition to 36) 1. the black poppy	37. 1. [papauer] nigrum	37. ***–poppy*** 1. black poppy	37. —
38. (Addition to 36) 1. henbane 2. opium	38. 1. iusquiamus 2. opium	38. 1. henbane 2. opium	38. —
39. 1. Armenian clay 2. tragacanth 3. gum Arabic 4. peppermint 5. hyssop 6. thyme 7. cinnamon 8. maidenhair	39. 1. bolus armenius 2. dragagantus 3. gummi arabicum 4. calamentum 5. hysopus 6. hasce 7. cinamomum ***–yreos***[23] 8. capillus veneris	39. 1. Armenian clay 2. tragacanth 3. gum Arabic 4. peppermint 5. hyssop 6. thyme (*hasce*) = thyme (*thimum*) 7. cinnamon ***–iris*** 8. maidenhair ***–honey***	39. —
40. 1. milk of donkey 2. milk of goats 3. and the like	40. 1. lac asininum 2. [lac] caprinum 3. [lac] aliorum	40. 1. milk of donkey 2. goat milk 3. woman's milk	40. —

[22] A version of *deiacur*. See Appendix 24.
[23] Not in the Arabic text of *K. al-Qānūn*. Also Despars uses this translation.

Ibn Sīnā	Latin Translation	Despars	Gentile
41.	41.	41. –***simple julep*** –***violet*** –***water lily*** –***chicken water/juice*** –***chicken*** *(capo)* –***juice of the ox's tripe***	41. —
42. 1. well-known cooling cerates[24]	42. 1. cerotaria infrigidatiua nota	42. 1. cerates moistening and cooling not in fact but *in potentia*: –***violet*** –***water lily*** –***fleawort*** –***wax*** –***cobweb***	42. —
43. 1. barley water	43. 1. aqua hordei	43. 1. barley water (*aqua hordei*)	43. —
44. 1. oils[25]	44. 1. olea	44. 1. moist and cooling oils: –***violet*** –***water lily*** –***willow*** –***pig's trotters*** –***cow trotters*** –***sheep trotters*** –***water***	44. —
45. 1. almond [soup]	45. 1. [sorbitio] amigdalina	45. 1. soups made of sweet almonds –***sweet water*** –***fānīdh sugar*** *(penidium)* –***sugar*** –***tragacanth medicament*** *(dia dragagantum)*	45. —

[24] See p. 244, n. 60, above.

[25] For a discussion of *duhn* (oil) of rose and oils and ointments in general see Hamarneh and Sonnedecker, 1963, pp. 117–118.

Ibn Sīnā	Latin Translation	Despars	Gentile
46. 1. simple poppy medicaments (*al-diyāqūdh al-sādhaj*) 2. poppy electuary 3. mucilage electuary	46. 1. deiacoret[26] simplicibus 2. electuarium de papauere 3. [electuarium de] muscilaginibus	46. 1. simple poppy medicament (*deiacor simplicia*) = medicaments made of black poppy without strengthening them with henbane and opium 2. poppy electuary 3a fleawort 3b quince –***sugar***	46. 1. poppy medicament (*deiacur*): simple (not containing myrrh, saffron or other similar drugs)
			46a. –***agaric pills***
47. 1. pistachio resin (*ʿilk al-anbāṭ*) 2. honey	47. 1. glutinum alimbat 2. mel	47. 1. pistachio resin (*gluten alimbat*) = terebinth (*terebinthina*) 2. honey	47. 1. pistachio resin (*gluten alimbat*) = terebinth (*albotim*) = terebinth (*terbenthina*)
48. 1. safflower (*qurṭum*) 2. honey	48. 1. crocus hortensis 2. mel	48. 1. safflower (*hortensis crocus*) = safflower (*cartamus*) 2. honey OR –***hydromel*** *(aqua mellis)*	48. —
49. 1. yellow nut grass 2. honey	49. 1. cyperus 2. mel	49. 1. yellow nut grass 2. honey	49. —

[26] A version of *deiacur*. See Appendix 24.

Ibn Sīnā	Latin Translation	Despars	Gentile
50.[27] 1. licorice 2. tragacanth	50. + 51. 1. liquiricia 2. dragagantum 2. amigdala dulcis	50. + 51. 1. licorice 2. tragacanth 2. sweet almond –*honey*	50. —
51. 1. galbanum 2. sweet almond	See Prescription #50.	See Prescription #50.	51. —
52. 1. aloe 2. honey	52. 1. aloe 2. mel	52. 1. aloe 2. honey	52. —
53. 1. whole eggs 2. honey 3. butter 4. pepper	53. 1. oua integra 2. mel 3. butyron 4. piper	53. 1. whole raw eggs 2. honey 3. butter 4. pepper	53. —
54. 1. Damascene leek (heads + the juice of its peel) 2. water 3. honey	54. 1. porrum desceni 2. aqua (1. residuus succi corticis eius) 3. mel	54. 1. leek from the region of Damascus (heads = roots + the juice of the peels) 2. water 3. honey	54. 1. Their peels = rest of their body
55. 1. roses 2. pine 3. terebinth resin 4. raisin 5. honey	55. 1. rosa 2. pinus 3. gommi albotin 4. passula 5. mel	55. 1. rose 2. pine 3. terebinth resin (*gummi albotin*) = terebinth (*terebenthina*) 4. raisins 5. honey	55. 2. pine 1. rose
56. 1. water mint 2. pine 3. nettle 4. flax 5. pepper 6. honey	56. 1. calamentum fluuiale 2. pinus 3. vrtica 4. linum 5. piper 6. mel	56. 1. water mint 2. pine 3. nettle 4. flax 5. pepper 6. honey	56. —

[27] The Latin translation, and following it, Despars, seem to combine Prescriptions #50 and #51, at the same time omitting galbanum.

Ibn Sīnā	Latin Translation	Despars	Gentile
57. 1. date 2. iris 3. saffron 4. pepper 5. vetch 6. honey	57. 1. dactilus 2. nigella 3. crocus 4. piper 5. herbum 6. mel	57. 1. dates 2. nigella 3. saffron 4. pepper 5. vetch (*orobum*) 6. honey	57. —
58. 1. saffron 2. valerian 3. pepper 4. horehound 5. hyssop 6. myrrh 7. iris 8. honey	58. 1. crocus 2. spica aromatica 3. —[28] 4. praslium 5. hysopus 6. myrrha 7. lilium 8. mel	58. 1. saffron 2. valerian (*spicenardum*) 3. — 4. horehound 5. hyssop 6. myrrh 7. lily (*lilium*) = iris (*vreos*) 8. honey	58. —
59. 1. resin (*al-qiṭrān*) 2. honey	59. 1. alkitran 2. mel	59. 1. resin (*alkitran*) = cedar resin (*gummi cedri*) 2. honey	59. —
60. 1. Indian costus 2. dill 3. vinegar[29] (*khall*)	60. 1. costum indum 2. anetum 3. [oleum] sisaminum	60. 1. costus from India 2. dill 3. sesame	60. —
61. 1. flax 2. honey 3/3a pepper	61. 1. linum 2. mel 3a piper	61. + 62.[30] 1. flax 2. honey 3a pepper OR 3b peppermint	61. —
62. 1. peppermint	62. 1. calamentum	See Prescription #61.	62. —

[28] Pepper has been omitted by the Latin translation. This seems to have been an accident, as the amount of pepper is still given. Despars, however, omits both pepper and its amount.

[29] In the Latin translation there is *olei sisamini* instead of vinegar. This may be due to different diacritic marks in the texts: vinegar is in Arabic *khall*, sesame oil *ḥall*.

[30] Despars combines Prescriptions #61 and #62.

Ibn Sīnā	Latin Translation	Despars	Gentile
63. 1. "storax honey" (*'asal al-lubnā*) 2. bee honey (*'asal al-naḥl*)	63. 1. mel storacis calamite 2. mel apum	63. 1. "storax honey" (*mel storacis*) = fluid storax (*storax liquidus*) (Serapion) 2. bee honey	63. —
64.[31] 1. opoponax 2. mustard 3. bitter almond 4. *Mithridatium*[32]	64. 1. oppoponax 2. sinapis 3. amigdala amara 4. methridatum	64a. 1. opoponax ***–honey*** 64b. 2. mustard ***–honey*** 64c. 3. bitter almond ***–honey*** OR ***–sugar*** 64d. 1. *Mithridatium*	64. —
65. 1. basil (*ḥabaq*)[33] 2a woman's milk 2b fennel	65. 1. sorbitiones 2a lac nutricis 2b feniculum	65. 1. soup (*sorbitio*) made of 2a milk of wet nurse OR 2b fennel water ***–wheat/cereals (frumentum)*** OR ***–barley*** ***–egg yolk***	65. 1. soups (*sorbitiones*) = in the form of fluid barley water (*ptisana liquida*) that can be made of: ***–fig*** ***–fānīdh sugar (penidium)*** ***–almond*** 2a –[34] 2b fennel

[31] Prescription #64 might also be understood as four separate prescriptions, and, in fact, Despars treats it so.

[32] See p. 455, n. 80, above.

[33] In the Latin translation there is, instead of *al-ḥabaq*, *sorbitiones*. Both Latin commentators follow *sorbitiones*.

[34] Gentile omits milk.

Ibn Sīnā	Latin Translation	Despars	Gentile
66. 1. fig	66. 1. ficus	66. 1. fig –***mustard*** 66a.[35] –***mustard*** –***figs***	66. 1. fig –***mustard***
67. 1. starch	67. 1. amidum	67. 1. starch (*amidum*)	67. —
68.	68.	68a. –***cypress*** –***tragacanth*** –***mastic*** OR –***mulberry*** 68b. –***myrrh*** –***honey*** 68c. –***myrrh*** –***saffron*** –***hydromel*** *(aqua mellis)* OR –***rose*** OR –***poppy medicament*** *(deiacur)*	68. —
69. 1. simple poppy medicament (*al-diyāqūdh al-sādhaj*)	69. 1. deuico: simplex	69. 1. simple poppy medicament (*deuicor simplex*)	69. —
70. 1. [poppy medicament (*al-diyāqūdh*)] 2. myrrh 3. saffron and the like	70. 1. [deuico] 2. myrrha 3. crocus & aliis	70. 1. — 2. myrrh 3. saffron –***frankincense*** –***iron water*** *(aqua ferrata)* OR –***wine***	70. —

[35] In spite of their similar ingredients, Prescriptions #66 and #66a are counted as separate because of their differences in the way of preparation and in the purpose of use.

Ibn Sīnā	**Latin Translation**	**Despars**	**Gentile**
71. –pills –pills for the hot cough 1. the known cough pill (*ḥabb al-suʿāl al-maʿrūf*)	71. –pillulae –pillulae ad tussim calidam 1. –[36]	71. –pills to be held in the mouth –well-known cough pills (*pillulae bithicae notae*)[37] ***–tragacanth*** ***–gum Arabic*** ***–myrrh*** ***–frankincense (olibanum)*** ***–saffron*** ***–licorice*** ***–date*** ***–wine***	71. —
72. 1. licorice 2. gum 3. tragacanth 4. starch 5. fleawort 6. quince 7. cucumber (*qithāʾ*) 8. pumpkin 9. cucumber (*qathad*) 10. mallow (*khubbāzā*) 11. Tabasheer 12. poppy and the like	72. 1. liquiricia 2. gummi 3. dragagantum 4. amilum 5. psilium 6. citonium 7. cucumis 10. conde 8. cucurbita 9. citrulus 11. spodium 12. papauer & similibus	72. 1. licorice 2. gum Arabic 3. tragacanth 4. starch (*amilum*) 5. fleawort 6. quince 7. cucumber 10. — 8. pumpkin 9. cucumber/melon (*citrulus*) 11. Tabasheer 12. white poppy[38] ***–lettuce*** ***–purslane***	72. —
73. 1. starch 2. tragacanth 3. licorice 4. lettuce	73. 1. amilum 2. dragagantum 3. liquiritia 4. lactuca	73. 1. starch (*amidum*) 2. tragacanth 3. licorice 4. lettuce	73. —

36 In the Latin translation the 'known cough pill' is missing.
37 "the Greek *bithice* and *bithi* are the same as the Latin *tussis*" (Despars).
38 Note the more detailed identification than the one in *K. al-Qānūn*.

Ibn Sīnā	Latin Translation	Despars	Gentile
74. 1. licorice 2. tamarind 3. wheat (*qamḥ*) 4. saffron 5. tragacanth 6. pine 7. cotton (*quṭn*) 8. myrtle 9. poppy 10. aniseed 11. dill 12. myrrh 13. saffron 14. *fānīdh* sugar	74. 1. liquiritia 2. thamaridus 3. triticum 4. crocus 5. dragagantum 6. pinus 7. coton 8. myrtus 9. papauer 10. anisum 11. anetum 12. myrrha 13. crocus 14. penidium	74. 1. licorice 2. tamarind 3. wheat 4. saffron 5. tragacanth 6. pine 7. cotton 8. myrtle 9. white poppy[39] 10. aniseed 11. dill 12. myrrh 13. saffron 14. *fānīdh* sugar (*penidium*)	74. —
75. 1. hot antidotes	75. 1. *bedzahariae*	75. 1. hot antidotes (*bedzahariae calidae*) = theriacs	75. —
76. 1. the well-known storax (*mayʿa*) pills	76. 1. pillulae de storace notae	76. 1. the well-known storax pills (*pillulae de storace notae*): –***storax** (storax)* –***myrrh*** –***opium*** –***frankincense** (olibanum)* OR –***balsam*** –***saffron*** –***opium***	76. —
77. 1. storax (*mayʿa*) 2. castoreum 3. asarabacca 4. opium	77. 1. storax 2. castoreum 3. asarum 4. opium	77. 1. storax (*storax*) 2. castoreum 3. asarabacca 4. Theban opium	77. —

[39] Note the more detailed identification than the one in *K. al-Qānūn*.

Ibn Sīnā	Latin Translation	Despars	Gentile
78. 1. henbane 2. alum[40] 3. pine 4. saffron 5. grape syrup (*maybukhtaj*)	78. 1. iusquamus 2. — 3. pinus 4. crocus 5. rob[41]	78. 1. henbane 2. — 3. pine 4. saffron 5. rob = cooked wine	78. —
79. 1. storax (*mayʿa*) 2. myrrh 3. opium 4. balsam 5. saffron	79. 1. storax 2. myrrha 3. opium 4. balsamum 5. crocus	79. 1. storax (*storax calamita*) 2. myrrh 3. Theban opium 4. balsam 5. saffron	79. —
80. [smokes mentioned in the chapter on asthma]	80. —	80. —	80. —
81. 1. red arsenic 2. excrement of hare 3. barley 4. pistachio 5. egg yolk	81. 1. arsenicum rubeum 2. stercus leporis 3. hordeum 4. fisticum 5. vitellum oui	81. –***arsenic*** –***sulphur*** –***kidney fat*** –***myrrh*** –***costus etc.*** 1. red arsenic 2. excrement of hare 3. barley 4. pistachio (*fisticum*) 5. egg yolks	81. —
82. 1. birthwort 2. myrrh[42] 3. storax (*mayʿa*) 4. thistle (*bādhāward*)[43] 5. arsenic 6. cow butter	82. 1. aristologia 2. — 3. storax 4. galbanum 5. arsenicum –***mel***[44] 6. butyron vaccinum	82. 1. round birthwort 2. — 3. storax (*storax calamita*) 4. galbanum 5. red arsenic[45] –***honey*** 6. cow butter	82. —

[40] Omitted both by the Latin translation and by Despars.
[41] Note the less exact identification than the one in *K. al-Qānūn*.
[42] Omitted both by the Latin translation and by Despars.
[43] Translated to Latin as 'galbanum', which also Despars follows.
[44] Addition of the Latin translation.
[45] Note the more detailed identification than the one in *K. al-Qānūn*.

Ibn Sīnā	Latin Translation	Despars	Gentile
		82a. –***cough pills*** (*pillas bichias*) –***electuaries made of***: –***poppy*** –***kernels of cold fruit*** –***starch*** *(amilum)* –***etc.***	
		82b. –***goat milk*** –***milk of donkey*** –***woman's milk***	
		82c. –***barley water*** *(ptisana)* –***violet*** –***water lily*** –***barley*** –***almond***	
		82d. –***violet*** –***licorice*** –***water lily*** –***poppy*** –***tragacanth medicament*** *(diadragagantum)* –***fānīdh medicament without spices*** (*diapenidion sine specibus*) –***poppy medicament*** *(dia papauer)* –***poppy medicament*** *(diacodion)*	

Ibn Sīnā	Latin Translation	Despars	Gentile
		82e. –***hyssop*** –***horehound*** –***maidenhair*** –***iris medicament*** *(diairis)* –***tragacanth medicament*** *(diadragagantum)* –***fānīdh medicament with spices*** (*diapenidion cum speciebus*) –***horehound medicament*** (*diaprassium*) –***peppermint medicament*** (*diacalamentum*) –***milk of wet nurse***	
		82f. –***cassia fistula*** –***manna, frankincense*** –***plum medicament*** *(diaprunis)*	
		82g. –***qūfī pills*** (*pillulis cochiis*) –***the great hierapicras*** (*hierae maiorae*) –safflower medicament (*diacartamus*)	
		82h. –***red arsenic*** –***sulphur*** –***other things mentioned in the text***	

APPENDIX 34

(See p. 270)

6.12. Identification of Drugs Recommended for Cough by the Latin Commentators.[1]

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonyme
Agaric	*agaricum*	1. *Polyporus*[2] 2. *Boletus*[3] 3. *Agaricus*[4]	
Almond	*amigdala*	1. *Prunus = Amygdalus*[5]	AR: *lawz = Amygdalus*[6]
Almond, bitter	*amigdala amara*	1. *Amygdalus*[7]	AR: *lawz murr = Amygdalus*[8]
Almond, sweet	*amigdala dulcis*	1. *Amygdalus*[9]	AR: *lawz ḥilw = Amygdalus*[10]
Aloe	*aloe*	1. *Aloe*[11]	AR: *ṣabr = Aloe*[12]

[1] For methodology, see Ch. 5.3.5.2.

[2] Daems, 1993, no. 48; Berendes, 1902, p. 261, 3:1; Dragendorff, 1898, p. 36; Thorndike and Benjamin, 1946, p. 12; see Lev and Amar, 2008, p. 89; Beck, 2005, III:1, p. 175.

[3] Berendes, 1902, p. 261, 3:1; Dragendorff, 1898, p. 36; Liddell and Scott, 1977, p. 6.

[4] Lev and Amar, 2008, p. 89.

[5] Glare, 1982, p. 125; Liddell and Scott, 1977, p. 81; Riddle, 1987, p. 49; Berendes, 1902, p. 142, 1:176; Wimmer, 1964, p. 532; Beck, 2005, I:123, p. 87; see André, 1956, p. 29; see Schmucker, 1969, no. 685.

[6] Schmucker, 1969, no. 658; Lev and Amar, 2008, p. 91; Dubler, 1953, I:139, pp. 112–113; Lev, 2003, pp. 32–33; see Lev and Amar, 2002, n. 185, p. 242.

[7] Glare, 1982, p. 125; see André, 1956, p. 29; see Schmucker, 1969, no. 685; see Beck, 2005, I:123, pp. 87–88.

[8] Schmucker, 1969, no. 658; Lev and Amar, 2008, p. 91; Lev, 2003, pp. 32–33.

[9] Glare, 1982, p. 125; see André, 1956, p. 29; Schmucker, 1969, no. 685; see Beck, 2005, I:123, pp. 87–88.

[10] Schmucker, 1969, no. 658; Lev and Amar, 2008, p. 91; Lev, 2003, pp. 32–33.

[11] Daems, 1993, no. 17; *ibid.*, 1967, p. 264; André, 1956, p. 24; Glare, 1982, p. 106; Liddell and Scott, 1977, p. 68; Berendes, 1902, p. 277, 3:22 (25); Beck, 2005, III:22, p. 18; see Schmucker, 1969, no. 452.

[12] Dubler, 1953, III:23, pp. 279–280; Kahl, 2003, p. 207; *ibid.*, 2007, pp. 328, 342; Lev and Amar, 2008, pp. 94–97; *ibid.*, 2002, n. 19, p. 74; Levey, 1966, p. 297; Schmucker, 1969, no. 452; see Beck, 2005, III:22, p. 187. For a detailed description of aloe and its history, see Lev, 2003, pp. 33–34.

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonyme
Aniseed	*anisum*	1. *Pimpinella*[13]	AR: *anīsūn* = *Pimpinella*[14]
Antidote	*bedzaharia*		AR: *adwiya bādazuhriyya (ḥārra)* S: ***bedzahariae calidae** = tyriacales
Apple/fruit	*pomum*	1. *Malus/Pyrus Malus* L.[15] 2. fruit in general[16]	S: pomum dulce = ***musa** (D.)
Apricot[17]	*chrysomelum*	1. *Cydonia* = *Pyrus*[18]	AR: *mishmish* = *Prunus*[19] S: ***chrysomilum** = parua persica coloris aurei (D.)
Arsenic	*arsenicum*	1. arsenic[20]	AR: *zirnīkh* = Arsenic (Orpiment), As_4S_6[21]
Arsenic, red	*arsenicum rubeum*	1. red arsenic, As4S4[22]	AR: *zirnīh aḥmar* = arsenic (Realgar), As_4S_4[23]

[13] Daems, 1993, no. 25; *ibid.*, 1967, p. 265; André, 1956, p. 32; Glare, 1982, pp. 128, 135; Liddell and Scott, 1977, pp. 125, 132; Riddle, 1987, p. 57; Berendes, 1902, p. 301, 3:58 (65); Thorndike and Benjamin, 1946, p. 26; Beck, 2005, III:56, p. 206; see Schmucker, 1969, no. 85.

[14] Schmucker, 1969, no. 85; Kahl, 2003, pp. 201, 234; *ibid.*, 2007, pp. 323, 342; Dubler, 1953, III:61, pp. 305–306; Dietrich, 1991, III:53, pp. 173–174; Levey, 1966, p. 237; Lev, 2003, pp. 34–35; Lev and Amar, 2008, p. 102; see *ibid.*, 2002, n. 74, p. 128; Beck, 2005, III:56, p. 206.

[15] André, 1956, pp. 199, 257, 258; Niermeyer, 1954–1976, p. 811; Battaglia, 1961–2000, Vol. 13, pp. 827–830.

[16] André, 1956, p. 257; Glare, 1982, p. 1400.

[17] The explanation "small golden peach" corresponds quite well the Arabic *mishmish*, apricot.

[18] Glare, 1982, p. 312; Battaglia, 1961–2000, Vol. 3, pp. 918, 978; Dragendorff, 1898, p. 274.

[19] Schmucker, 1969, no. 729; Dubler, 1953, I:131, pp. 101–107; Dietrich, 1991, I:121, pp. 83–84; Kahl, 2007, pp. 327, 344.

[20] Daems, 1993, nos. 73–74; Glare, 1982, pp. 173, 175; Liddell and Scott, 1977, p. 247; Riddle, 1987, p. 61; Berendes, 1902, p. 531, 5:120 (121); see Berthelot, 1893, Vol. 1, p. 159.

[21] Schmucker, 1969, no. 346; Kahl, 2003, pp. 209, 236; *ibid.*, 2007, p. 330; see Lev and Amar, 2008, p. 104.

[22] Daems, 1993, no. 73.

[23] Schmucker, 1969; Kahl, 2003, pp. 209, 236; *ibid*, 2007, p. 330; Levey, 1966, pp. 274–275; see Lev and Amar, 2008, p. 104.

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonyme
Asarabacca	*asarum*	1. *Asarum*[24]	AR: *asārūn* = *Asarum*[25]
Ash[26] water	*aqua cineris*		AR: *mā' al-ramād al-mumallaḥ* = water of salted ashes/salted ash water[27] S: ***aqua cineris** = lixiuium (D.)
Balsam	*balsamum*	1. *Commiphora*[28] 2. *Balsamodendron*[29] 3. *Amyris*[30]	AR: *balasān* = *Commiphora*[31] *Amyris*[32]
Banana/hydromel	*musa*	1. *Musa*[33] 2. hydromel[34]	AR: *mawz* = *Musa*[35] S: ***musa** = pomum[36] dulce (D.) S: ***musa** = mulsum = aqua mellis (G.) S: **musa** = nomen confectionis (G.)

[24] Daems, 1993, nos. 19, 470, 499; André, 1956, pp. 43, 49, 338; Glare, 1982, p. 179; Liddell and Scott, 1977, p. 230; Berendes, 1902, p. 33, 1:9; Dragendorff, 1898, p. 185; Löw, 1924–1934, Vol. 1, p. 223; Thorndike and Benjamin, 1946, p. 45; Beck, 2005, I:10, p. 11; see Schmucker, 1969, no. 20.

[25] Schmucker, 1969, no. 20; Lev and Amar, 2008, p. 504; Beck, 2005, I:10, p. 11; Kahl, 2003, pp. 201, 232; *ibid*. 2007, pp. 323, 342; Dubler, 1953, I:9, pp. 18–19; Dietrich, 1991, I:10, p. 42; Levey, 1966, p. 227.

[26] Glare, 1982, p. 316; Battaglia, 1961–2000, Vol. 2, p. 962; see Schmucker, 1969, no. 328.

[27] Schmucker, 1969, no. 328; Dietrich, 1991, I:141, p. 91; see Kahl, 2003, pp. 206, 237; Lev and Amar, 2002, n. 220, p. 282.

[28] André, 1956, p. 51; Riddle, 1987, p. 59; Dragendorff, 1898, p. 368; Löw, 1924–1934, Vol. 1, p. 299; Beck, 2005, I:19, p. 19; see Schmucker, 1969, no. 139.

[29] Hort, 1961, p. 443; Berendes, 1902, p. 47, 1:18; Liddell and Scott, 1977, p. 305; Löw, 1924–1934, Vol. 1, p. 299.

[30] Berendes, 1902, p. 47, 1:18; Wimmer, 1964, pp. 533–534; see List and Horhammer, 1969–1979, Vol. 3, p. 260.

[31] Schmucker, 1969, no. 139; Lev and Amar, 2008, p. 349; Dubler, 1953, I:18, pp. 26–27; Kahl, 2007, pp. 324, 342; Levey, 1966, p. 245; Lev, 2003, pp. 36–37.

[32] List and Horhammer, 1969–1979, Vol. 3, p. 260.

[33] Dragendorff, 1898, pp. 140–141; Battaglia, 1961–2000, Vol. 11, p. 111.

[34] On the basis of the synonymy.

[35] Schmucker, 1969, no. 746; Lev and Amar, 2008, p. 352; see *ibid*., 2002, n. 33, p. 88.

[36] Here possibly in the meaning of 'fruit'.

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonyme
Barley	*hordeum*	1. *Hordeum*[37]	AR: *shaʿīr* = *Hordeum*[38] S: * **aqua hordei** = ptisana (D. + G.) S: hordeum fractum & desiccatum coctum cum multa aqua = ***sauich hordei*** (D.)
Barley gruel	*sauich hordei*		AR: *sawīq al-shaʿīr* = *Hordeum* L. S: **sauich hordei** = hordeum fractum & desiccatum coctum cum multa aqua (D.)[39]
Barley water	*ptisana*	1. *Hordeum* (barley-water)[40]	S: ptisana = ***aqua hordei*** (D. + G.) S: in forma ptisanae liquide que possunt fieri de: carnibus ficuum & penidijs & amigdalis = ***sorbitiones*** (G.)
Birthwort	*aristologia*	1. *Aristolochia*[41]	AR: *zarāwand* = *Aristolochia*[42]
Birthwort, round	*aristologia rotunda*	1. *Aristolochia*[43] 2. *Corydalis*[44]	

[37] Daems, 1993, nos. 56, 348; *ibid.*, 1967, pp. 273, 289; André, 1956, p. 165; Glare, 1982, p. 803; Dragendorff, 1898, p. 88; see Schmucker, 1969, no. 431.

[38] Schmucker, 1969, no. 431; Lev and Amar, 2008, p. 353; Kahl, 2003, pp. 207, 234; Dubler, 1953, II:78, pp. 181–182; Dietrich, 1991, II:73, p. 111; Levey, 1966, p. 293; see Lev and Amar, 2002, n. 184, p. 240; Beck, 2005, II:86, p. 130.

[39] Kahl, 2003, pp. 207, 234: *shaʿīr* = barley = *Hordeum vulgare*; *sawīq al-nabiq* = palm twig mash; see Lev and Amar, 2002, n. 184, p. 240: *shaʿīr* = barley = *Hordeum vulgare*.

[40] Daems, 1993, no. 465; *ibid.*, 1967, pp. 273–274; Glare, 1982, pp. 1511, 1943.

[41] Daems, 1993, nos. 12, 13, 494; André, 1956, p. 40; Glare, 1982, p. 170; Hort, 1961, p. 442; Riddle, 1987, p. 54; Berendes, 1902, pp. 264–265, 3:4–6; Wimmer, 1964, p. 533; Thorndike and Benjamin, 1946, p. 42; Beck, 2005, III:4, p. 177; see Schmucker, 1969, no. 341.

[42] Schmucker, 1969, no. 341; Dubler, 1953, III:4, pp. 265–266; Levey, 1966, pp. 273–274; Lev and Amar, 2008, p. 359; Kahl, 2003, pp. 209, 232; *ibid.*, 2007, pp. 330, 343; see Beck, 2005, III:4, p. 177.

[43] Daems, 1993, no. 13; André, 1956, p. 41; Berendes, 1902, pp. 264–265, 3:4–6; Beck, 2005, III:4, p. 177.

[44] Daems, 1993, nos. 13, 493; Thorndike and Benjamin, 1946, p. 42.

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonyme
Butter[45]	*butyron; butyron vaccinum*		AR: *samn; samn al-baqar* = butter[46]
Cassia fistula	*cassiafistula*	1. *Cassia*[47] 2. *Cinnamomum*[48]	
Castoreum[49]	*castoreum*		AR: *jundbādastar* = castoreum from *Castor fiber* L.[50]
Cedar resin	*gummi cedri*	1. *Juniperus*[51] 2. *Citrus*[52] 3. *Cedrus*[53]	AR: *qiṭrān* AR: *durdī al-qiṭrān* **Cedrus* (tar)[54] **Cupressus* (tar)[55] **Coniferae* (tar)[56] S: gummi cedri = ***faex alkitran** S: gummi cedri = ***alkitran**
Chicken	*capo*[57]		
	pullus[58]		AR: *luḥūm al-farārīj* = meat of young birds

45 Glare, 1982, p. 245.

46 Bos, 1989; Kahl, 2003, p. 207; *ibid*., 2007, p. 328; Levey, 1966, p. 285; see Lev and Amar, 2008, p. 132: *samn* = sour cream.

47 Daems, 1993, no. 153; Kahl, 2003, p. 204.

48 André, 1956, pp. 75, 139.

49 Strong-smelling substance obtained from inguinal glands of the beaver (*Castor fiber*) and used medicinally by the ancients, castor (Glare, 1982, p. 282; Battaglia, 1961–2000, Vol. 2, p. 862; see Renaud and Colin, 1934, p. 103; see Beck, 2005, I:24, pp. 99–100).

50 Renaud and Colin, 1934, p. 103; Dubler, 1953, II:23, pp. 137–138; Dietrich, 1991, II:23, p. 97; Kahl, 2003, pp. 203, 236; Levey, 1966, p. 254; Lev, 2003, pp. 12–13; Lev and Amar, 2008, p. 354; see *ibid*., 2002, n. 196, p. 256; Beck, 2005, I:24, pp. 99–100. On the confusion between beaver and otter, see Lev, 2003, pp. 12–13.

51 Daems, 1993, nos. 262, 262*; André, 1956, p. 78, Glare, 1982, p. 293; Hort, 1961, pp. 455–456; Riddle, 1987, p. 59; Berendes, 1902, p. 99, 1:105; Wimmer, 1964, pp. 537–538; Beck, 2005, I:77, p. 60; see Schmucker, 1969, no. 582.

52 André, 1956, pp. 78, 93, 196, 199; Niermeyer, 1954–1976, p. 162; Battaglia, 1961–2000, Vol. 2, pp. 942–943.

53 André, 1956, p. 78; Battaglia, 1961–2000, Vol. 2, p. 942; see Schmucker, 1969, no. 582.

54 Dietrich, 1991, I:77, p. 62; Lev and Amar, 2008, pp. 134, 497; Schmucker, 1969, no. 582; see Lev and Amar, 2002, n. 231, p. 296.

55 Lev and Amar, 2008, pp. 396, 497; Schmucker, 1969, no. 582.

56 Kahl, 2003, pp. 206, 233; *ibid*., 2007, p. 327; Lev and Amar, 2008, pp. 466, 497; Levey, 1966, p. 316; Schmucker, 1969, no. 582.

57 *Gallus castratus* (Battaglia, 1961–2000, Vol. 2, pp. 722–723; Du Cange 1937–1938, Vol. 2, p. 143).

58 A young domestic fowl, a chicken, pullet (*Gallus domesticus* L.) (Glare, 1982, p. 1518).

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonyme
Cichory	*endivia*	1. *Sonchus*[59] 2. *Cichorium*[60]	
Cinnamon	*cinamomum*	1. *Cinnamomum*[61]	AR: *dār ṣīnī* = *Cinnamomum*[62]
Clay, Armenian	*bolus armenius*	1. Red clay composed of oxidized iron with lime chalk[63]	AR: *ṭīn armanī* = the better type of *ṭīn makhtūm*,[64] i.e., *terra sigillata*[65]
Cochium, pillulis cochijs[66]	*cochium*	(No information. Identification based on the Arabic synonymy.)	AR: *qūfī* = Gr. *kufi*, a compound incense of Egyptian origin[67] S: ***cochium** = cokion = trociscus quodam intrans in confectione mithrudati (D.)
Cock[68]	*gallus*		AR: *duyūk* = cocks[69]
Cokion	See *Cochium*		S: cokion = ***cochium**

[59] Daems, 1993, nos. 202, 450, 572.

[60] Daems, 1993, nos. 202, 572; *ibid.*, 1967, p. 271; André, 1956, pp. 126, 170.

[61] Daems, 1993, no. 119; *ibid.*, 1967, pp. 268, 278; André, 1956, p. 91; Glare, 1982, p. 316; Hort, 1961, p. 456; Riddle, 1987, p. 55; Berendes, 1902, p. 39, 1:13; Thorndike and Benjamin, 1946, p. 93; Beck, 2005, I:13, p. 14; see Schmucker, 1969, no. 292.

[62] Dubler, 1953, I:13, pp. 22–23; Schmucker, 1969, no. 292; Kahl, 2003, pp. 202, 233; *ibid.*, 2007, pp. 324, 343; Levey, 1966, pp. 265–266; Lev and Amar, 2008, p. 143; see Lev and Amar, 2002, ns. 148, 150, p. 206.

[63] Lev and Amar, 2008, p. 149. "Armenischer Tonerde, Aluminiumsilikate oder Aluminiumoxide, durch Eisen- und Manganoxide braunrot gefärbt" (Daems, 1993, no. 100).

[64] Schmucker, 1969, no. 476. Lev and Amar, 2008, p. 149: *ṭīn armanī* = "composed of oxidized iron with lime chalk. Red substance ...".

[65] Schmucker, 1969, no. 476. *Terra sigillata* = a medicinal clay containing ferrous oxide (List and Horhammer, 1969–1979, Vol. 2, p. 1262). Cf. Kahl, 2003, p. 208: *ṭīn makhtūm* = sealing bole.

[66] "*Recipe aloe, scamonee, masticis, absintii, coloquintide equali pondere; tempera cum succo absintii vel feniculi; in modum fabe da v vel vii cum vino.*" (Bartholomeus via Thorndike and Benjamin, 1946, p. 247)—"*Sunt alie pillule chochie. Recipe aloe, coloqui⟨n⟩tide, absinthii, suci maratri, scamonee equale pondus; pipinelle, centauree, bassilicon, brionie, ballionii, herbe fortis, origani, ungulle cabaline, filicis, asmunde, yringe, radicis, ebuli, terebentine et salvie equaliter.*" (*Ibid.*) Beck, 2005, I:25, pp. 22–23, n. 43: "A compound incense which the Egyptians used as a drink to clean the inner parts of the body and as an ointment. Plutarch, *Moralia. Isis and Osiris*, 80, describes the composition of Egyptian *cyphi* (16 ingredients) and describes the ritual associated with its preparation."

[67] Dozy, 1881, Vol. 2, p. 420; Beck, 2005, I:25, pp. 22–23, n. 43; Dietrich, 1991, I:24, p. 47.

[68] Battaglia, 1961–2000, p. 558; see also Glare, 1982, p. 753.

[69] Kahl, 2003, p. 202: *dīk* = cock.

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonyme
Costus	*costum, costum indum*	1. *Saussurea*[70]	AR: *al-qusṭ al-hindī* = *Aucklandia* = *Saussurea*[71]
Cotton	*coton*	1. *Gossypium*[72]	AR: *quṭn* = *Gossypium*[73]
"Cough pills"[74]	*pilla bichias, pillula bithica, pillula bichichia*		S: ***pillulae bithicae notae** (bithicae a bithi greco quod est tussis latine) (D.)
Cow trotters	*pedes vaccini*		
Crab	*cancer*	1. *Astacus*[75]	AR: *saraṭānāt* = *Astacus*[76]
Cucumber	*cucumis*	1. *Cucumis*[77] 2. *Citrullus*[78]	AR: *qithā'* = *Cucumis*[79]
Cucumber/melon	*citrulus*	1. *Citrullus*[80] 2. *Cucumis*[81]	AR: *khiyār* = *Cucumis*[82] AR: *qathad* = *Cucumis* L.[83]

[70] André, 1956, p. 103; Glare, 1982, p. 452; Hort, 1961, p. 458; Berendes, 1902, p. 42, 1:15; Wimmer, 1964, p. 538; Dragendorff, 1898, p. 146; Beck, 2005, I:16, p. 17; see Schmucker, 1969, no. 576.

[71] Schmucker, 1969, no. 576; Dubler, 1953, I:15, p. 24; Dietrich, 1991, I:16, p. 43; Levey, 1966, p. 316.

[72] Niermeyer, 1954–1976, p. 278; André, 1956, pp. 56, 151, 178; Thorndike and Benjamin, 1946, p. 55; see Schmucker, 1969, no. 584.

[73] *quṭn* = *Gossypium herbaceum* L. (Kahl, 2003, pp. 205, 233; *ibid.*, 2007, pp. 328, 342; Lev and Amar, 2008, p. 391; Levey, 1966, p. 317; Schmucker, 1969, no. 584).

[74] *bechico* = cough remedy (in ancient medicine). See Battaglia, 1961–2000, Vol. 2, p. 142.

[75] Berendes, 1902, p. 156, 2:12; Glare, 1982, p. 264; see Schmucker, 1969, no. 375.

[76] Schmucker, 1969, no. 375; Kahl, 2003, pp. 207, 236. Lev and Amar, 2008, p. 392: *saraṭān* = crab = *Decapoda*; Kahl, 2007, pp. 328: *saraṭān baḥrī* = lobster; Levey, 1966, p. 281: *saraṭān baḥrī* = shrimp, sea crab.

[77] Daems, 1993, no. 174; André, 1956, pp. 107, 205; Glare, 1982, p. 464; Dragendorff, 1898, p. 650; see Schmucker, 1969, no. 562.

[78] Daems, 1993, no. 159; André, 1956, pp. 107, 242.

[79] Dietrich, 1991, II:118, pp. 128–129; Dubler, 1953, I:124, pp. 217–220; Kahl, 2003, pp. 206, 233; *ibid.*, 2007, pp. 327, 345; Lev and Amar, 2008, p. 138; Schmucker, 1969, no. 562; see Beck, 2005, II:135, p. 149; Lev and Amar, 2002, n. 99, p. 154.

[80] Daems, 1993, nos. 159, 159*.

[81] Daems, 1993, no. 174; see Schmucker, 1969, no. 286.

[82] Schmucker, 1969, no. 286; Lev and Amar, 2008, p. 394; Kahl, 2003, pp. 204, 233; *ibid.*, 2007, pp. 325, 343; see Lev and Amar, 2002, n. 101, p. 156.

[83] Identified through the Latin translation. See Savage-Smith, 1980, p. 139, n. 19.

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonyme
Cypress	*cypressus*	1. *Juniperus*[84] 2. *Cupressus*[85]	
Date	*dactilus*	1. *Phoenix*[86]	AR: *tamr* = *Phoenix*[87]
Dill	*anetum*	1. *Anethum*[88]	AR: *shibitt* = *Anethum*[89]
Dock	*acedula*	1. *Rumex*[90] 2. *Sempervivum*[91]	
Dough	*pasta*		S: cibus de pasta: vt fila = ***tri** (G.)
Egg[92]	*ovum*		AR: *bayḍa* = egg[93]
Egg yolk[94]	*vitellum ovi*		AR: *ṣufrat al-bayḍ* = egg yolk[95]
Excrement of hare[96]	*stercus leporis*		AR: *khur' al-arnab* = excrement of hare[97]

[84] Daems, 1993, no. 262; André, 1956, pp. 109, 278.

[85] André, 1956, p. 109; Glare, 1982, pp. 473, 481; Hort, 1961, p. 461; Dragendorff, 1898, p. 71; Daems, 1967, p. 269; Wimmer, 1964, p. 539; Riddle, 1987, pp. 55, 59; Hort, 1961, p. 461; Beck, 2005, I:74, p. 58.

[86] Daems, 1993, no. 189; André, 1956, pp. 115, 235; Glare, 1982, p. 483; Niermeyer, 1954–1976, p. 300; see Schmucker, 1969, no. 172.

[87] Schmucker, 1969, no. 172; Lev and Amar, 2008, p. 397; Kahl, 2003, p. 208, *ibid.*, 2007, pp. 329, 343.

[88] Daems, 1993, no. 10; *ibid.*, 1967, pp. 265, 269; André, 1956, p. 32; Glare, 1982, p. 128; Liddell and Scott, 1977, p. 125; Riddle, 1987, p. 57; Berendes, 1902, p. 302, 3: 60 (67); Wimmer, 1964, pp. 532–533; see Schmucker, 1969, no. 420.

[89] Schmucker, 1969, no. 420; Kahl, 2003, pp. 207, 232; *ibid.*, 2007, pp. 329, 343; Dubler, 1953, III:63, p. 307; Dietrich, 1991, III:55, p. 174; Lev and Amar, 2008, p. 398; see *ibid*, 2002, n. 168, p. 224; see Beck, 2005, III:58, p. 207. "The anise of ancient times (*Pimpinella anisum* L.) was frequently confused with the dill. Both are abundant in the Levant." Levey, 1966, p. 292.

[90] Daems, 1993, nos. 14–15, 498; André, 1956, pp. 16, 232; Thorndike and Benjamin, 1946, p. 6.

[91] *accidula* = *aizon* (Greek) = *barba Iovis* (Thorndike and Benjamin, 1946, p. 6; André, 1956, pp. 21, 288; Daems, 1993, nos. 47, 54, 88, 428, 524, 733).

[92] Glare, 1982, p. 1278.

[93] Dubler, 1953, II:44, pp. 148–149; Kahl, 2007, pp. 324, 329; Lev and Amar, 2008, p. 141; Levey, 1966, pp. 248, 298.

[94] Glare, 1982, p. 2079.

[95] Kahl, 2003, p. 208; *ibid.*, 2007, p. 329; Levey, 1966, p. 298.

[96] Glare, 1982, pp. 1018, 1818. For more information on the use of excrement for healing purposes, see Beck, 2005, II:80, pp. 124–125.

[97] Kahl, 2003, p. 203.

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonyme
Fānīdh medicament[98]	*diapenidion*		
Fava bean	*faba*	1. *Vicia*[99]	AR: *baqilla* = *Vicia*[100]
Fennel	*feniculum*	1. *Foeniculum*[101]	AR: *rāziyānaj* = *Foeniculum*[102]
Fenugreek	*fenugrecum*	1. *Trigonella*[103]	AR: *ḥulba* = *Trigonella*[104]
Fig	*carica*	1. *Ficus*[105]	AR: *tīn* = *Ficus*[106] S: **carica** = ficus
	ficus	1. *Ficus*[107]	AR: *tīn* = *Ficus*[108] S: ficus = **carica**

98 *diapenidium*: "Farmac. Ant. Elettuario contenente zucchero, usato contro la tosse (= voce dotta, dal lat. mediev. *diapenidion*, dal gr. *diapaino* 'ingrasso' "). Battaglia, 1961–2000, Vol. 4, p. 328.

99 Daems, 1993, no. 224; André, 1956, p. 132; Dragendorff, 1898, p. 330; see Schmucker, 1969, no. 102; see Glare, 1982, p. 664; see Niermeyer, 1954–1976, p. 401.

100 Schmucker, 1969, no. 102; Lev and Amar, 2008, p. 110; Dubler, 1953, II:96, p. 191; Kahl, 2003, pp. 201, 235; *ibid.*, 2007, pp. 324, 343; Levey, 1966, pp. 240–241; see Beck, 2005, II:105, p. 136.

101 Daems, 1993, nos. 207, 322, 585; *ibid.*, 1967, p. 299; André, 1956, pp. 134, 200; Glare, 1982, p. 671; Dragendorff, 1898, pp. 491–492; Thorndike and Benjamin, 1946, p. 131; Schmucker, 1969, no. 318, n. 1.

102 Schmucker, 1969, no. 318; Lev and Amar, 2008, p. 166; Kahl, 2003, pp. 207, 233; *ibid.*, 2007, pp. 328, 343; Dietrich, 1991, III:66, p. 179; Dubler, 1953, III:77, pp. 316–317; see Beck, 2005, III:70, p. 211.

103 Daems, 1993, no. 210; André, 1956, p. 135; Dragendorff, 1898, p. 316; Glare, 1982, p. 671; see Schmucker, 1969, no. 247.

104 Schmucker, 1969, no. 247; Dubler, 1953, I:93, pp. 188–189; Dietrich, 1991, II:87, p. 116; Kahl, 2003, pp. 204, 235; *ibid.*, 2007, pp. 325, 343; Levey, 1966, pp. 259–260; Lev and Amar, 2008, p. 406; see *ibid.*, 2002, n. 42, p. 96.

105 Daems, 1993, no. 178; André, 1956, pp. 73, 136; Dragendorff, 1898, p. 172; Thorndike and Benjamin, 1946, p. 136; see Schmucker, 1969, no. 180.

106 Schmucker, 1969, no. 180; Kahl, 2003, pp. 208, 233; *ibid.*, 2007, pp. 329, 343; Dubler, 1953, I:145, pp. 118–121; Dietrich, 1991, I:140, pp. 90–91; Levey, 1966, p. 250; see Beck, 2005, I:128, p. 91.

107 Daems, 1993, no. 178; André, 1956, pp. 73, 136; Glare, 1982, p. 696; Dragendorff, 1898, p. 172; Thorndike and Benjamin, 1946, p. 136; Schmucker, 1969, no. 180.

108 Schmucker, 1969, no. 180; Kahl, 2003, pp. 208, 233; *ibid.*, 2007, pp. 329, 343; Dubler, 1953, I:145, pp. 118–121; Dietrich, 1991, I:140, pp. 90–91; Levey, 1966, p. 250; see Beck, 2005, I:128, p. 91.

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonyme
Fleawort	*psilium*	1. *Plantago*[109]	AR: *bizr qaṭūnā* = *Plantago*[110]
"Fox's lungs"[111]	*pulmo vulpis*		
Frankincense	*olibanum*	1. *Boswellia*[112]	
	thus	1. *Boswellia*[113]	
Galbanum /thistle	*galbanum*	1. *Ferula*[114]	AR: *bādhāward* = *Cirsium*[115] *Onopordum*[116] several kinds of thistles, *Carduaceae*[117]
Gallnut	*galla*	1. *gall-nut*[118]	
Garlic/onion	*allium*	1. *Allium*[119]	
Grape syrup[120]	*rob*		AR: *maybukhtaj* = the condensed juice of *'inab* (*Vitis*)[121] S: ***rob** = vinum coctum (D.)

[109] Daems, 1993, no. 368; André, 1956, p. 263; Glare, 1982, p. 1511; Dragendorff, 1898, p. 618; Beck, 2005, IV:69, p. 277.

[110] Schmucker, 1969, no. 121; Kahl, 2003, pp. 202, 235; *ibid.*, 2007, pp. 324, 343; Levey, 1966, p. 317; Dubler, 1953, IV:71, p. 418; Dietrich, 1991, IV:64, p. 241; Lev and Amar, 2008, p. 242; see *ibid.*, 2002, n. 84, p. 138.

[111] No identification found. Considering the general character of the medicaments in this list, it seems unlikely that intention really would be to an animal product. However, see also Beck, 2005, II:39, p. 103, where dried lung of the fox is mentioned among animal drugs and recommended, taken in drink, for asthma.

[112] Daems, 1993, nos. 352, 456; *ibid.*, 1967, p. 301; Riddle, 1987, p. 59; Dragendorff, 1898, p. 366; Thorndike and Benjamin, 1946, p. 212; André, 1956, pp. 37, 323.

[113] Daems, 1993, nos. 456, 352; *ibid.*, 1967, p. 301; André, 1956, pp. 323, 37; Glare, 1982, pp. 1939, 1995.

[114] André, 1956, pp. 135, 145; Glare, 1982, p. 752; Riddle, 1987, p. 58; Daems, 1967, p. 273; Beck, 2005, III:83, p. 221.

[115] Dietrich, 1991, III:12, p. 155; Kahl, 2003, pp. 201, 233.

[116] Dietrich, 1991, III:12, p. 155; Kahl, 2007, pp. 324, 343; Schmucker, 1969, no. 97.

[117] Schmucker, 1969, no. 97.

[118] André, 1956, p. 146; Glare, 1982, p. 753; Niermeyer, 1954–1976, p. 460; Daems, 1967, p. 273.

[119] Daems, 1993, nos. 4, 502; *ibid.*, 1967, pp. 282–283; André, 1956, p. 23; Glare, 1982, p. 101; Dragendorff, 1898, p. 121.

[120] Daems, 1993, no. 412. *roob* = zur Sirupdicke eingedampfte Pflanzensäfte (Schelenz, 1965, p. 280). "*Rob, id est, sucus usque ad spisitudinem decoctus vel ad tertiam partem.*" Thorndike and Benjamin, 1946, p. 273.

[121] Schmucker, 1969, no. 749. Levey, 1966, p. 338: "*maibakhtaj* = concentrated must.—Maim. (84) gives *jamhuri* as the juice of the grape boiled until half of it has evaporated. If only a quarter of it remains, then it is called *maibakhtaj*."

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonyme
Gum	*gummi*	1. gum[122] 2. resin[123]	AR: *ṣamgh* = resin, gum[124]
Gum Arabic	*gummi arabicum*	1. *Acacia*[125]	AR: *al-ṣamgh al-ʿarabī* = *Acacia*[126]
Henbane	*iusquamus*	1. *Hyoscyamus*[127]	AR: *banj* = *Hyoscyamus*[128]
Hierapicras[129]	*hiera maiora*		
Honey	*mel*		AR: *ʿasal* = honey[130]
Horehound	*prassium*	1. *Marrubium*[131]	AR: *farāsiyūn* = *Marrubium*[132]

[122] André, 1956, pp. 109, 154; Glare, 1982, p. 470; Niermeyer, 1954–1976, p. 477; see Schmucker, 1969, no. 457.

[123] André, 1956, pp. 109, 154; Niermeyer, 1954–1976, p. 477; see Schmucker, 1969, no. 457.

[124] *Ibid*., no. 457. Used also instead of *ṣamgh ʿarabī* = gum from *Acacia* spp. Schmucker, 1969, no. 460; Lev and Amar, 2008, p. 180; Kahl, 2003, pp. 207, 232; *ibid*., 2007, pp. 328, 343; Levey, 1966, p. 234; Lev, 2003, pp. 59–60; see Lev and Amar, 2002, n. 178, p. 234.

[125] Daems, 1967, p. 275: see Dragendorff, 1898, p. 290; see Schmucker, 1969, no. 460.

[126] Schmucker, 1969, no. 460; Lev and Amar, 2008, p. 180; Kahl, 2003, pp. 207, 232; *ibid*., 2007, pp. 328, 343; Levey, 1966, p. 234; Lev, 2003, pp. 59–60; see Lev and Amar, 2002, n. 178, p. 234.

[127] Daems, 1993, nos. 127, 138, 260, 260*, 442, 609; *ibid*., 1967, pp. 266, 277; André, 1956, pp. 25, 68, 166; Glare, 1982, pp. 108, 811; Riddle, 1987, p. 60; Thorndike and Benjamin, 1946, p. 159; Beck, 2005, IV:68, p. 276; see Schmucker, 1969, no. 147.

[128] Dubler, 1953, IV:70, pp. 416–418; Kahl, 2003, pp. 201, 234; *ibid*., 2007, pp. 324, 343; Lev and Amar, 2008, p. 418; Levey, 1966, p. 246; Schmucker, 1969, no. 147; see Beck, 2005, IV:68, p. 276.

[129] *Hiera*: "Farmac. Ant. Elettuario a base di aloe, cinnamomo, zafferano, spicanardi, mastice e altri ingredienti, impastati con miele o con sciroppi (= voce semidotta, lat. mediev., comp. al gr. *ieros* 'sacro' e *pikros* 'amaro.')" Battaglia, 1961–2000, Vol. 6, p. 695; Vol. 7, p. 231; see Du Cange, 1937–1938, Vol. 8, p. 455.

[130] Dietrich, 1991, II:65, p. 109; Kahl, 2003, p. 201; *ibid*., 2007, p. 323; Levey, 1966, p. 304; Schmucker, 1969, no. 486; Lev and Amar, 2008, p. 185; see *ibid*., 2002, n. 198, p. 258. For *ʿasal* as a fluid or viscose plant exudate, see Schmucker, 1969, no. 486. On different kinds of honey, see Lev, 2003, pp. 13–15.

[131] Daems, 1993, nos. 305, 377, 648, 678; *ibid*., 1967, p. 284; André, 1956, pp. 201, 260; Glare, 1982, pp. 1080, 1450; Hort, 1961, p. 471; Riddle, 1987, p. 56; Beck, 2005, III:105, p. 229.

[132] Schmucker, 1969, no. 523; Dubler, 1953, III:113, p. 339; Lev and Amar, 2008, p. 419; Kahl, 2003, pp. 202, 234; *ibid*., 2007, pp. 324, 344; see Beck, 2005, III:105, p. 229.

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonyme
Horehound medicament	*diaprassium*	Contains: *Marrubium*[133]	
Houseleek	*sempervivum*	1. *Sempervivum*[134] 2. *Sedum*[135]	
Hydromel	*hydromel*	1. drink made of honey and water, hydromel	S: ***hydromel** = aqua mellis (D.) *hydromel = mulsum S: mulsum = ***musa** = aqua mellis (G.)
Hyoscyamus	*iusquamus albus*	1. *Hyoscyamus*[136]	
Hyssop	*hysopus, ysopus*	1. *Hyssopus*[137] 2. *Origanum*[138]	AR: *zūfā', zūfā* = *Hyssopus*[139] other *Labiatae*[140]

[133] *Diaprassio*: "Farmac. Ant. Composizione dimpolvere cefalica, la cui base è il marrobbio (e serviva per cura contro il mal di testa) (= voce dotta, dal lat. mediev. *dyaprassium*, comp. dal gr. *dia* 'per mezzo di' e *prasion* 'marrobbio')" Battaglia, 1961–2000, Vol. 4, p. 328.

[134] Daems, 1993, nos. 47, 428, 733; *ibid.*, 1967, pp. 277, 296; André, 1956, pp. 21, 288, 289; Thorndike and Benjamin, 1946, p. 293; see Beck, 2005, IV:88–89, p. 286 and n. 31.

[135] André, 1956, pp. 21, 169, 288, 289; Thorndike and Benjamin, 1946, p. 293; see Beck, 2005, IV:90, p. 287 and n. 31, p. 286.

[136] Dragendorff, 1898, p. 590; André, 1956, pp. 25, 166; see Beck, 2005, IV:68, p. 276.

[137] Daems, 1993, nos. 258, 608; *ibid.*, 1967, p. 277; Dragendorff, 1898, p. 580; see Schmucker, 1969, no. 356; see Beck, 2005, III:25, p. 190: *Satureja graeca* L. = *Micromeria graeca* Benth.

[138] André, 1956, p. 167; Glare, 1982, p. 812; Riddle, 1987, p. 55; Dragendorff, 1898, p. 582; see Schmucker, 1969, no. 356.

[139] Dietrich, 1991, III:26, pp. 161–162; Dubler, 1953, III:28, pp. 283–284; Kahl, 2003, pp. 209, 234; *ibid.*, 2007, pp. 329, 344; Lev, 2003, pp. 62–63; Levey, 1966, p. 277; Schmucker, 1969, no. 356; see Lev and Amar, 2002, n. 31, p. 86.

[140] Dubler, 1953, III:28, pp. 283–284; Schmucker, 1969, no. 356; see Lev and Amar, 2002, n. 48, p. 102. On the historical uses of hyssop, see Lev, 2003, pp. 62–63.

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonyme
Iris	*vreos, yreos*	1. *Iris*[141] 2. *Lilium*[142]	S: vreos = ***lilium** AR: *sawsan* = *Lilium* = *Iris*[143] AR: *sūs*[144] = *Glycyrrhiza*[145]
Iris medicament	*diairis*		
Iron water[146]	*aqua ferrata*		
Julep[147]	*iulep*		AR: *julāb* = rosewater-syrup[148]
Kelim	*collyrium kelim*	No identification.	S: ***collyrium kelim** = crocus ortensis (G.)
Kidney fat[149]	*adeps renum*		
Leek, Damascene	*porrum de scenij, porrum desceni*	1. *Allium*[150]	AR: *al-kurrāth al-shāmī* = *Allium*[151]
Lettuce	*lactuca*	1. *Lactuca*[152]	AR: *khass* = *Lactuca*[153]

141 Daems, 1993, nos. 235, 273, 606, 620; *ibid.*, 1967, p. 282; André, 1956, pp. 171, 172, 187, 216; Thorndike and Benjamin, 1946, p. 347; Beck, 2005 I:1, p. 5; see Schmucker, 1969, no. 410.

142 Daems, 1993, nos. 273, 619; *ibid.*, 1967, p. 281; André, 1956, p. 187; Dragendorff, 1898, pp. 121–122; see Schmucker, 1969, no. 410.

143 Schmucker, 1969, no. 410; Kahl, 2003, pp. 207, 234: *sawsan* = iris = *Iris* spp.

144 See Appendix 33, Prescription #14 (p. 513, above).

145 Schmucker, 1969, no. 409; Kahl, 2003, p. 208; see Lev and Amar, 2002, n. 172, p. 228: *sūs* = liquorice = *Glycyrrhiza glabra*; see Beck, 2005, III:5, p. 178.

146 See Beck, 2005, V:80, pp. 366–367.

147 Sugar decoction (Battaglia, 1961–2000, Vol. 6, p. 881; Vol. 8, p. 635; see Schmucker, 1969, no. 200).

148 A combined drug, in most cases a sugar decoction, often sweetened rose water (Schmucker, 1969, no. 200); general name of refined and fragrant liquid, and specific name for rose water or sweets mixed with rose water (Lev and Amar, 2008, p. 562); *julāb* = julep (Kahl, 2003, p. 203; *ibid.*, 2007, p. 325).

149 Daems, 1993, no. 79, Glare, 1982, pp. 39, 1614. For more information on the use of fat/grease for healing purposes, see Beck, 2005, II:76, pp. 116–121.

150 *Porrum*: Daems, 1993, nos. 355, 683; *ibid.*, 1967, pp. 282–283; André, 1956, p. 259; Glare, 1982, p. 1407; Dragendorff, 1898, p. 121.

151 Dietrich, 1991, II:132, p. 134. *kurrāth* = *Allium porrum* L. (Dubler, 1953, II:138, pp. 229–230; Kahl, 2003, pp. 204, 232; *ibid.*, 2007, pp. 326, 344; Lev and Amar, 2008, p. 433; Levey, 1966, pp. 323–324; Schmucker, 1969, no. 624; see Beck, 2005, II:149, p. 154).

152 Daems, 1993, nos. 275, 615; *ibid.*, 1967, p. 281; André, 1956, p. 176; Dragendorff, 1898, p. 691; Glare, 1982, p. 995; see Schmucker, 1969, no. 270.

153 Dietrich, 1991, II:119, p. 129; Kahl, 2003, pp. 205, 234; *ibid.*, 2007, pp. 325, 344; Lev and Amar, 2008, p. 437; Schmucker, 1969, no. 270; see Beck, 2005, II:136, p. 150; Lev and Amar, 2002, n. 57, p. 112.

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonyme
Licorice	*liquiritia, liquiricia*	1. *Glycyrrhiza*[154]	AR: *sūs* = *Glycyrrhiza*[155]
Lily	*lilium*	1. *Lilium*[156] 2. *Iris*[157]	AR: *sawsan* = *Iris*[158] *Lilium*[159] AR: *sūs*[160] = *Glycyrrhiza*[161] S: ***lilium** = vreos
Linen, flax	*linum*	1. *Linum*[162]	AR: *kattān* = *Linum*[163]
Lye	*lixivium*		S: lixiuium = ***aqua cineris**
Maidenhair	*capillus veneris*	1. *Adiantum*[164]	AR: *barshāwshān* = *Adiantum*[165]
Mallow	*conde*	(No information. Identification based on the Arabic synonymy.)	AR: *khubbāzā* = *mulūhiyya* = *Malva*[166]

[154] Daems, 1993, no. 282; *ibid.*, 1967, p. 282; André, 1956, p. 151; Dragendorff, 1898, p. 319; see Schmucker, 1969, no. 409; see Beck, 2005, III:5, p. 178.

[155] Schmucker, 1969, no. 409; Dubler, 1953, III:5, pp. 266–268; Kahl, 2003, pp. 208, 233; *ibid.*, 2007, pp. 329, 344; Levey, 1966, pp. 288–289; Lev and Amar, 2008, p. 205; see *ibid.*, 2002, n. 172, p. 228; Beck, 2005, III:5, p. 178.

[156] Daems, 1993, nos. 273, 619; *ibid.*, 1967, p. 281; André, 1956, p. 187; Dragendorff, 1898, pp. 121–122; Glare, 1982, p. 1030; see Schmucker, 1969, no. 410.

[157] Daems, 1993, no. 273; André, 1956, pp. 171, 187, 216; see Schmucker, 1969, no. 410.

[158] Dietrich, 1991, IV:77, pp. 246–247; Kahl, 2003, pp. 207, 234; *ibid.*, 2007, pp. 328, 344; Lev and Amar, 2008, p. 423; Schmucker, 1969, no. 410.

[159] Dietrich, 1991, III:97, p. 191; Dubler, 1953, III:110, p. 337; Lev, 2003, pp. 66–67.

[160] See Appendix 33, Prescription #14 (p. 513, above).

[161] Schmucker, 1969, no. 409; see Lev and Amar, 2002, n. 172, p. 228: *sūs* = liquorice = *Glycyrrhiza glabra*.

[162] André, 1956, p. 188; Glare, 1982, p. 1034; Hort, 1961, p. 462; Riddle, 1987, p. 50; Dragendorff, 1898, p. 342; Daems, 1967, p. 283; see Schmucker, 1969, no. 620; see Beck, 2005, II:103, p. 135.

[163] Dietrich, 1991, II:88, p. 116; Dubler, 1953, I:94, pp. 189–190; Kahl, 2003, pp. 204, 234; *ibid.*, 2007, pp. 324, 344; Lev and Amar, 2008, p. 439; Schmucker, 1969, no. 620; see Beck, 2005, II:103, p. 135; Lev and Amar, 2002, n. 136, p. 190.

[164] Daems, 1993, nos. 156, 382, 496, 548; *ibid.*, 1967, pp. 278–279; André, 1956, pp. 18, 69; Dragendorff, 1898, p. 53; Beck, 2005, IV:134, p. 299; see Schmucker, 1969, no. 799.

[165] Lev and Amar, 2008, p. 443; Kahl, 2003, pp. 201, 232; *ibid.*, 2007, pp. 324, 344; Dubler, 1953, IV:137, pp. 458–459; see Beck, 2005, IV:134, p. 299.

[166] Schmucker, 1969, no. 738; Dubler, 1953, II:109, pp. 201–202; Lev and Amar, 2002, n. 52, p. 106; see Beck, 2005, II:118, p. 142. Other identifications: *Corchorus olitorius* (Lev and Amar, 2002, n. 97, p. 152); *Althaea rosea* (Kahl, 2007, pp. 325, 343).

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonyme
Manna, frankincense	*manna*	1. *Boswellia*[167]	
Mastic	*mastix*	1. *Pistacia*[168]	
Meat broth[169]	*brodium*		
Meat dish	*tafea*		S: tafea = ***alisfidabegi** = modus preparationis cibi (G.)
Meat soup	*alisfidabegi* *aliffidabegi*		AR: *al-isfīdbājāt* = meat soup S: ***alisfidabegi** = [ex] aqua carnis + sale (pauco) + pomis + oleo + pipere (paruissimo) (D.) S: ***alisfidabegi** = modus preparationis cibi = tafea (G.)
Meat	*caro / carnis*	1. meat 2. pulp of fleshy substance of plants or their fruits, sap-wood[170]	AR: *luḥūm* = meat
Melon	*melon*	1. *Cucumis*[171] SEE *cucumis, citroli*	
Milk	*lac*		AR: *laban* = milk[172]
Mithridatium[173]	*methridatum*		AR: *al-mithrūdīṭūs* = *Mithridatium* S: trociscus quodam intrans in confectione mithrudati = ***cochium** = cokion

[167] Daems, 1993, no. 352; André, 1956, p. 200; Glare, 1982, p. 1074.

[168] André, 1956, p. 201, see also p. 183; Glare, 1982, p. 1082; Dragendorff, 1898, p. 396; Daems, 1967, p. 285.

[169] Niermeyer, 1954–1976, p. 106; Battaglia, 1961–2000, Vol. 2, pp. 389–390; Du Cange, 1937–1938, Vol. 1, pp. 754–755.

[170] Glare, 1982, p. 278.

[171] Daems, 1993, nos. 174, 321; Thorndike and Benjamin, 1946, pp. 191, 235; André, 1956, pp. 205, 242; Dragendorff, 1898, pp. 650–651.

[172] Dietrich, 1991, II:58, p. 1097; Kahl, 2003, p. 201; *ibid.*, 2007, p. 326; Levey, 1966, p. 330.

[173] See p. 455, n. 80, above.

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonyme
Mulberry	*morum*	1. *Morus*[174] 2. *Ficus*[175] 3. *Rubus*[176]	
Mustard	*sinapis*	1. *Brassica*[177] 2. *Sinapis*[178]	AR: *khardal*: *khardal aswad* = *Brassica Sinapis*[179] *khardal abyaḍ* = *Brassica Sinapis*[180]
Myrrh	*myrrha*	1. *Commiphora*[181]	AR: *murr* = *Commiphora*[182]
Myrtle	*myrtus*	1. *Myrtus*[183]	AR: *ās* = *Myrtus*[184]
Narciss	*narciscus*	1. *Narcissus*[185]	AR: *narjis* = *Narcissus*[186]

[174] Daems, 1993, no. 331; *ibid.*, 1967, p. 287; André, 1956, pp. 211, 212; Glare, 1982, p. 1136; Dragendorff, 1898, p. 171; Beck, 2005, I:126, p. 89.

[175] André, 1956, pp. 136, 137, 211; Glare, 1982, p. 1136; Dragendorff, 1898, p. 171.

[176] André, 1956, pp. 211, 212, 275; Glare, 1982, p. 1136.

[177] Daems, 1993, nos. 339, 419; André, 1956, p. 294; Dragendorff, 1898, p. 256; see Schmucker, 1969, no. 265.

[178] Daems, 1993, no. 419; *ibid.*, 1967, pp. 287–288, 296; André, 1956, p. 294; Glare, 1982, p. 1767; Dragendorff, 1898, p. 256; Beck, 2005, II:154, p. 156; see Schmucker, 1969, no. 265.

[179] Dubler, 1953, II:143, pp. 233–234; Kahl, 2003, pp. 203, 232; *ibid.*, 2007, pp. 325, 344; Schmucker, 1969, no. 265.

[180] Kahl, 2003, pp. 203, 232; *ibid.*, 2007, pp. 325, 344; Schmucker, 1969, no. 265; Lev and Amar, 2008, p. 454; see *ibid.*, 2002, n. 59, p. 114; see Beck, 2005, II:154, p. 156.

[181] André, 1956, p. 215; Glare, 1982, pp. 1147, 1152; Dragendorff, 1898, p. 367; Daems, 1967, p. 287; see Schmucker, 1969, no. 704; Beck, 2005, I:64, p. 45.

[182] Dietrich, 1991, I:55, p. 55; Kahl, 2003, pp. 206, 233; *ibid.*, 2007, pp. 327, 344; Lev and Amar, 2008, p. 221; Lev, 2003, p. 71; Schmucker, 1969, no. 704; see Beck, 2005, I:64, p. 45; Lev and Amar, 2002, n. 95, p. 150. Also *Balsamodendron myrrha* Nees. suggested: Dubler, 1953, I:63, pp. 47–48; Levey, 1966, pp. 333–334; Schmucker, 1969, no. 704.

[183] Daems, 1993, no. 638; André, 1956, p. 213; Glare, 1982, p. 1153; Hort, 1961, p. 465; Dragendorff, 1898, pp. 468–469; see Schmucker, 1969, no. 19; see Beck, 2005, I:112, p. 82.

[184] Dietrich, 1991, I:115, pp. 81–82; Dubler, 1953, I:128, pp. 99–100; Kahl, 2003, pp. 201, 234; *ibid.*, 2007, pp. 323, 344; Lev and Amar, 2008, p. 223; Schmucker, 1969, no. 19; see Beck, 2005, I:112, p. 82.

[185] André, 1956, p. 216; Glare, 1982, p. 1155; Hort, 1961, p. 466; Riddle 1985b, p. 123; *ibid.*, 1987, p. 51; Dragendorff, 1898, p. 132; Beck, 2005, IV:158, p. 310.

[186] Schmucker, 1969, no. 766; Dietrich, 1991, I:45, p. 53; Kahl, 2007, pp. 327, 344; see Beck, 2005 IV:158, p. 310.

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonyme
Nettle	*urtica*	1. *Urtica*[187]	AR: *anjura* = *Urtica*[188]
Nigella	*nigella*	1. *Nigella*[189] 2. *Agrostemma*[190]	AR: *sawsan* (sic!) = *Lilium* *Iris*[191]
Nightshade	*solatrum*	1. *Atropa*[192] 2. *Solanum*[193] 3. *Physalis*[194]	
Nut	*nux*	1. nut (includes hazel-nut, walnut, almond, etc.)[195] 2. *Juglans*[196]	AR: *jawz* = *Juglans regia* L.[197] "nut" in general[198]
Nut grass, yellow	*cyperus*	1. *Cyperus*[199]	AR: *su'd* = *Cyperus*[200]

[187] Daems, 1993, nos. 38, 468; *ibid.*, 1967, p. 288; André, 1956, p. 336; Glare, 1982, p. 2108; Dragendorff, 1898, p. 179; Thorndike and Benjamin, 1946, p. 328; see Schmucker, 1969, no. 73.

[188] Dietrich, 1991, IV:75, pp. 249–250; Schmucker, 1969, no. 73; Kahl, 2003, pp. 201, 235; *ibid.*, 2007, pp. 323, 345; Dubler, 1953, IV:95, pp. 436–437; see Lev and Amar, 2002, n. 115, p. 170.

[189] Daems, 1993, nos. 244, 287, 336; André, 1956, pp. 149, 204, 219; Thorndike and Benjamin, 1946, p. 206.

[190] Daems, 1993, nos. 244, 287, 336; *ibid.*, 1967, p. 269; Thorndike and Benjamin, 1946, p. 206.

[191] Schmucker, 1969, no. 410; Kahl, 2003, pp. 207, 234: *sawsan* = iris = *Iris* spp.

[192] Daems, 1993, nos. 426/427, 718, 306, 472; *ibid.*, 1967, p. 288; André, 1956, p. 306.

[193] Daems, 1993, nos. 426/427, 306, 472; *ibid.*, 1967, p. 288; André, 1956, p. 305.

[194] Daems, 1993, nos. 426/427, 509; André, 1956, p. 306.

[195] Glare, 1982, p. 1209; André, 1956, p. 221; Schmucker, 1969, no. 208, n. 1.

[196] André, 1956, p. 221; Battaglia, 1961–2000, Vol. 11, pp. 475–476; see Schmucker, 1969, no. 208.

[197] Schmucker, 1969, no. 208, n. 1; Dietrich, 1991, I:135, p. 88; Dubler, 1953, I:141, pp. 113–114; Kahl, 2003, pp. 203, 234; *ibid.*, 2007, pp. 325, 334; Levey, 1966, pp. 255–256; Lev and Amar, 2008, p. 310; see *ibid.*, 2002, n. 3, p. 58; Beck, 2005, I:125, p. 88.

[198] Schmucker, 1969, no. 208, n. 1.

[199] Daems, 1993, nos. 114, 188; André, 1956, pp. 113, 149; Glare, 1982, p. 481; Hort, 1961, p. 461; Riddle, 1987, p. 55; Berendes, 1902, p. 27, 1:4; Dragendorff, 1898, p. 90; Beck, 2005, I:4, p. 8; see Schmucker, 1969, no. 381.

[200] Dubler, 1953, I:4, pp. 14–15; Schmucker, 1969, no. 381; Lev and Amar, 2008, p. 284; Kahl, 2003, pp. 208, 233; *ibid.*, 2007, pp. 329, 343; Levey, 1966, p. 282; Dietrich, 1991, I:39, p. 4.

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonyme
Opium	*opium*	1. *Papaver*[201]	AR: *afyūn* = opium from *Papaver somniferum* L.[202]
Opium, Theban	*opium thebaicum*	1. *Papaver*[203]	
Opoponax	*oppopanax, oppoponax*	1. *Opopanax, Opoponax*[204]	AR: *jāwshīr* = *Opopanax*[205] *Ferula*[206]
Orpiment	*auripigmentum*	SEE *arsenicum*	
Ox's tripe[207]	*omasum*		
Pasta	*tri*	No identification, identified on the basis of the Arabic original and the Latin comments.	AR: *iṭriya* = pasta[208] S: ***tri** = fila gracilia oblonga que de pasta azima fiunt (D.) S: ***tri** = cibus de pasta: vt fila (G.) S: ***tri** = fila oblonga de pasta azima (D.)

201 Daems, 1993, nos. 347, 361, 676/677, 677; *ibid*., 1967, pp. 284, 289; André, 1956, pp. 228, 237; Glare, 1982, pp. 1254, 1291; Dragendorff, 1898, p. 249; Thorndike and Benjamin, 1946, p. 214; see Schmucker, 1969, nos. 60, 273.

202 Dietrich, 1991, IV:59, p. 239; Kahl, 2003, pp. 201, 234; *ibid*., 2007, pp. 323, 344; Schmucker, 1969, nos. 60, 273. Opium is the brown latex obtained from incisions made in the unripe seed-capsules of *Papaver somniferum* L. The poppy heads are split two weeks before ripening, and during the night the milky white resin flows out. The gummy sap that oozes from the cuts is collected immediately and again on the following day, a technique that has not changed for millennia. The exuded latex is then dried, and manipulated to form cakes. See Tibi, 2006, p. 2; Lev and Amar, 2008, pp. 231–232.

203 Daems, 1993, nos. 347, 361, 676/677; André, 1956, pp. 96, 202, 238, 272; Thorndike and Benjamin, 1946, pp. 214, 229.

204 André, 1956, pp. 229, 236; Glare, 1982, pp. 1254, 1288; Dragendorff, 1898, p. 495; Thorndike and Benjamin, 1946, p. 219; Schmucker, 1969, no. 186; see Beck, 2005, III:48, p. 202.

205 Dubler, 1953, III:51–53, pp. 300–302; Kahl, 2003, pp. 203, 234; *ibid*., 2007, pp. 325, 344; Lev and Amar, 2008, p. 458; Levey, 1966, pp. 254–255; Schmucker, 1969, no. 186.

206 Dubler, 1953, III:51–53, pp. 300–302; Schmucker, 1969, no. 186. Also suggested *Heracleum Panaces* L. (Dubler, 1953, III:51–53, pp. 300–302).

207 Glare, 1982, p. 1247; Battaglia, 1961–2000, Vol. 11, p. 905.

208 = "a certain food, like threads, made of flour; a thing made of softened starch" (Lane, 1886–1893, p. 1852).

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonyme
Peach	*persica*	1. *Prunus*[209]	AR: *mishmish* = *Prunus armeniaca* L., apricot[210] S: parua persica coloris aurei = ***chrysomilum**
Pepper	*piper*	1. *Piper*[211]	AR: *filfil* = *Piper*[212]
Peppermint	*calamentum*	1. *Calamintha*[213] 2. *Mentha*[214] 3. *Nepeta*[215] 4. *Melissa*[216]	AR: *fūdhanj* = *Mentha*[217] other *Lamiaceae*[218]
Peppermint medicament[219]	*diacalamentum*		
Pig's trotters[220]	*pedes porcini*		

209 Dragendorff, 1898, p. 284; André, 1956, p. 244; Niermeyer, 1954–1976, p. 790; Glare, 1982, p. 1355.

210 Schmucker, 1969, no. 729; Dubler, 1953, I:131, pp. 101–107; Dietrich, 1991, I:121, pp. 83–84; Kahl, 2007, pp. 327, 344.

211 Daems, 1993, no. 391; *ibid.*, 1967, p. 290; André, 1956, p. 251; Glare, 1982, p. 1382; Hort, 1961, p. 469; Riddle, 1987, p. 55; Beck, 2005, II:159, p. 159; see Schmucker, 1969, no. 538.

212 Dietrich, 1991, II:141, p. 138; Dubler, 1953, II:148, pp. 237–238; Schmucker, 1969, no. 538; Kahl, 2003, pp. 202, 234; Kahl, 2007, pp. 324, 344; Levey, 1966, pp. 311–312; Lev and Amar, 2008, p. 236; see Lev and Amar, 2002, n. 128, p. 182; Beck, 2005, II:159, p. 159.

213 Daems, 1993, nos. 155, 309, 335, 557; *ibid.*, 1967, pp. 278, 286; André, 1956, p. 64; Dragendorff, 1898, pp. 578–579; Thorndike and Benjamin, 1946, p. 65; Beck, 2005, III:35, p. 195.

214 Daems, 1993, nos. 155, 304, 309; *ibid.*, 1967, pp. 278, 286; Berendes, 1902, p. 288, 3:37 (43); Thorndike and Benjamin, 1946, p. 65; André, 1956, p. 206; see Schmucker, 1969, no. 553.

215 Daems, 1993, nos. 155, 309, 335, 651; *ibid.*, 1967, pp. 278, 286; Riddle, 1987, p. 56; Thorndike and Benjamin, 1946, p. 65.

216 Berendes, 1902, p. 288, 3:37 (43); Daems, 1967, pp. 278, 286.

217 Dietrich, 1991, III:33, p. 165; Kahl, 2003, pp. 202, 234; *ibid.*, 2007, pp. 324, 344; Levey, 1966, pp. 312–313; Schmucker, 1969, no. 553; see Lev and Amar, 2002, n. 104, p. 158.

218 Dietrich, 1991, III:33, p. 165; Dubler, 1953, III:31, pp. 286–287; Levey, 1966, pp. 312–313; Schmucker, 1969, no. 553; see Beck, 2005, III:35, p. 195. For *fūdhanj* as a collective name for various species of aromatic plants, mainly of the *Lamiaceae* family, see Lev and Amar, 2008, p. 30.

219 *Diacalamento*: "Farmac. Ant. Farmaco composto di polvere medicinale confortativa, la cui base è il calamento (= voce dotta, dal lat. mediev. *dyacalamentum*, comp. dal gr. *dia* 'per mezzo di' e *calamento*)" Battaglia, 1961–2000, Vol. 4, p. 311.

220 Glare, 1982, p. 1405.

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonyme
Pine	*pinus*	1. *Pinus*[221]	AR: *ṣanawbar* = *Pinus*[222] S: ***grana pini** = zuccarum edendi vel loco specierum in forma pinoleti
Pistachio	*fisticum*	1. *Pistacia*[223]	AR: *fustuq* = *Pistacia*[224]
Pistachio resin	*gluten alimbat, glutinum alimbat*	No identification, identified on the basis of the Arabic original and the Latin comments.	AR: *ʿilk al-anbāṭ* = *Pistacia* L. turpentine[225] S: ***gluten alimbat** = terebinthina (D.) S: ***gluten alimbat** = albotim = terbenthina (G.)
Pitch (fluid)	*pix liquida*	1. pitch[226] 2. mineral pitch[227] 3. bitumen[228]	AR: *al-qiṭrān* **Cedrus* (tar)[229] **Cupressus* (tar)[230] **Coniferae* (tar)[231] S: pix liquida = ***alkitran** (G.)
Plum	*prunum*	1. *Prunus*[232]	
Plum medicament[233]	*diaprunis*	Contains: 1. *Prunus*	

[221] Daems, 1993, nos. 367, 367*; André, 1956, p. 251; Glare, 1982, p. 1382; see Niermeyer, 1954–1976, p. 797; Dragendorff, 1898, p. 67; Beck, 2005, I:69, p. 50; see Schmucker, 1969, no. 462.

[222] Dubler, 1953, I:70, pp. 51–54; Kahl, 2003, pp. 207, 234; *ibid.*, 2007, pp. 328, 345; Levey, 1966, pp. 299–300; Schmucker, 1969, no. 462; see Beck, 2005, I:69, p. 50.

[223] André, 1956, p. 253; Glare, 1982, p. 1383; Berendes, 1902, p. 143, 1:177; Dragendorff, 1898, p. 395; Beck, 2005, I:124, p. 88; see Schmucker, 1969, no. 530.

[224] Dietrich, 1991, I:134, p. 88; Dubler, 1953, I:140, p. 113; Schmucker, 1969, no. 530; Kahl, 2003, pp. 203, 235; *ibid.*, 2007, pp. 324, 345; Lev and Amar, 2008, p. 468; see *ibid.*, 2002, n. 18, p. 72; see Beck, 2005, I:124, p. 88.

[225] Schmucker, 1969, no. 493; Dietrich, 1991, I:67, pp. 59–60; see Lev and Amar, 2002, n. 17, p. 72.

[226] Glare, 1982, p. 1384; Berthelot, 1893, Vol. 1, pp. 82, 102.

[227] Glare, 1982, p. 1384; Berthelot, 1893, Vol. 1, p. 82.

[228] Battaglia, 1961–2000, Vol. 12, pp. 901–902; Berthelot, 1893, Vol. 1, pp. 82, 102.

[229] Dietrich, 1991, I:77, p. 62; Lev and Amar, 2008, pp. 134, 497; Schmucker, 1969, no. 582; see Lev and Amar, 2002, n. 231, p. 296.

[230] Lev and Amar, 2008, pp. 396, 497; Schmucker, 1969, no. 582.

[231] Kahl, 2003, pp. 206, 233; *ibid.*, 2007, pp. 327; Lev and Amar, 2008, pp. 466, 497; Levey, 1966, p. 316; Schmucker, 1969, no. 582.

[232] André, 1956, p. 262, see also pp. 95, 115; Glare, 1982, p. 1510.

[233] *diapruno, diaprunis*: "Farmac. Ant. Elettuario lenitivo o solutivo basato sulla polpa delle prugne (= voce dotta, latr. mediev. *diaprunis*, comp. dal gr. *dia* 'per mezzo di' e dal lat. *prunum* 'prugna')". Battaglia, 1961–2000, Vol. 4, p. 328.

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonyme
Pomegranate	*granatum*	1. *Punica*[234]	AR: *rummān* = *Punica*[235]
Poplar	*populeonum*	1. *Populus*[236]	
Poppy	*papaver*	1. *Papaver*[237]	AR: *khashkhāsh* = *Papaver*[238] S: medicamen de papauere nigro sine fortificatione sua cum iusquamo vel opio = **deiacor simplex** (D.)
Poppy medicament	*deiacor, deiacur, deuicor, deuico, aldeicur, aldeiacur*	Contains: 1. *Papaver*[239]	AR: *al-diyāqūdh al-sādhaj*[240] S: ***deiacur cum intentionem Galeni** = diacodion purum S: deiacur = ***anathari** = nomen confectionis (G.) S: **deiacor simplex** = medicamen de papauere nigro sine fortificatione sua cum iusquamo vel opio (D.)
	anathari	Contains: 1. *Papaver*	S: ***anathari** = nomen confectionis = deiacur (G.)
	dia papaver[241]	Contains: 1. *Papaver*	

[234] Daems, 1993, nos. 104, 330, 396; André, 1956, pp. 152, 198, 199; Glare, 1982, p. 771; Dragendorff, 1898, p. 463; see Schmucker, 1969, no. 329.
[235] Dietrich, 1991, I:113, p. 80; Kahl, 2003, pp. 207, 235; *ibid.*, 2007, pp. 328, 345; Schmucker, 1969, no. 329; Lev and Amar, 2008, p. 248; see *ibid.*, 2002, n. 165, p. 222; Beck, 2005, I:110, p. 82.
[236] Daems, 1993, nos. 398, 398*; see Daems, 1967, p. 292; see Thorndike and Benjamin, 1946, p. 339; André, 1956, p. 258.
[237] Daems, 1993, nos. 361, 676/677, 677; *ibid.*, 1967, pp. 284, 289; André, 1956, p. 237; Glare, 1982, p. 1291; Dragendorff, 1898, p. 249; see Schmucker, 1969, no. 273.
[238] Schmucker, 1969, no. 273; Kahl, 2003, p. 203; *ibid.*, 2007, pp. 325, 344; Dietrich, 1991, IV:59, p. 239; Dubler, 1953, III:65, pp. 412–413; see Lev and Amar, 2002, n. 133, p. 188; Beck, 2005, IV:64, p. 273.
[239] See Appendix 33, Prescription #36a (p. 519, above).
[240] From the Greek *dyacodion*. *diyāqūdh* comes from the Greek *(e) dia kodion* = "[remedy made] with poppy capsules" (Kahl, 2007, p. 229, n. 119; see Liddell and Scott, 1977, p. 1016; Dozy, 1881, Vol. I, p. 480).
[241] *Diapapavero*: "Farmac. Ant. Elettuario contenente papavero (= voce dotta, lat. mediev. *diapapaver*, comp. dal gr. *dia* 'per mezzo di' e dal lat. *papaver* 'papavero')". Battaglia, 1961–2000, Vol. 4, p. 327.

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonyme
	diacodion[242]	Contains: 1. *Papaver*[243]	S: diacodion purum = ***deiacur cum intentionem Galeni**
Porridge[244]	*puls*		AR: *ḥarīra* (sic!) = silk
Pumpkin	*cucurbita*	1. *Citrullus*[245] 2. *Lagenaria*[246] 3. *Cucurbita*[247]	AR: *qarʿ* = *Cucurbita*[248] *Lagenaria*[249]
Purslane	*portulaca*	1. *Portulaca*[250]	
Quince	*citonium*	1. *Cydonia*[251] 2. *Pyrus Cydonia L.*[252]	AR: *safarjal* = *Cydonia oblonga* Mill.[253] *Cydonia vulgaris*[254]
Raisin	*uvae passae*	1. *Vitis*: dried grapes, raisins[255]	

[242] "... Confectio *Diacodion* (*e dia kodeion, kodeia*, Mohnkopf), die, nach Damokrates (Plin. 29,5) aus frischen *Mohnkapseln, Myrrha, Hypocistis* und *Honig* zusammengesetzt ..." (Schelenz, 1965, p. 162); "... *item papaver nigrum unde fit diacodium* ..." (Thorndike and Benjamin, 1946, p. 229).

[243] *codion* = *Papaver* (Daems, 1993, no. 361; *ibid.*, 1967, p. 284; André, 1956, pp. 96, 237, 238, 272; Thorndike and Benjamin, 1946, p. 105).

[244] A dish made by boiling crushed spelt or other grain in water, a kind of porridge (Glare, 1982, p. 1518; Battaglia, 1961–2000, Vol. 13, pp. 731, 800–801). The difference in translation is probably based on a confusion with the Arabic *ḥarīra* = porridge(?) (Garcia Sánchez, 2002, p. 282/8).

[245] Daems, 1993, no. 159; André, 1956, pp. 107–108.

[246] André, 1956, p. 107; Dragendorff, 1898, pp. 651–652; see Schmucker, 1969, no. 569.

[247] Glare, 1982, p. 464; Dragendorff, 1898, p. 652; see Schmucker, 1969, no. 569.

[248] Dietrich, 1991, II:117, p. 128; Dubler, 1953, II:123, p. 217; Levey, 1966, pp. 314–315; Schmucker, 1969, no. 569.

[249] Kahl, 2007, pp. 327, 343; Lev and Amar, 2008, p. 120; Levey, 1966, pp. 314–315; Schmucker, 1969, no. 569. On the nomenclature of *Cucurbitaceae* see Savage-Smith, 1980, p. 139, n. 19.

[250] Daems, 1993, nos. 357, 661, 71; André, 1956, p. 259; Glare, 1982, p. 1408.

[251] Daems, 1993, no. 172; Glare, 1982, p. 1069; Niermeyer, 1954–1976, p. 179; Hort, 1961, p. 460; Thorndike and Benjamin, 1946, p. 183.

[252] Berendes, 1902, p. 136, 1:160; Riddle, 1987, p. 49; see Schmucker, 1969, no. 383.

[253] Dietrich, 1991, I:119, p. 83; Kahl, 2003, pp. 207, 233; *ibid.*, 2007, pp. 328, 345; Lev and Amar, 2008, p. 255.

[254] Dubler, 1953, I:131, pp. 101–107; Levey, 1966, pp. 282–283; Schmucker, 1969, no. 383.

[255] Glare, 1982, p. 2120.

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonyme
	passula	1. *Vitis*: dried grapes, raisins[256]	AR: *zabīb* = dried grapes from *Vitis vinifera* L. etc.[257]
Resin	*alkitran*	1. pitch[258] 2. *Juniperus*[259] 3. *Cedrus*[260]	AR: *qiṭrān* **Cedrus* (tar)[261] **Cupressus* (tar)[262] **Coniferae* (tar)[263] S: ***faex alkitran** = gummi cedri (D.) S: ***alkitran** = pix liquida (G.) S: ***alkitran** = gummi cedri (D.)
Resin dregs[264]	*faex alkitran*		AR: *durdī al-qiṭrān* = resin dregs S: ***faex alkitran** = gummi cedri (D.)
Rice	*risum*	1. *Oryza*[265]	

256 Glare, 1982, p. 2120; Daems, 1967, pp. 289, 293; Dragendorff, 1898, p. 415; see Schmucker, 1969, no. 339.

257 Dubler, 1953, V:4, p. 506; Schmucker, 1969, no. 339; Lev and Amar, 2008, p. 176; Lev, 2003, pp. 57–59; Kahl, 2003, pp. 208, 235; Kahl, 2007, pp. 330, 345.

258 Berthelot, 1893, Vol. 1, pp. 82, 102; Glare, 1982, p. 1384.

259 Daems, 1993, nos. 262, 262*; André, 1956, p. 78; Glare, 1982, p. 293; Hort, 1961, pp. 455–456; Riddle, 1987, p. 59; Berendes, 1902, p. 99, 1:105; Wimmer, 1964, pp. 537–538; see Schmucker, 1969, no. 582.

260 André, 1956, p. 78; Battaglia, 1961–2000, Vol. 2, p. 942; see Schmucker, 1969, no. 582.

261 Dietrich, 1991, I:77, p. 62; Lev and Amar, 2008, pp. 134, 497; Schmucker, 1969, no. 582; see Lev and Amar, 2002, n. 231, p. 296.

262 Lev and Amar, 2008, pp. 396, 497; Schmucker, 1969, no. 582.

263 Kahl, 2003, pp. 206, 233; *ibid.*, 2007, p. 327; Lev and Amar, 2008, pp. 466, 497; Levey, 1966, p. 316; Schmucker, 1969, no. 582.

264 Glare, 1982, p. 672.

265 Niermeyer, 1954–1976, p. 921; Daems, 1967, p. 293; Glare, 1982, p. 1272.

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonyme
Rose	*rosa*	1. *Rosa*[266]	AR: *ward* = *Rosa*[267] AR: *al-julunjubīn al-ʿasalī* = rose honey[268]
Safflower	*cartamus*	1. *Crocus*[269] 2. *Carthamus*[270]	AR: *qurṭum* = *Carthamus*[271] S: cartamus = ***semen hortensis croci** (D.)
	crocus (h)ortensis	1. *Crocus*[272] 2. *Carthamus*[273]	AR: *qurṭum* = *Carthamus*[274] S: crocus ortensis = ***collyrium kelim** (G.) S: ***semen hortensis croci** = cartamus (D.)
Safflower medicament[275]	*diacartamus*	Contains: 1. *Crocus* 2. *Carthamus*	
Saffron	*crocus*	1. *Crocus*[276]	AR: *zaʿfarān* = *Crocus*[277]

[266] Daems, 1993, no. 404; *ibid.*, 1967, p. 293; André, 1956, pp. 80, 102, 112, 274, 300; Glare, 1982, p. 1661; see Schmucker, 1969, no. 797; Beck, 2005, I:99, p. 70.

[267] Dietrich, 1991, I:101, p. 73; Dubler, 1953, I:110, pp. 83–84; Kahl, 2003, pp. 208, 235; *ibid.*, 2007, pp. 329, 345; Lev and Amar, 2008, pp. 261–262; Lev, 2003, pp. 52–54; Levey, 1966, pp. 344–345; Schmucker, 1969, no. 797; see Beck, 2005, I:99, p. 70; Lev and Amar, 2002, n. 47, p. 102.

[268] *julunjubīn* = rose honey (Schmucker, 1969, n. 202). *ʿasal* = honey (Dietrich, 1991, II:65, p. 109; Kahl, 2003, p. 201; *ibid.*, 2007, p. 323; Levey, 1966, p. 304; Schmucker, 1969, no. 486; Lev and Amar, 2008, p. 185; see *ibid.*, 2002, n. 198, p. 258).

[269] Daems, 1993, nos. 134, 564; Thorndike and Benjamin, 1946, p. 106.

[270] Daems, 1993, no. 134; Thorndike and Benjamin, 1946, p. 106; Schmucker, 1969, no. 568.

[271] Schmucker, 1969, no. 568; Kahl, 2003, pp. 206, 232; *ibid.*, 2007, pp. 328, 345; Lev and Amar, 2008, p. 474; see *ibid.*, 2002, n. 158, p. 214; Beck, 2005, IV:188, p. 327.

[272] Daems, 1993, nos. 134, 564; Thorndike and Benjamin, 1946, p. 106.

[273] Daems, 1993, no. 134; Thorndike and Benjamin, 1946, p. 106; see Schmucker, 1969, no. 568.

[274] Schmucker, 1969, no. 568; Kahl, 2003, pp. 206, 232; *ibid.*, 2007, pp. 328, 345; Lev and Amar, 2008, p. 474; see *ibid.*, 2002, n. 158, p. 214; Beck, 2005, IV:188, p. 327.

[275] *Diacartamo*: "Farmac. Ant: Lassativo a base de semi di cartamo (= voce dotta, lat. mediev. *diacarthamum*, comp. dal gr. *dia* 'per mezzo di' e *carthamum* 'cartamo')". Battaglia, 1961–2000, Vol. 4, p. 311.

[276] Daems, 1993, nos. 134, 564; *ibid.*, 1967, pp. 280, 294; André, 1956, p. 105; Glare, 1982, p. 461; Hort, 1961, p. 459; Riddle, 1987, p. 60; Berendes, 1902, p. 54, 1:25; Dragendorff, 1898, p. 139; Beck, 2005, I:26, p. 23; see Schmucker, 1969, no. 349.

[277] Dubler, 1953, I:25, pp. 31–32; Schmucker, 1969, no. 349; Kahl, 2003, pp. 208, 233; *ibid.*, 2007, pp. 330, 345; Levey, 1966, pp. 275–276; Lev, 2003, pp. 77–78; Dietrich, 1991,

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonyme
Sagapenum	*(gummi) serapinum*	1. *Ferula*[278]	AR: *sakabīnaj* = *Ferula*[279]
Salt	*sal*	1. common salt (sodium chloride)[280]	AR: *mā' al-ramād al-mumallaḥ* = salted ash water[281]
Sebesten	*sebesten*	1. *Cordia*[282]	AR: *sabistān* = *Cordia*[283]
Sesame	*(oleum) sisaminum*	1. *Sesamum*[284]	(AR: *khall* = vinegar)[285]
Sheep trotters[286]	*pedes mutonini*		
Sheep yearlings	*annualis agnus*		AR: *luḥūm al-ḥawliyyāt [min] al-ḍa'n* = meat of yearlings of sheep
Spinach	*spinachia*	1. *Spinacia*[287] 2. *Atriplex*[288] 3. *Brassica*[289]	
Starch	*amidum*	1. *Triticum (Farina Tritici)*[290] 2. amylum, starch[291]	AR: *nashā* = amylum, starch[292]

I:25, p. 47; Lev and Amar, 2008, p. 270; see *ibid.*, 2002, n. 79, p. 134; Beck, 2005, I:26, p. 23. According to Levey, sometimes also the root of *Curcuma longa* L. (Levey, 1966, pp. 275–276).

278 Battaglia, 1961–2000, Vol. 17, p. 353; Vol. 18, p. 710; see Schmucker, 1969, no. 390.

279 Schmucker, 1969, no. 390; Lev and Amar, 2008, p. 472; Kahl, 2003, pp. 207, 233; *ibid.*, 2007, pp. 328, 345; Dubler, 1953, III:89, p. 327; Dietrich, 1991, III:77, pp. 183–184; see Beck, 2005, III:81, p. 219; Levey, 1966, pp. 283–284.

280 Glare, 1982, p. 1680.

281 *milḥ* = salt, NaCl (Kahl, 2003, pp. 206, 237; see Lev and Amar, 2002, n. 220, p. 282).

282 Dragendorff, 1898, pp. 558–559; Battaglia, 1961–2000, Vol. 18, p. 386; see Schmucker, 1969, no. 364.

283 Levey, 1966, p. 279; Schmucker, 1969, no. 364; Lev and Amar, 2008, p. 282; see Kahl, 2003, pp. 207, 233; *ibid.*, 2007, pp. 328, 345; Lev and Amar, 2002, n. 120, p. 174.

284 André, 1956, p. 291; Glare, 1982, p. 1748; Hort, 1961, p. 476; Riddle, 1987, p. 49; Dragendorff, 1898, p. 613; Beck, 2005, II:99, p. 133.

285 See Appendix 33, n. 29 (p. 523, above).

286 Niermeyer, 1954–1976, pp. 707, 713.

287 Daems, 1993, no. 737; Battaglia, 1961–2000, Vol. 19, p. 918.

288 Daems, 1993, nos. 16, 737.

289 *Ibid.*, no. 106.

290 Daems, 1993, no. 55; *ibid.*, 1967, pp. 264–265.

291 Niermeyer, 1954–1976, p. 41; Daems, 1967, pp. 264–265; see Schmucker, 1969, no. 769.

292 Schmucker, 1969, no. 769; Lev and Amar, 2008, p. 293; Kahl, 2007, p. 327. For the preparation and use of starch in medicine, see Tibi, 2006, p. 202.

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonyme
	amilum	1. *Triticum (Farina Tritici)*[293] 2. amylum, starch[294] 3. fine meal[295]	AR: *nashā* = amylum, starch[296]
Storax	*storax*	1. *Styrax*[297] 2. *Liquidambar*[298]	AR: *mayʿa* = *Liquidambar orientalis* Mill.[299] *Styrax* spp.[300] S: storax liquida = ***mel storacis** (D.)
"Storax honey"	*mel storacis*	1. *Styrax*[301] 2. *Liquidambar*[302]	AR: *ʿasal al-lubnā* = *Liquidambar*[303] *Styrax* L.[304] S: ***mel storacis** = storax liquida

293 Daems, 1993, no. 55; *ibid.*, 1967, pp. 264–265.
294 Glare, 1982, pp. 118, 125; Liddell and Scott, 1977, p. 81; Berendes, 1902, pp. 205–206, 2:123; Daems, 1967, pp. 264–265; Schmucker, 1969, no. 769; Beck, 2005, II:101, p. 134.
295 Glare, 1982, pp. 118, 125; Liddell and Scott, 1977, p. 81; Berendes, 1902, pp. 205–206, 2:123.
296 Schmucker, 1969, no. 769; Lev and Amar, 2008, p. 293; Kahl, 2007, p. 327. For the preparation and use of starch in medicine, see Tibi, 2006, p. 202.
297 André, 1956, p. 306; Glare, 1982, pp. 1825, 1832; Riddle, 1987, p. 59; Beck, 2005, I:66, p. 47; see Schmucker, 1969, no. 753.
298 Dragendorff, 1898, pp. 270–271; see Schmucker, 1969, no. 753.
299 Dietrich, 1991, I:56, pp. 55–56; Schmucker, 1969, no. 753; see Lev and Amar, 2002, n. 86, p. 140.
300 Dietrich, 1991, I:56, pp. 55–56; Kahl, 2003, pp. 205, 235; *ibid.*, 2007, pp. 326, 345; Schmucker, 1969, no. 753.
301 André, 1956, p. 306; Glare, 1982, pp. 1825, 1832; Riddle, 1987, p. 59; see Schmucker, 1969, no. 671.
302 Dragendorff, 1898, pp. 270–271; see Schmucker, 1969, no. 671.
303 Dietrich, 1991, I:56, pp. 55–56; Kahl, 2007, pp. 323, 345; Schmucker, 1969, no. 671.
304 Dietrich, 1991, I:56, pp. 55–56; Schmucker, 1969, no. 671; see Lev and Amar, 2002, n. 82, p. 136.

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonyme
Sugar	*zuccarum*	1. *Saccharum*[305]	AR: *sukkar* = sugar, saccharum[306] *Saccharum officinarum* (*qaṣab al-sukkar*)[307] S: zuccara edendi vel loco specierum in forma pinoleti = ***grana pini** (D.) S: zuccarum violatum vbi violae nutriunt in zuccaro = ***violatum nutritum** (G.)
Sugar cane	*canna zuccari*	1. *Saccharum*[308]	AR: *qaṣab al-sukkar* = *Saccharum*[309]
Sugar, crystalline	*zuccarum tabarzed*		AR: *al-sukkar al-ṭabarzadh* = crystalline sugar[310] S: ***zuccarum tabarzed** = (zuccarum) albissimum (D.)

[305] Daems, 1993, no. 487; André, 1956, pp. 156, 278, 341; Niermeyer, 1954–1976, p. 1138.
[306] Schmucker, 1969, no. 391; Kahl, 2003, p. 208.
[307] Schmucker, 1969, nos. 391, 580; Dietrich, 1991, II:66, p. 109; Lev, 2003, pp. 84–86; Lev and Amar, 2008, p. 294; Kahl, 2003, p. 208; *ibid.*, 2007, p. 329; Levey, 1966, p. 284; see Lev and Amar, 2002, n. 147, p. 204. *Sukkar* is the general term for the sap of the sugar cane which becomes solid upon boiling (Savage-Smith, 1980, pp. 142–143, n. 30).
[308] Daems, 1993, no. 487; André, 1956, pp. 156, 278, 341; Niermeyer, 1954–1976, p. 1138.
[309] Schmucker, 1969, nos. 391, 580; Dietrich, 1991, II:66, p. 109; Lev, 2003, pp. 84–86; Lev and Amar, 2008, p. 294; Kahl, 2003, p. 208; *ibid.*, 2007, p. 329; Levey, 1966, p. 284; see Lev and Amar, 2002, n. 147, p. 204.
[310] Bos, 1989; Kahl, 2003, p. 208: *sukkar ṭabarzadh* = white sugar candy. "When *sukkar* has been boiled twice and purified by being poured into a vessel in which the impurities are separated out, it is called Sulaymani sugar, a name probably deriving from a trade name associated with the town of Sulayman in Khuzistan. When *sukkar* is boiled a third time, after fresh milk equal in quantity to one-tenth its volume has been added to it, and it is boiled until is solidified, it is called *ṭabarzadh*, from the Persian meaning literally "chopped with an axe'. Sugar prepared in this manner was apparently so hard that it had to be smashed into smaller pieces." (Savage-Smith, 1980, pp. 142–143, n. 30).

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonyme
Sugar, *fānīdh*	*penidium*,[311] *penith*[312]		AR: *fānīdh* = sweets, candy[313] S: ***penith** = penidium (ex zuccara & amido vel melle & amido) (D.)
Sugar, white	*zuccarum album, zuccarum albissimum*		S: zuccarum albissimum = ***zuccarum tabarzed** (D.)
Sulphur[314]	*sulphur*		AR: *kibrīt* = sulphur[315]
Tabasheer	*spodium*	1. burned ivory, hydroxyl apathite, Ca5(OH)(PO4)3[316] 2. ash[317] 3. metallic oxide produced by calcination[318] 4. *Bambusa*[319]	AR: *ṭabāshīr* = chalk[320] *Bambusa arundinacea*, ashes[321]

[311] *Penidium*: 1. "An einem Faden kristallisiert Zucker, Kandi-Zucker von: *Saccharum officinarum* L." (Daems, 1993, no. 389); 2. Zucchero d'orzo (Battaglia, 1961–2000, Vol. 12, p. 1012); *Saccharum penidiatum*, Gerstenzucker, verschieden gedrehter *Gerstenzucker* (Schelenz, 1965, p. 353); 3. "Medic. Ant. Pasticca di farina d'orzo e zucchero usata un tempo come rimedio delle affezioni delle vie respiratorie e in partic. per la tosse" (Battaglia, 1961–2000, Vol. 12, p. 1030); 4. "*Fiunt sic: aqua miscetur zucharo, fit decoctio puousque lapidi gutta superposita adeo induretur quod statim inter digitos frangatur. Post super lapidem ponatur politum ut infrigidentur et clavo aseri infixo suspendantur et ibi manibus tractentur usque dum desiccentur. Quidam superaspergunt pulverem amidi ut albi fiant*." *Circa instans via* Thorndike and Benjamin, 1946, p. 234.

[312] *Penith*: "Medic. Ant. Pasticca di farina d'orzo e zucchero usata un tempo come rimedio delle affezioni delle vie respiratorie e in partic. per la tosse." Battaglia, 1961–2000, Vol. 12, pp. 1017, 1030.

[313] Lev and Amar, 2008, p. 571; Kahl, 2003, p. 202. Schmucker, 1969, no. 520: "weiche Zuckermasse, Feinzucker, Art Pflanzenzucker, den man hauptsachlich aus dem Sussholz zu gewinnen pflegte."

[314] Daems, 1993, no. 448; Glare, 1982, p. 1864; see Schmucker, 1969, no. 618.

[315] Schmucker, 1969, no. 618; Lev and Amar, 2008, p. 297; Kahl, 2003, p. 204; see Lev and Amar, 2002, n. 215, p. 276.

[316] Daems, 1993, no. 444; Thorndike and Benjamin, 1946, p. 307; see Schmucker, 1969, no. 464.

[317] Glare, 1982, p. 1808.

[318] *Ibid.*; Battaglia, 1961–2000, Vol. 19, p. 975.

[319] Thorndike and Benjamin, 1946, p. 307; Battaglia, 1961–2000, Vol. 2, p. 31; Vol. 19, p. 975; see Schmucker, 1969, no. 464.

[320] Schmucker, 1969, no. 464; see also Levey, 1966, p. 300.

[321] Schmucker, 1969, no. 464; Kahl, 2003, pp. 208, 232; *ibid.*, 2007, pp. 329, 345; see Lev

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonyme
Tamarind	*thamarindus*	1. *Tamarindus*[322]	AR: *tamr hindī* = *Tamarindus*[323]
Terebinth	*terbenthina*	1. *Pistacia*[324]	AR: (*ʿilk al-buṭm*), actually *glutinum album* = *terib.* = *Pistacia*[325] S: teribinthina = ***glutinum album** (Lat. *Canon*) S: terebinthina = ***gluten albotin** (D.) S: terbenthina = ***gluten albotim** (G.) S: terebinthina = ***gluten alimbat** (D.) S: terbenthina = ***gluten alimbat** = albotim (G.) S: terebenthina = ***gummi albotin** (D.)
Terebinth resin	*gummi albotin*, *gluten albotim*	1. *Pistacia*[326]	AR: *ṣamgh al-buṭm* = *Pistacia*[327] S: ***gluten albotin** = terebinthina (D.) S: ***gluten albotim** = terbenthina (G.) S: albotim = ***gluten alimbat** = terbenthina (G.) S: ***gummi albotin** = terebenthina (D.)

and Amar, 2008, pp. 106–107: Chalk, tabashir, *Bambusa vulgaris* (Poaceae): "Bamboo contains a large amount of silica and in medieval times it was burned as part of the extraction process. The ashes, which form crystals of a bluish white, hard light substance, were called *ṭabāshīr*." Silicic acid was also prepared of bamboo (Hill, 1993, p. 89).

322 Dragendorff, 1898, p. 299; André, 1956, p. 310; see Schmucker, 1969, no. 173.

323 Schmucker, 1969, no. 173; Kahl, 2003, pp. 208, 235; *ibid.*, 2007, pp. 329, 345; Levey, 1966, p. 251; Lev and Amar, 2008, p. 301; see *ibid.*, 2002, n. 190, p. 246.

324 André, 1956, p. 311; Glare, 1982, p. 1924; Hort, 1961, p. 480; Riddle, 1987, p. 59; Dragendorff, 1898, pp. 395–396; Beck, 2005, I:71, p. 54; see Schmucker, 1969, no. 130.

325 Schmucker, 1969, no. 130; Kahl, 2003, pp. 204, 235; *ibid.*, 2007, pp. 324, 345; Dietrich, 1991, I:67, pp. 59–60.

326 André, 1956, p. 311; Glare, 1982, p. 1924; Hort, 1961, p. 480; Riddle, 1987, p. 59; Dragendorff, 1898, pp. 395–396; see Schmucker, 1969, nos. 130, 493.

327 Schmucker, 1969, no. 130; Kahl, 2003, pp. 204, 235; *ibid.*, 2007, pp. 324, 345; Dietrich, 1991, I:67, pp. 59–60.

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonyme
	glutinum album	(No information. Identification based on the Arabic and Latin synonymy.)	AR: *ʿilk al-buṭm* = *Pistacia*[328] S: ***glutinum album*** = teribinthina (Lat. *Canon*)
Theriac[329]	*tyriaca*		S: tyriacales = ***bedzahariae calidae*** (D.)
Thyme	*thimum*	1. *Thymus*[330] 2. *Satureja*[331]	AR: *ḥāshā* = *Satureja* spp.[332] *Thymus* spp.[333] other *Labiatae*[334] S: thimum = ***hasce*** (D.)
	hasce	(No information. Identification based on the Arabic synonymy.)	S: ***hasce*** = thimum (D.) AR: *ḥāshā* = *Satureja* spp.[335] *Thymus* spp.[336] other *Labiatae*[337]
Tragacanth	*dragagantum*	1. *Astragalus*[338]	AR: *kathīrā'* = *Astragalus*[339]

[328] Schmucker, 1969, no. 130; Kahl, 2003, pp. 204, 235; *ibid*., 2007, pp. 324, 345; Dietrich, 1991, I:67, pp. 59–60.

[329] Du Cange, 1937–1938, Vol. 8, pp. 100, 174, 221.

[330] Daems, 1993, no. 461; *ibid*., 1967, p. 299; André, 1956, pp. 315, 316; Riddle, 1987, p. 56; Dragendorff, 1898, p. 582; see Schmucker, 1969, no. 219; Glare, 1982, p. 1940.

[331] Daems, 1993, nos. 461, 464, 464*; André, 1956, pp. 127, 315, 316; Glare, 1982, p. 1940; Beck, 2005, III:36, p. 196; see Schmucker, 1969, no. 219.

[332] Lev, 2003, pp. 78–80; Schmucker, 1969, no. 219; see Beck, 2005, III:36, p. 196.

[333] Dubler, 1953, III:40, pp. 292–293; Lev, 2003, pp. 60–61, 78–80; Levey, 1966, p. 256; Schmucker, 1969, no. 219.

[334] Kahl, 2003, pp. 203, 232; *ibid*., 2007, pp. 325, 343; Schmucker, 1969, no. 219. On difficulties of identification of thyme and other *Labiatae*, see Lev, 2003, pp. 60–61, 78–80.

[335] Lev, 2003, pp. 78–80; Schmucker, 1969, no. 219; see Beck, 2005, III:36, p. 196.

[336] Dubler, 1953, III:40, pp. 292–293; Lev, 2003, pp. 60–61, 78–80; Levey, 1966, p. 256; Schmucker, 1969, no. 219.

[337] Kahl, 2003, pp. 203, 232; *ibid*., 2007, pp. 325, 343; Schmucker, 1969, no. 219. On difficulties of identification of thyme and other *Labiatae*, see Lev, 2003, pp. 60–61, 78–80.

[338] André, 1956, p. 319; Daems, 1967, p. 270; see Hort, 1961, p. 481; see Berendes, 1902, p. 275, 3:20 (23); Beck, 2005, III:20, p. 186; see Schmucker, 1969, no. 621.

[339] Dietrich, 1991, III:20, p. 158; Dubler, 1953, III:21, p. 278; Schmucker, 1969, no. 621; Kahl, 2003, pp. 204, 232; *ibid*., 2007, pp. 326, 345; Levey, 1966, p. 323; Lev, 2003, pp. 89–90; Lev and Amar, 2008, p. 302; see Lev and Amar, 2002, n. 140, p. 196; see Beck, 2005, III:20, p. 186.

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonyme
Tragacanth medicament[340]	*diadragagantum, diadragantum*	Contains: 1. *Astragalus*[341]	
Valerian	*spica aromatica*	1. *Valeriana*[342] 2. *Nardostachys*[343]	AR: *sunbul al-ṭīb = sunbul hindī = sunbul* *sunbul = Valeriana* *= Nardostachys*[344]
	spicenardum	1. *Nardostachys*[345]	
Vegetables[346]	*olera*		AR: *al-buqūl* = vegetables
Vetch	*herbum*	1. *Ervum*[347] 2. *Vicia*[348]	AR: *kirsinna* = *Vicia* L.[349]
	orobum	1. *Vicia*[350] 2. *Ervum*[351]	

340 *Diadragante*: "Farmac. Ant. Elettuario a base di dragante (= voce dotta, lat. mediev. *dyadragantum*, comp. dal gr. *dia* 'per mezzo di' e dal lat. *dragantum* 'gomma')" Battaglia, 1961–2000, Vol. 4, p. 316.

341 André, 1956, p. 319; Daems, 1967, p. 270; Battaglia, 1961–2000, Vol. 1, p. 180; Vol. 4, p. 996; Beck, 2005, III:20, p. 186.

342 André, 1956, pp. 217, 299; see Glare, 1982, p. 1804, Niermeyer, 1954–1976, p. 984.

343 Daems, 1993, no. 423; André, 1956, p. 217; see Beck, 2005, I:7, p. 9.

344 Dubler, 1953, I:6, pp. 16–17; Dietrich, 1991, I:6, p. 40; Schmucker, 1969; Lev and Amar, 2008, p. 289; Kahl, 2003, pp. 208, 234; *ibid.*, 2007, pp. 329, 344, 224, n. 111; see Lev and Amar, 2002, n. 107, p. 162; Levey, 1966, pp. 286–287.

345 Daems, 1993, no. 423; André, 1956, pp. 217, 299; Thorndike and Benjamin, 1946, p. 203.

346 André, 1956, p. 164; Glare, 1982, p. 800.

347 Dragendorff, 1898, p. 331.

348 Dragendorff, 1898, p. 331; Daems, 1993, no. 346; see Schmucker, 1969, no. 626.

349 Levey, 1966, p. 324; Dietrich, 1991, II:93, p. 118; Dubler, 1953, II:100, pp. 194–195; Schmucker, 1969, no. 626; Kahl, 2003, pp. 202, 235; Kahl, 2007, pp. 326, 345; Lev and Amar, 2008, p. 360; see Lev and Amar, 2002, n. 35, p. 90; see Beck, 2005, II:108, p. 138.

350 Daems, 1993, nos. 346, 483, 659; André, 1956, pp. 128, 231, 329; see Glare, 1982, p. 1271; Riddle, 1987, p. 48; Dragendorff, 1898, p. 331; Thorndike and Benjamin, 1946, p. 218; Beck, 2005, II:108, p. 138.

351 André, 1956, pp. 128, 231; Hort, 1961, p. 468; Dragendorff, 1898, p. 331.

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonyme
Violet	*viola*	1. *Viola*[352] 2. *Matthiola*[353] 3. *Cheiranthus*[354]	AR: *banafsaj* = *Viola*[355] S: ***violatum nutritum** = violae cum zuccara nutritae = conserua violarum (D.) S: ***violatum nutritum** = zuccarum violatum vbi violae nutriunt in zuccaro (G.)
Water lily	*nenufar*	1. *Nymphaea*[356] 2. *Nuphar*[357]	
Water mint	*calamentum fluviale*	1. *Mentha*[358]	AR: *fūdhanj nahrī* = *Mentha*[359]
Wax	*cera*	1. *beeswax, wax*[360]	
Wax, red[361]	*cera rubea*		AR: *shamʿ aḥmar* = red wax[362]

---

352 Daems, 1993, nos. 478, 749; *ibid.*, 1967, p. 300; André, 1956, pp. 330, 331; Glare, 1982, p. 2068; see Schmucker, 1969, no. 151.

353 André, 1956, pp. 330, 331; Glare, 1982, p. 2068.

354 *Ibid.*

355 Schmucker, 1969, no. 151; Dubler, 1953, IV:122, pp. 452–453; Levey, 1966, p. 247; Lev, 2003, pp. 87–88; Kahl, 2003, pp. 201, 235; *ibid.*, 2007, pp. 324, 345; Lev and Amar, 2008, p. 299; see *ibid.*, 2002, n. 108, p. 162; see Beck, 2005, IV:121, p. 296.

356 Daems, 1993, nos. 338, 342, 652; *ibid.*, 1967, p. 285; Thorndike and Benjamin, 1946, p. 205; André, 1956, pp. 189, 190, 223, 335; see Lev and Amar, 2008, pp. 210–211.

357 *Ibid.*

358 Daems, 1993, no. 526.

359 Schmucker, 1969, no. 553; Kahl, 2003, pp. 202, 234; *ibid.*, 2007, pp. 324, 345; Levey, 1966, pp. 312–313; Dietrich, 1991, III:33, p. 165.

360 Glare, 1982, p. 300; Battaglia, 1961–2000, Vol. 2, pp. 981–982; see Beck, 2005, II:83, pp. 128–129.

361 *cera rossa, ceralacca*: "Sostanza, usata soprattutto per sigillare, costituita da un miscuglio di sostanze resinose (trementina, gommalacca, colofonia) e di sostanze minerali (creta, carbonato di magnesio, bianco di zinco, caolino, gesso cotto, ecc.), alle quali si aggiungono sostanze coloranti diverse a seconda del colore che si vuole impartire." Battaglia, 1961–2000, Vol. 2, pp. 982, 984.

362 See Renaud and Colin, 1934, p. 260; Kahl, 2003, p. 207: *shamʿ* = beeswax.

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonyme
Wax, cerate[363]	*cerotum, cerotarium*		AR: *al-qayrūṭiyyāt* = cerates[364]
Wheat	*triticum*	1. *Triticum*[365]	AR: *qamḥ* = *Triticum*[366]
Wheat/cereals	*frumentum*	1. cereal plants[367] 2. *Triticum*[368]	AR: *al-aḥsā' al-ḥinṭiyya* = *Triticum* L.[369] S: ***sorbitio frumentalis** = frumentaria (ex granis frumenti & lacte vacce) (D.)
Willow	*salix*	1. *Salix*[370]	
Wine	*vinum*	1. wine[371] 2. an analogous drink made from other fruits or vegetable products[372]	AR: *sharāb* = wine from *Vitis vinifera* L.[373] wine (in general) juice (in general)[374] S: succus sive vinum = ***aqua (granatorum)** (G.) S: vinum coctum = ***rob** (D.)

[363] Glare, 1982, p. 302; Battaglia, 1961–2000, Vol. 2, p. 1003; Schelenz, 1965, p. 280. *cerotarium, cerotum*: "Cerotarium. Idem quod *Ceratum* vel *Cerotum* ..." (Du Cange, 1937–1938, Vol. 2, p. 275). *Cerotto*: "Ant. Impiastro; unguento (= Lat. tardo *cerotum*, dal gr. *keroton* 'unguento a base di cera', neutro sostant. di *kerotos* 'di cera')" (Battaglia, 1961–2000, Vol. 2, p. 1003). *Cerotum*: "Galienus in libro *de simplici medicina* de ceroto. et est cerotum cera liquefacta cum oleo, quando est simplex. Non est de proprietate eius ut calefaciat vel infrigidet. Sed quando miscetur cum aqua, infrigidat, quoniam aqua in complexione sua facta est ..." (Thorndike and Benjamin, 1946, p. 4).

[364] *Qīrūṭī* = a wax-salve or cerate, from the Greek *kerute* (Dols, 1984, p. 147, n. 14). Lev and Amar, 2008, p. 565: *Qayruti* = Greek name, plaster or ointment for wounds made of olive oil, wax and sometime rose oil. Kahl, 2007, p. 273, n. 207: The term used here for "wax-liniment", i.e. *qīrūṭī*, is a transliteration of *kerote*, "cerate" (see Liddell and Scott, 1977, p. 949).

[365] Daems, 1993, nos. 55, 392; *ibid*., 1967, p. 299; André, 1956, pp. 133, 293, 298–299, 317, 321, 322; Glare, 1982, p. 1978; see Schmucker, 1969, no. 595.

[366] Schmucker, 1969, no. 595; Lev and Amar, 2008, p. 502; see Lev and Amar, 2002, n. 51, p. 106.

[367] Glare, 1982, p. 739; André, 1956, p. 142.

[368] André, 1956, pp. 18, 133, 142, 293, 317, 321; Glare, 1982, p. 739; Niermeyer, 1954–1976, p. 456; see Daems, 1993, no. 55.

[369] Schmucker, 1969, no. 257; see Beck, 2005, II:85, p. 129.

[370] Daems, 1993, no. 447; *ibid*., 1967, pp. 294, 301; André, 1956, p. 279; Glare, 1982, p. 1681.

[371] Glare, 1982, p. 2067; see Niermeyer, 1954–1976, pp. 1109–1110.

[372] Glare, 1982, p. 2068.

[373] Fellmann, 1986, pp. 269–272; Kahl, 2003, p. 207; *ibid*., 2007, p. 328. For a good overview of several products of grapevine and their medicinal uses, see Lev, 2003, pp. 57–59.

[374] Fellmann, 1986, pp. 269–272.

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonyme
Wine, Greek	*vinum grecum*		
Wine, malvoisie[375]	*(vinum) maluisia*		
Wine, Romanian[376]	*(vinum) romania*		

375 *Malvasia*: "Vino bianco pregiato, originario del peloponneso; hanno lo stesso nome anche altri vini con caratteristiche in parte diverse, derivati da varieta di vitigni coltivari in Italia, Spagna, ecc. (= dal nome della cittadina greca di *Monembasia* o *Napoli di Malvasia* dei Veneziani)" (Battaglia, 1961–2000, Vol. 9, pp. 586–587); *malvesy*: Arvisium vinum, *Malvoisie* (Du Cange, 1937–1938, Vol. 5, p. 202).

376 *Romania*: "Ant. Vino bianco dolce di origine greca simile alla malvasia (= dal gr. biz. *Romania*, termine usato nel Medioevo per indicare i territori dell'Impero Romano d'Oriente, in partic. la penisola greca)" (Battaglia, 1961–2000, Vol. 17, p. 36).

APPENDIX 35

(See p. 270)

6.13. Frequencies of the Simple Drugs for Cough in the Arabic and Latin Commentaries.[1]

#1	Drug	Latin	b.S.	Lat	b.N	J	sc	GF	JD	JD-bS
1	Agaric	*agaricum*						1		
6	Almond	*amigdala*	7	7	2	1	1	2	8	1
1	Aloe	*aloe*	1	1					1	
1	Alum	—	1							
1	Amaranth	—			1					
1	Aniseed	*anisum*	1	1					1	
2	Antidote, hot + theriacs	*bedzaharia calida* + *tyriaca*	1	1	1				1 + S1	
2	Apple/fruit + banana /hydromel	*pomum* + *musa*[2]	1[3]	1[4]					2 + S1	1
1	Apricot	*chrysomelum* + *persica*	1	1					1 + S1	
2	Arsenic + red arsenic	*arsenicum* + *arsenicum rubeum*	2	2					4	2
1	Asarabacca	*asarum*	2	2					2	
1	Ash water	*aqua cineris*	1	1					1	
2	Balsam	*balsamum*	2	2					3	1
5	Barley + barley water + barley gruel	*hordeum* + *ptisana* + *sauic hordei*	8	7	2	2		2 + 2 (S) + S2	14 + 1(S) + S2	9

[1] Column #1: number of texts (= *K. al-Qānūn* or Arabic or Latin commentaries) in which the drug appears in prescriptions for cough (column JD–bS is used instead of column JD). b.S. = *K. al-Qānūn*; Lat. = the Latin translation of *K. al-Qānūn*; b.N. = Ibn al-Nafīs; J = al-Jaghmīnī; sc. = supracommentary to *Qānūnja*; GF = Gentile da Foligno; JD = Jacques Despars; JD–bS = innovations by Jacques Despars. S = synonym, (S) = name for which the synonym is given. (S) has been noted only where relevant, i.e., not when Despars is routinely repeating a drug mentioned by Ibn Sīnā and adding a synonyme.

[2] Counted also as honey.

[3] Counted also as honey.

[4] Counted also as honey.

#1	Drug	Latin	b.S.	Lat	b.N	J	sc	GF	JD	JD-bS
1	Basil (*ḥabaq*)	*sorbitio (aḥsā' + ḥabaq)*	1	2				1(S)	2	
1	Birthwort	*aristologia*	1	1					1	
2	Bran (*nukhāla*)	—	1				1			
1	Butter	*butyron*	3	3					3	
2	Cassia fistula	*cassiafistula*				1			1	1
1	Castoreum	*castoreum*	1	1					1	
1	Cichory	*endivia*							1	1
2	Cinnamon	*cinamomum*	1	1			1		1	
2	Clay, Armenian	*bolus armenicus*	1	1			1		1	
1	Coriander	—					1			
2	Costus, Indian + costus	*costum indum/costum allatum ex india + costum*	1	1					2	1
1	Cotton (*quṭn*)	*coton*	1	1					1	
2	Cow trotters	*pedes vaccini*			1				1	1
1	Crab	*cancer*	1	1					1	
4	Cucumber (*khiyār/qathad*)	*citrulus*	2	2	1		1		4	2
4	Cucumber (*qithā'*)	*cucumis*	2	2	1		1		4	2
1	Cypress	*cypressus*							1	1
2	Date	*dactilus*	2	2					3	1
1	Dill	*anetum*	2	2					2	
1	Dock	*acedula*							1	1
1	Dragon's blood	—				1				
4	Egg	*ovum*	3	3	2		1		4	1
1	Excrement of hare	*stercus leporis*	1	1					1	
2	Fava bean	*faba*	2	1			1		1	
2	Fennel	*feniculum*	1	1				1	1	
2	Fenugreek	*fenugrecum*	2	2					3	1
3	Fig	*ficus + carice*	6	6				3	7 + S1	1
1	Flax, linen	*linum*	2	2					2	
3	Fleawort	*psilium*	2	2			1		5	3

#1	Drug	Latin	b.S.	Lat	b.N	J	sc	GF	JD	JD-bS
1	"Fox's lungs"	*pulmo vulpis*						1		
1	Frankincense	*olibanum*							2	2
2	Frankincense	*thus*						1	1	1
1	Galbanum (*qinna*)	—	1							
2	Grape + grape syrup	— + *rob (maybukhtaj)*	1	1	1				1	
3	Gruel	*sauic(h)*	1	1				1	1	
2	Gum	*gummi*	1	1	1					
4	Gum arabic	*gummi arabicum*	2	2			1	1	4	2
2	Henbane	*iusquamus* + *iusquamus albus*	2	2					3	1
1	Henna	—			1					
1	Hierapicras	*hiera maiora*							1	1
3	Honey + hydromel + banana /hydromel + rose honey[5]	*mel* + *hydromel* + *mulsa* + *musa* + *mel rosearum*	22[6]	21[7]			1	1(S) + S1	33[8] + S2	11
3	Horehound	*prassium* + *diaprassium*	1	1				1	3	2
1	Houseleek	*sempervivum*							1	1
4	Hyssop	*(h)ysopus*	5	5			1	3	6	1
1	Iron water	*aqua ferrata*							1	1
2	Jujube	—			1	1				
3	Julep	*iulep*					1	1	1	
1	Kidney fat	*adeps renum*							1	1
2	Leek	*porrum de sceni*	2	2					2	1
1	Lentil	—			1					
2	Lettuce	—	1	1			1			
3	Licorice	*liquiritia*	5	4	1				6	1

[5] Counted also as rose.
[6] *Musa* counted also as apple/fruit, 'rose honey' counted also as rose.
[7] *Musa* counted also as apple/fruit, 'rose honey' counted also as rose.
[8] 'Rose honey' counted also as rose.

#1	Drug	Latin	b.S.	Lat	b.N	J	sc	GF	JD	JD-bS
4	Lily (*sawsan/sūs*) + iris	*lilium* + *diairis* + *vreos* + *yreos* + *nigella*	3	5		1	1		5 + S1	2
3	Maidenhair	*capillus veneris*	2	2			1		4	2
2	Mallow (*khubbāzā*)	*conde*	1	1	2					
1	Mallow (*mulūkhiyya*)	—			1					
1	Malva (*khaṭmī*)	—			1					
1	Manna, frankincense	*manna*							1	1
1	Mastic	*mastix*							1	1
1	Meat broth	*brodium*					1			
1	Meat juice	*aqua carnis*							3	3
2	Meat of cocks + chicken	*caro gallorum* + *caponis*	1	1					2	1
1	Meat of yearlings of sheep	*caro agnorum annualium*	1	1					1	
2	Meat of young birds	*carnes pullorum* + *aqua vituli pulli*	1	1					2	1
1	Meat soup (*al-isfīdbājāt*)	*alisfidabegi* /*aliffidabegi* + *tafea*	1	1				1(S) + S1	1	
2	Melon	*melon*					1		2	2
3	Milk	*lac*[9]	2	4			1		9	7
1	*Mithridatium*	*methridatum*	1	1					1	
1	Mucilage	*muscilago*	2	2					2	
1	Mulberry	*morum*							1	1
3	Mustard	*sinapis*	1	1				1	3	2
3	Myrrh	*myrrha*	6	5				1	10	4
3	Myrtle	*myrtus*	1	1	1			1	1	
2	Narciss	*narciscus*	1	1		1			1	
1	Nettle	*urtica*	1	1					1	
1	Nightshade	*solatrum*							1	1

[9] Includes *lac*, *lac asinae*, *lac caprae*, *lac mulieris, lac nutricis*, and *lac vaccae*.

#1	Drug	Latin	b.S.	Lat	b.N	J	sc	GF	JD	JD-bS
2	Nut	*nux*	1	1				1	1	
1	Nut grass, yellow (*suʿd*)	*cyperus*	1	1					1	
3	Opium + Theban opium	*opium + opium thebaicum*	3	3				1	5	2
1	Opoponax	*oppoponax / oppopanax*	1	1					1	
1	Ox's tripe	*aqua omasorum*							1	1
3	Pasta	*tri + pasta azima*	2[10]	2	1[11]			1(S) + S1	3 + S1	1
2	Pepper	*piper*	5	4					5	1
3	Peppermint	*calamentum, calamentum fluviale, diacalamentum*	3	3			1		4	1
1	Pig's trotters	*pedes porcini*							1	1
2	Pine	*pinus*	6	6		1			6	
1	Pistachio (*ʿilk*) + terebinth	*gluten albotin, gummi/gommi albotin/albotim, glutinum album, glutinum/gluten alimbat, terbenthina*	3	2 + 1(S) + S1				2(S) + S3	3 + S3	
3	Pistachio nut	*fisticum*	3	3		1	1		3	
3	Plum	*prunum + diaprunis*					1	1	1	1
4	Pomegranate	*granatum*	2	2	5		1	1	2	
1	Poplar	*populeonum*							1	1
5	Poppy	*papaver*[12]	6	7	3	2		1	17	11
3	Poppy medicaments	*deiacur*[13] *+ anathari + diacodion*	5	6				1 + 1(S) + S1	6 + S1	1

[10] *iṭriya*.

[11] *rishta*.

[12] Includes also *papauer album, papauer nigrum, dia papauer*.

[13] Includes also *aldeicur, aldeiacur, deuico(r), deuicor/deiacor simplex*. For the ingredients, see Appendix 33, Prescriptions #36a and #36b (p. 519, above).

#1	Drug	Latin	b.S.	Lat	b.N	J	sc	GF	JD	JD-bS
4	Pumpkin	*cucurbita*	3	3	3		2		5	2
1	Purslane	*portulaca*							1	1
1	Purslane (*baqla al-ḥamqāʾ*)	—			1					
1	Purslane (*baqla*)	—			1					
2	*qūfī*[14]	*cochium, pillula cochijs* + *cokion*	1	1					2 + S1	1
2	Quince	*citonium*	2	2					4	2
2	Raisin	*passula, uvae passae*	3	3					4	1
1	Resin (*qiṭrān*) + cedar resin + fluid pitch	*alkitran* + *gummi cedri* + *pix liquida*	2	2				1(S) + S1	2 + S2	
1	Rice	*risum*							1	1
3	Rose + rose honey[15]	*rosa* + *mel rosearum*[16]	2	2				1	3	1
2	Safflower (*qurṭum*)	*cartamus, diacartamus* + *crocus ortensis* + *kelim*	1	1				1(S) + S1	2 + S1	1
2	Saffron	*crocus*	6	6					9	3
1	Sagapenum	*serapinum*	1	1					1	
1	Salt	*sal*							2	2
1	Sandalwood	—			1					
3	Sebesten	*sebesten*	1	1	1	1			1	
1	Sheep's trotters	*pedes mutonini*							1	1
1	Silk /porridge[17]	*puls*	1	1					1	
1	Spinach	*spinachia*							1	1
1	Squill	—			1					
3	Starch	*amidum/amilum*	5	4	3				6	1

14 See Appendix 24, above.
15 Counted also as honey.
16 Counted also as honey.
17 In the Arabic *K. al-Qānūn*: silk (*al-ḥarīra*), in the Latin translation *puls*, 'porridge'.

#1	Drug	Latin	b.S.	Lat	b.N	J	sc	GF	JD	JD-bS
1	Storax *(may‘a)* + storax (*‘asal al-lubnā*)	*storax + mel storacis*	6	6					6	
6	Sugar	*zuccarum + canna zuccari*[18]	5	5	1	2	3	1	14 + S1	9
5	Sugar, *fānīdh*	*penidium, penith*[19]	3	3		1	1	2	7 + S1	4
2	Sulphur	*sulphur*	1	1					3	2
1	Tabasheer	*spodium*	1	1					1	
1	Tamarind	*thamarindus*	1	1					1	
1	Thistle (*bādhāward*) /galbanum[20]	*galbanum*	1	1					1	
2	Thyme	*hasce + thimum*	1	1			1		1 + S1	
5	Tragacanth	*dragagantum, diadragagantum, diadragantum (sic)*	6	6	1		2	1	13	7
1	Valerian	*spica aromatica + spicenardum*	1	1					1	
2	Vegetables	*olera*	2	1	1				1	
1	Vetch	*herbum + orobum*	2	2					2	
1	Vinegar/sesame[21]	*(oleum) sisaminum*	1	1					1	
6	Violet	*viola*	1	1	2	4	1	1	10	9
1	Water lily	*nenuphar*							6	6

[18] Includes also *zuccarum album, zuccarum albissimum, zuccarum candi* and *zuccarum tabarzed/tabarzet* (*al-sukkar al-tabarzad*).
[19] Includes also *diapenidion cum speciebus* and *diapenidion sine speciebus*.
[20] See Prescription #82 (pp. 253, 528, above).
[21] See Prescription #60, p. 248, n. 67, above.

#1	Drug	Latin	b.S.	Lat	b.N	J	sc	GF	JD	JD-bS
4	Wax + red wax	*cera* + *cera rubea*	1[22]	1[23]		1	1[24]		1 + 1[25]+ 1[26]	2
3	Wheat *([aḥsā'] ḥinṭiyya)*	*frumentum*	1	1	1				3	2
1	Wheat (*qamḥ*)	*triticum*	1	1					1	
1	Willow	*salix*							1	1
3	Wine + Wine, malvoisie + Wine, Romanian + Wine, Greek	*vinum* + *vinum (maluisia)* + *vinum (romania)* + *vinum grecum*	1	1				1	3[27] + S1	2

[22] Red wax.
[23] Cera rubea.
[24] White wax.
[25] Cera rubea.
[26] Cera virginea.
[27] In Prescription # 24a (p. 516, above) Despars recommends wine and then gives three examples of suitable wines. They are thus counted as one instance.

APPENDIX 36

(See p. 272)

6.14. Medical Qualities in the Arabic and Latin Commentators' Drugs for Cough.[1, 2]

#1		#2	AA	BB	CC	DD	EE	FF	GG	HH	II	JJ	KK	LL	MM	NN	OO	PP	QQ	RR	SS	TT	UU	VV	XX
6	Almond[3]	6		+	+			+									+							+	+
1	Aloe	3			+							+												+	
1	Alum	2			+							+													
1	Aniseed	2			+								+												
1	Apricot	0																							
2	Arsenic[4]	2		+																					+
1	Asarabacca	3						+					+				+								
1	Ash water[5]	0																							
2	Balsam	4		+				+				+													+
1	Banana	1																					+		
5	Barley	3						+		+									+						
1	Birthwort	3		+				+									+								
2	Bran (*nukhāla*)	3						+					+										+		
1	Butter	6			+							+	+					+					+		+
1	Castoreum	1											+												
2	Cinnamon	5					+					+	+			+									+
2	Clay, Armenian	3		+			+					+													

[1] Column #1: number of texts (= *K. al-Qānūn* or Arabic or Latin commentaries) in which the drug appears in prescriptions for cough (of the drugs in Despars, only his independent additions to the ones mentioned in *K. al-Qānūn* are considered); column #2: number of therapeutically suitable qualities it embodies. AA = collecting the expectoration; BB = performing asthma therapy; CC = astringent; DD = antidotes; EE = performing catarrh therapy; FF = performing a clearing effect; GG = coldness; HH = cooling; II = cutting; JJ = acting as a desiccant; KK = acting as a dissolving medication; LL = having a dry property; MM = emetic; NN = heating; OO = rarefying; PP = maturating; QQ = moistening; RR = anesthetics; SS = acting to obstruct catarrh; TT = enabling [expectorated] matter to slide; UU = softening; VV = soporific; XX = for cough. (S) and S (= the synonymes) have not been included, as they seem to have been mentioned only in order to solve the problem caused by the difficulty of the term, not as a specific recommendation.

[2] The following drugs were not described in Book II of *K. al-Qānūn*: basil (*ḥabaq*), cucumber (*qathad*), cucumber (*khiyār*), and plant mucilages.

[3] See also Chipman, 2002, pp. 144–145.

[4] Includes arsenic and red arsenic.

[5] Taken from the article on ashes.

#1		#2	AA	BB	CC	DD	EE	FF	GG	HH	II	JJ	KK	LL	MM	NN	OO	PP	QQ	RR	SS	TT	UU	VV	XX
2	Costus	4						+				+				+			+						
1	Cotton (*quṭn*)	2																					+		+
1	Crab[6]	3						+				+	+												
4	Cucumber (*qithā'*)	3						+							+								+		
2	Date	0																							
1	Dill	7									+	+	+		+			+					+	+	
4	Egg	5		+	+		+																+		+
1	Excrement Hare	5[7]				+		+				+	+			+									
2	Fava bean	5			+			+	+						+										+
2	Fennel	0																							
2	Fenugreek	9		+									+	+	+	+		+	+				+		+
3	Fig	7						+			+		+				+	+					+		+
1	Flax	7			+		+	+										+	+				+		+
3	Fleawort	2			+																		+		
1	Galbanum (*qinna*)	5		+							+		+										+		+
2	Grape syrup	0																							
2	Gum	4			+							+											+		+
4	Gum arabic[8]	4			+							+											+		+
2	Henbane	4											+						+	+					+
3	Honey	5						+				+	+		+								+		
3	Horehound	3						+			+		+												
4	Hyssop	4		+				+					+												+
2	Leek	3		+	+													+							
2	Lettuce	4						+	+			+												+	
3	Licorice	2																	+				+		
4	Lily	8			+			+				+	+				+						+	+	+
3	Maidenhair	5		+	+								+				+								+
2	Mallow (*khubbāzā*)	6			+								+		+				+				+		+
3	Milk	7		+				+									+	+	+				+		+
3	Mustard	4						+			+	+	+												

6 Taken from articles on river crab and sea crab.

7 Every quality appearing either in the article on hare or in the article on excrement is included.

8 Taken from the article on gum.

#1		#2	AA	BB	CC	DD	EE	FF	GG	HH	II	JJ	KK	LL	MM	NN	OO	PP	QQ	RR	SS	TT	UU	VV	XX
3	Myrrh	9		+	+			+				+	+					+					+	+	+
3	Myrtle	7			+			+	+	+		+				+									+
2	Narciss	4						+				+	+		+										
1	Nettle	4		+				+					+										+		
2	Nut	5			+			+				+				+			+						
1	Nut grass, yellow	1			+																				
3	Opium	4										+								+				+	+
1	Opoponax	4						+					+										+		+
3[9]	Pasta (*iṭriya*)	2																					+		+
2	Pepper	6						+				+	+			+			+						+
3	Peppermint	6						+			+	+	+		+		+								
2	Pine[10]	8			+			+				+	+					+	+				+		+
1	Pistachio (*ʿilk*) + terebinth[11]	7			+			+		+		+	+					+							+
3	Pistachio nut	1			+																				
4	Pomegranate	4			+			+								+							+		
5	Poppy	10					+	+		+	+	+			+					+			+	+	+
4	Pumpkin	3																				+	+		+
2	Quince	4		+	+														+				+		
2	Raisin[12]	1			+																				
1	Resin (*qiṭrān*)	2						+																	+
3	Rose	5			+			+			+	+				+									
2	Safflower (*qurṭum*)	1											+												
2	Saffron	8			+			+					+		+	+		+		+				+	
1	Sagapenum	6		+				+					+				+						+		+
3	Sebesten	1																					+		
1	Silk[13]	3										+		+			+								
3	Starch	1																					+		
1	Storax (*lubnā*)	6					+						+					+		+			+		+

[9] Pasta: the qualities are from the article on *iṭriya*, but also *rishta* is counted here, as it is a synonyme of *iṭriya* and does not appear in Book II of *K. al-Qānūn*.

[10] Taken from articles on pine and pine seed.

[11] Taken from articles on resin (*ʿilk*), terebinth (*buṭm*) and pistachio (*al-ḥabba al-khaḍrāʾ*) See *K. al-Qānūn*, Vol. 1, p. 280.

[12] Taken from articles on raisins and grapes.

[13] Silk, *ḥarīra*, does not exist in Book II of *K. al-Qānūn*, and therefore the information is taken from the article on *ibrīsam*, silk (*K. al-Qānūn*, Vol. 1, p. 261).

#1		#2	AA	BB	CC	DD	EE	FF	GG	HH	II	JJ	KK	LL	MM	NN	OO	PP	QQ	RR	SS	TT	UU	VV	XX
1	Storax *(mayʿa)*	2			+							+													
6	Sugar	3						+							+								+		
5	Sugar, *fānīdh*	3														+							+		+
2	Sulphur	4						+					+				+				+				
1	Tabasheer	4			+					+		+	+												
1	Tamarind	3			+														+				+		
1	Thistle (*bādhāward*)	2			+								+												
2	Thyme	4									+	+	+	+											
5	Tragacanth	2										+													+
1	Valerian	4			+							+	+			+									
1	Vetch	3						+						+									+		
1	Vinegar	8							+	+	+	+	+			+	+								+
6	Violet	2																					+		+
4	Wax	4											+					+	+				+		
3	Wheat (*ḥinṭa*)	0																							
3	Wine	7	+		+			+					+		+								+	+	
	#91		1	16	33	1	6	41	4	6	10	34	40	4	12	13	12	13	14	5	1	1	39	10	37
	%		1	18	36	1	7	45	4	7	11	37	44	4	13	14	13	14	15	5	1	1	43	11	41

APPENDIX 37

(See p. 275)

6.15. Evaluation of the Medical Effect of the Drugs against Cough.[1, 2]

Eff	Drug	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11
++	*Acacia*[3]				++[4]	++[5]	++[6]					++[7]
—	*Adiantum*[8]						++[9]					
++	*Agaricus*						++[10]	++[11]			++[12]	
++	*Agrostemma*			++[13]								
++	*Allium*	++[14]			++[15]	++[16]	++[17]	++[18]	++[19]			
++	*Aloe*					++[20]	++[21]				++[22]	

1 For methodology, see Ch. 5.4.

2 Eff = level of medicinal effect; ++ = having a relevant medicinal effect, e.g. astringency; + = having an chemical constituent with a relevant medicinal effect, e.g. tannin; — = not having any known relevant medical effect or chemical constituent with it. #1 = against cough. Includes plants that are evaluated as good against various kinds of cough without further details; #2 = antitussive; #3 = expectorant; #4 = bronchodilator (+spasmolytic); #5 = anti-inflammatory; #6 = antimicrobial; #7 = antihistaminic; antiallergic; #8 = antiasthmatic; #9 = emetic; #10 = increasing resistance of body; modification of immunological response; immunostimulating; #11 = mucilaginous nature.

3 See also Chipman, 2002, p. 148.

4 Trivedi *et al.*, 1986.

5 *Ibid.*; Dafallah and al-Mustafa, 1996.

6 Sotohy *et al.*, 1995; Caceres *et al.*, 1991.

7 Hoppe, 1981, p. 4; Hiltunen and Holm, 1994, p. 103.

8 See also Chipman, 2002, p. 151.

9 Mahmoud *et al.*, 1989; Singh *et al.*, 2008.

10 Faccin *et al.*, 2007; Al-Fatimi *et al.*, 2005; Sorimachi *et al.*, 2001.

11 Choi *et al.*, 2006.

12 Chan *et al.*, 2007; Bernardshaw *et al.*, 2005; Kim *et al.*, 2005.

13 Dr. Duke's Phytochemical and Ethnobotanical Databases.

14 Hoppe, 1981, pp. 14–15.

15 Vohora, 1986.

16 *Ibid*.

17 Hoppe, 1981, pp. 14–15; Vohora, 1986.

18 Vohora, 1986.

19 Dorsch and Wagner, 1991.

20 Vazquez *et al.*, 1996; Davis *et al.*, 1994.

21 Hoppe, 1981, p. 16; Andersen *et al.*, 1991.

22 Stuart *et al.*, 1997.

Eff	Drug	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11
++	*Althaea*[23]	++[24]	++[25]			++[26]					++[27]	++[28]
+	*Amaranthus*					++[29]	+[30]				++[31]	
++	*Amygdalus*[32]		++[33]									
—	*Amyris*											
—	*Anethum*				++[34]		++[35]					
++	*Aristolochia*	++[36]		++[37]	++[38]	++[39]	++[40]		++[41]		++[42]	
++	*Asarum*			++[43]	++[44]		++[45]			++[46]		
++	*Astragalus*[47]					++[48]	++[49]				++[50]	++[51]
++	*Atriplex*	++[52]	+[53]				++[54]					

23 See also Chipman, 2002, pp. 152–153.
24 Zepernick *et al.*, p. 45; Pitkänen *et al.*, 1996, p. 217.
25 Nosal'ova *et al.*, 1992; Hiltunen and Holm, 1994, p. 198.
26 Pitkänen *et al.*, 1996, p. 217.
27 *Ibid.*
28 Zepernick *et al.*, p. 45; Hoppe, 1981, p. 18.
29 Strzelecka *et al.*, 2005.
30 Antimicrobial peptides. Broekaert *et al.*, 1992.
31 Sirota *et al.*, 2007.
32 See also Chipman, 2002, pp. 144–145.
33 Dr. Duke's Phytochemical and Ethnobotanical Databases.
34 Alanko *et al.*, 1982, p. 259; Pitkänen *et al.*, 1996, p. 241.
35 Sarbhoy *et al.*, 1978; Shcherbanovsky and Kapelev, 1975; Chaurasia and Jain, 1978.
36 Harborne and Baxter, 1983.
37 Hoppe, 1981.
38 Dr. Duke's Phytochemical and Ethnobotanical Databases.
39 Duke, 1992a.
40 *Ibid.*
41 Hoppe, 1981.
42 Dr. Duke's Phytochemical and Ethnobotanical Databases.
43 *Ibid.*
44 Duke, 1992a.
45 *Ibid.*
46 Dr. Duke's Phytochemical and Ethnobotanical Databases.
47 See also Chipman, 2002, pp. 148–149.
48 Bisignano *et al.*, 1994.
49 *Ibid.*
50 Jin *et al.*, 1995; Li, 1991.
51 Hiltunen and Holm, 1994, p. 95; Hoppe, 1981, p. 36.
52 Bruchhausen *et al.*, 1990–2000, Vol. 4, p. 421; Hoppe, 1975–1987, p. 143.
53 Hydrocyanic acid. Watt and Breyer-Brandwijk, 1962, p. 185.
54 Yun *et al.*, 1997.

Eff	Drug	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11
++	*Atropa*	++[55]			++[56]				++[57]			
—	*Aucklandia*											
+	*Balsamodendron*					+[58]						
++	*Bambusa*					++[59]						
—	*Boletus*						+[60]					
++	*Boswellia*					++[61]	++[62]					++[63]
++	*Brassica*	++[64]	++[65]	++[66]			++[67]			++[68]		++[69]
—	*Calamintha*						++[70]					
—	*Calamus*											
++	*Carthamus*					++[71]					++[72]	
++	*Cassia*					++[73]	++[74]	++[75]				
++	*Cedrus*	++[76]		++[77]								
—	*Cheiranthus*						++[78]					
+	*Cichorium*			+[79]			++[80]					

55 Hoppe, 1975–1987, p. 144.
56 Bruchhausen *et al.*, 1990–2000, Vol. 4, p. 429; Hoppe, 1975–1987, p. 143.
57 Hoppe, 1975–1987, p. 143.
58 Myrrhanol A. Kimura *et al.*, 2001.
59 Muniappan and Sundararaj, 2003.
60 Lee *et al.*, 1999.
61 Gupta *et al.*, 1997.
62 Hoppe, 1981, p. 43.
63 *Ibid.*
64 Hiltunen and Holm, 1994, p. 200.
65 *Ibid.*
66 *Ibid.*
67 Wagner, 1982, pp. 32, 44.
68 Watt and Breyer-Brandwijk, 1962, p. 328.
69 Alanko *et al.*, 1982, p. 168.
70 Panizzi *et al.*, 1993; Nostro *et al.*, 2002.
71 Akihisa *et al.*, 1996.
72 Tang and Eisenbrand, 1992, p. 270.
73 Bruchhausen *et al.*, 1990–2000, Vol. 4, p. 704.
74 *Ibid.*
75 Inamori *et al.*, 1991.
76 Hiltunen and Holm, 1994, p. 200.
77 *Ibid.*
78 Amoros *et al.*, 1977.
79 Fructose, 10–22 %. Pitkänen *et al.*, 1996, p. 233.
80 *Ibid.*

Eff	Drug	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11
++	*Cinnamomum*	++[81]		++[82]	++[83]	++[84]	++[85]					++[86]
++	*Cirsium*					++[87]	++[88]					
++	*Citrullus*					++[89]		+[90]				
++	*Citrus*		++[91]	++[92]	++[93]	+[94]	++[95]	+[96]	++[97]		+[98]	
++	*Commiphora*	++[99]		++[100]		++[101]	++[102]					
++	*Corchorus*		+[103]			++[104]	++[105]	++[106]	+[107]		+[108]	+[109]
++	*Cordia*[110]		++[111]		++[112]	++[113]	++[114]					++[115]
—	*Coriandrum*				+[116]		++[117]					

81 Hiltunen and Holm, 1994, p. 200.
82 *Ibid.*, p. 211.
83 *Ibid.*, Vohora, 1986.
84 Otsuka *et al.*, 1982.
85 Lima *et al.*, 1993; Janssen *et al.*, 1989.
86 Watt and Breyer-Brandwijk, 1962, p. 531.
87 Martínez-Vázquez *et al.*, 1998.
88 Barbour *et al.*, 2004.
89 Wasfi *et al.*, 1995.
90 Bryonolic acid. Tabata *et al.*, 1993.
91 Li *et al.*, 2006.
92 *Ibid.*
93 Forster *et al.*, 1980.
94 Hesperidin (Galati *et al.*, 1994); Nobiletin (Lin *et al.*, 2003).
95 Conte *et al.*, 2007; Hoppe, 1981, p. 74.
96 Naringenin (Park *et al.*, 2005); Hesperidin (Lee *et al.*, 2004).
97 Li *et al.*, 2006.
98 Nobiletin. Lin *et al.*, 2003.
99 Vohora, 1986; Hiltunen and Holm, 1994, p. 211.
100 Alanko *et al.*, 1982, p. 361.
101 Tariq *et al.*, 1986.
102 Zepernick *et al.*, 1983, pp. 149–151.
103 Hydrogen cyanide. Huang, 1993.
104 Zakaria *et al.*, 2007.
105 Pal *et al.*, 2006.
106 Yoshikawa *et al.*, 1997.
107 Hydrogen cyanide (Huang, 1993); Strophanthidin (Duke, 1992b).
108 Chlorogenic acid. Dr. Duke's Phytochemical and Ethnobotanical Databases.
109 Innami *et al.*, 2005; Ohtani *et al.*, 1995.
110 See also Chipman, 2002, pp. 155–156.
111 Vohora, 1986.
112 Occhiuto *et al.*, 1989.
113 Sertie *et al.*, 1990.
114 Vohora, 1986.
115 *Ibid.*
116 Hiltunen and Holm, 1994, p. 87.
117 Lo Cantore *et al.*, 2004.

Eff	Drug	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11
++	*Corydalis*		+[118]	+[119]	++[120]	++[121]	++[122]	++[123]		+[124]	+[125]	
++	*Crocus*				++[126]					++[127]		
++	*Cucumis*[128]					++[129]	++[130]			++[131]		
++	*Cucurbita*				+[132]	++[133]						
++	*Cupressus*	++[134]							++[135]			
++	*Cydonia*[136]	++[137]	+[138]				++[139]					++[140]
++	*Cyperus*					++[141]	++[142]					
++	*Dracaena*					++[143]	++[144]					
—	*Ervum*											
++	*Ferula*				++[145]	++[146]	++[147]	++[148]				

[118] Protopine. Wren *et al.*, 1988.
[119] Sanguinarine. *Ibid.*
[120] Boegge *et al.*, 1996.
[121] Kubo *et al.*, 1994.
[122] Li *et al.*, 2005; Xie *et al.*, 2004.
[123] Matsuda *et al.*, 1995; Saito *et al.*, 2004.
[124] Berberine, Sanguinarine. Dr. Duke's Phytochemical and Ethnobotanical Databases.
[125] Berberine. Dr. Duke's Phytochemical and Ethnobotanical Databases.
[126] Hoppe, 1981, p. 91.
[127] Zepernick *et al.*, 1983, p. 163.
[128] See also Chipman, 2002, pp. 145–146.
[129] Naik *et al.*, 1980.
[130] Bruchhausen *et al.*, 1990–2000, Vol. 4, p. 1066.
[131] Watt and Breyer-Brandwijk, 1962, p. 350.
[132] Cucurbitin causes a prolonged depressive action on the contraction of isolated strips of ileum. Tang and Eisenbrand, 1992, p. 400.
[133] Wagner, 1989.
[134] Hoppe, 1981, p. 94.
[135] *Ibid.*
[136] See also Chipman, 2002, p. 154.
[137] Vohora, 1986; Hoppe, 1981, p. 96.
[138] Amygdalin. Hoppe, 1981, p. 96.
[139] Guevara *et al.*, 1994.
[140] Hoppe, 1981, p. 96; Watt and Breyer-Brandwijk, 1962, p. 888.
[141] Seo *et al.*, 2001.
[142] Mongelli *et al.*, 1995; Watt and Breyer-Brandwijk, 1962, p. 374.
[143] Moharram and El-Shenawy, 2007.
[144] Kumar *et al.* 2006.
[145] al-Khalil *et al.*, 1990.
[146] Valencia *et al.*, 1994.
[147] Vaziri, 1975.
[148] al-Khalil *et al.*, 1990.

Eff	**Drug**	**#1**	**#2**	**#3**	**#4**	**#5**	**#6**	**#7**	**#8**	**#9**	**#10**	**#11**
++	*Ficus*[149]	++[150]		+[151]		++[152]	++[153]					
++	*Foeniculum*[154]	++[155]		++[156]	++[157]	++[158]	++[159]					
++	*Glycyrrhiza*[160]	++[161]	++[162]	++[163]	++[164]	++[165]	++[166]	++[167]				
++	*Gossypium*				++[168]	++[169]	++[170]					
++	*Hordeum*	++[171]			++[172]		++[173]					++[174]
++	*Hyoscyamus*				++[175]				++[176]			
++	*Hyssopus*[177]	++[178]		++[179]	++[180]		++[181]		++[182]			
++	*Iris*			++[183]						++[184]		++[185]

[149] See also Chipman, 2002, pp. 147–148.
[150] Mousa *et al*., 1994.
[151] Invert sugar 50–70 %. Hoppe, 1981, p. 122.
[152] Caceres *et al*., 1991.
[153] *Ibid*.; Al-Fatimi *et al*., 2007.
[154] See also Chipman, 2002, pp. 146–147.
[155] Hiltunen and Holm, 1994, p. 191; Zepernick *et al*., 1983, p. 201.
[156] Hiltunen and Holm, 1994, p. 191.
[157] *Ibid*.
[158] Pitkänen *et al*., 1996, p. 114.
[159] Hiltunen and Holm, 1994, p. 191.
[160] See also Chipman, 2002, pp. 150–151.
[161] Alanko *et al*., 1982, p. 142.
[162] Vohora, 1986.
[163] Hoppe, 1981, p. 132.
[164] *Ibid*.; Huang *et al*., 1990.
[165] Huang *et al*., 1990; Vohora, 1986.
[166] *Ibid*.
[167] *Ibid*.
[168] Touvay *et al*., 1987.
[169] Benhaim *et al*., 1994.
[170] Dr. Duke's Phytochemical and Ethnobotanical Databases.
[171] Hoppe, 1981, p. 145.
[172] *Ibid*.
[173] *Ibid*., Watt and Breyer-Brandwijk, 1962, p. 473.
[174] Hoppe, 1981, p. 145.
[175] Hiltunen and Holm, 1994, p. 85.
[176] Zepernick *et al*., 1983, p. 234; Wagner, 1982, pp. 159–161; Hoppe, 1981, p. 148.
[177] See also Chipman, 2002, pp. 149–150.
[178] Hoppe, 1981, pp. 149–150.
[179] Pitkänen *et al*., 1996, p. 125.
[180] Alanko *et al*., 1982, p. 100.
[181] Wagner, 1982, p. 44.
[182] Hoppe, 1981, p. 150.
[183] *Ibid*., p. 154; Wagner, 1982, p. 43.
[184] Alanko *et al*., 1982, p. 124.
[185] Hoppe, 1981, p. 154.

Eff	Drug	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11
++	*Juglans*					++[186]	++[187]			++[188]		
++	*Juniperus*	++[189]		+[190]		++[191]						
++	*Lactuca*					++[192]	++[193]					
—	*Lagenaria*						++[194]					
++	*Lawsonia*		+[195]		+[196]	++[197]	++[198]	+[199]	+[200]	+[201]	+[202]	
—	*Lens*						+[203]					
—	*Lilium*						++[204]					
++	*Linum*	++[205]	+[206]			++[207]	++[208]					++[209]
++	*Liquidambar*	++[210]		++[211]			++[212]					
++	*Malus*		+[213]			++[214]	++[215]					

[186] Wagner, 1982 p. 246.
[187] *Ibid*.
[188] *Ibid*.
[189] Hoppe, 1981, p. 157.
[190] Invert sugar, up to 30%. Hoppe, 1981, p. 157.
[191] Zepernick *et al*., 1983, pp. 239–240.
[192] Sayyah *et al*., 2004.
[193] Moulin-Traffort *et al*., 1990.
[194] Elisha *et al*., 1987.
[195] Luteolin. Duke, 1992b.
[196] Gallic acid (Harborne and Baxter, 1983); Lawsone (Duke, 1992b); Luteolin (Wren *et al*., 1988); Scopoletin (Huang, 1993).
[197] Ali *et al*., 1995.
[198] Aqil *et al*., 2005; Habbal *et al*., 2005; Ali *et al*., 2001; Sharma, 1990.
[199] Gallic acid (Harborne and Baxter, 1983); Luteolin (Dr. Duke's Phytochemical and Ethnobotanical Databases).
[200] Gallic acid (Watt and Breyer-Brandwijk, 1962); Scopoletin (Duke, 1992b).
[201] Mannitol, Martindale *et al*., 1982.
[202] Gallic acid. McKenna *et al*., 2000.
[203] Wang and Ng, 2007.
[204] Lisa *et al*., 1990; Wang and Ng, 2002.
[205] Pitkänen *et al*., 1996, p. 186.
[206] Cyanogenic glycosides. Hiltunen and Holm, 1994, p. 94.
[207] Vohora, 1986.
[208] *Ibid*.
[209] *Ibid*.
[210] Hoppe, 1981, p. 169.
[211] Wagner, 1982, p. 81.
[212] *Ibid*.
[213] List and Horhammer, 1969–1979, Vol. 5, p. 679; Hoppe, 1981, p. 175.
[214] Ageel *et al*., 1989.
[215] Guevara *et al*., 1994.

Eff	Drug	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11
++	*Malva*[216]	++[217]		++[218]	++[219]	++[220]	++[221]					++[222]
++	*Marrubium*	++[223]	++[224]	++[225]		++[226]					++[227]	
—	*Matthiola*											
+	*Melissa*				+[228]	+[229]	+[230]				++[231]	
++	*Mentha*			++[232]	++[233]	++[234]	++[235]		++[236]			
++	*Morus*		++[237]		++[238]	++[239]	++[240]					
+	*Musa*					+[241]						++[242]
++	*Myrtus*	++[243]		++[244]			++[245]					
++	*Narcissus*						++[246]			++[247]		

216 See also Chipman, 2002, p. 152.
217 Zepernick *et al.*, 1983, pp. 260–261; Pitkänen *et al.*, 1996, p. 144; Hoppe, 1981, p. 175.
218 Wagner, 1982, p. 274.
219 Pitkänen *et al.*, 1996, p. 144.
220 Vohora, 1986.
221 *Ibid.*
222 *Ibid.*
223 Hiltunen and Holm, 1994, pp. 180, 200; Pitkänen *et al.*, 1996, p. 124.
224 Pitkänen *et al.*, 1996, p. 124; Hiltunen and Holm, 1994, p. 200.
225 Hiltunen and Holm, 1994, p. 200; Hoppe, 1981, p. 177.
226 Pitkänen *et al.*, 1996, p. 124.
227 Hiltunen and Holm, 1994, p. 180.
228 *Ibid.*, pp. 28, 83.
229 Rosmarinic acid. Englberger *et al.*, 1988.
230 Mimica-Dukic *et al.*, 2004; Araújo *et al.*, 2003; Wagner, 1982, p. 49.
231 Drozd and Anuszewska, 2003.
232 Hiltunen and Holm, 1994, pp. 76–77, 214.
233 *Ibid.*, pp. 76–77; Hoppe, 1981, p. 181.
234 Hiltunen and Holm, 1994, pp. 76–77.
235 Caceres *et al.*, 1991.
236 Hoppe, 1981, p. 184.
237 Tang and Eisenbrand, 1992, p. 691.
238 Yamatake *et al.*, 1976.
239 *Ibid.*
240 Tang and Eisenbrand, 1992, p. 691.
241 Abad *et al.*, 2000.
242 Mondal *et al.*, 2001.
243 List and Horhammer, 1969–1979, Vol. 5, p. 938; Alanko *et al.*, 1982, p. 170.
244 Hiltunen and Holm, 1994, p. 191.
245 *Ibid.*, p. 190; Alanko *et al.*, 1982, p. 170.
246 Van Den Berghe *et al.*, 1978.
247 Vigneau *et al.*, 1982.

Eff	Drug	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11
+	*Nardostachys*				+[248]	+[249]	++[250]					
++	*Nepeta*					++[251]	++[252]					
++	*Nigella*				++[253]	++[254]	++[255]	++[256]	++[257]		++[258]	
+	*Nuphar*				+[259]	+[260]	+[261]					
—	*Nymphaea*				+[262]		+[263]					
++	*Ocimum*				+[264]	++[265]	++[266]				++[267]	++[268]
—	*Onopordum*											
—	*Opoponax, Opopanax*											
++	*Origanum*	++[269]	++[270]	++[271]	++[272]		++[273]					
++	*Oryza*						+[274]	++[275]				

[248] Valeranone. Hiltunen and Holm, 1994, p. 25.
[249] Zhang *et al.*, 2007.
[250] Sarbhoy *et al.*, 1978; Kumar *et al.*, 2006.
[251] Miceli *et al.*, 2005.
[252] Sonboli *et al.*, 2004; Nostro *et al.*, 2001; Duke, 1992a.
[253] Gilani *et al.*, 2001; Hoppe, 1981, p. 192.
[254] Abbas *et al.*, 2005; Houghton *et al.*, 1995.
[255] Morsi, 2000; Hanafy and Hatem, 1991; El-Fatatry, 1975.
[256] Kanter *et al.*, 2006; El Gazzar *et al.*, 2006.
[257] Abbas *et al.*, 2005; Boskabady *et al.*, 2007.
[258] Fararh *et al.*, 2004; Swamy and Tan, 2000.
[259] Alanko *et al.*, 1982, p. 149.
[260] Deoxynupharidine. Zhang *et al.*, 1995.
[261] 6,6'-dihydroxythiobinupharidine. Cullen *et al.*, 1973.
[262] Alanko *et al.*, 1982, p. 149.
[263] Gallic acid, ellagic acid. Saeed and Hamdy, 1996.
[264] Alanko *et al.*, 1982, p. 90.
[265] Singh, 1999; Benedec *et al.*, 2007.
[266] Wannissorn *et al.*, 2005; Lima *et al.*, 1993; Janssen *et al.*, 1989.
[267] Mediratta *et al.* 2002.
[268] Patel *et al.*, 1987; Melo and D'Souza, 2004.
[269] Hoppe, 1981, p. 198; Alanko *et al.*, 1982, p. 172.
[270] Alanko *et al.*, 1982, p. 172.
[271] *Ibid.*
[272] *Ibid.*; Hoppe, 1981, p. 197; Zepernick *et al.*, 1983, p. 283.
[273] Alanko *et al.*, 1982, p. 172; Zepernick *et al.*, 1983, p. 283; Pitkänen *et al.*, 1996, pp. 171, 181.
[274] Oryzalexin D. Duke, 1992b.
[275] Dr. Duke's Phytochemical and Ethnobotanical Databases.

Eff	Drug	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11
++	*Papaver*[276]	++[277]	++[278]	++[279]	++[280]				++[281]			
+	*Phoenix*		+[282]	+[283]								
++	*Physalis*				+[284]	++[285]	++[286]	++[287]			++[288]	+[289]
++	*Pimpinella*	++[290]	++[291]	++[292]	++[293]		++[294]					
++	*Pinus*	++[295]	++[296]	++[297]		++[298]	++[299]		++[300]			
++	*Piper*			++[301]	++[302]		++[303]			++[304]		
++	*Pistacia*					++[305]	++[306]					

276 See also Chipman, 2002, pp. 153–154.
277 Martindale *et al.*, 1982.
278 Duke, 1992a; Budavari and Windholz, 1989.
279 Duke, 1992a.
280 Dr. Duke's Phytochemical and Ethnobotanical Databases.
281 Duke, 1992a.
282 Luteolin. Duke, 1992b.
283 Sugar. Hoppe, 1981, p. 210.
284 Luteolin (Wren *et al.*, 1988); Tigloidine (Martindale *et al.*, 1989); Rutin (Huang, 1993).
285 Choi and Hwang, 2003; Vieira *et al.*, 2005.
286 Caceres *et al.*, 1991; Pietro *et al.*, 2000.
287 Choi and Hwang, 2003.
288 Lin *et al.*, 1992.
289 Duke, 1992a.
290 Hoppe, 1981, p. 215.
291 Alanko *et al.*, 1982, p. 88.
292 Muller-Limmroth and Frohlich, 1980; Wagner, 1982, pp. 32, 70; Hoppe, 1981, p. 214; Zepernick *et al.*, 1983, p. 313.
293 Pitkänen *et al.*, 1996, p. 110; Alanko *et al.*, 1982, p. 88; Wagner, 1982, p. 70; Hiltunen and Holm, 1994, pp. 87, 191.
294 Wagner, 1982, p. 44; Hoppe, 1981, pp. 214–215.
295 Alanko *et al.*, 1982, p. 173; Pitkänen *et al.*, 1996, p. 182; Hiltunen and Holm, 1994, p. 200; Wagner, 1982, p. 60; Hoppe, 1981, pp. 217–221.
296 Hiltunen and Holm, 1994, p. 200.
297 Wagner, 1982, pp. 32, 60; Hoppe, 1981, pp. 216–220; Hiltunen and Holm, 1994, pp. 192–193, 200.
298 Blazso *et al.*, 1997; Zepernick *et al.*, 1983, p. 320.
299 Wagner, 1982, p. 60; Hoppe, 1981, pp. 216–220; Hiltunen and Holm, 1994, p. 210.
300 Hiltunen and Holm, 1994, p. 188.
301 *Ibid.*, p. 142.
302 Kretzschmar *et al.*, 1969.
303 Hoppe, 1981, pp. 222–223; List and Horhammer, 1969–1979, Vol. 6a, p. 705.
304 List and Horhammer, 1969–1979, Vol. 6a, p. 705.
305 Giner-Larza *et al.*, 2000; Orhan *et al.*, 2006a.
306 Iauk *et al.*, 1996; Alma *et al.*, 2004.

Eff	Drug	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11
++	*Plantago*	++[307]	++[308]	++[309]	++[310]	++[311]	++[312]	+[313]				++[314]
++	*Polyporus*					++[315]	++[316]		++[317]		++[318]	
++	*Populus*	++[319]		++[320]		++[321]	++[322]					
++	*Portulaca*				++[323]	++[324]	+[325]		++[326]			
++	*Prunus*	++[327]	++[328]	++[329]	++[330]	++[331]	++[332]		++[333]			++[334]
++	*Pterocarpus*							++[335]				
++	*Punica*					++[336]	++[337]				++[338]	

[307] Hiltunen and Holm, 1994, pp. 199–200; Pitkänen *et al.*, 1996, p. 205.
[308] Hiltunen and Holm, 1994, p. 200; Alanko *et al.*, 1982, p. 216.
[309] Hiltunen and Holm, 1994, p. 200; Muller-Limmroth and Frohlich, 1980; Hoppe, 1981, p. 226; Wagner, 1982, p. 32; Zepernick *et al.*, 1983, p. 324.
[310] Pitkänen *et al.*, 1996, pp. 205, 213.
[311] *Ibid.*, p. 205; Hoppe, 1981, p. 226; Wagner, 1982, p. 273.
[312] Caceres *et al.*, 1991; Hoppe, 1981, p. 226; Hiltunen and Holm, 1994, pp. 209, 217.
[313] Noscapin. Pitkänen *et al.*, 1996, p. 205.
[314] Hoppe, 1981, p. 226.
[315] Wang and Zhu, 1989.
[316] Bianco-Coletto, 1981.
[317] Hoppe, 1981, p. 333.
[318] Wang and Zhu, 1989; Babakhin *et al.*, 1997.
[319] Pitkänen *et al.*, 1996, p. 177.
[320] *Ibid.*; Alanko *et al.*, 1982, p. 166.
[321] Hiltunen and Holm, 1994, pp. 144–145; von Kruedener *et al.*, 1995.
[322] Hiltunen and Holm, 1994, pp. 154–155.
[323] Malek *et al.*, 2004; Okwuasaba *et al.*, 1987; Habtemariam *et al.*, 1993.
[324] Chan *et al.*, 2000.
[325] Jimenez-Misas *et al.*, 1979.
[326] Malek *et al.*, 2004.
[327] Ma and Roper, 1968; Zepernick *et al.*, 1983, p. 338; Alanko *et al.*, 1982, p. 181; Hoppe, 1981, p. 231.
[328] Zepernick *et al.*, 1983, pp. 336, 338.
[329] Alanko *et al.*, 1982, p. 181.
[330] Hoppe, 1981, p. 234.
[331] Blazso and Gabor, 1994.
[332] Caceres *et al.*, 1993.
[333] Zepernick *et al.*, 1983, pp. 336, 338; Hoppe, 1981, p. 234.
[334] Pitkänen *et al.*, 1996, p. 118; Hoppe, 1981, p. 231.
[335] Gupta *et al.*, 1993.
[336] Lansky and Newman, 2007; Jung *et al.*, 2006.
[337] Guevara *et al.*, 1994; Navarro *et al.*, 1996.
[338] Gracious Ross *et al.*, 2001.

Eff	Drug	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11
+	*Pyrus*		+[339]			+[340]	++[341]					++[342]
++	*Rosa*	++[343]				++[344]	++[345]		++[346]	++[347]	++[348]	
++	*Rubus*	++[349]				++[350]			++[351]			
++	*Rumex*				++[352]	++[353]	++[354]		++[355]	++[356]		
++	*Saccharum*		+[357]	++[358]								
++	*Salix*				++[359]	++[360]	++[361]					
—	*Santalum*						++[362]					
++	*Satureja*			++[363]		++[364]	++[365]					++[366]
++	*Saussurea*				++[367]	++[368]						
++	*Scilla*					++[369]						

339 Amygdalin. Hoppe, 1981, pp. 96, 175; Watt and Breyer-Brandwijk, 1962, p. 458.
340 Quercetin. Hoppe, 1981, p. 175.
341 Guevara *et al.*, 1994.
342 Hoppe, 1981, p. 96; Watt and Breyer-Brandwijk, 1962, p. 888.
343 Hoppe, 1981, p. 253.
344 *Ibid.*, p. 254; Wagner, 1982, pp. 246, 250; Yesilada *et al.*, 1997.
345 Wagner, 1982, pp. 246, 250; Hoppe, 1981, p. 254; McCutcheon *et al.*, 1995.
346 Hoppe, 1981, p. 254.
347 Wagner, 1982, pp. 246, 250.
348 Zepernick *et al.*, 1983, pp. 353–355.
349 Dr. Duke's Phytochemical and Ethnobotanical Databases.
350 *Ibid.*
351 Duke, 1992a.
352 Hoppe, 1981, p. 257.
353 Jager *et al.*, 1996.
354 Hoppe, 1981, p. 257; Taylor *et al.*, 1996.
355 Aggarwal *et al.*, 1986.
356 List and Horhammer, 1969–1979, Vol. 6b, p. 194.
357 Hydrocyanic acid. Watt and Breyer-Brandwijk, 1962, pp. 464, 484.
358 Zepernick *et al.*, 1983, p. 78.
359 Pitkänen *et al.*, 1996, p. 250.
360 Hiltunen and Holm, 1994, pp. 21–22.
361 List and Horhammer, 1969–1979, Vol. 6b, pp. 232–234.
362 Luo *et al.*, 2007.
363 Hoppe, 1981, p. 265.
364 Pitkänen *et al.*, 1996, p. 238.
365 Caceres *et al.*, 1991.
366 Hoppe, 1981, p. 265.
367 Gilani *et al.*, 2007.
368 Gokhale *et al.*, 2002.
369 Sparg *et al.*, 2002.

Eff	Drug	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11
++	*Sedum*					++[370]					+[371]	
—	*Sempervivum*						++[372]					
—	*Sesamum*											++[373]
++	*Sinapis*	++[374]					++[375]					++[376]
—	*Solanum*						++[377]					
—	*Sonchus*											
+	*Spinacia*					+[378]	+[379]					
++	*Styrax*	++[380]		++[381]			++[382]					
+	*Tamarindus*			+[383]			++[384]				+[385]	++[386]
++	*Thymus*	++[387]	++[388]	++[389]	++[390]	++[391]	++[392]					
++	*Trigonella*			++[393]		++[394]	++[395]					++[396]
—	*Triticum*						+[397]					

[370] Kim *et al*., 2004. Rhamnogalacturonans (Sendl *et al*., 1993).
[371] Rhamnogalacturonans. Sendl *et al*., 1993.
[372] Abram and Donko, 1999.
[373] Watt and Breyer-Brandwijk, 1962, p. 831.
[374] Wagner, 1982, p. 90.
[375] Hoppe, 1981, p. 270.
[376] *Ibid*.
[377] Al-Fatimi *et al*., 2007.
[378] Duke, 1992a.
[379] Martindale *et al*., 1989; Segura *et al*., 1998.
[380] Hoppe, 1981, p. 281.
[381] Hiltunen and Holm, 1994, p. 192.
[382] Wagner, 1982, pp. 32, 80.
[383] Invert sugar. Wagner, 1982, p. 254.
[384] Al-Fatimi *et al*., 2007; Watt and Breyer-Brandwijk, 1962, p. 653.
[385] Sreelekha *et al*., 1993.
[386] Mucilage, 60 % of the seed. Watt and Breyer-Brandwijk, 1962, p. 652.
[387] Muller-Limmroth and Frohlich, 1980.
[388] Duke, 1992a.
[389] Martindale *et al*., 1989.
[390] Van Den Broucke and Lemli, 1981.
[391] Duke, 1992a.
[392] Panizzi *et al*., 1993.
[393] Wagner, 1982, p. 275.
[394] Vohora, 1986.
[395] *Ibid*.
[396] *Ibid*.
[397] Perez and Anesini, 1994.

Eff	Drug	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11
++	*Urginea*			++[398]						++[399]		++[400]
++	*Urtica*					++[401]					+[402]	
—	*Valeriana*				++[403]		++[404]				+[405]	
—	*Vicia*						++[406]					
++	*Viola*	++[407]				++[408]	++[409]	++[410]		++[411]		
++	*Vitis*[412]		++[413]	++[414]		++[415]				++[416]		++[417]
++	*Zizyphus*[418]				++[419]	++[420]	++[421]				+[422]	++[423]

398 Vohora, 1986.
399 Court, 1985.
400 Vohora, 1986.
401 See Obertreis *et al.*, 1996a; 1996b.
402 Chlorophyll. Hoppe, 1981, p. 296.
403 Gilani *et al.*, 2005; Hiltunen and Holm, 1994, p. 88.
404 Letchamo *et al.*, 2004.
405 Ebringerová *et al.*, 2003.
406 Hoppe, 1981, p. 303; Fabatins (Zhang and Lewis, 1997).
407 Duke, 1992a.
408 *Ibid.*
409 Martindale *et al.*, 1982.
410 Dr. Duke's Phytochemical and Ethnobotanical Databases.
411 Duke, 1992a.
412 See also Chipman, 2002, pp. 154–155.
413 Duke, 1992a.
414 *Ibid.*; Martindale *et al.*, 1982.
415 Castilla *et al*, 2006; Greenspan *et al.*, 2005.
416 Duke, 1992a.
417 Watt and Breyer-Brandwijk, 1962, p. 1060.
418 See also Chipman, 2002, p. 150.
419 Huang *et al.*, 1990.
420 *Ibid.*; Borgi *et al.*, 2007.
421 Cruz *et al.*, 2007; Gundidza and Sibanda, 1991.
422 Matsuda *et al.*, 1999.
423 Clifford *et al.*, 2002.

APPENDIX 38

(See p. 275)

6.16. Appearances of the Drugs for Cough in the Texts and their Medical Effect.[1]

#1	#2	#3	#4	b.S.	Lat	b.N	J	Sc	GF	JD	JD-bS	#5
++ ++ — ++	**Agaric** 1. *Polyporus* 2. *Boletus* 3. *Agaricus*	*agaricum*	1						1			
++ ++	**Aloe** 1. *Aloe*	*aloe*	1	1	1					1		3
==	**Alum**	—	1	1	—							2
++ ++	**Aniseed** 1. *Pimpinella*	*anisum*	1	1	1					1		2
==	**Antidote** **+ theriacs**	*bedzaharia calida* + *tyriaca*	2	1	1	1				1 + S1		

[1] Column #1: the effect of the plant in the therapy of cough according to Appendix 37: the code written in bold underliner letters on the side of the English identification is the final result, the codes under it relate to the plant genuses in #2; column #2: the identification of the drug and its English name according to Chapters 6.1.5.3 and 6.2.5.2; column #3: the Latin name of the plant in the translation of *K. al-Qānūn* and in the Latin commentaries; column #4: number of texts (= *K. al-Qānūn* or Arabic or Latin commentaries) in which the drug appears (column JD–bS is used instead of column JD); column #5: number of the medical qualities required by Ibn Sīnā for drugs for cough that the drug embodies (acc. to Book II of *K. al-Qānūn*; if several drugs are combined, we choose the one with most qualities). b.S. = *K. al-Qānūn*; Lat. = the Latin translation of *K. al-Qānūn*; b.N. = Ibn al-Nafīs; J = al-Jaghmīnī; sc. = supracommentary to *Qānūnja*; GF = Gentile da Foligno; JD = Jacques Despars; JD–bS = innovations by Jacques Despars. ++ = having a relevant medicinal effect, e.g. astringency; + = having an chemical constituent with a relevant medicinal effect, e.g. tannin; — = not having any known relevant medical effect or chemical constituent with it; === = not relevant (e.g. a mineral or animal product). S = synonym, (S) = name for which the synonym is given. Synonyms are not counted as independent entities.

#1	#2	#3	#4	b.S.	Lat	b.N	J	Sc	GF	JD	JD-bS	#5
++ + ++ ++ ++ ++ +	**Apricot** + **almond** + **plum** + **quince** + **apple/fruit** + **banana/hydro-** **mel** 1. *Pyrus* = *Cydonia* = *Malus* 2. *Prunus* = *Amygdalus* 3. *Musa*	*chrysomelum* + *persica* + *amigdala* + *prunum* + *diaprunis* + *citonium* + *pomum* + *musa*[2]	6	11[3]	11[4]	2	1	2	3	16 + S2	5	6
==	**Arsenic** + **red arsenic** + **orpiment**	*arsenicum* + *arsenicum rubeum* + *auripigmentum*	2	2	2					4	2	2
++ ++	**Asarabacca** 1. *Asarum*	*asarum*	1	2	2					2		3
==	**Ash water**	*aqua cineris*	1	1	1					1		0
++ ++ + —	**Balsam** + **myrrh** 1. *Commiphora* 2. *Balsamoden-* *dron* 3. *Amyris*	*balsamum* + *myrrha*	3	8	7				1	13	5	9
++ ++	**Barley** + **barley water** + **barley gruel** 1. *Hordeum*	*hordeum* + *ptisana* + *sauich hordei*	5	8	7	2	2		2 + 2(S) + S2	14 + 1(S) + S2	9	3
++ ++	**Basil** (*ḥabaq*) AR: *Ocimum*	*sorbitio (aḥsāʾ + ḥabaq)*	1	1	2				1(S)	2		
++ ++ ++	**Birthwort** + **round** **birthwort** 1. *Aristolochia* 2. *Corydalis*	*aristologia* + *aristologia rotunda*	1	1	1					1		3
==	**Bran**	—	2	1	—			1				3
==	**Butter**	*butyron*	1	3	3					3		6

2 Counted also as honey.
3 *Musa* counted also as honey.
4 *Musa* counted also as honey.

#1	#2	#3	#4	b.S.	Lat	b.N	J	Sc	GF	JD	JD-bS	#5
++ ++ ++	**Cassia fistula** 1. *Cassia* 2. *Cinnamomum*	*cassiafistula*	2				1			1	1	
==	**Castoreum**	*castoreum*	1	1	1					1		1
+ + —	**Cichory** 1. *Cichorium* 2. *Sonchus*	*endivia*	1							1	1	
++ ++	**Cinnamon** 1. *Cinnamomum*	*cinamomum*	2	1	1			1		1		5
==	**Clay, Armenian**	*bolus armenicus*	2	1	1			1		1		3
— —	**Coriander** 1. *Coriandrum*	—	1					1				
++ ++ —	**Costus** **+ Indian costus** 1. *Saussurea* = 2. *Aucklandia*	*costum* *indum/costum* *allatum ex* *india* + *costum*	2	1	1					2	1	4
++ ++	**Cotton** 1. *Gossypium*	*coton*	1	1	1					1		2
==	**Cow trotters** **+ pig trotters** **+ sheep trotters**	*pedes vaccini* + *pedes porcini* + *pedes mutonini*	2			1				3	3	
==	**Crab**	*cancer*	1	1	1					1		3
++ ++ ++ ++ —	**Cucumber/** **melon** (*khiyār* /*qathad*) **+ cucumber** (*qithā'*) **+ melon** **+ pumpkin** **+ musk melon** 1. *Cucumis* 2. *Citrullus* 3. *Cucurbita* 4. *Lagenaria*	*citrulus* + *cucumis* + *melon* + *cucurbita*	4	7	7	5		5		15	9	3
++ ++ ++	**Cypress** 1. *Cupressus* 2. *Juniperus*	*cypressus*	1							1	1	
+ +	**Date** 1. *Phoenix*	*dactilus*	2	2	2					3	1	0
— —	**Dill** 1. *Anethum*	*anetum*	1	2	2					2		7

#1	#2	#3	#4	b.S.	Lat	b.N	J	Sc	GF	JD	JD-bS	#5
++ ++ —	**Dock** 1. *Rumex* 2. *Sempervivum*	*acedula*	1							1	1	
± + —	**Dragon's blood** 1. *Dracaena* 2. *Calamus*	—	1				1					
==	**Egg**	*ovum*	4	3	3	2		1		4	1	5
==	**Excrement of hare**	*stercus leporis*	1	1	1					1		5
— — —	**Fava bean** **+ vetch** 1. *Vicia* 2. *Ervum*	*faba* *+ herbum* *+ orobum*	2	4	3			1		3		5
++ ++	**Fennel** 1. *Foeniculum*	*feniculum*	2	1	1				1	1		0
++ ++	**Fenugreek** 1. *Trigonella*	*fenugrecum*	2	2	2					3	1	9
++ ++	**Fig** 1. *Ficus*	*ficus* *+ carica*	3	6	6				3	7 + S1	1	7
++ ++	**Fleawort** 1. *Plantago*	*psilium*	3	2	2			1		5	3	2
==	**"Fox's lungs"**[5]	*pulmo vulpis*	1						1			
++ ++	**Frankincense** **+ manna, frankincense** 1. *Boswellia*	*olibanum* *+ thus* *+ manna*	2						1	4	4	
++ ++ — ++ —	**Galbanum** (*qinna*) **+ thistle** (*bādhāward*) **/galbanum**[6] **+ opoponax** **+ sagapenum** 1. *Ferula* 2. *Opopanax, Opoponax* AR: *Cirsium* AR: *Onopordum*	— *+ galbanum* *+ oppoponax* */oppopanax* *+ serapinum*	1	4	3					3		6

[5] See p. 511, n. 4, above.
[6] See Prescription #82 (pp. 253, 528, above) and Appendix 34 (p. 540, above).

#1	#2	#3	#4	b.S.	Lat	b.N	J	Sc	GF	JD	JD-bS	#5
++ ++	**Grape** **+ grape syrup** **+ raisin** 1. *Vitis*	— + *rob (maybukhtaj)* + *passula, uvae passae*	3	4	4	1				5 + S1	1	1
==	**Gruel**	*sauic(h)*	3	1	1				1	1		
==	**Gum** 1. *gum* 2. *resin*	*gummi*	2	1	1	1						4
++ ++	**Gum arabic** 1. *Acacia*	*gummi arabicum*	4	2	2			1	1	4	2	4
++ ++	**Henbane** **+ hyoscyamus** 1. *Hyoscyamus*	*iusquamus* + *iusquamus albus*	2	2	2					3	1	4
++ ++	**Henna** 1. *Lawsonia*	—	1			1						
==	**Hierapicras**	*hiera maiora*	1							1	1	
==	**Honey** **+ hydromel** **+ banana/hydromel** **+ rose honey**[7]	*mel* + *hydromel* + *mulsa* + *musa* + *mel rosearum*	3	22[8]	21[9]			1	1(S) + S1	33[10] + S2	11	5
++ ++	**Horehound** 1. *Marrubium*	*prassium* + *diaprassium*	3	1	1				1	3	2	3
++ — ++	**Houseleek** 1. *Sempervivum* 2. *Sedum*	*sempervivum*	1							1	1	
++ ++ ++	**Hyssop** 1. *Hyssopus* 2. *Origanum*	*(h)ysopus*	4	5	5			1	3	6	1	4
++ ++ ++ — ++	**Iris/nigella**[11] 1. *Nigella* 2. *Agrostemma* AR: *Lilium* AR: *Iris*	*nigella*	1	—	1					1		
==	**Iron water**	*aqua ferrata*	1							1	1	

7 Counted also as rose.
8 *Musa* counted also as apple/fruit, 'rose honey' also as rose.
9 *Musa* counted also as apple/fruit, 'rose honey' also as rose.
10 'Rose honey' counted also as rose.
11 See Prescription #57 (pp. 247, 523, above) and Appendix 34 (p. 547, above).

#1	#2	#3	#4	b.S.	Lat	b.N	J	Sc	GF	JD	JD-bS	#5
++ ++	**Jujube** 1. *Zizyphus*	—	2			1	1					
==	**Julep**	*iulep*	3					1	1	1		
==	**Kidney fat**	*adeps renum*	1							1	1	
++ ++	**Leek, Damascene** 1. *Allium*	*porrum de sceni*	1	2	2					2		3
— —	**Lentil** 1. *Lens*	—	1			1						
++ ++	**Lettuce** 1. *Lactuca*	*lactuca*	2	1	1			1				4
++ ++	**Licorice** 1. *Glycyrrhiza*	*liquiritia*	3	5	4	1				6	1	2
++ — ++	**Lily** (*sawsan/sūs*) **+ iris** 1. *Lilium* 2. *Iris*	*lilium* *+ diairis* *+ vreos + yreos*	4	3	4		1	1		4 + S1	2	8
++ ++	**Linen, flax** 1. *Linum*	*linum*	1	2	2					2		7
— —	**Maidenhair** 1. *Adiantum*	*capillus veneris*	3	2	2			1		4	2	5
++ ++	**Mallow** (*khubbāzā + mulūkhiyya*) 1. *Malva*	*conde*	2	1	1	3						6
++ ++	**Malva** (*khaṭmī*) 1. *Althaea*	—	1			1						
==	**Meat: Chicken** **+ cocks** **+ meat broth** **+ meat juice** **+ meat of yearlings of sheep** **+ meat of young birds** **+ meat soup** (*al-isfīdbājāt*)	*aqua caponis* *+ caro gallorum* *+ brodium* *+ aqua carnis* *+ caro agnorum annualium* *+caro pullorum* *+ aqua vituli pulli* *+ alisfidabegi /aliffidabegi* *+ tafea*	3	4	4			1	1(S) + S1	9	5	
==	**Milk**	*lac*[12]	3	2	4			1		9	7	7

[12] Includes *lac, lac asinae, lac caprae, lac mulieris, lac nutricis*, and *lac vaccae*.

#1	#2	#3	#4	b.S.	Lat	b.N	J	Sc	GF	JD	JD-bS	#5
==	***Mithridatium***	*methridatum*	1	1	1					1		
==	**Mucilage**	*muscilago*	1	2	2					2		
++ ++ ++ ++	**Mulberry** 1. *Morus* 2. *Ficus* 3. *Rubus*	*morum*	1							1	1	
++ ++ ++	**Mustard** 1. *Brassica* 2. *Sinapis*	*sinapis*	3	1	1				1	3	2	4
++ ++	**Myrtle** 1. *Myrtus*	*myrtus*	3	1	1	1			1	1		7
++ ++	**Narciss** 1. *Narcissus*	*narciscus*	2	1	1		1			1		4
++ ++	**Nettle** 1. *Urtica*	*urtica*	1	1	1					1		4
++ ++ — ++	**Nightshade** 1. *Atropa* 2. *Solanum* 3. *Physalis*	*solatrum*	1							1	1	
++ == ++	**Nut** 1. nuts in general 2. *Juglans*	*nux*	2	1	1				1	1		5
++ ++	**Nut grass, yellow** 1. *Cyperus*	*cyperus*	1	1	1					1		1
==	**Ox's tripe**	*omasum*	1							1	1	
==	**Pasta**	*tri* + *pasta azima*	3	2[13]	2	1[14]			1(S) + S1	3 + S1	1	2
++ ++	**Pepper** 1. *Piper*	*piper*	2	5	4					5	1	6
++ — ++ ++ +	**Peppermint** **+ water mint** 1. *Calamintha* 2. *Mentha* 3. *Nepeta* 4. *Melissa*	*calamentum, calamentum fluviale, dia-calamentum*	3	3	3			1		4	1	6
++ ++	**Pine** 1. *Pinus*	*pinus*	2	6	6		1			6		8

13 *iṭriya.*
14 *rishta.*

#1	#2	#3	#4	b.S.	Lat	b.N	J	Sc	GF	JD	JD-bS	#5
++ ++	**Pistachio resin** **+ pistachio nut** **+ mastic** **+ terebinth** **+ terebinth resin** 1. *Pistacia*	*gluten albotin, gummi/ gommi albotin, albotim, glutinum album, glutinum /gluten alimbat, terbenthina* + *fisticum* + *mastix*	4	6	5 + 1(S) + S1		1	1	2(S) + S3	7 + S3	1	7
++ ++	**Pomegranate** 1. *Punica*	*granatum*	4	2	2	5		1	1	2		4
++ ++	**Poplar** 1. *Populus*	*populeonum*	1							1	1	
++ ++	**Poppy** **+ opium** **+ Theban opium** **+ poppy medicament** 1. *Papaver*	*papaver*[15] + *opium* + *opium thebaicum* + *deiacur*[16] + *anathari* + *diacodion*	5	11	11	3	2		3 + 1(S) + S1	28 + S1	14	10
++ ++ ++ ++	**Purslane** **+ purslane** (*baqla al-ḥamqāʾ*) **+ purslane** (*baqla*) **+ amaranth** 1. *Portulaca* 2. *Amaranthus* 3. *Corchorus*	*portulaca*	2			3				1	1	
==	***Qūfī***[17]	*cochium, pillulis cochijs* + *cokion*	2	1	1					2 + S1	1	

[15] Includes also *papauer albums, papauer nigrum, dia papauer*.
[16] Includes also *aldeicur, aldeiacur, deuico(r), deuicor/deiacor simplex*.
[17] See p. 458 and n. 111, p. 513, n. 10, p. 536 and ns. 66–67, above.

#1	#2	#3	#4	b.S.	Lat	b.N	J	Sc	GF	JD	JD-bS	#5
++ == ++ ++ ++ ++ ==	**Resin** (*qiṭrān*) **+ resin dregs** **+ cedar resin** **+ fluid pitch** 1. *pitch* 2. *Cedrus* 3. *Juniperus* 4. *Cupressus* 5. *Citrus* 6. *bitumen*	*alkitran* + *faex alkitran* + *gummi cedri* + *pix liquida*	1	2	2				1(S) + S1	2 + S2		2
++ ++	**Rice** 1. *Oryza*	*risum*	1							1	1	
++ ++	**Rose** **+ rose honey**[18] 1. *Rosa*	*rosa* + *mel rosearum*[19]	3	2	2				1	3	1	5
++ ++ ++	**Saffron** **+ safflower** 1. *Crocus* 2. *Carthamus*	*crocus* + *cartamus* + *diacartamus* + *crocus (h)ortensis* + *collyrium kelim*	2	7	7				1(S) + S1	11 + S1	4	8
==	**Salt**	*sal*	1							2	2	
++ — ++	**Sandalwood** 1. *Santalum* 2. *Pterocarpus*	—	1			1						
++ ++	**Sebesten** 1. *Cordia*	*sebesten*	3	1	1	1	1			1		1
==	**Silk** (*ḥarīra*) **/porridge**[20]	*puls*	1	1	1					1		3
++ + ++ ++	**Spinach** 1. *Spinacia* 2. *Atriplex* 3. *Brassica*	*spinachia*	1							1	1	
++ ++ ++	**Squill** 1. *Scilla* 1. = *Urginea*	—	1			1						

[18] Counted also as honey.
[19] Counted also as honey.
[20] In the Arabic *K. al-Qānūn*: silk (*al-ḥarīra*), in the Latin translation: *puls*, 'porridge'. The difference in translation is probably based on a confusion with the Arabic *ḥarīra* = porridge(?) (Garcia Sánchez, 2002, p. 282/8).

#1	#2	#3	#4	b.S.	Lat	b.N	J	Sc	GF	JD	JD-bS	#5
==	**Starch**	*amidum/amilum*	3	5	4	3				6	1	1
++ ++ ++	**Storax** *(may'a)* + **storax** (*'asal al-lubnā*) 1. *Styrax* 2. *Liquidambar*	*storax* + *mel storacis*	1	6	6					6		6
++ ++ ==	**Sugar** + ***fānīdh*** **sugar** 1. *Saccharum* = 1. sugar	*zuccarum* + *canna zuccari*[21] + *penidium, penith*[22]	6	8	8	1	3	4	3	21 + S2	13	3
==	**Sulphur**	*sulphur*	2	1	1					3	2	4
++ == == == ++ ==	**Tabasheer** 1. burned ivory, hydroxyl apathite, $Ca_5(OH)(PO_4)_3$ 2. ash 3. metallic oxide produced by calcination 4. *Bambusa* 5. chalk	*spodium*	1	1	1					1		4
± +	**Tamarind** 1. *Tamarindus*	*thamarindus*	1	1	1					1		3
++ ++ ++	**Thyme** 1. *Thymus* 2. *Satureja*	*hasce* + *thimum*	2	1	1			1		1 + S1		4
++ ++	**Tragacanth** 1. *Astragalus*	*dragagantum, diadragagantum, diadragantum (sic)*	5	6	6	1		2	1	13	7	2
± — +	**Valerian** 1. *Valeriana* 2. *Nardostachys*	*spica aromatica* + *spicenardum*	1	1	1					1		4
==	**Vegetables**	*olera*	2	2	1	1				1		

[21] Includes also *zuccarum album, zuccarum albissimum, zuccarum candi* and *zuccarum tabarzed/tabarzet* (*al-sukkar al-ṭabarzadh*).
[22] Includes also *diapenidion cum speciebus* and *diapenidion sine speciebus*.

#1	#2	#3	#4	b.S.	Lat	b.N	J	Sc	GF	JD	JD-bS	#5
— — ==	**Vinegar/ sesame**[23] 1. *Sesamum* AR: *vinegar*	*{oleum} sisaminum*	1	1	1					1		8
++ ++ — —	**Violet** 1. *Viola* 2. *Matthiola* 3. *Cheiranthus*	*viola*	6	1	1	2	4	1	1	10	9	2
± — +	**Water lily** 1. *Nymphaea* 2. *Nuphar*	*nenuphar*	1							6	6	
==	**Wax** **+ red wax**	*cera* + *cera rubea*	4	1[24]	1[25]		1	1[26]		1 + 1[27]+ 1[28]	2	4
— == —	**Wheat** (*ḥinṭa*) **+ wheat** (*qamḥ*) 1. cereal plants 2. *Triticum*	*frumentum* + *triticum*	3	2	2	1				4	2	0
++ ++	**Willow** 1. *Salix*	*salix*	1							1	1	
==	**Wine** **+ wine, Greek** **+ wine, malvoisie** **+ wine, Romanian**	*vinum* + *vinum grecum* + *vinum (maluisia)* + *vinum (romania)*	3	1	1				1	3[29] + S1	2	7

[23] See Prescription #60 (p. 248, n. 67, above).
[24] Red wax.
[25] *Cera rubea.*
[26] White wax.
[27] *Cera rubea.*
[28] *Cera virginea.*
[29] In Prescription #24a (p. 516, above) Despars recommends wine and then gives three examples of suitable wines. They are thus counted as one instance.

APPENDIX 39

(See p. 289)

7.1. Medical Qualities Recommended for Diabetes by Ibn Sīnā.

Code	Quality	Ibn Sīnā
AA	Astringency	Astringent, cold juices (diabetes caused by fiery heat)
BB	Anesthetizing	Anesthetizing the region of the lower back (diabetes caused by fiery heat) Numbing [and thereby disabling] the kidney's ability to attract water (diabetes caused by fiery heat)
CC	Cold + cooling	Cold, astringent juices (diabetes caused by fiery heat) Cooling (diabetes caused by fiery heat)
DD	Cooling the kidney	Cooling the patient's kidney (purpose of treatment; diabetes caused by fiery heat)
EE	Hotness + warming the body	Warming the patient's body with hot compresses and fumigations (diabetes caused by coldness) Hot baths (diabetes caused by coldness)
FF	Rarefying	Rarefying (*sit subtilitas*) (in order to alleviate the thirst; diabetes caused by coldness)
GG	Moistness + moistening	Moistening (diabetes caused by fiery heat) Moist, cold air (diabetes caused by fiery heat)
HH	Causing perspiration	Causing the watery [part] to flow off from the kidney by making the patient perspire (diabetes caused by fiery heat)
II	Laxatives	Purging him (diabetes caused by coldness) Softening the nature (diabetes caused by fiery heat)
JJ	Rubefacient	Rubefacient drugs (diabetes caused by coldness)
KK	Soporific	Making the patient sleep (diabetes caused by fiery heat)
LL	Strengthening	Strengthening (diabetes caused by fiery heat)
MM	Against thirst	Regulation of the thirst (diabetes caused by fiery heat)
NN	Emetics	Causing the watery [part] to flow off from the kidney by vomiting (diabetes caused by fiery heat) Making the patient vomit after the meal (diabetes caused by coldness)

APPENDIX 40

(See p. 298)

7.2a. Identification of Drugs Recommended for Diabetes by Ibn Sīnā.[1]

English Name	**Arabic Name**	**Latin (Scientific) Name**
Acacia	*aqāqiyā*	*Acacia* sp.[2] *Acacia arabica* Willd. var. *nilotica* Del.[3] *Acacia nilotica* [L.] Del.[4] *Acacia Senegal* [L.] Willd.[5]
Almond	*lawz* *lawz ḥilw* *lawz murr*	 = *Amygdalus communis* L. var. *dulcis* = *A. communis* L. var. *amara*[6]
Aloe	*ṣabr*	*Aloe* L.[7] *A. vera* L.[8]
Apple	*tuffāḥ*	*Malus sylvestris* [L.] Mill. = *Pyrus malus* L.[9]
Barley	*shaʿīr*	*Hordeum* L.[10] *H. vulgare* L.[11]
Brew	*fuqqāʿ*	fermented drink made out of barley, similar to beer[12]

[1] For methodology, see Ch. 5.1.5.3.

[2] Lev and Amar, 2008, p. 325; Beck, 2005, I:101, p. 72. *Acacia vera* (Dubler, 1953, I:113, pp. 86–87).

[3] Schmucker, 1969, no. 61; Levey, 1966, p. 234.

[4] Lev and Amar, 2008, p. 180; Dietrich, 1991, I:103, pp. 74–75.

[5] Kahl, 2003, pp. 206, 232; *ibid*., 2007, pp. 323, 343; Dietrich, 1991, I:103, pp. 74–75.

[6] Schmucker, 1969, no. 658; Lev and Amar, 2008, p. 91; see Dubler, 1953, I:139, pp. 112–113; Lev, 2003, pp. 32–33; Lev and Amar, 2002, n. 185, p. 242.

[7] Schmucker, 1969, no. 452; Lev and Amar, 2008, pp. 94–97; Lev and Amar, 2002, n. 19, p. 74; Lev, 2003, pp. 33–34; Dubler, 1953, III:23, pp. 279–280; Levey, 1966, p. 297.

[8] Schmucker, 1969, no. 452; Kahl, 2003, p. 207; *ibid*., 2007, pp. 328, 342; Dubler, 1953, III:23, pp. 279–280; Levey, 1966, p. 297; see Beck, 2005, III:22, p. 187.

[9] Schmucker, 1969, no. 169; Kahl, 2003, pp. 208, 234; *ibid*., 2007, pp. 329, 342; Dietrich, 1991, I:118, p. 83; Lev and Amar, 2008, p. 335; see *ibid*., 2002, n. 192, p. 248; Beck, 2005, I:115, p. 84.

[10] Schmucker, 1969, no. 431; Lev and Amar, 2008, p. 353; see Beck, 2005, II:86, p. 130.

[11] Schmucker, 1969, no. 431; Kahl, 2003, pp. 207, 234; *ibid*., 2007, pp. 328, 342; Dubler, 1953, II:78, pp. 181–182; Dietrich, 1991, II:73, p. 111; see Lev and Amar, 2002, n. 184, p. 240.

[12] Lev and Amar, 2008, p. 571; Lane, 1886–1893, p. 2428; Dietrich, 1991, II:74, p. 111; Schmucker, 1969, no. 535; Kahl, 2007, p. 324; see Beck, 2005, II:87, p. 131. "Recipes are extant for a kind of barley beer called *fuqqāʿ* which could be simply and cheaply made. By mixing into the basic barley wort ingredients such as wheat, rice or walnuts, the flavour

English Name	Arabic Name	Latin (Scientific) Name
Camphor	*kāfūr*	*Cinnamomum camphora* Fr. Nees[13]
Crab, river	*al-saraṭān al-nahrī*	*Astacus fluviatilis* Fabr.[14]
Cucumber	*khiyār*	*Cucumis sativus*[15] *Cucumis* L.[16]
Egg[17]	*bayḍa*	
Fish[18]	*samak*	
Fleawort	*bizr qaṭūnā*	*Plantago psyllium* L.[19]
Frankincense	*kundur*	*Boswellia carterii* Birdw.[20] *Boswellia* spp.[21]
Gallnut	*ʿafṣ*	gallnuts,[22] for ex. from **Quercus infectoria*[23] **Quercus* sp.[24]

and consistency were altered. A more exotic type was brewed from barley sweetened with honey and seasoned with pepper, cloves, ginger, cinnamon and rue with a handful of millet (*jāwars*) blended in. Fermentation was achieved by placing the contents in a skin container (*kir*) and leaving it for two days ready for drinking on the third." Waines, 1989, p. 26.

13 Kahl, 2003, pp. 204, 233; *ibid.*, 2007, pp. 326, 343; Lev and Amar, 2008, p. 123; Levey, 1966, p. 321; Schmucker, 1969, no. 610; see Lev and Amar, 2002, n. 149, p. 206. Schmucker suggests also *Dryobalanops aromatica* Gaertn., *Blumea balsamifera* Dc.

14 Schmucker, 1969, no. 375; Kahl, 2003, pp. 207. 236.

15 Lev and Amar, 2008, p. 394; Kahl, 2003, pp. 204, 233; *ibid.*, 2007, pp. 325, 343; see Lev and Amar, 2002, n. 101, p. 156.

16 Schmucker, 1969, no. 286. On the general difficulty of the terminology of *Cucumis* and *Cucurbita*, see Savage-Smith, 1980, p. 139, n. 19.

17 Dubler, 1953, II:44, pp. 148–149; Kahl, 2007, pp. 324, 329; Lev and Amar, 2008, p. 141; Levey, 1966, pp. 248, 298.

18 Lev and Amar, 2008, p. 407.

19 Schmucker, 1969, no. 121; Kahl, 2003, pp. 202, 235; *ibid.*, 2007, pp. 324, 343; Levey, 1966, p. 317; Dubler, 1953, IV:71, p. 418; Dietrich, 1991, IV:64, p. 241; Lev and Amar, 2008, p. 242; see *ibid.*, 2002, n. 84, p. 138.

20 Schmucker, 1969, no. 651; Lev and Amar, 2008, p. 168; Dietrich, 1991, I:58, p. 57; see Beck, 2005, I:68, p. 49.

21 Kahl, 2003, pp. 204, 232; *ibid.*, 2007, pp. 326, 343; Dietrich, 1991, I:58, p. 57. Schmucker, 1969, no. 651 adds *Boswellia serrata* Roxb., *B. thurifera* and *B. frereana* Birdw.

22 = Protective tissue developed by the plant after the eggs of wasps (especially *Cynips tinctoria*) and other pests are deposited in its branches (Lev and Amar, 2008, p. 225; Schmucker, 1969, no. 492; Beck, 2005, I:107, p. 78).

23 Schmucker, 1969, no. 492; Dubler, 1953, I:123, pp. 94–95; see Beck, 2005, I:107, p. 78.

24 Schmucker, 1969, no. 492; Lev and Amar, 2008, p. 225; Kahl, 2003, pp. 201, 235; see Lev and Amar, 2002, n. 16, p. 70.

English Name	Arabic Name	Latin (Scientific) Name
Grape, unripe/sour	*ḥiṣrim*	*Vitis vinifera* L., unripe/sour fruit[25]
Grapevine	*karm*	*Vitis vinifera* L.[26]
Gruel	*sawīq*	
Gum	*ṣamgh*	resin, gum[27] (*al-ṣamgh al-ʿarabī* = *Acacia arabica*[28] *Acacia senegal*[29] *Acacia* spp.)[30]
Hen	*dajāj*	*Gallus gallus domesticus*,[31] chicken[32]
Knotgrass	*ʿaṣā al-rāʿī*	*Polygonum aviculare* L.[33]
Lac	*lakk*	gummi lacca[34]

[25] Kahl, 2007, pp. 325, 343; Lev and Amar, 2008, p. 176; Lev, 2003, pp. 57–59; Schmucker, 1969, no. 245; see Beck, 2005, V:5, p. 332.

[26] Kahl, 2003, pp. 204, 235; *ibid*., 2007, pp. 326, 345; Schmucker, 1969, no. 632; see Beck, 2005, V:1, p. 330. For an extensive description of the different vine products and their use in medieval pharmacy, see Lev, 2003, pp. 57–59.

[27] Schmucker, 1969, no. 457. Used also instead of *ṣamgh ʿarabī* = gum from *Acacia* spp. Schmucker, 1969, no. 460; Lev and Amar, 2008, p. 180; Kahl, 2003, pp. 207, 232; *ibid*., 2007, pp. 328, 343; Levey, 1966, p. 234; Lev, 2003, pp. 59–60; see Lev and Amar, 2002, n. 178, p. 234.

[28] Kahl, 2003, pp. 207, 232; *ibid*., 2007, pp. 328, 343; Levey, 1966, p. 234; Lev, 2003, pp. 59–60.

[29] Lev and Amar, 2002, n. 178, p. 234; Schmucker, 1969, no. 460.

[30] Lev and Amar, 2008, p. 180; Schmucker, 1969, no. 460. For more information on Gum Arabic, see Lev, 2003, pp. 59–60.

[31] Lev and Amar, 2008, p. 141.

[32] Kahl, 2007, p. 324.

[33] Dubler, 1953, IV:4, pp. 378–379; Kahl, 2003, pp. 201, 235; *ibid*., 2007, pp. 323, 344; Schmucker, 1969, nos. 430, 490, 767; see Beck, 2005, IV:4, p. 253.

[34] Lev and Amar, 2008, p. 193: *lakk* = *Laccifer lacca*. "The Kerridae family consists of many aphid species, the most important being *Laccifer lacca*. It grows in South-East Asia on various tree species. The caterpillars, after hatching from their eggs, dwell on the host tree and suck out their food. The liquids that were drawn from the tree undergo a bio-chemical process in the larvae and are secreted from a special gland as a liquid, which transferred into lac. This substance is collected from the trees and sold as a reddish-brown colouring material and a medicinal substance." Dietrich, 1991, I:23, p. 46: *al-lakk* = Lacca, Gummi lacca, Resina lacca, das Lackharz. "Es ist eine gelbe bis rote, harzartige Masse, die durch den Stich der Gummilackschildlaus, *Coccus lacca*, in die Triebe von Ficus-, Rhamnus-, Butea-, Mimosa- und anderen Arten erzeugt wird. Das Wort bezeichnet auch den Siegellack (cire d'Espagne). ferner den Scharlachfärbstoff der Kermesschildlaus." See also Lev and Amar, 2002, n. 226, p. 290; Schmucker, 1969, no. 682; Kahl, 2003, p. 204; *ibid*., 2007, p. 326.

English Name	Arabic Name	Latin (Scientific) Name
Ladanum	*lādhan*	*Cistus ladaniferus* L.[35] *Cistus* spp.[36]
Lettuce	*khass*	*Lactuca sativa* L.[37]
Meat of young animal/lamb	*al-luḥūm al-ḥawliyya*	
Medlar	*zuʿrūr*	*Mespilus* spp.[38] *Crataegus sp.*[39]
Milk[40] * milk of ewes * freshly milked milk[41]	*laban* * *laban al-niʿāj* * *al-laban al-ḥalīb*	
Mint	*naʿnaʿ*	*Mentha piperita* L.[42] *Mentha sativa* L.[43] *Mentha* spp.[44]
Mulberry	*tūt*	*Morus alba* L.[45] *Morus nigra* L.[46] *Morus* spp.[47]
Myrtle	*ās*	*Myrtus communis* L.[48]

[35] Dubler, 1953, I:108, pp. 80–81; Kahl, 2003, pp. 204, 233; *ibid*., 2007, pp. 326, 344; Lev and Amar, 2008, p. 194; Levey, 1966, p. 329; Schmucker, 1969, no. 665.

[36] Levey, 1966, p. 329; Schmucker, 1969, no. 665.

[37] Dietrich, 1991, II:119, p. 129; Kahl, 2003, pp. 205, 234; *ibid*., 2007, pp. 325, 344; Lev and Amar, 2008, p. 437; Schmucker, 1969, no. 270; see Beck, 2005, II:136, p. 150; Lev and Amar, 2002, n. 57, p. 112.

[38] Schmucker, 1969, no. 348; Dubler, 1953, I:133, pp. 107–108; see Beck, 2005, I:118, p. 86.

[39] Lev and Amar, 2008, p. 347; Kahl, 2003, pp. 209, 233.

[40] Dietrich, 1991, II:58, p. 1097; Kahl, 2003, p. 201; *ibid*., 2007, p. 326; Levey, 1966, p. 330.

[41] Kahl, 2003, p. 204; Lane, 1886–1893, p. 624.

[42] Dietrich, 1991, III:32, p. 165; Schmucker, 1969, no. 772.

[43] Dubler, 1953, III:37, p. 290; Lev and Amar, 2008, p. 449; Schmucker, 1969, no. 772.

[44] Dietrich, 1991, III:32, p. 165; Kahl, 2003, pp. 206, 232; *ibid*., 2007, pp. 327, 344; Schmucker, 1969, no. 772; see Lev and Amar, 2002, n. 106, p. 160.

[45] Dubler, 1953, I:143, pp. 116–117; Levey, 1966, pp. 241–242; Schmucker, 1969, no. 177.

[46] Dubler, 1953, I:143, pp. 116–117; Levey, 1966, pp. 241–242; Schmucker, 1969, no. 177.

[47] Kahl, 2003, pp. 208, 234; *ibid*., 2007, pp. 329, 344; Schmucker, 1969, no. 177.

[48] Dietrich, 1991, I:115, pp. 81–82; Dubler, 1953, I:128, pp. 99–100; Kahl, 2003, pp. 201, 234; *ibid*., 2007, pp. 323, 344; Lev and Amar, 2008, p. 223; Schmucker, 1969, no. 19; see Beck, 2005, I:112, p. 82.

English Name	Arabic Name	Latin (Scientific) Name
Plum	*ijjās*	*Prunus domestica* L.[49] *Prunus* spp.[50]
Pomegranate	*rummān*	*Punica granatum*[51]
Pomegranate flower, wild	*jullanār*	*Punica granatum* L., wild, flower[52] *Punica granatum* L., flower[53]
Poppy	*khashkhāsh*	*Papaver somniferum* L.[54]
Pumpkin	*qarʿ*	*Cucurbita maxima* Duch.[55] *Cucurbita pepo* L.[56] *Lagenaria vulgaris* Ser.[57]
Quince	*safarjal*	*Cydonia oblonga* Mill.[58] *Cydonia vulgaris*[59]
Radish	*fujl*	*Raphanus sativus* L.[60] *Raphanus* spp.[61]

[49] Schmucker, 1969, no. 7; Kahl, 2003, pp. 204, 235; *ibid.*, 2007, pp. 325, 345; Dubler, 1953, I:137, pp. 110–111; Dietrich, 1991, I:130, p. 87; Levey, 1966, p. 225; Lev, 2003, pp. 73–74.

[50] Schmucker, 1969, no. 7; Levey, 1966, p. 225. "Identification of the plum in medieval sources is a complicated matter because of the large number of species and the alternate names given for similar varieties such as: peach, pear, apricot, and bear's plum." Lev, 2003, p. 73.

[51] Dietrich, 1991, I:113, p. 80; Kahl, 2003, pp. 207, 235; *ibid.*, 2007, pp. 328, 345; Schmucker, 1969, no. 329; Lev and Amar, 2008, p. 248; see *ibid.*, 2002, n. 165, p. 222; Beck, 2005, I:110, p. 82.

[52] Dietrich, 1991, I:114, pp. 80–81; Dubler, 1953, I:127, pp. 97–98; Levey, 1966, p. 253; Schmucker, 1969, no. 201.

[53] Dietrich, 1991, I:114, pp. 80–81; Kahl, 2003, pp. 203, 235; *ibid.*, 2007, pp. 325, 345; Lev and Amar, 2008, p. 248.

[54] Schmucker, 1969, no. 273; Kahl, 2003, p. 203; Dietrich, 1991, IV:59, p. 239; see Lev and Amar, 2002, n. 133, p. 188; Beck, 2005, IV:64, p. 273.

[55] Dubler, 1953, II:123, p. 217; Levey, 1966, pp. 314–315; Schmucker, 1969, no. 569.

[56] Dietrich, 1991, II:117, p. 128; Dubler, 1953, II:123, p. 217; Levey, 1966, pp. 314–315; Schmucker, 1969, no. 569.

[57] Kahl, 2007, pp. 327, 343; Lev and Amar, 2008, p. 120; Levey, 1966, pp. 314–315; Schmucker, 1969, no. 569. On the nomenclature of *Cucurbitaceae*, see Savage-Smith, 1980, p. 139, n. 19.

[58] Dietrich, 1991, I:119, p. 83; Kahl, 2003, pp. 207, 233; *ibid.*, 2007, pp. 328, 345; Lev and Amar, 2008, p. 255.

[59] Dubler, 1953, I:131, pp. 101–107; Levey, 1966, pp. 282–283; Schmucker, 1969, no. 383.

[60] Dietrich, 1991, II:97, p. 120; Dubler, 1953, II:104, pp. 197–198; Kahl, 2003, pp. 202, 234; *ibid.*, 2007, pp. 324, 345; Lev and Amar, 2008, p. 257; Schmucker, 1969, no. 522.

[61] Dietrich, 1991, II:97, p. 120; Dubler, 1953, II:104, pp. 197–198.

English Name	Arabic Name	Latin (Scientific) Name
Rhubarb	*rībās*	*Rheum ribes*[62] *Rheum* sp.[63]
Rose	*ward*	*Rosa gallica* L.[64] *Rosa* spp.[65]
Salsify	*liḥyat al-tays*	*Tragopogon porrifolius* L.[66] *Tragopogon pratensis* L.[67]
Tabasheer	*ṭabāshīr*	chalk[68] *Bambusa arundinacea*, ashes[69]
Terra sigillata[70]	*ṭīn makhtūm*	a medicinal clay containing ferrous oxide[71]
Tragacanth	*kathīrāʾ*	*Astragalus gummifer* Lab.[72] *Astragalus* spp.[73]
Trotters, cow[74]	*akāriʿ al-baqar*	
Vinegar	*khall*	vinegar from *Vitis vinifera* L.[75]
Water, cold	*al-maʾ al-bārid*	

---

62 Kahl, 2007, pp. 328, 345; Schmucker, 1969, no. 333.

63 Lev, 2003, pp. 76–77; Lev and Amar, 2008, p. 259; *ibid.*, 2002, n. 161, p. 218.

64 Dubler, 1953, I:110, pp. 83–84; Levey, 1966, pp. 344–345; Schmucker, 1969, no. 797.

65 Dietrich, 1991, I:101, p. 73; Dubler, 1953, I:110, pp. 83–84; Kahl, 2003, pp. 208, 235; *ibid.*, 2007, pp. 329, 345; Lev and Amar, 2008, pp. 261–262; Schmucker, 1969, no. 797; see Beck, 2005, I:99, p. 70; Lev and Amar, 2002, n. 47, p. 102. On the importance of rose in the medieval Middle East, see Lev, 2003, pp. 52–54.

66 Kahl, 2007, pp. 326, 345; see Beck, 2005, II:143, p. 152.

67 Kahl, 2007, p. 185, n. 17; Schmucker, 1969, nos. 672, 795.

68 Schmucker, 1969, no. 464; see also Levey, 1966, p. 300.

69 Schmucker, 1969, no. 464; Kahl, 2003, pp. 208, 232; *ibid.*, 2007, pp. 329, 345; see Lev and Amar, 2008, pp. 106–107: Chalk, tabashir, *Bambusa vulgaris* (Poaceae): "Bamboo contains a large amount of silica and in medieval times it was burned as part of the extraction process. The ashes, which form crystals of a bluish white, hard light substance, were called *ṭabāshīr*." Silicic acid was also prepared of bamboo (Hill, 1993, p. 89).

70 Schmucker, 1969, no. 476.

71 List and Horhammer, 1969–1979, Vol. 2, p. 1262. Cf. Kahl, 2003, p. 208: *ṭīn makhtūm* = sealing bole. *ṭīn* = clay, earth, bole (Lev and Amar, 2008, p. 149; see Lev and Amar, 2002, n. 223, p. 284).

72 Lev, 2003, pp. 89–90; Levey, 1966, p. 323; Schmucker, 1969, no. 621; Lev and Amar, 2008, p. 302; see *ibid.*, 2002, n. 140, p. 196; see Beck, 2005, III:20, p. 186.

73 Dietrich, 1991, III:20, p. 158; Dubler, 1953, III:21, p. 278; Kahl, 2003, pp. 204, 232; *ibid.*, 2007, pp. 326, 345; Levey, 1966, p. 323; Schmucker, 1969, no. 621; see Beck, 2005, III:20, p. 186. For further information on tragacanth, see Lev, 2003, pp. 89–90.

74 See Kahl, 2003, p. 201; *ibid.*, 2007, p. 323.

75 Kahl, 2003, p. 203; *ibid.*, 2007, p. 325; Lev and Amar, 2008, p. 176. According to Waines, the medieval vinegar was genuine *vin aigre* or soured wine, as the term *khall khamr* indicates (Waines, 1989, p. 25). On medical uses of vinegar in the Middle Ages, see Lev, 2003, pp. 57–59.

English Name	Arabic Name	Latin (Scientific) Name
Water lily	*naylūfar*	*Nymphaea alba* L.[76] *Nymphaea* spp.[77] *Nuphar luteum* Sm.[78]
Wheat (*khandarūs*)	*khandarūs*	*Triticum dicoccum*[79] *Triticum* spp.[80]
Whey[81]	*dūgh*	
Wine, aromatic	*al-sharāb al-rayḥānī*	*sharāb* = wine from *Vitis vinifera* L.[82] wine (in general) juice (in general)[83]

[76] Dubler, 1953, III:142–143, pp. 357–358; Lev, 2003, pp. 91–92; Schmucker, 1969, no. 779.
[77] Dubler, 1953, III:142–143, pp. 357–358; Kahl, 2007, pp. 327, 344; Schmucker, 1969, no. 779.
[78] Dubler, 1953, III:142–143, pp. 357–358; Lev, 2003, p. 94; see Schmucker, 1969, no. 779.
[79] Dietrich, 1991, II:81, pp. 113–114; see also Beck, 2005, II:96, p. 132; II:89, p. 131 and n. 46.
[80] Schmucker, 1969, no. 595; see also Beck, 2005, II:96, p. 132; II:89, p. 131 and n. 46.
[81] On the preparation of whey, see Kahl, 2007, pp. 250–251, prescription n. 226.
[82] Fellmann, 1986, pp. 269–272; Kahl, 2003, p. 207; *ibid.*, 2007, p. 328. For a good overview of several products of grapevine and their medicinal uses, see Lev, 2003, pp. 57–59.
[83] Fellmann, 1986, pp. 269–272.

7.2b. Compound Drugs Recommended by Ibn Sīnā for Diabetes.

English Name	Arabic Name	Latin (Scientific) Name
Aloe pills[84]	*ḥabb al-ṣabr*	
Meat dish	*halāmāt*	
Meat dish	*maṣūṣāt*	Dish of flesh-meat, cooked, and steeped in vinegar; or steeped in vinegar, and then cooked: or of the flesh of birds particularly[85]
Meat soup	*isfīdbājāt*	A meat dish[86]
Rāmik		A certain astringent medicine, used as a remedy for dysentery[87]

[84] See p. 298, above; see Aloe, Table 7.2a, p. 603, above.
[85] Lane, 1886–1893, p. 2718.
[86] See p. 239, n. 48, above.
[87] Lane, 1886–1893, pp. 1158–1159. "Ramek ist eine aus Schustertinte, aus Granatrinde, arabischem Gummi und anderen Dingen zusammengefeßte Mischung, die man dem Moschus beizumischen pflegt" (Sontheimer, 1845, p. 175). According to Gentile and Despars, made of gallnuts and raisins (see Appendix 49, Prescription #18, p. 632, below). Kahl, 2003, pp. 207, 232: *rāmik* = ramie = *Boehmeria nivea*. Meyerhof, 1940, No. 290 *via* Lev and Amar, 2008, p. 566: *Rāmik* = Astringent (tannin), which is made out of pomegranate peels or gallnuts. Similar to *sukk*; Kahl, 2003, pp. 207, 232: *rāmik* = ramie = *Boehmeria nivea*; Kahl, 2007, p. 302, n. 251: "*rāmik* is the name of a 'perfume' which is made from unripe dates, oak galls, pomegranate rind, honey, musk, and certain other aromatics in varying proportions of mixture, and whose prevailing ingredient may serve as an additional label."

APPENDIX 41

(See p. 299)

7.3a. The Frequencies of the Drugs in the Prescriptions for Diabetes by Ibn Sīnā.

Drug	Frequency
Acacia	2
Almond	1
Apple	2
Barley	2
Camphor	1
Chicken	1
Crab, river	1
Cucumber	3
Egg	1
Fish	1
Fleawort	3
Frankincense	1
Gallnut	1
Grapevine	4[1]
Gruel	2
Gum	1
Knotgrass	2
Lac	1
Ladanum	1
Lettuce	2
Meat of a young animal	1
Medlar	2
Milk	
*milk of ewes	1
*freshly milked milk[2]	1
Mint	1
Mulberry	1
Myrtle	1
Plum	1
Pomegranate	5
Pomegranate flower, wild	1
Poppy	2
Pumpkin	4
Quince	2
Radish	1
Rhubarb	2
Rose	4
Salsify	1

[1] Twice grapevine, twice juice of unripe grapes.
[2] *al-laban al-ḥalīb*.

Drug	Frequency
Tabasheer	2
Terra sigillata	1
Tragacanth	1
Trotters, cow	1
Vinegar	1
Water lily	1
Wheat (*khandarūs*)	1
Whey	4
Wine, aromatic	1

7.3b. Compound Drugs in Prescriptions for Diabetes by Ibn Sīnā.[3]

Drug	Frequency
Aloe pills[4]	1
Brew	1
Meat soup (*isfīdbājāt*)	1
Meat dish (*halāmāt*)	1
Meat dish (*maṣūṣāt*)	1
rāmik[5]	1

[3] For the identifications, see Appendix 40.
[4] As it is clear that one of the main ingredients of the pills is aloe, I have counted this as a separate case of the use of aloe. See p. 109, n. 119, above.
[5] See p. 610 and n. 87, above, and Appendix 49, Prescription #18, p. 632, below.

APPENDIX 42

(See p. 300)

7.4a. Medical Qualities in Ibn Sīnā's Drugs for Diabetes.[1, 2]

Drug	**AA**	**BB**	**CC**	**DD**	**EE**	**FF**	**GG**	**HH**	**II**	**JJ**	**KK**	**LL**	**MM**	**NN**
Acacia	+		+			+								
Almond	+				+	+					+			
Aloe	+								+		+			
Apple	+						+					+		
Barley			+				+							
Brew														
Camphor														
Chicken	+								+					+
Cow trotters									+					
Crab, river														
Eggs	+													
Fish		+							+					
Fleawort	+								+				+	
Frankincense	+				+							+		
Gallnut	+		+											
Grapevine	+				+									
Gum	+											+		
Knotgrass	+		+											
Lac												+		
Ladanum	+				+									
Lettuce			+						+		+		+	
Meat					+	+	+		+			+		
Medlar	+													
Milk						+	+		+			+		
Mint	+				+		+					+		

[1] AA = astringency; BB = anesthetizing; CC = cold + cooling; DD = cooling the kidney; EE = hotness + warming the body; FF = rarefying; GG = moistening (+ moist); HH = causing perspiration; II = laxative; JJ = rubefacient; KK = making him sleep; LL = strengthening; MM = against thirst; NN = emetic.

[2] The following drugs are not given any information about in Book II of *K. al-Qānūn*: cucumber, unripe grapes, gruel, *ḥalīb* milk, and whey.

Drug	**AA**	**BB**	**CC**	**DD**	**EE**	**FF**	**GG**	**HH**	**II**	**JJ**	**KK**	**LL**	**MM**	**NN**
Mulberry	+		+				+		+					
Myrtle	+		+		+				+			+		
Plum	+		+			+	+		+					
Pomegranate	+				+				+			+		
Pomegranate flower												+		
Poppy		+	+						+		+			+
Pumpkin									+				+	
Quince	+						+		+			+	+	
Radish						+			+					+
Rāmik	+											+		
Rhubarb														
Rose	+				+				+			+		
Salsify	+											+		
Tabasheer	+		+									+	+	
Terra sigillata			+											+
Tragacanth														
Vinegar			+		+	+						+		
Water lily						+			+		+			
Wheat (*khandarūs*)														
Wine	+	+[3]			+				+			+		+
#45	25	3	12	0	11	8	8	0	19	0	5	17	5	5
%	56	7	27	0	24	18	18	0	42	0	11	38	11	11

[3] Causes a state of insensibility comparable to the consequences of a stroke.

7.4b. The Frequency of the Different Therapeutic Qualities in the Drugs for Diabetes by Ibn Sīnā.

Code	Quality	Frequency
AA	Astringency	56 %
II	Laxative	42 %
LL	Strengthening	38 %
CC	Cold + cooling	27 %
EE	Hotness + warming the body	24 %
FF	Rarefying	18 %
GG	Moistening (+ moist)	18 %
KK	Soporific	11 %
MM	Against thirst	11 %
NN	Emetic	11 %
BB	Anesthetizing	7 %
JJ	Rubefacient	0 %
DD	Cooling the kidney	0 %
HH	Causing perspiration	0 %

APPENDIX 43

(See p. 301)

7.5a. The Connection between Ibn Sīnā's Frequency of Use of Drugs for Diabetes and their Qualities.[1]

#1	#2		AA	BB	CC	DD	EE	FF	GG	HH	II	JJ	KK	LL	MM	NN
2	3	Acacia	+		+			+								
1	4	Almond	+				+	+					+			
1	3	Aloe	+								+		+			
2	3	Apple	+						+					+		
2	2	Barley			+				+							
1	0	Brew														
1	0	Camphor														
1	3	Chicken	+								+					+
1	0	Crab, river														
1	1	Eggs	+													
1	2	Fish		+							+					
3	3	Fleawort	+								+				+	
1	3	Frankincense	+				+							+		
1	2	Gallnut	+		+											
2	2	Grapevine	+				+									
1	2	Gum	+											+		
2	2	Knotgrass	+		+											
1	1	Lac												+		
1	2	Ladanum	+				+									
2	4	Lettuce			+						+		+		+	
1	5	Meat					+	+	+		+			+		
2	1	Medlar	+													
2	4	Milk						+	+		+			+		
1	4	Mint	+				+		+					+		
1	4	Mulberry	+		+				+		+					

[1] Column #1: number of times the drug appears in the prescriptions; column #2: number of therapeutically suitable qualities it embodies. AA = astringency; BB = anesthetizing; CC = cold + cooling; DD = cooling the kidney; GG = heat + warming the body; HH = rarefying; II = moistening (+ moist); LL = causing perspiration; MM = laxative; NN = rubefacient; OO = making the patient sleep; QQ = strengthening; RR = against thirst; SS = emetic.

#1	#2		AA	BB	CC	DD	EE	FF	GG	HH	II	JJ	KK	LL	MM	NN
1	5	Myrtle	+		+		+				+			+		
1	5	Plum	+		+			+	+		+					
5	4	Pomegranate	+				+				+			+		
1	1	Pomegranate flower												+		
2	5	Poppy		+	+						+		+			+
4	2	Pumpkin									+				+	
2	5	Quince	+						+		+			+	+	
1	3	Radish						+			+					+
1	2	*Rāmik*	+											+		
2	0	Rhubarb														
4	4	Rose	+				+				+			+		
1	2	Salsify	+											+		
2	4	Tabasheer	+		+									+	+	
1	2	*Terra sigillata*			+											+
1	0	Tragacanth														
1	1	Trotters, cow									+					
1	4	Vinegar			+		+	+						+		
1	3	Water lily						+			+		+			
1	0	Wheat (*khandarūs*)														
1	6	Wine	+	+[2]			+				+			+		+
		#45	25	3	12	0	11	8	8	0	19	0	5	17	5	5
		%	56	7	27	0	24	18	18	0	42	0	11	38	11	11

[2] Causes a state of insensibility comparable to the consequences of a stroke.

7.5b. The Relationship between Ibn Sīnā's Frequency of Use of Drugs for Diabetes and their Qualities. Number of Qualities *vs*. Number of Appearances.[3]

	5 app	4 ≤ app	3 ≤ app	2 ≤ app	All app	1 app
6 q					2 % (1)	3 % (1)
5 ≤ q				13 % (2)	13 % (6)	14 % (4)
4 ≤ q	100 % (1)	67 % (2)	50 % (2)	44 % (7)	33 % (15)	28 % (8)
3 ≤ q	100 % (1)	67 % (2)	75 % (3)	63 % (10)	51 % (23)	45 % (13)
2 ≤ q	100 % (1)	100 % (3)	100 % (4)	88 % (14)	76 % (34)	69 % (20)
1 ≤ q	100 % (1)	100 % (3)	100 % (4)	94 % (15)	87 % (39)	83 % (24)
All q	100 % (1)	100 % (3)	100 % (4)	100 % (16)	100 % (45)	100 % (29)
0 + 1 q				13 % (2)	24 % (11)	31 % (9)
0 q				6 % (1)	13 % (6)	17 % (5)
Drug #	1	3	4	16	45	29

3 app = number of appearances of the drug in prescriptions for diabetes in *K. al-Qānūn*; q = number of therapeutically suitable qualities it embodies; ≤ as much or more; All app = all the appearances counted together; All q = all the qualities counted together. Numbers in brackets = the number of drugs. Drug # = the total number of drugs in the column.

7.5c. The Relationship between Ibn Sīnā's Frequency of Use of Drugs for Diabetes and their Qualities. Number of Appearances *vs*. Number of Qualities.[4]

	6 q	**5 ≤ q**	**4 ≤ q**	**3 ≤ q**	**2 ≤ q**	**1 ≤ q**	**All q**	**0 + 1 q**
5 app			7 % (1)	4 % (1)	3 % (1)	3 % (1)	2 % (1)	
4 ≤ app			13 % (2)	9 % (2)	9 % (3)	8 % (3)	7 % (3)	
3 ≤ app			13 % (2)	13 % (3)	12 % (4)	10 % (4)	9 % (4)	
2 ≤ app		33 % (2)	47 % (7)	43 % (10)	41 % (14)	38 % (15)	36 % (16)	18 % (2)
All app	100 % (1)	100 % (6)	100 % (15)	100 % (23)	100 % (34)	100 % (39)	100 % (45)	100 % (11)
Drug #	1	6	15	23	34	39	45	11

[4] app = number of appearances of the drug in prescriptions for diabetes in *K. al-Qānūn*; q = number of therapeutically suitable qualities it embodies; ≤ as much or more; All app = all the appearances counted together; All q = all the qualities counted together. Numbers in brackets = the number of drugs. Drug # = the total number of drugs in the column.

APPENDIX 44

(See p. 303)

7.6. Causes of Diabetes in the Arabic and Latin Commentaries to *K. al-Qānūn*.

Ibn Sīnā	**Ibn al-Nafīs**	**Gentile da Foligno**	**Jacques Despars**
Strong attraction of water to kidney (caused by hot, unnatural force, material or immaterial)[1]	(Hot) force attracting moistures to kidney		Strong attraction to the kidneys
Coldness Biting cold Drinking of cold water	Coldness		Drinking frequently much cold water
Coldness dominating the whole body			Cold penetrating the whole body and besieging it
Coldness dominating the liver/kidneys[2]			Strong cold overpowering the kidneys
Expansion of the apertures of the channels of kidney	Expansion of the channels of kidney		Strong dilatation of the apertures of the urinary tracts
Fiery heat			
Hot, unnatural force in the kidneys (causes strong attraction of water to the kidney)	Hot force (attracting moistures) to the kidney		Excessive, unnatural heat in the kidneys (**main reason for diabetes**)
Condition of the kidney			Abnormal state of kidneys
Opening of the apertures of the channels of kidney			Excessive opening of the apertures of the urinary tracts

[1] This is the most frequent cause.
[2] See p. 288, n. 24, above.

Ibn Sīnā	**Ibn al-Nafīs**	**Gentile da Foligno**	**Jacques Despars**
Retention of urine/strong suffering from cold because of a biting cold[3]			
Weakness of kidney	Weakness of the kidneys		Weakness of the kidneys, **especially of their retentive faculty**
			Excessive strength of the expulsive faculty of the kidneys
			Cold, astringent fruit that are diuretic

[3] See p. 286, n. 18, above.

APPENDIX 45

(See p. 303)

7.7. Possible Symptoms of Diabetes in the Arabic and Latin Commentaries to *K. al-Qānūn*.

Ibn Sīnā	**Ibn al-Nafīs**	**Gentile da Foligno**	**Jacques Despars**
Tendency to constipation			Tendency to constipation
Thirst	Continuous thirst		Thirst
Excessive flow of urine			Continual urinating
Urinating the same amount as drunk, incapable of retention	Urinating all the fluid drunk (without absorbing anything to the body)		Water or wine or other drink exits in a short time from the urinary channels almost as it was drunk, **without any digestion**

APPENDIX 46

(See p. 303)

7.8. Consequences of Diabetes in the Arabic and Latin Commentaries to *K. al-Qānūn*.

Ibn Sīnā	**Ibn al-Nafīs**	**Gentile da Foligno**	**Jacques Despars**
Consuming fever	Consuming fever		*Ethica* fever
Emaciation	Emaciation of the body		Melting [of the body]
	Weakness of liver		

APPENDIX 47

(See p. 303)

7.9. Medical Qualities Recommended for Diabetes by the Arabic and Latin Commentators.

	Quality	Ibn Sīnā	Ibn al-Nafīs	Gentile	Despars
AA	Astringency	Astringent, cold juices	Cold, astringent robs, fruit and medications		Cooling and astringent medicines
BB	Anesthetizing	Anesthetizing the region of the low back Numbing [and therefore disabling] the kidney's ability to attract water			Coldness that anesthetizes Anesthetizing or **making insensible the power of sensation**[1]
CC	Cold + cooling	Cold, astringent juices Cooling	Cold, astringent robs, fruit and medications Cooling	Cold softening drugs	**Coldness that anesthetizes** Fruit, vegetables and robs cooling *in facto* or *in potentia*
DD	Cooling the kidney	Cooling the kidney			Cooling the kidneys
DDa	Cooling the liver				**Cooling the liver**
EE	Heat + warming the body	Warming the body with hot compresses and fumigations	Hot astringents (for incontinence caused by cold)	(Using cupping glasses without scarification: because they warm.)	Hot baths Warming the patient
FF	Rarefying	Rarefying			Rarefying
GG	Moistness + moistening	Moistening Moist air	Moistening		Moistening (the kidneys and the liver)
GGa	Moistening the kidneys				**Moistening the kidneys**
GGb	Moistening the liver				**Moistening the liver**

[1] Sensation both draws materia to the place and causes the need to urinate.

	Quality	Ibn Sīnā	Ibn al-Nafīs	Gentile	Despars
HH	Causing perspiration	Causing the watery part [of blood(?)] to exit from the kidney by perspiration			Diverting with strong perspiration the superfluous watery part [of blood(?)] so that it does not flow into urinary channels
II	Laxative	Purging the patient Softening the nature		Purgatives Cold softening drugs	Laxatives Purgatives Softening the nature Softening the stomach
JJ	Rubefacient	Rubefacient drugs			Rubefacients
KK	Soporific	Making the patient sleep		"Note that he must sleep . . ."	Letting the patient sleep as much as possible
LL	Strengthening	Strengthening			
MM	Against thirst	Regulation of the thirst		Taking care of the thirst, i.e. dealing with its cause	Suppressing the thirst
NN	Emetics	Causing the watery part [of blood(?)] to exit from the kidney by vomiting Making the patient vomit after the meal			Causing the patient to vomit Diverting with frequent vomiting the superfluous watery part [of blood(?)] so that it does not flow into urinary channels
OO	Medication for urinary incontinence		**Everything stated in the chapter about urinary inconti-nence**		

APPENDIX 48

(See p. 311)

7.10. Identification of Drugs Recommended for Diabetes by Ibn al-Nafīs.[1]

English Name	Arabic Name	Latin (Scientific) Name
Coriander, dry	*kuzbara yābisa*	*Coriandrum sativum* L.[2]
Costus	*qusṭ*	*Aucklandia costus* Falc.[3] = *Saussurea lappa* Clarke[4]
Cumin	*kammūn*	*Cuminum cyminum* L.[5]
Drumstick tree/ben	*bān*	*Moringa* spp.[6]
Lavender	*usṭūkhūdūs*	*Lavandula Stoechas* L.[7]
Myrrh	*murr*	*Commiphora myrrha* Engl.[8]
Nut grass, yellow	*suʿd*	*Cyperus longus* L.[9] *Cyperus rotundus* L.[10]
Oak	*ballūṭ*	*Quercus* spp.[11]

[1] For methodology, see Chapters 5.1.5.3 and 5.2.5.2. Only those simple drugs which do not appear in the treatments recommended in *K. al-Qānūn* are given. For the identification of the rest of the drugs, see Appendix 40.

[2] Dietrich, 1991, III:59, p. 176; Dubler, 1953, III:67, pp. 309–310; Kahl, 2003, pp. 204, 233; *ibid*., 2007, pp. 326, 343; Lev and Amar, 2008, p. 156; Levey, 1966, pp. 326–327; Schmucker, 1969, no. 635; see Beck, 2005, III:63, p. 208; Lev and Amar, 2002, n. 37, p. 92.

[3] Dubler, 1953, I:15, p. 24; Levey, 1966, p. 316; Schmucker, 1969, no. 576.

[4] Dietrich, 1991, I:16, p. 43; Dubler, 1953, I:15, p. 24; Schmucker, 1969, no. 576. Other identifications: *Chrysanthemum balsamita* (Kahl, 2003, p. 206); *Costus speciosus* (Lev and Amar, 2008, p. 157); *Tanacetum balsamita* (Kahl, 2007, pp. 328, 342).

[5] Schmucker, 1969, no. 649; Kahl, 2003, pp. 204, 233; *ibid*., 2007, pp. 326, 343; Dietrich, 1991, III:56, pp. 174–175; Dubler, 1953, III:64, pp. 307–308; Levey, 1966, pp. 327–328; see Lev and Amar, 2002, n. 73, p. 128; Beck, 2005, III:59, p. 207.

[6] Schmucker, 1969, no. 106; Kahl, 2003, pp. 201, 234; *ibid*., pp. 324, 343; Levey, 1966, p. 241; Lev, 2003, pp. 38–39; Lev and Amar, 2008, p. 356; see *ibid*., 2002, n. 96, p. 150; Beck, 2005, I:34, p. 29; IV:157, p. 310.

[7] Schmucker, 1969, no. 28; Lev and Amar, 2008, p. 196; Kahl, 2003, pp. 208, 234; *ibid*., 2007, pp. 329, 343; Dubler, 1953, III:29, pp. 284–285; see Beck, 2005, III:26, p. 191.

[8] Kahl, 2003, pp. 206, 233; *ibid*., 2007, pp. 327, 344; Lev and Amar, 2008, p. 221; Lev, 2003, p. 71; Schmucker, 1969, no. 704; see Beck, 2005, I:64, p. 45; Lev and Amar, 2002, n. 95, p. 150. Also *Balsamodendron myrrha* Nees. suggested: Dubler, 1953, I:63, pp. 47–48; Levey, 1966, pp. 333–334; Schmucker, 1969, no. 704.

[9] Dietrich, 1991, I:39, p. 4; Dubler, 1953, I:4, pp. 14–15; Kahl, 2003, pp. 208, 233; Lev and Amar, 2008, p. 284; Levey, 1966, p. 282.

[10] Kahl, 2007, pp. 329, 343; Schmucker, 1969, no. 381.

[11] Kahl, 2003, pp. 201, 235; *ibid*., 2007, pp. 324, 342; Levey, 1966, pp. 245–246; Schmucker, 1969, no. 143; see Lev and Amar, 2002, n. 15, p. 70; Beck, 2005, I:106, p. 77.

English Name	Arabic Name	Latin (Scientific) Name
Purslane	*baqla*	Does not exist alone. Possibilities: *baqla yamāniyya*: = *Amaranthus blitum* L.[12] *baqla ḥamqā'*: = *Portulaca oleracea* L.[13] *baqla yahūdiyya:* = *Corchorus olitorius* L.[14]
Sugar	*sukkar*	sugar, saccharum[15] *Saccharum officinarum*[16]
Sukk[17]	*sukk*	
Sumac	*summāq*	*Rhus coriaria* L.[18]

[12] Schmucker, 1969, no. 134; Dietrich, 1991, II:102, p. 122; see Lev and Amar, 2002, n. 66, p. 120; Beck, 2005, II:117, p. 142.

[13] Schmucker, 1969, no. 133; Kahl, 2003, p. 201; *ibid*., 2007, pp. 324, 345; Dubler, 1953, I:113, pp. 206–207; Dietrich, 1991, II:107, p. 124; Levey, 1966, pp. 244–245; Lev, 2003, pp. 74–75.

[14] Levey, 1966, p. 245.

[15] Schmucker, 1969, no. 391; Kahl, 2003, p. 208.

[16] Schmucker, 1969, nos. 391, 580; Dietrich, 1991, II:66, p. 109; Lev, 2003, pp. 84–86; Lev and Amar, 2008, p. 294; Kahl, 2003, p. 208; *ibid*., 2007, p. 329; Levey, 1966, p. 284; see Lev and Amar, 2002, n. 147, p. 204. *Sukkar* is the general term for the sap of the sugar cane which becomes solid upon boiling (Savage-Smith, 1980, pp. 142–143, n. 30).

[17] *sukk* = "Confection, oriental aromatic remedy composed of date juice, gallnut and Indian astringent drugs" (Lev and Amar, 2008; Meyerhof, 1940).

[18] Dietrich, 1991, I:110, p. 79; Dubler, 1953, I:124, pp. 95–96; Kahl, 2003, pp. 208, 235; *ibid*., 2007, pp. 329, 345; Lev and Amar, 2008, p. 490; Levey, 1966, p. 285; Schmucker, 1969, no. 401; see Beck, 2005, II:108, p. 78; Lev and Amar, 2002, n. 6, p. 60.

APPENDIX 49

(See p. 311)

7.11. The Prescriptions for Diabetes by the Latin Commentators.[1]

Ibn Sīnā	Latin Translation	Despars	Gentile
1. 1. cold herbs and fruit and robs from among those which do not cause the urine to flow, like 2. lettuce 3. poppy	1. 1. fructus & olera & robub frigidi de illis que non prouocant: sicut sunt 2. lactuca 3. papauer	1. 1. cooling fruit & vegetables & robs (= inspissated juices) –***peach*** –***plum*** 2. lettuce 3. poppy –***plum*** –***cherry***	1. —
2. 1. camphor 2. water lily 3. similar cold aromatic plants	2. 1. camphora 2. nenufar 3. similia de redolentibus frigidis	2. 1. camphor 2. white-flowered water lily 3. others like that[2]	2. —
		2a. –***opium*** –***water lily*** –***violet*** –***saffron*** or –***mandrake*** or –***henbane***	
		2b. –***hemlock*** –***cassia*** –***violet***	

[1] Latin translation = the Latin translation of *K. al-Qānūn* by Gerard of Cremona as it appears in *Liber Canonis Avicenne* (Venetiis, 1507); M = amount; Q = substitute drug; = = synonym; drugs in bold italics = additions by the commentators. The numbering of the prescriptions corresponds to that of the prescriptions from *K. al-Qānūn* in Ch. 7.1.5.3. Additions by the commentators are numbered according to the prescription they follow, with an additional lower-case letter. The same procedure is followed if Ibn Sīnā's original prescription is divided into several prescriptions by the Latin commentators. Asterisk after the list of ingredients indicates the way of application of the drug. The drug names connected with 'OR' are alternative choices for the same prescription.

[2] *& exorta ab eis.*

Ibn Sīnā	Latin Translation	Despars	Gentile
3. 1. sour, cooled whey, especially the one made of the milk of ewes	3. 1. lac de quo extrahitur butyrum acetosum infrigidatum …: & proprie quod est ex lacte ouino …	3. 1. cooled sour milk, butter removed	3. 1. milk
4. 1. (roasted) pumpkin	4. 1. cucurbita assata	4. 1. pumpkin	4. 1. roasted = (wrapped) in dough[3]
5. 1. cucumber 2. fleawort	5. 1. citrulus 2. psilium	5. 1. cucumber/melon 2. fleawort	5. —
6. 1. (sour) pomegranate[4]	6. 1. granatum acetosum	6. 1. sour pomegranate (*granatum*)	6. —
7. 1. mulberry	7. 1. morum	7. 1. slightly unripe mulberry	7. —
8. 1. plum 2. other similar drugs (as in Prescriptions #3-#8)	8. 1. prunum 2. similia horum	8. 1. Damascus[5] plums 2. –[6]	8. —
		8a. –***cherry dish*** (*ceraserium*) –***cider*** *made of* ***wild apples/fruit*** (*pomum agreste*)	
9. 1. mint	9. 1. menta	9. 1. mint (*menta*) 1. mint (*menta domestica*) (–***some of the waters mentioned in preceding prescriptions***)	9. —
10a. 1. rose	10a. 1. rosa	10a. 1. rose	10. —

[3] *Assate. i. in pasta.*
[4] Or: water of sour pomegranate or sour water of pomegranate (*māʾ al-rummān al-ḥāmiḍ*).
[5] Notice the accuracy of the definition.
[6] Different understanding of *similia horum*, here it seems to be "made/taken in a similar way".

Ibn Sīnā	Latin Translation	Despars	Gentile
10b. 1. rose	10b. 1. rosa	10b. 1. rose	
10c. 1. —	10c. 1. lac[7]	10c. 1. cow's or sheep's milk[8]	
11. 1. water filtered from 1a the sour whey of cows or 1b the sour whey of ewes	11. 1. aqua distillata ex 1a lacte vaccino extracto butyro aut 1b lacte ouino acetoso extracto butyro	11. 1. water distilled from sour milk of cows or sheep, butter removed	11. —
12.[9] 1. eggs 2. vinegar	12. —	12. —	12. —
13. 1. barley 2. filtered water of sour whey[10] *made to a brew	13. 1. hordeum 2. — *alfoca	13. 1. barley (*hordeum*) 2. — (–***other things***) *brew (*alfoca/foca/fuca*)	13. –***dough*** *(pasta)* 1. flour 1. barley (*hordeum*)
14. 1. acacia 2. rose 3. pomegranate flower 4. gum 5. tragacanth Drunk with: 6. fleawort 7. cold water or 8. pumpkin or 9. cucumber[11] or 10. pomegranate,[12, 13]	14. 1. accatia 2. rosa 3. balaustium 4. gummi 5. dragagantum 6. psilium 7. aqua frigida or 8. aqua cucurbitae 9. — 10. —	14. 1. acacia 2. rose 3. pomegranate flower (*balaustium*) 4. gum arabic[14] 5. tragacanth 6. fleawort 7. sweet cold water 8. pumpkin	14. 4. gum = [gum] arabic

[7] In the Latin translation, Prescription #10 ends: *& dosis quantitas cotile vnius lactis* (thus *lactis* seems to have been added as an ingredient).

[8] Following Gerard of Cremona's Latin translation.

[9] The prescription is missing from the Latin translation and from both Latin commentaries, but appears in the same form in Ibn al-Nafīs' commentary.

[10] Missing from the Latin translation and from the Latin commentaries.

[11] Missing from the Latin translation.

[12] Missing from the Latin translation.

[13] Or: 6 + 7 or 8 or 9 or 10. The Latin translation suggests 6 + 7 or 8, Jacques Despars 6 + 7 + 8.

[14] Note the more detailed definition of the type of gum used.

Ibn Sīnā	Latin Translation	Despars	Gentile
15. 1. lozenges of tabasheer Drunk with 2. pumpkin or 3. cucumber or 4. pomegranate	15. 1. trocisci de spodio 2. cucurbita aut 3. citrulus aut 4. granatum	15. 1. lozenges of tabasheer[15] 2. pumpkin or 3. cucumber/melon or 4. pomegranate (*granatum*)	15. —
16. 1. tabasheer 2. *terra sigillata* 3. river crab 4. lac 5. poppy 6. lettuce 7. fleawort	16. 1. spodium 2. terra sigillata 3. cancer fluuialis 4. lacca 5. papauer 6. lactuca 7. psilium	16. 1. tabasheer 2. *terra sigillata* 3. river crab 4. lac 5. poppy 6. lettuce 7. fleawort –***pumpkin*** or –***cucumber/melon*** or –***pomegranate*** (*granatum*)	16. —
		16a. –***pomegranate*** *(psidia)* –***gallnut*** *(gelle)* –***pomegranate flower*** (*balaustium*) –***oak*** *(cupula glandis)* –***knotgrass***	
17a 1. gruel[16] 2. shoots of vine Added, if possible: 3. flowers of quince 4. flowers of apple 5. flowers of medlar,[17, 18]	17a 1. atriplex 2. capreolus vitis 3. oleo malorum 4. oleo cytoniorum 5. oleo azarur	17a 1. orache 2. grapevine tendrils Added, if possible: 4. wild apple (*pomum siluestre*) or 3. quince or 5. medlar (*zarur*) = mountain ash (*sorbum*) or (–***other similar fruit***)	17a 5. medlar (*zarur*) = a small apple/fruit (*pomum*) like medlar (*nespula*)

[15] "*Quorum duas descriptiones dat. v. prima tra. viij. c. xiiij. &. xv.*"

[16] In the Latin translation, and following that, in Despars, instead of 'gruel' (*sawīq*), 'orache' (*atriplex*). This change is difficult to explain.

[17] In the Latin translation, instead of 'flowers', *oleum*.

[18] In the Arabic text Prescriptions #17a and #17b are one, but the Latin translation understands them as two separate ones.

Ibn Sīnā	Latin Translation	Despars	Gentile
17b. 1. fresh rose 2. rhubarb 3. juice of unripe grapes 4. knotgrass 5. pomegranate	17b. 1. sulla 2. ribes 3. agresta 4. virga pastoris 5. granatum	17b. 1. alfalfa (*sullq*) = *herba artetica* 3. juice of unripe grapes (*agresta*) = unripe grapes and their juice (*uva acerba vel succus ipsius*) 2. rhubarb/ribes 4. knotgrass 5. pomegranate (*granatum*)[19]	17b. 1. alfalfa (*sula*) = *herba impinguatiua* or = *herba arterica*
18. 1. acacia 2. frankincense 3. salsify 4. ladanum 5. *rāmik*[20] 6. gallnut 7. myrtle	18. 1. accatia 2. thus 3. barba hircina 4. laudanum 5. remich 6. galla 7. myrtus	18. 1. acacia 2. frankincene 3. salsify 4. ladanum 5. *remich* = compound drug made of –***gallnuts*** and –***raisins*** 6. gallnuts 7. myrtle or 7. ***oak*** *(quercus)* or 7. ***oak*** *(esculus)*	18. 5. *remith* = compound drug made of –***raisins*** and –***gallnuts***
19. 1. whey 2. the cold, astringent juices previously mentioned for the dressings[21] –gruel –shoots of vine –fresh rose –rhubarb –green, unripe grapes –knotgrass –pomegranate –quince –apple –medlar	19. 1. lac de quo extractum est butyrum 2. succi frigidi stiptici predicti in emplastris[22] –atriplex –capreolus vitis –sulla –ribes –agresta –virga pastoris –granatum –malum –cytonium –azarur	19. 1. sour milk of which butter has been removed 2. rhubarb/ribes 2. knotgrass 2. grapevine tendrils	19. —

[19] "*Sub forma emplastri renibus appone.*"
[20] An astringent compound drug. See Appendix 40.
[21] In Prescription #17, of which the following are taken. Despars repeats only part of them.
[22] See p. 632, n. 21, above.

Ibn Sīnā	**Latin Translation**	**Despars**	**Gentile**
20. 1. freshly milked milk (*al-laban al-ḥalīb*)[23] 2. pumpkin 3. almond	20. 1. fenugrecum 2. cucurbita 3. amigdala[24]	20. 1. fenugreek 2. pumpkin 3. sweet almond	20. —
21a. 1. wheat (*khandarūs*)	21a. 1. candarusum	21a. 1. wheat (*candarusum*) = Roman wheat (*triticum romanum*) or = Roman barley (*hordeum romanum*) both without husk	21a. 1. wheat (*candarusum*) = barley (*hordeum*) without husk = grain/wheat (*farrus*) = grain/wheat (*far*)
21b. 1. barley	21b. 1. hordeum	21b. 1. barley (*hordeum*) –***wheat/cereals*** *(frumentum)* or –***barley*** *(hordeum)* –***sour milk***	21b. —
21c. 1. meat dish (*maṣūṣāt*)	21c. 1. almosusat	21c. 1. meat dish (*almososus*) –*almososat* = tamarind -*almosos* or *almososus* is a type of food like –***pigeon*** cooked in –***vinegar***, in the stomach of which is put –***mint***	21c. 1. *Almosusath* is food made with vinegar.

[23] In the Latin translation, and following that, in Despars, instead of 'fresh milk' (Ar. *al-laban al-ḥalīb*), 'fenugreek' (*fenugrecum*). This may be caused by a scribal error in one of the texts, as fenugreek is in Arabic *ḥulba*.

[24] In the Latin translation these are given as examples, whereas in Arabic they are ingredients of a prescription.

Ibn Sīnā	Latin Translation	Despars	Gentile
21d. 1. meat dish (*halāmāt*)	21d. 1. allellemech	21d. 1. meat dish (*allellemech*) = –***wheat** (siligo)* of which is made porridge (*pulmentum*) –***violet*** or –***butter*** or –***plums*** or –***apples/fruit** (pomum)* or –***manna, frankincense*** or –***red sugar***	21d. 1. *Alchelemet* is another type of food.
21e. 1. meat soups made with 2. meat of young sheep 3. meat of fattened hens[25]	21e. 1. allifidabeget plurima	21e. 1. meat soups (*allifidabeget*) = meat dish (*tafeata*) –***chicken*** –***cut meat*** –***oil*** –***onion***	21e. 1. meat soups (*alesfidabaget*) = meat dish (*taffea*): it is of 2 types: a white and a green one –***meat*** –***water*** –***coriander*** –***other herbs***
21f. 1. meat of young sheep (*al-luḥūm al-ḥawliyya*) *see 21e	21f. 1. pinguedo carnium animalium	21f. 1. grease of the meat of calves and oxen	21f. —
21g. 1. fattened hens *see 21e and 21f	21g. 1. gallina pinguis	21g. 1. young and fat hens	21g. —
21h. 1. cow trotters	21h. 1. pedes vaccae	21h. 1. cow trotters 1. ox trotters –***sheep trotters*** –***pig's trotters***	21h. —

[25] The Arabic text makes possibly (but perhaps not necessarily) the meats to be the ingredients of the soup, whereas the Latin translation treats them as equal to it, that is, as 3 different prescriptions.

Ibn Sīnā	Latin Translation	Despars	Gentile
21i. 1. fresh fish It is made sour and not made sour…[26]	21i. 1. piscis recens 2. acetum	21i 1. fresh fish 2. vinegar *–**fish dish** (gelatina)* ***–crab*** ***–perch*** ***–pike***[27]	21i —
21j. 1. milk of ewes 2. water	21j. 1. lac ouinum decoctum cum 2. aqua	21j. 1. milk of ewes cooked with sweet water 1. milk 2. water	21j. 1. milk i.e. not boiled
		21k. ***–tamarinds*** or ***–silver foil*** or ***–plum*** or ***–fleawort*** ***–quince*** or ***–lettuce*** ***–purslane***	
		21l ***–flax*** ***–fenugreek*** ***–malva*** ***–figs*** ***–cassia fistula*** ***–lily*** ***–salt*** ***–ox's tripe*** *–**chicken** (capo)* ***–cassia***	
22a. 1. aloe pills	22a 1. pillulis de aloe	22a 1. aloe pills	22a —

[26] The Latin translation and Despars mention explicitly vinegar (*acetum*), clearly as the medium for the sourness.
[27] A fish.

Ibn Sīnā	Latin Translation	Despars	Gentile
22b 1. radish 2. other similar drugs	22b 1. raphanus 2. quae sunt ei similia	22b 1. radish –its root –***meat broth*** (*brodium*) 2. medicines similar to radish –***squill*** or –***saffron*** or –***Strychnine tree***	22b —
		22b(1) –***juniper*** or –***eaglewood*** or –***iris*** or –***laurel*** –***chamomile*** –***melilot*** –***sage*** –***marjoram*** –***yellow nut grass*** or –***rosemary***	
		22b(2) –***garlic/onion*** –***pepper*** –***mustard*** –***pellitory*** –***pigeon's excrement*** –***hot oils***: as –***spurge*** –***rue*** or –***castoreum*** –***wax***	
		22b(3) –***sage*** –***rosemary*** –***lavender*** –***chamomile*** –***wormwood*** –***dill*** –***melilot***	

Ibn Sīnā	Latin Translation	Despars	Gentile
22c 1. aromatic wine	22c 1. vinum odoriferum	22c 1. aromatic wine: as –***malvoisia*** –***wine, the warmth of which penetrates quickly to the whole body***	22c —

APPENDIX 50

(See p. 312)

7.12. Identification of Drugs Recommended for Diabetes by the Latin Commentators.[1]

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonyme
Acacia	*accatia*	1. *Prunus*[2] 2. *Acacia*[3]	AR: *aqāqiyā* = Acacia[4]
Alfalfa/rose	*sula, sulla*	1. *Medicago*[5]	AR: *al-ward al-raṭib* = *Rosa*[6] –**sulla** = herba artetica (D.) –**sula** = herba impinguatiua = herba arterica (G.)
Almond, sweet	*amigdala dulcis*	1. *Prunus* = *Amygdalus*[7]	AR: *lawz* = *Amygdalus*[8]
Aloe	*aloe*	1. *Aloe*[9]	AR: *ṣabr* = *Aloe*[10]

[1] For methodology, see Ch. 5.3.5.2.

[2] Daems, 1993, nos. 36, 513; *ibid*., 1967, p. 264; Thorndike and Benjamin, 1946, pp. 5, 257.

[3] André, 1956, pp. 14, 300, Glare, 1982, p. 16, Liddell and Scott, 1977, p. 44, Berendes, 1902, p. 119, 1:133, Dragendorff, 1898, p. 290; Beck, 2005, I:101, p. 72.

[4] Beck, 2005, I:101, p. 72; Dietrich, 1991, I:103, pp. 74–75; Dubler, 1953, I:113, pp. 86–87; Kahl, 2003, pp. 206, 232; *ibid*., 2007, pp. 323, 343; Lev and Amar, 2008, pp. 180, 325; Levey, 1966, p. 234; Schmucker, 1969, no. 61.

[5] *Sulla*. André, 1956, pp. 203, 307. Cf. Kahl, 2003, pp. 208, 233: *sull* = Indian quince = *Docynia indica*.

[6] Dietrich, 1991, I:101, p. 73; Dubler, 1953, I:110, pp. 83–84; Kahl, 2003, pp. 208, 235; *ibid*., 2007, pp. 329, 345; Lev and Amar, 2008, pp. 261–262; Lev, 2003, pp. 52–54; Levey, 1966, pp. 344–345; Schmucker, 1969, no. 797; see Beck, 2005, I:99, p. 70; Lev and Amar, 2002, n. 47, p. 102.

[7] Glare, 1982, p. 125; Liddell and Scott, 1977, p. 81; Riddle, 1987, p. 49; Berendes, 1902, p. 142, 1:176; Wimmer, 1964, p. 532; see André, 1956, p. 29; see Schmucker, 1969, no. 685; see Beck, 2005, I:123, pp. 87–88.

[8] Schmucker, 1969, no. 658; Lev and Amar, 2008, p. 91; Dubler, 1953, I:139, pp. 112–113; Lev, 2003, pp. 32–33; see Lev and Amar, 2002, n. 185, p. 242.

[9] Daems, 1993, no. 17; *ibid*., 1967, p. 264; André, 1956, p. 24; Glare, 1982, p. 106; Liddell and Scott, 1977, p. 68; Berendes, 1902, p. 277, 3:22 (25); Beck, 2005, III:22, p. 18.

[10] Dubler, 1953, III:23, pp. 279–280; Kahl, 2003, p. 207; *ibid*., 2007, pp. 328, 342; Lev and Amar, 2008, pp. 94–97; *ibid*., 2002, n. 19, p. 74; Lev, 2003, pp. 33–34; Levey, 1966, p. 297; Schmucker, 1969, no. 452; see Beck, 2005, III:22, p. 187.

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonyme
Apple/fruit	*malum*	1. fruit having seeds 2. *Pyrus/Malus*[11]	AR: *tuffāḥ* = *Pyrus/Malus*[12]
	pomum	1. *Malus/Pyrus Malus* L.[13] 2. fruit in general[14]	–**zarur** est pomum paruulum factum sicut nespula. (G.)
Barley	*hordeum*	1. *Hordeum*[15]	AR: *shaʿīr* = *Hordeum*[16] –**candarusum** = triticum romanum aut hordeum romanum cui non est cortex (D.) –**candarusum** = hordeum sine cortice (G.) = farrus (G.) = far (G.)
Barley water	*kist hordei*	1. *Hordeum*[17]	AR: *kashk* = barley-water; pounded wheat or barley; *Hordeum*[18]
Brew	*alfoca, foca, fuca*	1. drink made of barley and other things[19]	AR: *fuqqāʿ* = fermented drink made out of barley, similar to beer[20] –**alfoca** seu foca vel fuca = potus qui fit de farina hordei cum rebus alijs (F.) –**alfoca** est cibus factus de pasta vel farina (G.)

[11] André, 1956, pp. 196, 199.

[12] Schmucker, 1969, no. 169; Kahl, 2003, pp. 208, 234; *ibid.*, 2007, pp. 329, 342; Dietrich, 1991, I:118, p. 83; Lev and Amar, 2008, p. 335; see *ibid.*, 2002, n. 192, p. 248; Beck, 2005, I:115, p. 84. *Pyrus malus* = *Malus sylvestris* (Lev and Amar, 2008, p. 335).

[13] André, 1956, pp. 199, 257, 258; Niermeyer, 1954–1976, p. 811; Battaglia, 1961–2000, Vol. 13, pp. 827–830.

[14] André, 1956, p. 257; Glare, 1982, p. 1400.

[15] Daems, 1993, nos. 56, 348; *ibid.*, 1967, pp. 273, 289; André, 1956, p. 165; Glare, 1982, p. 803; Dragendorff, 1898, p. 88; see Schmucker, 1969, no. 431.

[16] Schmucker, 1969, no. 431; Lev and Amar, 2008, p. 353; Kahl, 2003, pp. 207, 234; Dubler, 1953, II:78, pp. 181–182; Dietrich, 1991, II:73, p. 111; Levey, 1966, p. 293; see Lev and Amar, 2002, n. 184, p. 240; Beck, 2005, II:86, p. 130.

[17] See Appendix 50 (p. 639, n. 18, below).

[18] Lane, 1886–1893, p. 3001; Levey, 1966, p. 327: *kishk* = A food made of groats mixed with sour milk, and dried in the sun.

[19] Glossar. medic. Simon. Januens. ex Cod. reg. 6959 via Du Cange, 1937–1938, p. 531.

[20] Lev and Amar, 2008, p. 571; Lane, 1886–1893, p. 2428; Dietrich, 1991, II:74, p. 111; Schmucker, 1969, no. 535; Kahl, 2007, pp. 324; see Beck, 2005, II:87, p. 131. "Recipes are extant for a kind of barley beer called *fuqqāʿ* which could be simply and cheaply made. By mixing into the basic barley wort ingredients such as wheat, rice or walnuts, the flavour and consistency were altered. A more exotic type was brewed from barley sweetened with honey and seasoned with pepper, cloves, ginger, cinnamon and rue with a handful of

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonyme
Butter[21]	*butyron*		
Calf[22]	*vitulus*		
Camphor	*camphora*	1. *Dryobalanops*[23] 2. *Cinnamomum*	AR: *kāfūr* = *Cinnamomum*[24]
Cassia	*casia*	1. *Daphne*[25] 2. *Cinnamomum*[26] 3. *Cassia*[27] 4. *Majorana*[28]	
Cassia fistula	*casiafistula*	1. *Cassia*[29] 2. *Cinnamomum*[30]	
Castoreum[31]	*castoreum*		
Chamomile	*camomilla*	1. *Chamomilla*[32] 2. *Chamaemelum*[33] 3. *Anthemis*[34] 4. *Matricaria*[35]	
Cherry	*cerasus*	1. *Prunus*[36] = 2. *Cerasus*[37]	

millet (*jāwars*) blended in. Fermentation was achieved by placing the contents in a skin container (*kir*) and leaving it for two days ready for drinking on the third." See Waines, 1989, p. 26.

[21] Glare, 1982, p. 245.

[22] The young of cattle, a calf (*Bos taurus*) (Glare, 1982, p. 2081).

[23] Daems, 1967, p. 278.

[24] Kahl, 2003, pp. 204, 233; *ibid*., 2007, pp. 326, 343; Lev and Amar, 2008, p. 123; Levey, 1966, p. 321; Schmucker, 1969, no. 610; see Lev and Amar, 2002, n. 149, p. 206. Schmucker suggests also *Dryobalanops aromatica* Gaertn., *Blumea balsamifera* Dc.

[25] Dragendorff, 1898, p. 459; Glare, 1982, p. 280; André, 1956, p. 75.

[26] André, 1956, p. 75; Glare, 1982, p. 280; Dragendorff, 1898, p. 239; Daems, 1993, no. 154; Beck, 2005, I:13, p. 13.

[27] Daems, 1993, no. 153; Battaglia, 1961–2000, Vol. 2, pp. 849–850.

[28] Glare, 1982, p. 280; André, 1956, pp. 26, 75.

[29] Daems, 1993, no. 153; Kahl, 2003, p. 204.

[30] André, 1956, pp. 75, 139.

[31] Strong-smelling substance obtained from inguinal glands of the beaver (*Castor fiber*) and used medicinally by the ancients, castor (Glare, 1982, p. 282; Battaglia, 1961–2000, Vol. 2, p. 862; see Renaud and Colin, 1934, p. 103; see Beck, 2005, I:24, pp. 99–100).

[32] Daems, 1993, nos. 112, 552.

[33] *Ibid.*

[34] Daems, 1993, no. 112; *ibid*., 1967, p. 278; see Beck, 2005, III:137, p. 241.

[35] André, 1956, pp. 67, 84; Daems, 1967, p. 278; see Beck, 2005, III:137, p. 241.

[36] André, 1956, pp. 81–82; Hort, 1961, Vol. 2, p. 456; Dragendorff, 1898, pp. 284–285; Glare, 1982, p. 301; Berendes, 1902, p. 134, 1:157; Beck, 2005, I:113, p. 83.

[37] Wimmer, 1964, p. 538.

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonyme
Chicken	*capo*[38]		
	pullus[39]		
Cider[40]	*sicera*		
Coriander	*coriandrum*	1. *Coriandrum*[41]	
Crab, river crab	*cancer, cancer fluvialis*	1. *Astacus*[42]	AR: *saraṭān nahrī* = *Astacus*[43]
Cucumber/melon	*citrulus*	1. *Citrullus*[44] 2. *Cucumis*[45]	AR: *khiyār* = *Cucumis*[46]
Dill	*anetum*	1. *Anethum*[47]	
Dough[48]	*pasta*		–**assata** = in pasta (G.)
Eaglewood	*lignum aloes*	1. *Aquilaria*[49] 2. *Aloëxylon*[50]	
Excrement[51]	*fimus*		

[38] *Gallus castratus* (Battaglia, 1961–2000, Vol. 2, pp. 722–723; Du Cange, 1937–1938, Vol. 2, p. 143).
[39] A young domestic fowl, a chicken, pullet (*Gallus domesticus* L.) (Glare, 1982, p. 1518).
[40] Any fermented beverage save wine or beer, especially cider (Niermeyer, 1954–1976, p. 969; Battaglia, 1961–2000, Vol. 18, p. 1052).
[41] Daems, 1993, nos. 121, 536; *ibid.*, 1967, p. 280; André, 1956, p. 100; Dragendorff, 1898, p. 500; Glare, 1982, p. 445; Hort, 1961, Vol. 2, p. 458; Riddle, 1987, p. 57; Berendes, 1902, p. 304, 3:64 (71); see Beck, 2005, III:63, p. 208.
[42] Berendes, 1902, p. 156, 2:12; Glare, 1982, p. 264; see Schmucker, 1969, no. 375.
[43] Schmucker, 1969, no. 375; Kahl, 2003, p. 207.
[44] Daems, 1993, nos. 159, 159*.
[45] *Ibid.*, no. 174; see Schmucker, 1969, no. 286.
[46] Schmucker, 1969, no. 286; Lev and Amar, 2008, p. 394; Kahl, 2003, pp. 204, 233; *ibid.*, 2007, pp. 325, 343; see Lev and Amar, 2002, n. 101, p. 156.
[47] Daems, 1993, no. 10; *ibid.*, 1967, pp. 265, 269; André, 1956, p. 32; Glare, 1982, p. 128; Liddell and Scott, 1977, p. 125; Riddle, 1987, p. 57; Berendes, 1902, p. 302, 3: 60 (67); Wimmer, 1964, pp. 532–533.
[48] Niermeyer, 1954–1976, p. 770.
[49] Battaglia, 1961–2000, Vol. 1, pp. 344–345; Dragendorff, 1898, p. 458; Lev and Amar, 2008, p. 97 (Arabic: ʿūd, ʿūd hindī); see Beck, 2005, I:22, p. 21.
[50] Dragendorff, 1898, p. 298.
[51] Glare, 1982, p. 702; see Niermeyer, 1954–1976, p. 427. For more information on the use of excrement for healing purposes, see Beck, 2005, II:80, pp. 124–125.

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonyme
Fenugreek	*fenugrecum*	1. *Trigonella*[52]	AR: *al-laban al-ḥalīb* = freshly milked milk[53, 54]
Fig	*ficus*	1. *Ficus*[55]	
Fish[56]	*piscis*		AR: *samak* = fish
Fish dish[57]	*gelatina*		
Fleawort	*psilium*	1. *Plantago*[58]	AR: *bizr qaṭūnā* = *Plantago*[59]
Frankincense	*thus*	1. *Boswellia*[60]	AR: *kundur* = *Boswellia*[61]
Gallnut	*galla*	1. *Quercus*: gall-nut[62]	AR: *'afṣ* = gallnuts from *Quercus*[63] –**remich** = confectio ex gallis & passulis (D.) –**remith** = confectio de passulis & gallis ex qua fit gallia muschata &c. (G.)
Garlic/onion	*allium*	1. *Allium*[64]	

52 Daems, 1993, no. 210; André, 1956, p. 135; Dragendorff, 1898, p. 316; Glare, 1982, p. 671.

53 Lane, 1886–1893, p. 624; Kahl, 2003, p. 204: *laban ḥalīb* = fresh milk.

54 In the Latin translation 'fenugreek' (*fenugrecum*) instead of 'fresh milk' (Ar. *al-laban al-ḥalīb*). This may be caused by a scribal error in one of the texts, as fenugreek is in Arabic *ḥulba*.

55 Daems, 1993, no. 178; André, 1956, pp. 73, 136; Glare, 1982, p. 696; Dragendorff, 1898, p. 172; Thorndike and Benjamin, 1946, p. 136; Schmucker, 1969, no. 180.

56 Glare, 1982, p. 1383.

57 Chosen as the translation because of the rest of the prescription is connected with fish. Fish jelly (Battaglia, 1961–2000, Vol. 6, p. 628). "*Piscium est, quando pisces coquuntur in aceto, et postea congelatur acetum cum quo coquuntur: et eodem modo fit cum carnibus.*" Matth. Silvatic. via Du Cange, 1937–1938, Vol. 4, p. 51.

58 Daems, 1993, no. 368; André, 1956, p. 263; Glare, 1982, p. 1511; Dragendorff, 1898, p. 618; Beck, 2005, IV:69, p. 277.

59 Schmucker, 1969, no. 121; Kahl, 2003, pp. 202, 235; *ibid.*, 2007, pp. 324, 343; Levey, 1966, p. 317; Dubler, 1953, IV:71, p. 418; Dietrich, 1991, IV:64, p. 241; Lev and Amar, 2008, p. 242; see *ibid.*, 2002, n. 84, p. 138.

60 Daems, 1993, nos. 456, 352; *ibid.*, 1967, p. 301; André, 1956, pp. 323, 37; Glare, 1982, pp. 1939, 1995; Dragendorff, 1898, p. 366; see Schmucker, 1969, no. 651.

61 Dietrich, 1991, I:58, p. 57; Kahl, 2003, pp. 204, 232; *ibid.*, 2007, pp. 326, 343; Lev and Amar, 2008, p. 168; see Beck, 2005, I:68, p. 49; Levey, 1966, pp. 328–330. Schmucker, 1969, no. 651, adds *Juniperus* L.

62 André, 1956, p. 146; Glare, 1982, p. 753; Niermeyer, 1954–1976, p. 460; Daems, 1967, p. 273.

63 Dubler, 1953, I:123, pp. 94–95; Kahl, 2003, pp. 201, 235; Lev and Amar, 2008, p. 225; Schmucker, 1969, no. 492; see Beck, 2005, I:107, p. 78; Lev and Amar, 2002, n. 16, p. 70.

64 Daems, 1993, nos. 4, 502; *ibid.*, 1967, pp. 282–283; André, 1956, pp. 23, 28; Glare, 1982, p. 101; Dragendorff, 1898, pp. 119, 121.

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonyme
Grape, (unripe)	*uva acerba*	1. *Vitis*[65]	–**agresta** = uva acerba vel succus ipsius
Grape, unripe/sour, juice of	*agresta*	1. *Vitis* (unripe grapes or their juice)[66]	AR: *ḥiṣrim* = *Vitis*, unripe/sour fruit[67] –**agresta** = uva acerba vel succus ipsius
Grapevine tendrils	*capreolus vitis*	1. *Vitis*: vine-tendril[68]	AR: *ʿasālij al-karm* = *Vitis*[69]
Grease[70]	*pinguedo*		AR: *al-luḥūm al-ḥawliyya* = meat of an one-year-old solid-hoofed animal[71]
Gum	*gummi*	1. gum[72] 2. resin[73]	AR: *ṣamgh* = resin, gum[74] –**gummi**. f. arabicum (G.)
Gum arabic	*gummi arabicum*	1. *Acacia*[75]	–**gummi**. f. arabicum (G.)
Hemlock	*conium*	1. *Cicuta*[76] 2. *Conium*[77]	

[65] André, 1956, p. 337; Daems, 1967, pp. 293–294, 302; Glare, 1982, p. 2120.

[66] Dragendorff, 1898, p. 415; Schelenz, 1965, p. 99; Thorndike and Benjamin, 1946, p. 12; André, 1956, pp. 21, 333, 337; Glare, 1982, pp. 2079, 2120; Daems, 1967, pp. 302, 293–294.

[67] Kahl, 2007, pp. 325, 343; Lev and Amar, 2008, p. 176; Lev, 2003, pp. 57–59; Schmucker, 1969, no. 245; see Beck, 2005, V:5, p. 332.

[68] André, 1956, pp. 70, 333; Glare, 1982, pp. 272, 2079; Daems, 1967, p. 302.

[69] Kahl, 2003, pp. 204, 235; *ibid.*, 2007, pp. 326, 345; Lev, 2003, pp. 57–59; Schmucker, 1969, no. 632; see Beck, 2005, V:1, p. 330.

[70] Niermeyer, 1954–1976, p. 797; Glare, 1982, p. 1381. For more information on the use of fat/grease for healing purposes, see Beck, 2005, II:76, pp. 116–121.

[71] Lane, 1886–1893, p. 676.

[72] André, 1956, pp. 109, 154; Glare, 1982, p. 470; Niermeyer, 1954–1976, p. 477; see Schmucker, 1969, no. 457.

[73] André, 1956, pp. 109, 154; Niermeyer, 1954–1976, p. 477; see Schmucker, 1969, no. 457.

[74] *Ibid.*, no. 457. Used also instead of *ṣamgh ʿarabī* = gum from *Acacia* spp. Schmucker, 1969, no. 460; Lev and Amar, 2008, p. 180; Kahl, 2003, pp. 207, 232; *ibid.*, 2007, pp. 328, 343; Levey, 1966, p. 234; Lev, 2003, pp. 59–60; see Lev and Amar, 2002, n. 178, p. 234.

[75] Daems, 1967, p. 275: see Dragendorff, 1898, p. 290.

[76] Battaglia, 1961–2000, Vol. 3, pp. 127, 567; Du Cange 1937–1938, Vol. 2, p. 506; Daems, 1993, nos. 108, 562.

[77] André, 1956, pp. 90, 99; Du Cange 1937–1938, Vol. 2, p. 506; Daems, 1993, nos. 108, 562; Beck, 2005, IV:78, p. 282.

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonyme
Hen[78]	*gallina*		AR: *al-dajāj al-musammana* = chicken, hen[79]
Henbane	*iusquamus albus*	1. *Hyoscyamus*[80]	
Herba arterica	*herba arterica*	SEE *herba artetica agrestis* Possible identifications, exact identification impossible: 1. *Euphrasia*[81] 2. *Mercurialis*[82] 3. Of or affecting the wind-pipe; a medicine for the air-passages[83]	S: **sula** = herba impinguatiua = herba arterica (G.)
Herba artetica agrestis	*herba artetica agrestis*	SEE *herba arterica* Possible identifications, exact identification impossible: 1. *Euphrasia*[84] 2. *Raphanus*[85] 3. *Armoracia*[86] 4. *Rubia*[87] 5. *Thymus*[88] 6. *Satureja*[89] 7. *Galium*[90]	S: herba artetica = **sulla** (D.)
Herba impinguativa	*herba impinguativa*	No identification found.	S: herba impinguatiua = herba arterica = **sula** (G.)

78 *Gallus domesticus* L. (Glare, 1982, p. 753).
79 *Gallus gallus domesticus* (Lev and Amar, 2008, p. 141).
80 Dragendorff, 1898, p. 590; André, 1956, pp. 25, 166; see Beck, 2005, IV:68, p. 276.
81 *Artecira*. Daems, 1993, no. 198.
82 *Arterites*. *Ibid*., no. 315.
83 *Arteriace*. Glare, 1982, p. 176.
84 *Artecira*. Daems, 1993, no. 198.
85 *Arthetica*. *Ibid*., no. 694.
86 *Ibid*.
87 *Yua artetica*. Daems, 1993, nos. 414, 414*.
88 *Yva artetica*. *Ibid*., nos. 723, 723*.
89 *Ibid*.
90 *Yva artetica*. *Ibid*., no. 723*.

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonyme
Iris	*yreos*	1. *Iris*[91] 2. *Lilium*[92]	
Juniper	*iuniperus*	1. *Juniperus*[93]	
Knotgrass	*virga pastoris*	1. *Dipsacus*[94] 2. *Polygonum*[95]	AR: *ʿaṣā al-rāʿī* = *Polygonum*[96]
Lac	*lacca*	lac, gum[97]	AR: *lakk* = gummi lacca[98]
Ladanum	*laudanum*	*Cistus*[99]	AR: *lādhan* = *Cistus*[100]
Laurel	*laurus*	*Laurus*[101]	
Lavender	*sticados arabicum*	*Lavandula*[102]	

91 Daems, 1993, nos. 235, 273, 606, 620; *ibid.*, 1967, p. 282; André, 1956, pp. 171–172; Thorndike and Benjamin, 1946, p. 347; Beck, 2005, I:1, p. 5.

92 Daems, 1993, nos. 273, 606.

93 Berendes, 1902, pp. 97–98, 1:103; Daems, 1993, nos. 262, 410, 613; André, 1956, p. 173; Glare, 1982, p. 983.

94 Daems, 1993, nos. 160, 474, 750; Löw, 1924–1934, Vol. 1, p. 587.

95 Based on the Arabic term and the synonymy with *poligonium*.

96 Dubler, 1953, IV:4, pp. 378–379; Kahl, 2003, pp. 201, 235; *ibid.*, 2007, pp. 323, 344; Schmucker, 1969, nos. 430, 490, 767; see Beck, 2005, IV:4, p. 253.

97 Niermeyer, 1954–1976, p. 578; Du Cange, 1937–1938, Vol. 5, p. 6.

98 Lev and Amar, 2008, p. 193: *lakk* = *Laccifer lacca*. "The Kerridae family consists of many aphid species, the most important being *Laccifer lacca*. It grows in South-East Asia on various tree species. The caterpillars, after hatching from their eggs, dwell on the host tree and suck out their food. The liquids that were drawn from the tree undergo a bio-chemical process in the larvae and are secreted from a special gland as a liquid, which transferred into lac. This substance is collected from the trees and sold as a reddish-brown colouring material and a medicinal substance." Dietrich, 1991, I:23, p. 46: *al-lakk* = Lacca, Gummi lacca, Resina lacca, das Lackharz. "Es ist eine gelbe bis rote, harzartige Masse, die durch den Stich der Gummilackschildlaus, *Coccus lacca*, in die Triebe von Ficus-, Rhamnus-, Butea-, Mimosa- und anderen Arten erzeugt wird. Das Wort bezeichnet auch den Siegellack (cire d'Espagne). ferner den Scharlachfärbstoff der Kermesschildlaus." See Lev and Amar, 2002, n. 226, p. 290; Schmucker, 1969, no. 682; Kahl, 2003, p. 204; *ibid.*, 2007, p. 326.

99 Dragendorff, 1898, p. 446; Glare, 1982, p. 995; Riddle, 1987, p. 59; André, 1956, p. 177; see Schmucker, 1969, no. 665.

100 Schmucker, 1969, no. 665; Lev and Amar, 2008, p. 194; Kahl, 2003, pp. 204, 233; *ibid.*, 2007, pp. 326, 344; Dubler, 1953, I:108, pp. 80–81; Levey, 1966, p. 329.

101 André, 1956, p. 182; Daems, 1993, no. 629; *ibid.*, 1967, p. 265; Glare, 1982, p. 1010.

102 Daems, 1993, nos. 431, 720a; Thorndike and Benjamin, 1946, pp. 302, 304; see Beck, 2005, III:26, p. 191.

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonyme
Lettuce	*lactuca*	1. *Lactuca*[103]	AR: *khass* = *Lactuca*[104]
Lily	*lilium*	1. *Lilium*[105] 2. *Iris*[106]	
Linen, flax	*linum*	1. *Linum*[107]	
Malva	*altea*	1. *Althaea*[108] 2. *Malva*[109]	
Mandrake	*mandragora*	1. *Mandragora*[110]	
Manna, frankincense	*manna granata*	1. *Boswellia*[111]	
Marjoram	*maiorana*	1. *Origanum majorana*[112] = 2. *Majorana*[113]	
Meat	*caro / carnis*	1. meat[114]	AR: *luḥūm* = meats
Meat broth[115]	*brodium*		
Meat dish	*alchelemet, allellemech*		AR: *al-halāmāt* S: **allellemech** = siligo de qua fit pulmentum: sicut ex hordeo fit hordeum mundatum (D.) S: **alchelemet** est alius modus cibarij. (G.)

103 Daems, 1993, nos. 275, 615; *ibid.*, 1967, p. 281; André, 1956, p. 176; Dragendorff, 1898, p. 691; Glare, 1982, p. 995; see Schmucker, 1969, no. 270.

104 Dietrich, 1991, II:119, p. 129; Kahl, 2003, pp. 205, 234; *ibid.*, 2007, pp. 325, 344; Lev and Amar, 2008, p. 437; Schmucker, 1969, no. 270; see Beck, 2005, II:136, p. 150; Lev and Amar, 2002, n. 57, p. 112.

105 Daems, 1993, nos 273, 619; *ibid.*, 1967, p. 281; André, 1956, p. 187; Dragendorff, 1898, pp. 121–122; Glare, 1982, p. 1030.

106 Daems, 1993, no. 273; André, 1956, pp. 171, 187, 216.

107 André, 1956, p. 188; Glare, 1982, p. 1034; Hort, 1961, Vol. 2, p. 462; Riddle, 1987, p. 50; Dragendorff, 1898, p. 342; Daems, 1967, p. 283; see Beck, 2005, II:103, p. 135.

108 André, 1956, pp. 25, 162, 196, 332; Dragendorff, 1898, p. 422; Daems, 1993, nos. 11, 204, 265, 516; *ibid.*, 1967, p. 289; Glare, 1982, p. 109; Thorndike and Benjamin, 1946, p. 18; Beck, 2005, III:146, p. 246.

109 Daems, 1993, nos. 11, 99, 204, 265, 515; Thorndike and Benjamin, 1946, p. 18.

110 Daems, 1993, no. 313; *ibid.*, 1967, p. 284; André, 1956, pp. 199, 211; Glare, 1982, p. 1072; Hort, 1961, Vol. 2, p. 463; Riddle, 1987, p. 60; Dragendorff, 1898, p. 597; Beck, 2005, IV:75, p. 280.

111 Daems, 1993, no. 352; André, 1956, p. 200; Glare, 1982, p. 1074.

112 Daems, 1993, nos. 317, 649; Thorndike and Benjamin, 1946, p. 176.

113 Thorndike and Benjamin, 1946, p. 176; André, 1956, p. 26.

114 Glare, 1982, p. 278.

115 Niermeyer, 1954–1976, p. 106; Battaglia, 1961–2000, Vol. 2, pp. 389–390; Du Cange, 1937–1938, Vol. 1, pp. 754–755.

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonyme
Meat dish[116]	*almosos, almososus, almososat, almosusath*		AR: *al-maṣūṣāt* = Dish of flesh-meat, cooked, and steeped in vinegar; or steeped in vinegar, and then cooked: or of the flesh of birds particularly[117] S: **almososat** = thamarindus (Avi. iiij. prima trac. ij. ca. de siti in febribus) (D.) S: **almosos** seu **almososus** est genus cibariorum sicut columba in aceto cocta: in cuius ventre ponit menta.) (D.) S: **almosusath** est cibus acetosus. (G.)
	taffea, tafeata		S: tafeata = **allifidabeget** (D.) S: taffea = **alesfidabaget** (G.)
Meat soup	*allifidabeget, alesfidabaget*		AR: *al-isfīdbājāt* = meat soup S: **allifidabeget multa**. = tafeata (D.) S: **alesfidabaget**. = taffea: que est duplex: quodam alba quodam viridis (G.)
Medlar	*zarur, azarur*		AR: *zuʿrūr* = *Mespilus* spp.[118] *Crataegus sp*.[119] S: **oleum zarur** = sorbarum (D.) S: **zarur** est pomum paruulum factum sicut nespula. (G.)
	pomum parvulum factum sicut nespula	1. *Mespilus*[120]	S: **zarur** est pomum paruulum factum sicut nespula. (G.)
Melilot	*melilotus*	1. *Melilotus*[121]	

[116] *almusosat*: Brodium, id est, jus carnium elixarum, nostris *Brouet*. Locum vide in *Brodium*. See Du Cange, 1937–1938, Vol. 1, p. 193. Matth. Silvaticus: *Almusosat, id est, Brodium cibabile, quod Latine vocatur Amorusia* (*ibid*., Vol. 1, pp. 754–755).

[117] Lane, 1886–1893, p. 2718.

[118] Schmucker, 1969, no. 348; Dubler, 1953, I:133, pp. 107–108; see Beck, 2005, I:118, p. 86.

[119] Lev and Amar, 2008, p. 347; Kahl, 2003, pp. 209, 233.

[120] Niermeyer, 1954–1976, p. 717; André, 1956, pp. 208, 219.

[121] Dragendorff, 1898, p. 315; Daems, 1993, nos. 162, 312, 643; André, 1956, p. 204; Glare, 1982, p. 1093; Riddle, 1987, p. 58; Thorndike and Benjamin, 1946, pp. 185–186; Beck, 2005, III:40, p. 198.

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonyme
Milk	*lac*	1. milk[122]	AR: *laban al-niʿāj* = ewe's milk *milk[123]
Mint	*menta, menta domestica*	1. *Mentha*[124]	AR: *naʿnaʿ* = *Mentha*[125]
Mountain ash	*sorbum*	1. *Sorbus* = *Pyrus Sorbus*[126]	S: **oleum zarur** = sorbarum (D.)
Mulberry	*morum*	1. *Morus*[127] 2. *Ficus*[128] 3. *Rubus*[129]	AR: *tūt* = *Morus*[130]
Mustard	*sinapis*	1. *Brassica*[131] 2. *Sinapis*[132]	
Myrtle	*myrtus*	1. *Myrtus*[133]	AR: *ās* = *Myrtus*[134]
Nut grass, yellow	*ciperus*	1. *Cyperus*[135]	

[122] Glare, 1982, p. 992; Battaglia, 1961–2000, Vol. 8, pp. 826, 828.

[123] Dietrich, 1991, II:58, p. 1097; Kahl, 2003, p. 201; *ibid.*, 2007, p. 326; Levey, 1966, p. 330.

[124] Daems, 1993, nos. 304, 87, 356, 429, 639, 658; *ibid.*, 1967, p. 286; André, 1956, pp. 206, 207, 296; Glare, 1982, p. 1100; Hort, 1961, Vol. 2, p. 465; Beck, 2005, III:34, p. 195; see Schmucker, 1969, no. 772.

[125] Dietrich, 1991, III:32, p. 165; Kahl, 2003, pp. 206, 232; *ibid.*, 2007, pp. 327, 344; Schmucker, 1969, no. 772; Dubler, 1953, III:37, p. 290; Lev and Amar, 2008, p. 449; see *ibid.*, 2002, n. 106, p. 160.

[126] Dragendorff, 1898, p. 276; Glare, 1982, p. 1793; André, 1956, pp. 297–298.

[127] Daems, 1993, no. 331; *ibid.*, 1967, p. 287; André, 1956, pp. 211, 212; Glare, 1982, p. 1136; Dragendorff, 1898, p. 171; Beck, 2005, I:126, p. 89; see Schmucker, 1969, no. 177.

[128] André, 1956, pp. 136, 137, 211; Glare, 1982, p. 1136; Dragendorff, 1898, p. 171.

[129] André, 1956, pp. 211, 212, 275; Glare, 1982, p. 1136.

[130] Schmucker, 1969, no. 177; Lev and Amar, 2008, p. 451; Kahl, 2003, pp. 208, 234; *ibid.*, 2007, pp. 329, 344; Levey, 1966, pp. 241–242; Dubler, 1953, I:143, pp. 116–117; see Beck, 2005, I:126, p. 89.

[131] Daems, 1993, nos. 339, 419; André, 1956, p. 294; Dragendorff, 1898, p. 256; see Schmucker, 1969, no. 265.

[132] Daems, 1993, no. 419; *ibid.*, 1967, pp. 287–288, 296; André, 1956, p. 294; Glare, 1982, p. 1767; Dragendorff, 1898, p. 256; Beck, 2005, II:154, p. 156; see Schmucker, 1969, no. 265.

[133] Daems, 1993, no. 638; André, 1956, p. 213; Glare, 1982, p. 1153; Hort, 1961, Vol. 2, p. 465; Dragendorff, 1898, pp. 468–469; see Schmucker, 1969, no. 19; see Beck, 2005, I:112, p. 82.

[134] Dietrich, 1991, I:115, pp. 81–82; Dubler, 1953, I:128, pp. 99–100; Kahl, 2003, pp. 201, 234; *ibid.*, 2007, pp. 323, 344; Lev and Amar, 2008, p. 223; Schmucker, 1969, no. 19; see Beck, 2005, I:112, p. 82.

[135] Daems, 1993, nos. 114, 188; André, 1956, pp. 113, 149, 173; Glare, 1982, p. 481; Hort, 1961, Vol. 2, p. 461; Riddle, 1987, p. 55; Berendes, 1902, p. 27, 1:4; Dragendorff, 1898, p. 90; Beck, 2005, I:4, p. 8.

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonyme
Oak	*cupula glandis*	1. *Quercus*[136]	
	esculus	1. *Quercus*[137]	
	quercus	1. *Quercus*[138]	
Olive; oil	*oleum*	1. *Olea* 2. oil in general[139]	
Onion	*cepa*	1. *Allium*[140]	
Opium	*opium*	1. opium, *Papaver*[141]	
Orach(e)	*atriplex*	1. *Atriplex*[142]	AR: *al-sawīq* = gruel[143]
Peach	*persica*	1. *Prunus*[144]	
Pellitory	*piretrum*	1. *Anacyclus*[145] =2. *Anthemis pyrethrum*[146]	
Pepper	*piper*	1. *Piper*[147]	
Perch[148]	*perka*		
Pig's trotters[149]	*pedes porci*		
Pike; a fish	*lucius*		

136 Daems, 1993, nos. 242, 242*; André, 1956, pp. 150, 168; see Niermeyer, 1954–1976, p. 470; Glare, 1982, pp. 765–766.

137 Glare, 1982, p. 71, 621; André, 1956, p. 20.

138 André, 1956, p. 267; Daems, 1993, no. 242; Glare, 1982, p. 1546; Niermeyer, 1954–1976, p. 876.

139 Glare, 1982, p. 1245.

140 André, 1956, p. 80; Daems, 1993, no. 109, see also no. 502; Dragendorff, 1898, p. 121; Glare, 1982, pp. 253, 300.

141 Daems, 1993, no. 347; André, 1956, p. 228; Glare, 1982, p. 1254; Dragendorff, 1898, p. 249.

142 *Atriplex*. André, 1956, pp. 46, 77; Daems, 1993, no. 16; Thorndike and Benjamin, 1946, p. 48.

143 Meal of parched barley, sometimes wheat; it is generally made into a kind of gruel, being moistened with water, clarified butter, fat of sheep's tail, etc. (Dols, 1984, p. 132, n. 17). For details, see also Lane, 1886–1893, p. 1472; Waines, 1989, p. 21; Tibi, 2006, p. 23, n. 82; Kahl, 2003, p. 207; Lev and Amar, 2008, p. 572.

144 Dragendorff, 1898, p. 284; André, 1956, p. 244; Niermeyer, 1954–1976, p. 790; Glare, 1982, p. 1355.

145 Daems, 1993, nos. 363, 674; André, 1956, p. 266; Glare, 1982, p. 1528; Beck, 2005, III:63, p. 213.

146 Battaglia, 1961–2000, Vol. 13, p. 474; Beck, 2005, III:63, p. 213.

147 Daems, 1993, no. 391; *ibid*., 1967, p. 290; André, 1956, p. 251; Glare, 1982, p. 1382; Hort, 1961, Vol. 2, p. 469; Riddle, 1987, p. 55; Beck, 2005, II:159, p. 159.

148 A perch or similar fish (*Perca fluviatilis*) (Glare, 1982, p. 1329).

149 Du Cange, 1937–1938, Vol. 6, p. 414; see Niermeyer, 1954–1976, p. 814; Glare, 1982, p. 1405.

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonyme
Pigeon[150]	*columba*		S: **almosos** seu **almososus** est genus cibariorum sicut columba in aceto cocta: in cuius ventre ponit menta. (D.)
Plums, prunes	*prunum*	1. *Prunus*[151]	AR: *ijjās* = *Prunus domestica* L.[152] *Prunus* spp.[153]
Pomegranate	*granatum*	*Punica*[154]	AR: *rummān* = *Punica*[155]
	psidia	*Punica*[156]	
Pomegranate flower	*balaustium*	1. *Punica (Flores Granati)*[157]	AR: *jullanār* = *Punica*[158]
Poppy	*papaver*	1. *Papaver*[159]	AR: *khashkhāsh* = *Papaver*[160]
Porridge[161]	*puls*		

[150] Dove, turtle, *Columba* or *Streptopelia* (Glare, 1982, p. 357; Battaglia, 1961–2000, Vol. 3, p. 304).

[151] André, 1956, p. 262, see also pp. 95, 115; Glare, 1982, p. 1510.

[152] Schmucker, 1969, no. 7; Kahl, 2003, pp. 204, 235; *ibid.*, 2007, pp. 325, 345; Dubler, 1953, I:137, pp. 110–111; Dietrich, 1991, I:130, p. 87; Levey, 1966, p. 225; Lev, 2003, pp. 73–74.

[153] Schmucker, 1969, no. 7; Levey, 1966, p. 225. "Identification of the plum in medieval sources is a complicated matter because of the large number of species and the alternate names given for similar varieties such as: peach, pear, apricot, and bear's plum." Lev, 2003, p. 73.

[154] Daems, 1993, nos. 104, 330, 396; André, 1956, pp. 152, 198, 199; Glare, 1982, p. 771; Dragendorff, 1898, p. 463; see Schmucker, 1969, no. 329.

[155] Dietrich, 1991, I:113, p. 80; Kahl, 2003, pp. 207, 235; *ibid.*, 2007, pp. 328, 345; Schmucker, 1969, no. 329; Lev and Amar, 2008, p. 248; see *ibid.*, 2002, n. 165, p. 222; Beck, 2005, I:110, p. 82.

[156] Daems, 1993, no. 396; *ibid.*, 1967, p. 284; André, 1956, p. 263; Dragendorff, 1898, p. 463; Thorndike and Benjamin, 1946, p. 246; Beck, 2005, I:110, pp. 80–81.

[157] Daems, 1993, no. 104; *ibid.*, 1967, p. 266; André, 1956, p. 50; Glare, 1982, p. 224; Dragendorff, 1898, p. 463; Schelenz, 1965, p. 165; see Thorndike and Benjamin, 1946, p. 52; see Beck, 2005, I:111, p. 81.

[158] Dietrich, 1991, I:114, pp. 80–81; Dubler, 1953, I:127, pp. 97–98; Kahl, 2003, pp. 203, 235; *ibid.*, 2007, pp. 325, 345; Lev and Amar, 2008, p. 248; Levey, 1966, p. 253; Schmucker, 1969, no. 201; see Beck, 2005, I:111, p. 81.

[159] Daems, 1993, nos. 361, 676/677, 677; *ibid.*, 1967, pp. 289, 284; André, 1956, p. 237; Glare, 1982, p. 1291.

[160] Schmucker, 1969, no. 273; Kahl, 2003, p. 203; *ibid.*, 2007, pp. 325, 344; Dietrich, 1991, IV:59, p. 239; Dubler, 1953, III:65, pp. 412–413; see Lev and Amar, 2002, n. 133, p. 188; Beck, 2005, IV:64, p. 273.

[161] A dish made by boiling crushed spelt or other grain in water, a kind of porridge (Glare, 1982, p. 1518; Battaglia, 1961–2000, Vol. 13, pp. 731, 800–801).

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonyme
Pumpkin	*cucurbita*	1. *Citrullus*[162] 2. *Lagenaria*[163] 3. *Cucurbita*[164]	AR: *qarʿ* = *Cucurbita pepo* L.[164] *Lagenaria vulgaris* Ser.[165]
Purslane	*portulaca*	1. *Portulaca*[167]	
Quince	*citonium*	1. *Cydonia*[168] 2. *Pyrus Cydonia L.*[169]	AR: *safarjal* = *Cydonia oblonga* Mill.[170] *Cydonia vulgaris*[171]
Radish	*raphanus*	1. *Raphanus*[172] 2. *Armoracia*[173]	AR: *fujl* = *Raphanus*[174]
Raisin	*passula*	1. *Vitis*: dried grapes, raisins[175]	S: **remich** = confectio ex gallis & passulis (D.) S: **remith**: est confectio de passulis & gallis ex qua fit gallia muschata &c. (G.)
Rāmik	*remich, remith*		AR: *rāmik* = compound medicine[176] S: **remich** = confectio ex gallis & passulis (D.) S: **remith**: est confectio de passulis & gallis ex qua fit gallia muschata &c. (G.)

162 Daems, 1993, no. 159; André, 1956, pp. 107–108.
163 André, 1956, p. 107; Dragendorff, 1898, pp. 651–652; see Schmucker, 1969, no. 569.
164 Glare, 1982, p. 464; Dragendorff, 1898, p. 652; see Schmucker, 1969, no. 569.
165 Dietrich, 1991, II:117, p. 128; Dubler, 1953, II:123, p. 217; Levey, 1966, pp. 314–315; Schmucker, 1969, no. 569.
166 Kahl, 2007, pp. 327, 343; Lev and Amar, 2008, p. 120; Levey, 1966, pp. 314–315; Schmucker, 1969, no. 569. On the nomenclature of *Cucurbitaceae*, see Savage-Smith, 1980, p. 139, n. 19.
167 Daems, 1993, nos. 357, 661, 71; André, 1956, p. 259; Glare, 1982, p. 1408.
168 Daems, 1993, no. 172; Glare, 1982, p. 1069; Niermeyer, 1954–1976, p. 179; Hort, 1961, Vol. 2, p. 460; Thorndike and Benjamin, 1946, p. 183; see Schmucker, 1969, no. 383.
169 Berendes, 1902, p. 136, 1:160; Riddle, 1987, p. 49; see Schmucker, 1969, no. 383.
170 Dietrich, 1991, I:119, p. 83; Kahl, 2003, pp. 207, 233; *ibid.*, 2007, pp. 328, 345; Lev and Amar, 2008, p. 255.
171 Dubler, 1953, I:131, pp. 101–107; Levey, 1966, pp. 282–283; Schmucker, 1969, no. 383.
172 Daems, 1993, nos. 405, 694; *ibid.*, 1967, p. 290; André, 1956, pp. 269, 270; Riddle, 1987, p. 48; Glare, 1982, p. 1572; Dragendorff, 1898, p. 257; Beck, 2005, II:112, p. 140.
173 Daems, 1993, nos. 405, 411, 694; *ibid.*, 1967, p. 290.
174 Schmucker, 1969, no. 522; Kahl, 2003, pp. 202, 234; *ibid.*, 2007, pp. 324, 345; Dubler, 1953, II:104, pp. 197–198; Dietrich, 1991, II:97, p. 120; Lev and Amar, 2008, p. 257; see *ibid.*, 2002, n. 140, p. 194; Beck, 2005, II:112, p. 140.
175 Glare, 1982, p. 2120; Battaglia, 1961–2000, Vol. 12, p. 784; Daems, 1967, pp. 289, 293; Dragendorff, 1898, p. 415.
176 *Rāmik* = Astringent (tannin), which is made out of pomegranate peels or gallnuts. Similar to *sukk*; Kahl, 2003, pp. 207, 232: *rāmik* = ramie = *Boehmeria nivea*; Kahl, 2007,

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonyme
Rhubarb	*ribes*	1. *Ribes*[177] 2. *Rumex*[178]	AR: *rībās* = *Rheum*[179]
Rob[180]	*robub*		AR: *rubūb* = robs[181] S: **robub** = succi inspissati
Rose	*rosa*	1. *Rosa*[182]	AR: *ward* = *Rosa*[183]
Rosemary	*rosmarinus, rosismarinus*	1. *Rosmarinus*[184]	
Rue	*ruta*	1. *Ruta*[185]	
Saffron	*crocus*	1. *Crocus*[186]	
Sage	*salvia*	1. *Salvia*[187]	
Salsify	*barba hircina*	1. *Tragopogon*[188]	AR: *liḥyat al-tays* = *Tragopogon*[189]

p. 302, n. 251: "*rāmik* is the name of a 'perfume' which is made from unripe dates, oak galls, pomegranate rind, honey, musk, and certain other aromatics in varying proportions of mixture, and whose prevailing ingredient may serve as an additional label." See also Lane, 1886–1893, pp. 1158–1159.

[177] Daems, 1993, no. 702; see Battaglia, 1961–2000, Vol. 14, p. 22.

[178] Daems, 1993, no. 498.

[179] Kahl, 2007, pp. 328, 345; Schmucker, 1969, no. 333; Lev, 2003, pp. 76–77; Lev and Amar, 2008, p. 259; *ibid.*, 2002, n. 161, p. 218.

[180] Daems, 1993, no. 412. *roob* = zur Sirupdicke eingedampfte Pflanzensäfte (Schelenz, 1965, p. 280). "*Rob, id est, sucus usque ad spisitudinem decoctus vel ad tertiam partem*" (Synonima via Thorndike and Benjamin, 1946, p. 273).

[181] Kahl, 2003, p. 207: *rubb al-sūs* = liquorice rob; *rubb al-khashkhāsh al-aswad* = black poppy mash.

[182] Daems, 1993, no. 404; *ibid.*, 1967, p. 293; André, 1956, pp. 80, 102, 112, 274, 300; Glare, 1982, p. 1661; Beck, 2005, I:99, p. 70; see Schmucker, 1969, no. 797.

[183] Dietrich, 1991, I:101, p. 73; Dubler, 1953, I:110, pp. 83–84; Kahl, 2003, pp. 208, 235; *ibid.*, 2007, pp. 329, 345; Lev and Amar, 2008, pp. 261–262; Lev, 2003, pp. 52–54; Levey, 1966, pp. 344–345; Schmucker, 1969, no. 797; see Beck, 2005, I:99, p. 70; Lev and Amar, 2002, n. 47, p. 102.

[184] Dragendorff, 1898, p. 570; Daems, 1993, nos. 78, 288, 505, 693; Glare, 1982, p. 1661; André, 1956, p. 274.

[185] André, 1956, p. 277; Daems, 1993, nos. 386, 403, 692; *ibid.*, 1967, p. 294; Glare, 1982, p. 1672; Dragendorff, 1898, pp. 351–352.

[186] Daems, 1993, nos. 134, 564; *ibid.*, 1967, pp. 280, 294; André, 1956, p. 105; Glare, 1982, p. 461; Hort, 1961, Vol. 2, p. 459; Riddle, 1987, p. 60; Berendes, 1902, p. 54, 1:25; Dragendorff, 1898, p. 139; Beck, 2005, I:26, p. 23.

[187] Daems, 1993, nos. 197, 418, 704; *ibid.*, 1967, pp. 294, 296; Glare, 1982, p. 1683; André, 1956, p. 279.

[188] Daems, 1993, nos. 105, 268, 268*; *ibid.*, 1967, p. 277; André, 1956, pp. 51, 319; Beck, 2005, II:143, p. 152.

[189] Kahl, 2007, pp. 185 (n. 17), 326, 345; Schmucker, 1969, nos. 672, 795; see Beck, 2005, II:143, p. 152.

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonyme
Salt	*sal*	1. salt (sodium chloride)[190]	
Sheep trotters[191]	*pedes mutonis*		
Silver foil[192]	*lamina argenti*		
Spurge	*euforbium*	1. *Euphorbia*[193]	
Squill	*squilla*	1. *Scilla*[194] 2. *Urginea*[195]	
Strychnine tree	*nux vomica*	1. *Strychnos*[196]	
Sugar, red	*zuccarum rubeum*	1. *Saccharum*[197]	
Tabasheer	*spodium*	1. burned ivory, hydroxyl apathite, Ca5(OH)(PO4)3[198] 2. ash[199] 3. metallic oxide produced by calcination[200] 4. *Bambusa*[201]	AR: *ṭabāshīr* = chalk[202] *Bambusa arundinacea*, ashes[203]

[190] Glare, 1982, p. 1680.
[191] Niermeyer, 1954–1976, pp. 707, 713.
[192] Battaglia, 1961–2000, Vol. 1, pp. 644–645; Glare, 1982, p. 167; see Niermeyer, 1954–1976, p. 59.
[193] André, 1956, p. 130; Daems, 1993, no. 206; Glare, 1982, p. 628; Dragendorff, 1898, p. 385; Beck, 2005, III:82, p. 220.
[194] Dragendorff, 1898, p. 123; André, 1956, p. 284; Riddle, 1987, p. 52; Beck, 2005, II:171, p. 166.
[195] Dragendorff, 1898, p. 123; Daems, 1993, no. 434; André, 1956, p. 284; Glare, 1982, pp. 1704, 1812; Riddle, 1987, p. 52; Beck, 2005, II:171, p. 166.
[196] Dragendorff, 1898, p. 533; Battaglia, 1961–2000, Vol. 11, p. 476.
[197] Daems, 1993, no. 487; André, 1956, pp. 156, 278, 341; Niermeyer, 1954–1976, p. 1138.
[198] Daems, 1993, no. 444; Thorndike and Benjamin, 1946, p. 307; see Schmucker, 1969, no. 464.
[199] Glare, 1982, p. 1808.
[200] *Ibid.*; Battaglia, 1961–2000, Vol. 19, p. 975.
[201] Thorndike and Benjamin, 1946, p. 307; Battaglia, 1961–2000, Vol. 2, p. 31; Vol. 19, p. 975; see Schmucker, 1969, no. 464.
[202] Schmucker, 1969, no. 464; see also Levey, 1966, p. 300.
[203] Schmucker, 1969, no. 464; Kahl, 2003, pp. 208, 232; *ibid.*, 2007, pp. 329, 345; see Lev and Amar, 2008, pp. 106–107: Chalk, tabashir, *Bambusa vulgaris* (Poaceae): "Bamboo contains a large amount of silica and in medieval times it was burned as part of the extraction process. The ashes, which form crystals of a bluish white, hard light substance, were called *ṭabāshīr*." Silicic acid was also prepared of bamboo (Hill, 1993, p. 89).

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonyme
Tamarind	*thamarindus*	1. *Tamarindus*[204]	S: **almososat** = thamarindus (Avi. iiij. prima trac. ij. ca. de siti in febribus) (D.)
Terra sigillata[205]	*terra sigillata*		AR: *ṭīn makhtūm* = *Terra sigillata*,[206] = a medicinal clay containing ferrous oxide[207]
Tragacanth	*dragagantum*	1. *Astragalus*[208]	AR: *kathīrāʾ* = tragacanth **Astragalus*[209]
Tripe, ox's[210]	*omasum*		
Trotters, cow	*pedes vaccini*		AR: *akāriʿ al-baqar* = cow trotters[211]
Trotters, ox	*pedes bovini*		
Vegetables[212]	*olera*		AR: *buqūl* = vegetables[213]
Vinegar[214]	*acetum*		
Violet	*viola*	1. *Viola*[215] 2. *Matthiola*[216] 3. *Cheiranthus*[217]	

[204] André, 1956, p. 310; see Dragendorff, 1898, p. 299.

[205] *terra sigillata*: 1. = "*Calx est odorifferra*" (*Circa instans* via Thorndike and Benjamin, 1946, p. 313); 2. *terra argentaria* = *terra saracenica* (*ibid*., 1946, p. 314).

[206] Schmucker, 1969, no. 476.

[207] List and Horhammer, 1969–1979, Vol. 2, p. 1262. Cf. Kahl, 2003, p. 208: *ṭīn makhtūm* = sealing bole. *ṭīn* = clay, earth, bole (Lev and Amar, 2008, p. 149; see Lev and Amar, 2002, n. 223, p. 284).

[208] André, 1956, p. 319; Daems, 1967, p. 270; Beck, 2005, III:20, p. 186; see Hort, 1961, Vol. 2, p. 481; see Berendes, 1902, p. 275, 3:20 (23); see Schmucker, 1969, no. 621.

[209] Dietrich, 1991, III:20, p. 158; Dubler, 1953, III:21, p. 278; Schmucker, 1969, no. 621; Kahl, 2003, pp. 204, 232; *ibid*., 2007, pp. 326, 345; Levey, 1966, p. 323; Lev, 2003, pp. 89–90; Lev and Amar, 2008, p. 302; see Lev and Amar, 2002, n. 140, p. 196; see Beck, 2005, III:20, p. 186.

[210] Glare, 1982, p. 1247; Battaglia, 1961–2000, Vol. 11, p. 905.

[211] See Kahl, 2003, p. 201; *ibid*., 2007, p. 323.

[212] André, 1956, p. 164; Glare, 1982, p. 800.

[213] See Lane, 1886–1893, p. 236.

[214] Glare, 1982, p. 26; Daems, 1993, no. 70.

[215] Daems, 1993, nos. 478, 749; *ibid*., 1967, p. 300; André, 1956, pp. 330, 331; Glare, 1982, p. 2068.

[216] André, 1956, pp. 330, 331; Glare, 1982, p. 2068.

[217] *Ibid*.

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonyme
Water lily	*nenuphar, nenufar*	1. *Nymphaea*[218] 2. *Nuphar*[219]	AR: *naylūfar* = *Nymphaea*[220] *Nuphar*[221]
Wax	*cera*	1. beeswax, wax[222]	
Wheat	*siligo*	1. *Triticum*[223]	–**allellemech** = siligo de qua fit pulmentum: sicut ex hordeo fit hordeum mundatum (D.)
Wheat	*candarusum*		AR: *khandarūs* = *Triticum*[224] –**candarusum** = triticum romanum aut hordeum romanum cui non est cortex (D.) –**candarusum** = hordeum sine cortice (G.) = farrus (G.) = far (G.)
Wheat	*spelta*	1. *Triticum*[225]	
Wheat/cereals	*frumentum*	1. cereal plants[226] 2. *Triticum*[227]	
Wheat/grain	*far*	1. grains in general[228] 2. *Triticum*[229]	–**candarusum** = hordeum sine cortice (G.) = farrus (G.) = far (G.)

218 Daems, 1993, nos. 338, 342, 652; *ibid.*, 1967, p. 285; see Schmucker, 1969, no. 779.
219 *Ibid.*
220 Lev, 2003, pp. 91–92; Kahl, 2007, pp. 327, 344; Dubler, 1953, III:142–143, pp. 357–358; Schmucker, 1969, no. 779.
221 Lev, 2003, p. 94; Dubler, 1953, III:142–143, pp. 357–358; see Schmucker, 1969, no. 779.
222 Glare, 1982, p. 300; see Beck, 2005, II:83, pp. 128–129.
223 André, 1956, pp. 227, 293, 321; Daems, 1993, nos. 55, 149, 392; Dragendorff, 1898, p. 87.
224 Schmucker, 1969, no. 595; Dietrich, 1991, II:81, pp. 113–114; see also Beck, 2005, II:96, p. 132; II:89, p. 131 and n. 46.
225 André, 1956, pp. 133, 293, 298–299, 317; Dragendorff, 1898, p. 87.
226 Glare, 1982, p. 739; André, 1956, p. 142.
227 André, 1956, pp. 18, 133, 142, 293, 317, 321; Glare, 1982, p. 739; Niermeyer, 1954–1976, p. 456; see Daems, 1993, no. 55.
228 Glare, 1982, p. 676.
229 André, 1956, p. 133; see also p. 134 (*farrago*); Glare, 1982, p. 676.

English Name	Latin Name	Latin (Scientific) Name	Arabic Name/ Latin Synonyme
Wheat, Roman	*triticum romanum*	1. *Triticum*[230]	–**candarusum** = triticum romanum aut hordeum romanum cui non est cortex (D.)
Wine	*vinum*	1. wine 2. an analogous drink made from other fruits or vegetable products[231]	AR: *sharāb* = wine from *Vitis vinifera* L.[232] wine (in general) juice (in general)[233]
Wine, malvoisie[234]	*maluisia*		
Wormwood	*absinthium*	1. *Artemisia*[235]	

[230] Dragendorff, 1898, p. 87; Daems, 1993, nos. 55, 392; *ibid.*, 1967, p. 299; André, 1956, pp. 133, 293, 298–299, 317, 321, 322; Glare, 1982, p. 1978.

[231] Glare, 1982, pp. 2067–2068.

[232] Fellmann, 1986, pp. 269–272; Kahl, 2003, p. 207; *ibid.*, 2007, p. 328. For a good overview of several products of grapevine and their medicinal uses, see Lev, 2003, pp. 57–59.

[233] Fellmann, 1986, pp. 269–272.

[234] *Malvasia*: "Vino bianco pregiato, originario del peloponneso; hanno lo stesso nome anche altri vini con caratteristiche in parte diverse, derivati da varieta di vitigni coltivari in Italia, Spagna, ecc. (= dal nome della cittadina greca di *Monembasia* o *Napoli di Malvasia* dei Veneziani)" (Battaglia, 1961–2000, Vol. 9, pp. 586–587); *malvesy*: Arvisium vinum, *Malvoisie* (Du Cange, 1937–1938, Vol. 5, p. 202).

[235] Dragendorff, 1898, p. 677; Daems, 1993, nos. 3, 489a; *ibid.*, 1967, pp. 262, 264; Glare, 1982, pp. 11, 155; Riddle, 1987, p. 56; André, 1956, p. 13; Beck, 2005, III:23, p. 188.

APPENDIX 51

(See p. 312)

7.13. Frequencies of the Simple Drugs for Diabetes in the Arabic and Latin Commentaries.[1]

#1	Drug	Latin	b.S.	b.N.	GF	JD	JD-bS
1	Acacia	*accatia*	2			2	
1	Almond	*amigdala dulcis*	1			1[2]	
1	Aloe	*aloe*	1			1	
2	Apple/fruit	*malum* + *pomum*	2		(S)1	3[3]	2
2	Barley	*hordeum* + *hordeum romanum*	2		1 + 1S	2[4] + 1S[5]	
1	Brew	*alfoca* + *foca* + *fuca*	1			1	
1	Butter	*butyron*				1	1
2	Camphor	*camphora*	1	1		1	
1	Cassia	*casia*				2	2
1	Cassia fistula	*casiafistula*				1	1
1	Castoreum	*castoreum*				1	1
1	Chamomile	*camomilla*				2	2
1	Cherry	*cerasus* + *ceraserium*				2[6]	2

[1] Column #1: number of texts (= *K. al-Qānūn* or Arabic or Latin commentaries) in which the drug appears in prescriptions for diabetes (column JD–bS is used instead of column JD). b.S. = *K. al-Qānūn*; b.N. = Ibn al-Nafīs; GF = Gentile da Foligno; JD = Jacques Despars; JD–bS = innovations by Jacques Despars. S = synonym, (S) = name for which the synonym is given. (S) has been noted only where relevant, i.e., not when Despars is routinely repeating a drug mentioned by Ibn Sīnā and adding a synonyme.

[2] Sweet almond.

[3] In Prescription #17a: 'wild apple'. See p. 631, above.

[4] Mentioned twice in the same prescription (#21b) with the same name, counted only once. See p. 633, above.

[5] In Prescription #21a: *hordeum romanum*. See p. 633, above.

[6] Including *ceraserium*.

#1	Drug	Latin	b.S.	b.N.	GF	JD	JD-bS
2	Chicken + hen	*capo* + *pullus* + *gallina*	1			3	2
1	Cider	*sicera*				1	1
2	Coriander	*coriandrum*		2	1		
1	Costus	—		2			
1	Cow trotters	*pedes vaccini*	1			1	
2	Crab	*cancer* + *cancer fluvialis*	1			2	1
2	Cucumber/melon	*citrulus*	3			3	1
1	Cumin	—		1			
1	Dill	*anetum*				1	1
1	Dough	*pasta*			2		
1	Drumstick tree	—		1			
1	Eaglewood	*lignum aloes*				1	1
2	Eggs	—	1	1			
1	Fig	*ficus*				1	1
2	Fish	*piscis* + *gelatina*	1			2[7]	1
1	Flax	*linum*				1	1
2	Fleawort	*psilium*	3			4[8]	1
1	Flour (without other definition)	*farina*			1		
2	Frankincense	*thus*	1	1		1	
1	Frankincense, manna	*manna granata*				1	1
3	Gallnut	*galla*[9]	1		1	2[10]	1
1	Garlic/onion	*allium*				1	1
2	Grapes, unripe, juice of	*agresta* + *uva acerba*	2	2		1 + (S)1	
1	Grapevine	*capreolus vitis*	2			2	

[7] Mentioned twice in the same prescription (Prescription #21i) with 2 different names, and therefore counted twice. See p. 635, above.

[8] Mentioned twice in the same prescription (Prescription #6) with the same name, counted only once.

[9] Including *gella*.

[10] Mentioned twice in the same prescription (Prescription #18) with the same name, counted only once. See p. 632, above.

#1	Drug	Latin	b.S.	b.N.	GF	JD	JD-bS
2	Grapevine, raisin	*passula*			1	1	1
1	Grease	*pinguedo carnium animalium*				1	1
1	Gruel / orache[11]	*sawīq / atriplex*	2			1[12]	
1	Gum	*gummi*	1		1S		
0	Gum arabic	*gummi arabicum*			(S)1	1	–[13]
1	Hemlock	*conium*				1	1
1	Henbane	*iusquamus albus*				1	1
0	*Herba arterica*	see *rose*			(S)1		
0	*Herba artetica*	see *rose*				(S)1	
0	*Herba impinguatiua*	see *rose*			(S)1		
1	Iris	*yreos*				1	1
1	Juniper	*iuniperus*				1	1
2	Knotgrass	*virga pastoris*	2			3	1
1	Lac	*lacca*	1			1	
1	Ladanum	*laudanum*	1			1	
1	Laurel	*laurus*				1	1
2	Lavender	*sticados arabicum*		1		1	1
3	Lettuce	*lactuca*	2	1		3	1
1	Lily	*lilium*				1	1
1	Malva	*altea*				1	1
1	Mandrake	*mandragora*				1	1
1	Marjoram	*maiorana*				1	1
4[14]	Meat	*caro / carnis*	1	1	1	1	1
(1)	Meat broth (*brodium*)	*brodium*				1	1
(1)	Meat dish (*halāmāt*)	*allellemech + alchelemet*	1		(S)1	1[15]	

[11] In the Arabic text of *K. al-Qānūn*, *sawīq*, 'gruel,' in Latin, *atriplex*, 'orache.'
[12] Orache.
[13] Prescription #14: corresponds to Ibn Sīnā's 'gum' and is thus no real innovation.
[14] All the following meat dishes are included here.
[15] *Allellemech*.

#1	Drug	Latin	b.S.	b.N.	GF	JD	JD-bS
(1)	Meat dish (*maṣūṣāt*)	*almosos* + *almososus* + *almososat* + *almosusath* + *almosusat*	1			1	
(0)	Meat dish (*taffea*)	*taffea* + *tafeata*			(S)1	(S)1	
(2)	Meat soup (*isfīdbājāt*)	*allifidabeget* + *alesfidabaget*	1		1	1	
(0)	Meat, grease	*medulla carnium animalium*				(S)1	
1	Medlar	*zarur* + *azarur*	2		1S	1	
1	Melilot	*mellilotum*				2	2
4	Milk	*lac*	1	1	1	4[16]	1[17]
1 / 2[18]	Milk, freshly milked / fenugreek	*ḥalīb* / *fenugrecum*	1			2[19]	1
2	Mint	*menta* + *menta domestica*	1			3[20]	2
0	Mountain ash	*sorbum*				(S)1	
1	Mulberry	*morum* + *morum celsi*	1			1	
1	Mustard	*sinapis*				1	1
1	Myrrh	—		1			
1	Myrtle	*myrtus*	1			1	
2	Nut grass, yellow	*ciperus*		1		1	1

[16] In Prescription #21b: 'sour milk', in Prescription #21j: 'milk of ewes cooked with sweet water'. See pp. 633, 635, above.

[17] Milk mentioned in Prescription #10 is not considered an innovation, but a repetition from the Latin translation of *K. al-Qānūn*. See Appendix 49, Prescription #10 (pp. 629–630, above).

[18] Appears once in the Arabic text of *K. al-Qānūn* as *ḥalīb*, 'freshly milked milk,' and twice in Despars' commentary as *fenugrecum*, 'fenugreek.' See Appendix 50 (p. 642, n. 54, above).

[19] Fenugreek.

[20] Mentioned twice in the same prescription (Prescription #9) with 2 different names, counted twice. See p. 629, above.

#1	Drug	Latin	b.S.	b.N.	GF	JD	JD-bS
2	Oak	*cupula glandis* + *esculus* + *quercus*		1		3[21]	3
1	Olive/oil	*oleum*				1	1
1	Onion	*cepa*				1	1
1	Opium	*opium*				1	1
1	Ox trotters	*pedes bovini*				1	1
1	Peach	*persica*				1	1
1	Pellitory	*piretrum*				1	1
1	Pepper	*piper*				1	1
1	Perch	*perka*				1	1
1	Pig's trotters	*pedes porci*				1	1
1	Pigeon	*columba*				1	1
1	Pigeon excrement	*fimus columbinus*				1	1
1	Pike (fish)	*lucium*				1	1
2	Plum	*prunum* + *prunum damascenum*	1			4[22]	3
3	Pomegranate	*granatum* + *psidia*	5	1		5	2
2	Pomegranate, flower	*balaustium*	1			2	1
1	Poppy	*papaver*	2			2	
2	Pumpkin	*cucurbita*	4			5	1
2	Purslane	*portulaca*		1		1	1
2	Quince	*citonium*	2			2	1
1	Radish	*raphanus*	1			1	
2	*Rāmik*	*remich* + *remith*	1		1[23]	1[24]	

[21] *Cupula glandis* (Prescription #16a), *quercus* (Prescription #18), *esculus* (Prescription #18). Mentioned twice in the same prescription (#18) with 2 different names, counted twice. See pp. 631–632, above.
[22] Mentioned twice in the same prescription (Prescription #1) with the same name, counted only once. See p. 628, above.
[23] *Remith*.
[24] *Remich*.

#1	Drug	Latin	b.S.	b.N.	GF	JD	JD-bS
1	Rhubarb/ribes	*ribes*	2			2[25]	
3	Rose	*rosa*	3	3		3[26]	1
1	Rose / Alfalfa[27]	*sula* + *sulla* + *herba impinguativa* + *herba arterica* + *herba artetica*	1		1S[28] + (S)2	1[29] (S)1	
1	Rosemary	*rosmarinus / rosismarinus*				2	2
1	Rue	*ruta*				1	1
1	Saffron	*crocus*				2	2
1	Sage	*salvia*				2	2
1	Salsify	*barba hircina*	1			1	
1	Salt	*sal*				1	1
1	Sheep trotters	*pedes mutonis*				1	1
1	Silver foil	*lamina argenti*				1	1
1	Spurge	*euforbium*				1	1
1	Squill	*squilla*				1	1
1	Strychnine tree	*nux vomica*				1	1
2	Sugar + red sugar	— + *zuccarum rubeum*		1		1[30]	1
1	*Sukk*			1			
1	Sumac	—		2			
1	Tabasheer	*spodium*	2			2	
1	Tamarind	*thamarindus*				1 + (S)1	1
1	*Terra sigillata*	*terra sigillata*	1			1	
1	Tragacanth	*dragagantum*	1			1	
1	Tripe, ox's	*omasum*				1	1

25 *Ribes*.

26 Although rose is mentioned twice in Prescription #10 with the same name, in Despars it forms 2 separate prescriptions and is thus counted twice. See p. 630, above.

27 In the Arabic text of *K. al-Qānūn*, *ward ratib*, 'fresh rose,' in Latin *sula, sulla*, 'alfalfa.'

28 *Sula*.

29 *Sulla*.

30 Red sugar.

#1	Drug	Latin	b.S.	b.N.	GF	JD	JD-bS
3	Vinegar	*acetum*	1	1		2	1[31]
1	Violet	*viola*				3	3
2	Water lily	*nenuphar* / *nenufar*	1			2	1
1	Wax	*cera*				1	1
1	Wheat (*khandarūs*)	*candarusum*	1		1S	1	
0	Wheat	*triticum romanum*				(S)1	
0	Wheat	*siligo*				(S)1	
1	Wheat/cereals	*farina frumenti*				1	1
0	Wheat/grain	*far*			(S)2[32]		
1	Whey	*aqua distillata ex lacte acetoso*	4			3	
2	Wine	*vinum aromaticum* + *maluisia* + *uvarnacia*	1			2	1
1	Wormwood	*absinthium*				1	1

[31] Despars' *acetum* in Prescription #21i, although not mentioned in the Arabic text of *K. al-Qānūn*, is copied from its Latin translation and is thus not an innovation. See p. 635, above.

[32] Mentioned twice in the same prescription (Prescription #21a) with 2 different names, therefore counted twice. See p. 633, above.

APPENDIX 52

(See p. 314)

7.14. Medical Qualities in the Arabic and Latin Commentators' Drugs for Diabetes.[1]

#1	#2	**Drug**	AA	BB	CC	DD	EE	FF	GG	HH	II	JJ	KK	LL	MM	NN
1	3	Acacia	+		+			+								
1	4	Almond	+				+	+					+			
1	3	Aloe	+								+		+			
2	3	Apple/fruit	+						+					+		
2	2	Barley			+				+							
1	0	Brew														
2	0	Camphor														
2	3	Chicken	+								+					+
1	1	Cow trotters									+					
2	0	Crab, river														
2	1	Eggs	+													
2	2	Fish		+							+					
2	3	Fleawort	+								+				+	
2	3	Frankincense	+				+							+		
3	2	Gallnut	+		+											
1	2	Grapevine	+				+									
1	2	Gum	+											+		
2	2	Knotgrass	+		+											
1	1	Lac												+		
1	2	Ladanum	+				+									
3	4	Lettuce			+						+		+		+	

[1] Column #1: number of texts (= *K. al-Qānūn* or Arabic or Latin commentaries) in which the drug appears in prescriptions for diabetes (of the drugs in Despars, only his independent additions to the ones mentioned in *K. al-Qānūn* are considered); column #2: number of therapeutically suitable qualities it embodies. AA = astringency; BB = anesthetizing; CC = cold (+ cooling); DD = cooling the kidney; GG = heat (+ warming); HH = rarefying; II = moistness (+ moistening); LL = causing perspiration; MM = laxative; NN = rubefacient; OO = making the patient sleep; QQ = strengthening; RR = against thirst; SS = emetic. (S) and S (= the synonymes) have not been included, as they seem to have been mentioned only in order to solve the problem caused by the difficulty of the term, not as a specific recommendation.

#1	#2	Drug	AA	BB	CC	DD	EE	FF	GG	HH	II	JJ	KK	LL	MM	NN
4	5	Meat					+	+	+		+			+		
1	1	Medlar	+													
4	4	Milk						+	+		+			+		
2	4	Mint	+				+		+					+		
1	4	Mulberry	+		+				+		+					
1	5	Myrtle	+		+		+				+			+		
2	5	Plum	+		+			+	+		+					
3[2]	4	Pomegranate	+				+				+			+		
2	1	Pomegranate flower												+		
1	5	Poppy		+	+						+		+			+
2	2	Pumpkin									+				+	
2	5	Quince	+						+		+			+	+	
1	3	Radish						+			+					+
2	2	*Rāmik*	+											+		
1	0	Rhubarb														
3	4	Rose	+				+				+			+		
1	2	Salsify	+											+		
1	4	Tabasheer	+		+									+	+	
1	2	*Terra sigillata*			+											+
1	0	Tragacanth														
3	4	Vinegar			+		+	+						+		
2	3	Water lily						+			+		+			
1	0	Wheat (*khandarūs*)														
2	6	Wine	+	+[3]			+				+			+		+
		#45	25	3	12	0	11	8	8	0	19	0	5	17	5	5
		%	56	7	27	0	24	18	18	0	42	0	11	38	11	11

[2] Pomegranate is not mentioned by Despars in Prescription #14, where Ibn Sīnā has it, but it is mentioned in the Prescription #16 as Despars' addition. See pp. 630–631, above.

[3] Causes a state of insensibility comparable to the consequences of a stroke.

APPENDIX 53

(See p. 317)

7.15. Evaluation of the Medical Effect of the Drugs against Diabetes.[1, 2]

Effect	Drug	Antidiabetic	Hypoglycemic	Insulin-like effect/effect on insulin	Ag. *diabetes insipidus*
++	*Acacia*		++[3]	++[4]	
++	*Allium*	+[5]	++[6]	+[7]	
++	*Aloe*	++[8]	++[9]	++[10]	
—	*Aloëxylon*				
++	*Althaea*		++[11]		
++	*Amaranthus*	++[12]		++[13]	
++	*Amygdalus*		++[14]		
+	*Anacyclus*		+[15]		
—	*Anethum*				
+	*Anthemis*		+[16]		
—	*Aquilaria*				
—	*Armoracia*				
++	*Artemisia*		++[17]		

---

[1] For methodology, see Ch. 5.4.

[2] Effect = level of medicinal effect; ++ = having a relevant medicinal effect, e.g. astringency; + = having an chemical constituent with a relevant medicinal effect, e.g. tannin; — = not having any known relevant medical effect or chemical constituent with it.

[3] Wassel *et al.*, 1992; Wadood *et al.*, 1989.

[4] Wadood *et al.*, 1989.

[5] S-methyl cysteine sulphoxide, S-allylcysteine sulfoxide. Sheela *et al.*, 1995.

[6] Grover *et al.*, 2002; Babu and Srinivasan, 1997.

[7] S-allyl cysteine sulfoxide. Augusti and Sheela, 1996.

[8] Duke, 1992a.

[9] *Ibid.*

[10] *Ibid.*

[11] *Ibid.*

[12] Sangameswaran and Jayakar, 2008; Kim *et al.*, 2006.

[13] Kim *et al.*, 2006.

[14] Duke, 1992a.

[15] Inulin, 30–55 %. Hoppe, 1981, p. 21.

[16] Inulin, 30–55 %. *Ibid.*

[17] Subramoniam *et al.*, 1996; Marrif *et al.*, 1995; al-Shamaony *et al.*, 1994; al-Khazraji *et al.*, 1993.

Effect	Drug	Antidiabetic	Hypoglycemic	Insulin-like effect/effect on insulin	Ag. *diabetes insipidus*
++	*Astragalus*		++[18]		
++	*Atriplex*		++[19]	++[20]	
—	*Aucklandia*				
++	*Bambusa*		++[21]		
++	*Boswellia*		++[22]		
++	*Brassica*		++[23]		
++	*Cassia*		++[24]		
—	*Cerasus*				
++	*Chamaemelum*		++[25]		
++	*Chamomilla*		++[26]		
—	*Cheiranthus*				
—	*Cicuta*				
+	*Cinnamomum*		+[27]	+[28]	
—	*Cistus*				
++	*Citrullus*		++[29]		
+	*Commiphora*		+[30]		
—	*Conium*				
++	*Corchorus*		++[31]		
++	*Coriandrum*	++[32]	++[33]		

[18] Shabana *et al.*, 1990.
[19] Aharonson *et al.*, 1969.
[20] Shani *et al.*, 1972; Mertz *et al.*, 1973.
[21] Fernando *et al.*, 1990.
[22] Kavitha *et al.*, 2007.
[23] Roman-Ramos *et al.*, 1995.
[24] Palanichamy *et al.*, 1988.
[25] Eddouks *et al.*, 2005. On the hypoglygemic effect of Chamaemeloside, Tschan *et al.*, 1996; König *et al.*, 1998.
[26] Cemek *et al.*, 2008.
[27] Cinnamaldehyde (Subash Babu *et al.*, 2007); Naphthalenemethyl ester of 3,4-dihydroxyhydrocinnamic acid (DHH105) (Kim *et al.*, 2006).
[28] Cinnamaldehyde. Subash Babu *et al.*, 2007.
[29] Elawad *et al.*, 1984.
[30] Ubillas *et al.*, 1999.
[31] Innami *et al.*, 2005.
[32] Swanston-Flatt *et al.*, 1990.
[33] *Ibid.*

Effect	Drug	Antidiabetic	Hypoglycemic	Insulin-like effect/effect on insulin	Ag. *diabetes insipidus*
++	*Crataegus*		++[34]		
—	*Crocus*				
++	*Cucumis*		++[35]		
++	*Cucurbita*		++[36]		
++	*Cuminum*		++[37]		
—	*Cydonia*				
++	*Cyperus*		++[38]		
—	*Daphne*				
—	*Dipsacus*				
—	*Dryobalanops*				
++	*Euphorbia*		++[39]		
++	*Ficus*	+[40]	++[41]	++[42]	
++	*Gall-nut*		++[43]		
++	*Gum arabic*		++[44]	++[45]	
++	*Hordeum*		++[46]	++[47]	
—	*Hyoscyamus*				
—	*Iris*				
++	*Juniperus*		++[48]		
+	*Lactuca*	+[49]			

[34] Jouad *et al.*, 2003; Román Ramos *et al.*, 1992.
[35] Roman-Ramos *et al.*, 1995.
[36] *Ibid.*
[37] *Ibid.*
[38] Raut and Gaikwad, 2006.
[39] Akhtar *et al.*, 1984.
[40] Dimethoxy derivative of leucocyandin 3-O-beta-D-galactosyl cellobioside, leucopelargonidin glycoside, dimethoxy derivative of pelargonidin 3-O-alpha-L rhamnoside. Cherian *et al.*, 1992.
[41] Achrekar *et al.*, 1991.
[42] *Ibid.*
[43] *Quercus infectoria* galls. Dar *et al.*, 1976.
[44] Dr. Duke's Phytochemical and Ethnobotanical Databases.
[45] *Ibid.*
[46] Naismith *et al.*, 1991.
[47] Shukla *et al.*, 1991.
[48] Bruchhausen et al., 1990–2000, Vol. 5, p. 574; Sanchez De Medina *et al.*, 1994; Swanston-Flatt *et al.*, 1990.
[49] Lactucain C, lactucaside. Hou *et al.*, 2003.

Effect	Drug	Antidiabetic	Hypoglycemic	Insulin-like effect/effect on insulin	Ag. *diabetes insipidus*
—	*Lagenaria*				
—	*Laurus*				
++	*Lavandula*	++[50]	++[51]		
—	*Lilium*				
++	*Linum*		++[52]		
—	*Majorana*				
—	*Malus*				
+	*Malva*		+[53]		
—	*Mandragora*				
++	*Matricaria*		++[54]		
++	*Matthiola*		++[55]		
++	*Medicago*		++[56]	++[57]	
—	*Melilotus*				
—	*Mentha*				
—	*Mespilus*				
++	*Moringa*		++[58]		
++	*Morus*		++[59]	+[60]	
++	*Myrtus*	++[61]	++[62]		
—	*Nuphar*				
++	*Nymphaea*		++[63]		

[50] Gamez *et al.*, 1987.
[51] *Ibid.*; Gamez *et al.*, 1988.
[52] Cunnane *et al.*, 1993.
[53] A neutral polysaccharide and a pectic substance in *M. verticillata* are hypoglycemic, but *M. sylvestris* actually raises the level of blood sugar. Pitkänen *et al.*, 1996, p. 144; Tomoda *et al.*, 1990.
[54] Cemek *et al.*, 2008.
[55] Shabana *et al.*, 1990.
[56] Duke, 1992a.
[57] *Ibid.*
[58] *M. stenopetala*. *M. oleifera* increases the blood glucose in diabetes. Asres, 1993; Mossa, 1985.
[59] Chen *et al.*, 1995.
[60] Fagomine. Nojima *et al.*, 1998.
[61] Elfellah *et al.*, 1984.
[62] *Ibid.*
[63] Rajagopal and Sasikala, 2008; Dhanabal *et al.*, 2007.

Effect	Drug	Antidiabetic	Hypoglycemic	Insulin-like effect/effect on insulin	Ag. *diabetes insipidus*
++	*Olea*	++[64]	++[65]		
++	*Origanum*	–[66]	++[67]		
++	*Papaver*		++[68]		
++	*Piper*		++[69]		
++	*Plantago*	++[70]	++[71]		
—	*Polygonum*				
++	*Portulaca*		++[72]		
++	*Prunus*		++[73]		
++	*Punica*		++[74]		
—	*Pyrus*				
++	*Quercus*		++[75]		
++	*Raphanus*		++[76]		
++	*Rheum*		++[77]	++[78]	
++	*Rhus*	++[79]			
—	*Ribes*				
++	*Rosa*		++[80]		
++	*Rosmarinus*		++[81]		

[64] Bruchhausen et al., 1990–2000, Vol. 5, p. 940.
[65] *Ibid.*; Fehri *et al.*, 1994.
[66] Improves tissue injury induced by streptozotocin treatment, thus retarding the development of some complications of diabetes mellitus. Lermioglu *et al.*, 1997.
[67] Lemhadri *et al.*, 2004; McCue *et al.*, 2004.
[68] Duke, 1992a.
[69] Peungvicha *et al.*, 1998.
[70] Fagerberg, 1982.
[71] Wolever *et al.*, 1991.
[72] Duke, 1992a.
[73] Choi *et al.*, 1991.
[74] Katz *et al.*, 2007; Nogueira and Pereira, 1986.
[75] *Quercus infectoria* galls (Dar *et al.*, 1976); Quercetin (Ivorra *et al.*, 1989).
[76] Taniguchi *et al.*, 2007a; Taniguchi *et al.*, 2007b.
[77] Duke, 1992a.
[78] *Ibid.*
[79] Dr. Duke's Phytochemical and Ethnobotanical Databases.
[80] Cho *et al.*, 2004.
[81] *R. officinalis* is both hyper- and hypoglycemic. Al-Hader *et al.*, 1994; Dr. Duke's Phytochemical and Ethnobotanical Databases.

Effect	Drug	Antidiabetic	Hypoglycemic	Insulin-like effect/effect on insulin	Ag. *diabetes insipidus*
++	*Rubus*		++[82]		
++	*Rumex*		++[83]		
—	*Ruta*				
++	*Saccharum*		++[84]		
++	*Salvia*	+[85]	++[86]		
—	*Saussurea*				
—	*Scilla*				
—	*Sinapis*				
—	*Sorbus*	–[87]			
—	*Strychnos*				
++	*Tamarindus*		++[88]		
—	*Tragopogon*				
++	*Trigonella*	++[89]	++[90]	++[91]	
++	*Triticum*		++[92]	++[93]	
++	*Urginea*		++[94]		
—	*Viola*				
++	*Vitis*		++[95]	++[96]	

82 Jouad *et al.*, 2002; Novaes *et al.*, 2001; see, however, also Swanston-Flatt *et al.*, 1990.
83 Degirmenci *et al.*, 2005.
84 Takahashi *et al.*, 1985. On the hypoglycemic effect of the polysaccharide fraction (glycans), Hikino *et al.*, 1985.
85 Kim *et al.*, 2007.
86 Shabana *et al.*, 1990; Eidi *et al.*, 2005.
87 As a sugar substitute for diabetic patients (Sorbitol). Hoppe, 1975–1987, p. 1019.
88 Hoppe, 1983, p. 282.
89 Ribes *et al.*, 1986; Madar and Stark, 2002.
90 Xue *et al.*, 2007; Abdel-Barry *et al.*, 2000.
91 Petit *et al.*, 1993; Haefele *et al.*, 1997.
92 Eddouks *et al.*, 2005.
93 Villaume *et al.*, 1984; Beck and Villaume, 1987.
94 Bruchhausen *et al.*, 1990–2000, Vol. 6, p. 1036.
95 Banini *et al.* 2006; Orhan *et al.*, 2006b; El-Alfy *et al.*, 2005; Pinent, *et al.*, 2004. On the antihyperglycemic effect of resveratrol, see Chi *et al.*, 2007.
96 Pinent *et al.*, 2004.

APPENDIX 54

(See p. 317)

7.16. Appearances of the Drugs for Diabetes in the Texts and their Medical Effect.[1]

#1	#2	#3	#4	b.S.	b.N.	GF	JD	JD-bS	#5
++	**Acacia**	*accatia*	1	2			2		3
++	1. *Prunus*								
++	2. *Acacia*								
++	**Gum**	*gummi*	1	1		1S + (S)1	1		2
	+ gum arabic	+ *gummi arabicum*							
==	1. gum								
==	2. resin								
++	3. *Acacia*								
++	**Almond**	*amigdala dulcis*	2	2			8[4, 5]	6	5
	+ cherry	+ *cerasus*							
	+ peach	+ *ceraserium*							
	+ plum	+ *persica*							
++	1. *Prunus*	+ *prunum*							
++	2. *Amygdalus*[2]	+ *prunum damascenum*							
—	3. *Cerasus*[3]								

[1] Column #1: the effect of the plant in the therapy of diabetes according to Appendix 12: the code written in bold letters on the side of the English identification is the final result, the codes under it relate to the plant genuses in #2; column #2: the identification of the drug and its English name according to Chapters 7.1.5.3 and 7.2.5.2; column #3: the Latin name of the plant in the translation of *K. al-Qānūn* and in the Latin commentaries; column #4: number of texts (= *K. al-Qānūn* or Arabic or Latin commentaries) in which the drug appears (column JD–bS is used instead of column JD); column #5: number of the medical qualities required by Ibn Sīnā for drugs for diabetes that the drug embodies (acc. to Book II of *K. al-Qānūn*; if several drugs are combined, we choose the one with most qualities). b.S. = *K. al-Qānūn*; b.N. = Ibn al-Nafīs; GF = Gentile da Foligno; JD = Jacques Despars; JD–bS = innovations by Jacques Despars. ++ = having a relevant medicinal effect, e.g. astringency; + = having an chemical constituent with a relevant medicinal effect, e.g. tannin; — = not having any known relevant medical effect or chemical constituent with it; == = not relevant (e.g. a mineral or animal product). S = synonym, (S) = name for which the synonym is given. Synonyms are not counted as independent entities.

[2] A synonym for some of the *Prunus*.

[3] A synonym for some of the *Prunus*.

[4] Mentioned twice in the same prescription (Prescription #1) with the same name, counted only once. See p. 628, above.

[5] Including *ceraserium*.

#1	#2	#3	#4	b.S.	b.N.	GF	JD	JD-bS	#5
++ ++	**Aloe** 1. *Aloe*	*aloe*	1	1			1		3
— — —	**Apple/fruit** 1. *Malus* =*Pyrus*	*malum* + *pomum*	2	2		(S)1	3[6]	2	3
++ — ++	**Medlar** 1. *Mespilus* 2. *Crataegus*	*zarur* + *azarur*	1	2		1S	1		1
— — —	**Mountain ash** 1. *Sorbus* 2. *Pyrus*[7]	*sorbum*	0				(S)1		
++ ++	**Barley** **+ barley water** 1. *Hordeum*	*hordeum* + *kist hordei*	2	2		1 + 1S	2[8] + 1S[9]		2
++ ++ ++	**Wheat** (*khandarūs*) **+ grain/wheat** **+ wheat, Roman** **+ wheat** 1. *Hordeum* 2. *Triticum*	*candarusum* + *hordeum romanum* + *hordeum sine cortice* + *far* + *triticum romanum* + *spelta*	1	1		1S + (S)2[10]	1		0
++ ++ ==	**Wheat/cereals** (*frumenti*) 1. *Triticum* 2. cereals	*farina frumenti*	1				1	1	
==	**Brew**	*alfoca* + *foca* + *fuca*	1	1			1		0
==	**Butter**	*butyron*	1				1	1	
± — +	**Camphor** 1. *Dryobalanops* 2. *Cinnamomum*	*camphora*	2	1	1		1		0

[6] In Prescription #17a: 'wild apple'. See p. 631, above.
[7] A synonym for some of the *Pyrus*.
[8] Mentioned twice in the same prescription (Prescription #21b) with the same name, counted only once. See p. 633, above.
[9] In Prescription #21a: *hordeum romanum*.
[10] Mentioned twice in the same prescription (Prescription #21a) with 2 different names, therefore counted twice. See p. 633, above.

#1	#2	#3	#4	b.S.	b.N.	GF	JD	JD-bS	#5
++ — + ++ —	**Cassia** 1. *Daphne* 2. *Cinnamomum* 3. *Cassia* 4. *Majorana*	*casia*	1				2	2	
++ ++ +	**Cassia fistula** 1. *Cassia* 2. *Cinnamomum*	*casiafistula*	1				1	1	
==	**Castoreum**	*castoreum*	1				1	1	
++ ++ ++ + ++	**Chamomile** 1. *Chamomilla* 2. *Chamaemelum* 3. *Anthemis* 4. *Matricaria*	*camomilla*	1				2	2	
==	**Chicken + hen**	*capo* + *pullus* + *gallina*	2	1			3	2	3
==	**Cider**	*sicera*	1				1	1	
++ ++	**Coriander** 1. *Coriandrum*	*coriandrum*	2		2	1			
— — —	**Costus** AR. 1. *Aucklandia* 2. = *Saussurea*	—	1		2				
==	**Cow trotters** **+ ox trotters**	*pedes vaccini* + *pedes bovini*	2	1			2[11]	1	1
==	**Pig's trotters**	*pedes porci*	1				1	1	
==	**Sheep trotters**	*pedes mutonis*	1				1	1	
==	**Crab**	*cancer* + *cancer fluvialis*	2	1			2	1	0
++ ++ ++	**Cucumber/melon** 1. *Citrullus* 2. *Cucumis*	*citrulus*	2	3			3	1	No inf
++ ++	**Cumin** AR. *Cuminum*	—	1		1				

[11] Mentioned in the same prescription (Prescription #21h) with 2 different names, *pedes bovini* and *pedes vaccini*, and therefore counted twice. See p. 634, above.

#1	#2	#3	#4	b.S.	b.N.	GF	JD	JD-bS	#5
— —	**Dill** 1. *Anethum*	*anetum*	1				1	1	
==	**Dough** (*pasta*)	*pasta*	1			2			
++ ++	**Drumstick tree / ben** AR. *Moringa*	—	1		1				
— — —	**Eaglewood** 1. *Aquilaria* 2. *Aloëxylon*	*lignum aloes*	1				1	1	
==	**Eggs**	—	2	1	1				1
++ ++	**Fig** 1. *Ficus*	*ficus*	1				1	1	
==	**Fish**	*piscis* + *gelatina*	2	1			2[12]	1	2
==	**Perch**	*perka*	1				1	1	
==	**Pike**	*lucius*	1				1	1	
++ ++	**Fleawort** 1. *Plantago*	*psilium*	2	3			4[13]	1	3
==	**Flour** (without other definition)	*farina*	1			1			
++ ++	**Frankincense** **+ frankincense, manna** 1. *Boswellia*	*thus* + *manna granata*	3	1	1		2	1	3
++ ++ ++	**Gallnut** 1. gall-nut 2. *Quercus*	*galla*	3	1		1	2[14]	1	2
++ ++	**Garlic/onion** **+ onion** 1. *Allium*	*allium* + *cepa*	1				2	2	

[12] Mentioned twice in the same prescription (Prescription #21i) with 2 different names, and therefore counted twice. See p. 635, above.

[13] Mentioned twice in the same prescription (Prescription #6) with the same name, counted only once.

[14] Mentioned twice in the same prescription (Prescription #18) with the same name, counted only once. See p. 632, above.

#1	#2	#3	#4	b.S.	b.N.	GF	JD	JD-bS	#5
++ ++	**Grapes, unripe / sour, juice of** **+ grapevine** **+ grapevine, raisin** 1. *Vitis*	*agresta* + *uva acerba* + *capreolus vitis* + *passula*	4	4	2	1	4 + (S)1	1	2
??[15] ++ ==	**Gruel / orache**[16] 1. *Atriplex* AR. gruel of grains	*sawīq / atriplex*	1	2			1 (orache)		No inf[17]
— — —	**Hemlock** 1. *Cicuta* 2. *Conium*	*conium*	1				1	1	
— —	**Henbane** 1. *Hyoscyamus*	*iusquamus albus*	1				1	1	
— — —	**Iris** 1. *Iris* 2. *Lilium*	*yreos*	1				1	1	
++ ++	**Juniper** 1. *Juniperus*	*iuniperus*	1				1	1	
— — —	**Knotgrass** 1. *Dipsacus* AR. *Polygonum*	*virga pastoris*	2	2			3	1	2
==	**Lac** 1. gummi lacca	*lacca*	1	1			1		1
— —	**Ladanum** 1. *Cistus*	*laudanum*	1	1			1		2
— —	**Laurel** 1. *Laurus*	*laurus*	1				1	1	
++ ++	**Lavender** 1. *Lavandula*	*sticados arabicum*	2		1		1	1	
+ +	**Lettuce** 1. *Lactuca*	*lactuca*	3	2	1		3	1	4
— — —	**Lily** 1. *Lilium* 2. *Iris*	*lilium*	1				1	1	

15 Due to the confusion in the identification of the drug, its evaluation is not possible.
16 See Appendix 51 (p. 659, n. 11, above).
17 Considered here only the Arabic variant, gruel.

#1	#2	#3	#4	b.S.	b.N.	GF	JD	JD-bS	#5
++ ++	**Linen, flax** 1. *Linum*	*linum*	1				1	1	
++ ++ +	**Malva** 1. *Althaea* 2. *Malva*	*altea*	1				1	1	
— —	**Mandrake** 1. *Mandragora*	*mandragora*	1				1	1	
++ ++ —	**Marjoram** 1. *Origanum* = *Majorana*	*maiorana*	1				1	1	
==	**Meat**	*caro / carnis*	4	1	1	1	1	1	5
==	**Meat broth**	*brodium*	1				1	1	
??[18] == ++	**Meat dish** (*halāmāt*) **+ wheat** 1. meat 2. *Triticum*	*allellemech* + *alchelemet* + *siligo*	1	1		(S)1	1[19] + (S)1		
??[20] == ++	**Meat dish** (*maṣūṣāt*) 1. meat 2. *Tamarindus*	*almosos* + *almososus* + *almososat* + *almosusath* + *almosusat*	1	1			1		
++ ++	**Tamarind** 1. *Tamarindus*	*thamarindus*	1				1 + (S)1	1	
==	**Meat soup** (*isfīdbājāt*) **+ meat dish** (*taffea/tafeata*)	*allifidabeget* + *alesfidabaget* + *taffea* + *tafeata*	2	1		1 + (S)1	1 + (S)1		
==	**Grease** **+ meat, medulle**	*pinguedo carnium animalium* + *medulla carnium animalium*	1				1 + (S)1	1	
— —	**Melilot** 1. *Melilotus*	*mellilotum*	1				2	2	

18 Due to the confusion in the identification of the drug, its evaluation is not possible.
19 *Allellemech*.
20 Due to the confusion in the identification of the drug, its evaluation is not possible.

#1	#2	#3	#4	b.S.	b.N.	GF	JD	JD-bS	#5
==	**Milk**	*lac*	4	1	1	1	4[21]	1[22]	4
==	**Whey**	*aqua distillata ex lacte acetoso*	1	4			3		No inf
??[23] ++ ==	**Milk, freshly milked / fenugreek**[24] 1. *Trigonella* AR. *Milk*	*ḥalīb* / *fenugrecum*	1 / 2	1			2[25]	1	No inf[26]
— —	**Mint** 1. *Mentha*	*menta* + *menta domestica*	2	1			3[27]	2	4
++ ++ ++ ++	**Mulberry** 1. *Morus* 2. *Ficus* 3. *Rubus*	*morum* + *morum celsi*	1	1			1		4
++ ++ —	**Mustard** 1. *Brassica* 2. *Sinapis*	*sinapis*	1				1	1	
+ +	**Myrrh** 1. *Commiphora*	—	1		1				
++ ++	**Myrtle** 1. *Myrtus*	*myrtus*	1	2			1		5
++ ++	**Nut grass, yellow** 1. *Cyperus*	*ciperus*	2		1		1	1	

21 In Prescription #21b: 'sour milk', in Prescription #21j: 'milk of ewes cooked with sweet water'. See pp. 633, 635, above.
22 Milk mentioned in Prescription #10 is not considered an innovation, but as a repetition from the Latin translation of *K. al-Qānūn*. See Appendix 49, Prescription #10 (p. 629–630, above).
23 Due to the confusion in the identification of the drug, its evaluation is not possible.
24 See Appendix 50 (p. 642, n. 54, above).
25 Fenugreek.
26 Here is considered only the Arabic variant, 'freshly milked milk'.
27 Mentioned twice in the same prescription (Prescription #9) with 2 different names, counted twice. See p. 629, above.

#1	#2	#3	#4	b.S.	b.N.	GF	JD	JD-bS	#5
++ ++	**Oak** 1. *Quercus*	*cupula glandis* *+ esculus* *+ quercus*	2		1		3[28]	3	
++ ++ ==	**Olive/oil** 1. *Olea* 2. oil	*oleum*	1				1	1	
++ ++	**Opium** **+ poppy** 1. *Papaver*	*opium* *+ papaver*	2	2			3	1	5
± + +	**Pellitory** 1. *Anacyclus* *= Anthemis*	*piretrum*	1				1	1	
++ ++	**Pepper** 1. *Piper*	*piper*	1				1	1	
==	**Pigeon**	*columba*	1				1	1	
==	**Pigeon excrement**	*fimus columbinus*	1				1	1	
++ ++	**Pomegranate** **+ pomegranate flower** 1. *Punica*	*granatum* *+ psidia* *+ balaustium*	3	6	1		7	3	4
++ ++ — ++	**Pumpkin** 1. *Citrullus* 2. *Lagenaria* 3. *Cucurbita*	*cucurbita*	2	4			5	1	2
++ ++ ++ ++	**Purslane** 1. *Portulaca* AR. also *Amaranthus* *Corchorus*	*portulaca*	2		1		1	1	
— — —	**Quince** 1. *Cydonia* *= Pyrus*	*citonium*	2	2			2	1	5
++ ++ —	**Radish** 1. *Raphanus* 2. *Armoracia*	*raphanus*	1	1			1		3

[28] *Cupula glandis* (Prescription #16a), *quercus* (Prescription #18), *esculus* (Prescription #18). Mentioned twice in the same prescription (#18) with 2 different names, counted twice. See pp. 631–632, above.

#1	#2	#3	#4	b.S.	b.N.	GF	JD	JD-bS	#5
==	***Rāmik***	*remich* + *remith*	2	1		1[29]	1[30]		2
++ — ++ ++	**Rhubarb/ribes** 1. *Ribes* 2. *Rumex* AR. *Rheum*	*ribes*	1	2			2[31]		0
++ ++	**Rose** 1. *Rosa*	*rosa*	3	3	3		3[32]	1	4
++ ++ == ++	**Rose / Alfalfa**[33] 1. *Medicago* 2. No identification AR. *Rosa*	*sula* + *sulla* + *herba impinguativa* + *herba arterica* + *herba artetica*	1	1		1S[34] + (S)2	1[35] + (S)1		4[36]
++ ++	**Rosemary** 1. *Rosmarinus*	*rosmarinus / rosismarinus*	1				2	2	
— —	**Rue** 1. *Ruta*	*ruta*	1				1	1	
— —	**Saffron** 1. *Crocus*	*crocus*	1				2	2	
++ ++	**Sage** 1. *Salvia*	*salvia*	1				2	2	
— —	**Salsify** 1. *Tragopogon*	*barba hircina*	1	1			1		2
==	**Salt**	*sal*	1				1	1	
==	**Silver foil**	*lamina argenti*	1				1	1	
++ ++	**Spurge** 1. *Euphorbia*	*euforbium*	1				1	1	

29 *Remith.*
30 *Remich.*
31 *Ribes.*
32 Although rose is mentioned twice in Prescription #10 with the same name, in Despars it forms 2 separate prescriptions and is thus counted twice. See p. 630, above.
33 See Appendix 51 (p. 662, n. 27, above).
34 *Sula.*
35 *Sulla.*
36 Here is considered only the Arabic variant, 'fresh rose'.

#1	#2	#3	#4	b.S.	b.N.	GF	JD	JD-bS	#5
++ — ++	**Squill** 1. *Scilla* 2. *Urginea*	*squilla*	1				1	1	
— —	**Strychnine tree** 1. *Strychnos*	*nux vomica*	1				1	1	
++ ++	**Sugar + red sugar** 1. *Saccharum*	— + *zuccarum rubeum*	2		1		1[37]	1	
==	***Sukk***		1		1				
++ ++	**Sumac** 1. *Rhus*	—	1		2				
++ == == == ++ ==	**Tabasheer** 1. burned ivory, hydroxyl apathite, $Ca_5(OH)(PO_4)_3$[38] 2. ash[39] 3. metallic oxide produced by calcination[40] 4. *Bambusa*[41] 5. chalk	*spodium*	1	2			2		4
==	***Terra sigillata***	*terra sigillata*	1	1			1		2
++ ++	**Tragacanth** 1. *Astragalus*	*dragagantum*	1	1			1		0
==	**Tripe, ox's**	*omasum*	1				1	1	
==	**Vinegar**	*acetum*	3	1	1		2	1[42]	4

---

37 Red sugar.

38 Daems, 1993, no. 444; Thorndike and Benjamin, 1946, p. 307; see Schmucker, 1969, no. 464.

39 Glare, 1982, p. 1808.

40 *Ibid.*; Battaglia, 1961–2000, Vol. 19, p. 975.

41 Thorndike and Benjamin, 1946, p. 307; Battaglia, 1961–2000, Vol. 2, p. 31; Vol. 19, p. 975; see Schmucker, 1969, no. 464.

42 Despars' *acetum* in Prescription #21i, although not mentioned in the Arabic text of *K. al-Qānūn*, is copied from its Latin translation and is thus not an innovation. See p. 635, above.

#1	#2	#3	#4	b.S.	b.N.	GF	JD	JD-bS	#5
++ — ++ —	**Violet** 1. *Viola* 2. *Matthiola* 3. *Cheiranthus*	*viola*	1				3	3	
++ ++ —	**Water lily** 1. *Nymphaea* 2. *Nuphar*	*nenuphar / nenufar*	2	1			2	1	3
==	**Wax**	*cera*	1				1	1	
==	**Wine**	*vinum* + *vinum aromaticum* + *maluisiam* + *uvarnaciam*	2	1			3	2	6
++ ++	**Wormwood** 1. *Artemisia*	*absinthium*	1				1	1	

GLOSSARIES

GLOSSARY 1

IDENTIFICATION OF DRUGS MENTIONED IN THE TEXTS[1]

English name	Arabic name	Medieval Latin name	Scientific name or other identification
Acacia	*aqāqiyā, qāqiyā*	*accatia*	1. *Acacia* (A, L) 2. *Prunus* (L)
Agaric		*agaricum*	1. *Polyporus* (L) 2. *Boletus* (L) 3. *Agaricus* (L)
Alfalfa		*sula, sulla*	*Medicago* (L)
Almond	*lawz*	*amigdalum, amigdala*	*Prunus* = *Amygdalus* (A, L)
Almond, bitter	*lawz murr*	*amigdala amara*	*Prunus* = *Amygdalus* (A, L)
Almond, sweet	*lawz ḥilw*	*amigdala dulcis*	*Prunus* = *Amygdalus* (A, L)
Aloe	*ṣabr*	*aloe*	*Aloe* (A, L)
Alum	*shabb*		Alum; mostly a mixture of several sulphates, $Alk(SO_4)_2 . 12 H_2O$[2] (A)
Amaranth	*baqla yamāniyya*		*Amaranthus* (A)
Aniseed	*anīsūn*	*anisum*	*Pimpinella* (A, L)
Antidote	*adwiya bādazuhriyya*[3]	*bedzaharia*	
Apple/fruit	*tuffāḥ*	*malum* *pomum*	1. *Malus/Pyrus* (A, L) 2. fruit in general (L)
Apricot	*mishmish*	*chrysomelum*	1. *Cydonia* (L) 2. *Prunus* (A)

[1] For methodology, see Chs. 5.1.5.3, 5.2.5.2 and 5.3.5.2. (A) = identification of the Arabic name, (L) = identification of the Latin name.

[2] Schmucker, 1969, no. 418; Lev & Amar, 2008, p. 99; see *ibid*., 2002, n. 213, p. 274; Kahl, 2007, pp. 328. "Alum is a composition of different salts of metals with crystallization water. The prototype of this group of materials is natural alum saltpetre." (Lev, 2003, pp. 18–20; see also for medieval alum trade.)

[3] Lev and Amar, 2008, p. 358: *bādzahr*, *bādazuhr armanī* = Bezoar stone. Stone formed in the intestine of wild or domesticated animals. It was extracted from the gall bladder of goats (or even elephants), and used as medicine mainly to treat poisoning. The name is a Persian word meaning antidote. See Meyerhof, 1940, no. 316; Levey, 1966, p. 313, no. 225; Meyerhof, 1932, pp. 377–380, no. 185.

English name	Arabic name	Medieval Latin name	Scientific name or other identification
Arsenic	*zirnīkh*	*arsenicum*	arsenic, As_4S_6[4] (A, L)
Arsenic, red	*zirnīh aḥmar*	*arsenicum rubeum*	red arsenic, As_4S_4 (A, L)
Asarabacca	*asārūn*	*asarum*	*Asarum* (A, L)
Ash water[5]	*māʾ al-ramād al-mumallaḥ*	*aqua cineris*	
Balsam	*balasān*	*balsamum*	1. *Commiphora* (A, L) 2. *Balsamodendron* (L) 3. *Amyris* (A, L)
Banana/ hydromel[6]	*mawz*	*musa*	1. *Musa* (A, L) 2. hydromel (L)
Barberry	*anbarbārīs*	*berberis*	1. *Berberis* (A, L) 2. *Cistus* (L)
Barley	*shaʿīr*	*hordeum*	*Hordeum* (A, L)
Barley gruel	*sawīq al-shaʿīr*	*sauich hordei*	*Hordeum* (A, L)
Barley water		*ptisana* *kist hordei*	*Hordeum* (barley-water) (L)
Basil	*bādharūj*	*albedarogi* *basilicon* *ozimum fluviale*	*Ocimum* (A, L)
	ḥabaq		*Ocimum* (A)
Birthwort	*zarāwand*	*aristologia*	*Aristolochia* (A, L)
Birthwort, round		*aristologia rotunda*	1. *Aristolochia* (L) 2. *Corydalis* (L)
Blite		*bletum*	1. *Amaranthus* (L) 2. *Beta* (L)
Borage		*borago*	1. *Borago* (L) 2. *Anchusa* (L)
Brains of chicken	*dimāgh al-dajāj*	*cerebellum gallinae*, *cerebrum gallinae*	
Bramble		*batus* *rubus*	*Rubus* (L)
Bran[7]	*nukhāla*		

---

[4] Schmucker, 1969, no. 346; Kahl, 2003, pp. 209, 236; *ibid*., 2007, p. 330; see Lev and Amar, 2008, p. 104.

[5] 'Water of salted ashes/salted ash water'.

[6] The Latin *musa*, translated from the Arabic *mawz*, 'banana,' has in our texts also the Latin synonym *hydromel*.

[7] *Sawīq* = "meal of parched barley (*shaʿīr*), or of [the species thereof, or similar grain, called] *sult*, likewise parched; and it is also of wheat; but is mostly made of barley (*shaʿīr*);

English name	Arabic name	Medieval Latin name	Scientific name or other identification
Bread		*panis*	
Brew	*fuqqāʿ*	*alfoca, foca, fuca*	drink made of barley and other ingredients (A, L)
Briar bush		*dumus*	a thorn or briar bush (L)
Broom	*makānis*[8]	*palma silvestris*	
Bryony		*vitis alba*	1. *Bryonia* (L) 2. *Tamus* (L) 3. *Rubus* (L) 4. a thorny bush (L)
Buckthorn	*ʿawsaj*	*sentis* *spina alba*	1. *Rubus* (L) 2. *Rhamnus* (A, L) 3. *Lycium* (A) 4. thorny plants (L)
Butter[9]	*samn; samn al-baqar*	*butyron; butyron vaccinum*	
Calcicheos		*calcicheos*	Possible identifications: 1. *Carlina* (*halkeios*) (L) 2. *Carthamus* (*chalkeios akanthudes*) (L) 3. chalcite, chalcopyrite, copper iron sulfide (*kalkitis*) burned copper, copper burned white (*chalcitis*) (L) 4. copper sulfate, copper vitriol (*chalkites*) (L) 5. calcand, vitriol (*chalkitis*) (L) 6. *squama ferri (calciteos)* (L) 7. *calx (calcineus)* (L) *SEE calx*

what is made of wheat or of barley; well known: [it is generally made into a kind of gruel, or thick ptisan, being moistened with water, or clarified butter, or fat of a sheep's tail, &c.; and is therefore said to be supped, or sipped, not eaten: but it is likewise thus called when dry; and in this state is taken in the palm of the hand and conveyed to the mouth, or licked up: it is also made of other grains beside those mentioned above; and of several mealy fruits; of the fruit of the Theban palm; and of the carob." Lane, 1886–1893, p. 1472. Kahl, 2003, p. 207: *sawīq al-nabiq* = palm twig mash.

[8] See Lev and Amar, 2002, n. 43, p. 98: *makānis* = Egyptian millet = *Sorghum vulgare* var. *technicum*.

[9] Kahl, 2003, p. 207: *samn* = ghee; *samn (al-)baqar* = ghee from cows.

English name	Arabic name	Medieval Latin name	Scientific name or other identification
Calf[10]		*vitulus*	
Camphor	*kāfūr*	*camphora*	1. *Dryobalanops* (L) 2. *Cinnamomum* (A, L)
Cassia		*cassia*	1. *Daphne* (L) 2. *Cinnamomum* (L) 3. *Cassia* (L) 4. *Majorana* (L)
Cassia fistula	*khiyār shanbar*	*cassiafistula*	1. *Cassia* (A, L) 2. *Cinnamomum* (L)
Castoreum	*jundbādastar*	*castoreum*	strong-smelling substance obtained from inguinal glands of the beaver (*Castor fiber* L.) (A, L)
Cedar resin	*qiṭrān* *durdī al-qiṭrān*	*gummi cedri*	1. *Juniperus* (L) 2. *Citrus* (L) 3. *Cedrus* (A, L) 4. *Cupressus* (A) 5. *Coniferae* (A)
Chamomile		*camomila*	1. *Chamomilla* (L) 2. *Chamaemelum* (L) 3. *Anthemis* (L) 4. *Matricaria* (L)
Cheese	*jubn*	*caseum*	
Cherry		*cerasus*	*Prunus* = *Cerasus* (L)
Chicken	*[luḥūm] al-farārīj*	*capo* *pullus*	
Cichory		*endivia*	1. *Sonchus* (L) 2. *Cichorium* (L)
Cider		*sicera*	Any fermented beverage save wine or beer, especially cider (L)
Cinnamon	*dār ṣīnī*	*cinamomum*	*Cinnamomum* (A, L)
Clay		*terra*	
Clay, Armenian	*ṭīn armanī*	*bolus armenius*	Red clay composed of oxidized iron with lime chalk[11] (A, L)
Clay, pottery	*khazaf*		

[10] The young of cattle, a calf (*Bos taurus*) (Glare, 1982, p. 2081).
[11] Lev and Amar, 2008, p. 149. “Armenischer Tonerde, Aluminiumsilikate oder Aluminiumoxide, durch Eisen- und Manganoxide braunrot gefärbt” (Daems, 1993, no. 100).

English name	Arabic name	Medieval Latin name	Scientific name or other identification
Clay, pottery/pepper cress[12]	*turāb ḥurf abyaḍ*[13]	*terra siguli*	
Clove	*qaranful*	*gariofilus*	*Syzygium* = *Eugenia* (A, L)
Cobweb	*nasj al-ʿankabūt*	*tela araneae*	
Cochium, pillulis cochijs[14]	*qūfī*	*cochium*[15]	*qūfī* = Gr. *kufi*, a compound incense of Egyptian origin[16] (A)
Cock	*duyūk*	*gallus*	
Cokion			See *Cochium*.
Colocynth		*colloquintis*	1. *Citrullus* (L) 2. *Cucurbita* (L) 3. *Cucumis* (L)
Copper vitriol		*calcantum*	copper vitriol, $CuSO_4.5H_2O$ (L)
Coriander	*kuzbara*	*coriandrum*	*Coriandrum* (A, L)
Costus	*qusṭ hindī*	*costum, costum indum*	*Saussurea* (A, L) = *Aucklandia*
Cotton	*quṭn*	*bombax* *coton*	*Gossypium* (A, L)
cotton-like substances from plants	*quṭn sāʾir mā yakhruju mina al-nabāt*		

[12] See pp. 147, 343, above.

[13] The Arabic text has *turāb ḥurf abyaḍ* which could either be punctuated *turāb ḥurf abyaḍ* and translated 'clay (sic!) of white pepper cress' (see p. 343, n. 21, above), or it could be punctuated *turāb khazaf abyaḍ* and translated 'clay of white clay pottery' (see p. 343, n. 20, above), which seems more reasonable from the point of view of the Latin translation. *turāb* = clay, earth (see Lev and Amar, 2002, n. 223, p. 284); dust (Kahl, 2003, p. 208).

[14] "*Recipe aloe, scamonee, masticis, absintii, coloquintide equali pondere; tempera cum succo absintii vel feniculi; in modum fabe da v vel vii cum vino*" (Bartholomeus via Thorndike and Benjamin, 1946, p. 247).—"*Sunt alie pillule chochie. Recipe aloe, coloqui⟨n⟩tide, absinthii, suci maratri, scamonee equale pondus; pipinelle, centauree, bassilicon, brionie, ballionii, herbe fortis, origani, ungulle cabaline, filicis, asmunde, yringe, radicis, ebuli, terebentine et salvie equaliter.*" (*Ibid.*) Beck, 2005, I:25, pp. 22–23, n. 43: "A compound incense which the Egyptians used as a drink to clean the inner parts of the body and as an ointment. Plutarch, *Moralia. Isis and Osiris*, 80, describes the composition of Egyptian *cyphi* (16 ingredients) and describes the ritual associated with its preparation."

[15] No information. Identification based on the Arabic synonymy.

[16] Dozy, 1881, Vol. 2, p. 420; Beck, 2005, I:25, pp. 22–23, n. 43; Dietrich, 1991, I:24, p. 47.

English name	Arabic name	Medieval Latin name	Scientific name or other identification
"Cough pills"[17]		*pilla bichias, pillula bithica, pillula bichichia*	
Cow trotters	*akāriʿ al-baqar*	*pedes vaccini*	
Crab	*saraṭān*	*cancer*	*Astacus* (A, L)
Crab, river	*saraṭān nahrī*	*cancer fluvialis*	*Astacus* (A, L)
Cucumber	*qithāʾ*	*cucumis*	1. *Cucumis* (A, L) 2. *Citrullus* (L)
Cucumber/melon	*khiyār* *qathad*	*citrulus*	1. *Citrullus* (L) 2. *Cucumis* (A, L)
Cumin	*kammūn*		*Cuminum* (A)
Cyclamen		*ciclamen*	1. *Cyclamen* (L) 2. *Aristolochia* (L)
Cypress		*cypressus*	1. *Juniperus* (L) 2. *Cupressus* (L)
Date	*tamr*	*dactilus*	*Phoenix* (A, L)
Date palm		*palma*	*Phoenix* (L)
Dates, unripe	*balaḥ (al-nakhl)*	*flos palmae*	*Phoenix* (A, L)
Diagredium		*diagredium*	Medicine containing: 1. *Convolvulus* (L) 2. *Euphorbia* (L)
Dill	*shibitt*	*anetum*	*Anethum* (A, L)
Dock		*acedula*[18] *acetosa*[19]	1. *Rumex* (L) 2. *Sedum* (L) 3. *Sempervivum* (L)
Dog-rose	*nisrīn*		*Rosa* (A)
Dough		*pasta*	
Dragon's blood	*dam al-akhawayn*	*sanguis draconis*	1. *Dracaena* (A, L) 2. *Calamus* (A, L) 3. *Daemonorops* (L)
Drumstick tree / ben	*bān*		*Moringa* (A)
Eaglewood		*lignum aloes*	1. *Aquilaria* (L) 2. *Aloëxylon* (L)
Egg	*bayḍa*	*ovum*	

17 *bechico* = cough remedy (in ancient medicine) (Battaglia, 1961–2000, Vol. 2, p. 142).
18 *Rumex* or *Sempervivum*.
19 *Sempervivum, Sedum* or *Rumex*.

English name	Arabic name	Medieval Latin name	Scientific name or other identification
Egg yolk	*ṣufrat al-bayḍa*	*vitellum ovi*	
Egg-white	*bayāḍ al-bayḍ*	*albumen ovi*	
Excrement		*fimus*	
Excrement of donkey	*rawth al-ḥimār* *sirqīn al-ḥimār*	*faex asini* *stercus asini*	
Excrement of hare	*khur' al-arnab*	*stercus leporis*	
Excrement of pig		*stercus porci recens* *porcina faex*	
Fānīdh medicament[20]		*diapenidion*	Medicine containing: *fānīdh* = sweets, candy[21]
Fava bean	*bāqillā*	*faba*	*Vicia* (A, L)
Fennel	*rāziyānaj*	*feniculum*	*Foeniculum* (A, L)
Fenugreek	*ḥulba*	*fenugrecum*	*Trigonella* (A, L)
Fig	*ṭīn*	*carica* *ficus*	*Ficus* (A, L)
Fish	*samak*	*piscis*	
Fish dish[22]		*gelatina*	
Fleawort	*bizr qaṭūnā*	*psilium*	*Plantago* (A, L)
"Fox's lungs"[23]		*pulmo vulpis*	
Frankincense	*kundur*	*olibanum* *thus*	*Boswellia* (A, L)
Frogs	*ḍafāḍiʿ*	*rana*	
Galbanum	*qinna*	*galbanum*	*Ferula* (A, L)
Galen's *hierapicra*		*hierapigra Galieni*	

[20] *diapenidium*: "Farmac. Ant. Elettuario contenente zucchero, usato contro la tosse (= voce dotta, dal lat. mediev. *diapenidion*, dal gr. *diapaino* 'ingrasso')" (Battaglia, 1961–2000, Vol. 4, p. 328).

[21] Lev and Amar, 2008, p. 571; Kahl, 2003, p. 202. Schmucker, 1969, no. 520: "weiche Zuckermasse, Feinzucker, Art Pflanzenzucker, den man hauptsachlich aus dem Sussholz zu gewinnen pflegte."

[22] Chosen as the translation because of the rest of the prescription is connected with fish. Fish jelly (Battaglia, 1961–2000, Vol. 6, p. 628). "*Piscium est, quando pisces coquuntur in aceto, et postea congelatur acetum cum quo coquuntur: et eodem modo fit cum carnibus*." Matth. Silvatic. via Du Cange, 1937–1938, Vol. 4, p. 51.

[23] No identification found. Considering the general character of the medicaments in this list, it seems unlikely that intention really would be to an animal product. However, see also Beck, 2005, II:39, p. 103, where dried lung of the fox is mentioned among animal drugs and recommended, taken in drink, for asthma.

English name	Arabic name	Medieval Latin name	Scientific name or other identification
Gallnut	*ʿafṣ*	*galla*	1. gall-nut (A, L) 2. *Quercus* (A, L)
Garlic/onion		*allium*	*Allium* (L)
Grape	*ʿinab*		*Vitis* (A)
Grape syrup	*maybukhtaj*	*rob*	the condensed juice of *Vitis* (A, L)
Grapes, unripe/sour, or their juice	*ḥiṣrim*	*agresta* *veriutum antiquum* *uva acerba*	*Vitis* (unripe/sour grapes or their juice) (A, L)
Grapevine	*karm*	*vitis*	*Vitis* (A, L)
Grapevine tendrils	*ʿasālij al-karm*	*capreolus vitis*	*Vitis*: vine-tendril (A, L)
Grease		*pinguedo*	
Gruel	*sawīq*	*sauic(h)*	
Gum	*ṣamgh*	*gummi*	1. gum (A, L) 2. resin (A, L)
Gum arabic	*ṣamgh ʿarabī*	*gummi arabicum*	*Acacia* (A, L)
Hares, fur of	*wabar al-arnab*	*pilus leporis*	fur of hare (A, L)
Hematite		*lapis sanguinaria*	hematite (L)
Hemlock		*conium*	1. *Cicuta* (L) 2. *Conium* (L)
Hen	*dajāj*	*gallina*	
Henbane	*banj*	*iusquamus*, *iusquamus albus*	*Hyoscyamus* (A, L)
Henna	*ḥinnāʾ*		*Lawsonia* (A)
Herba arterica		*herba arterica*	SEE *herba artetica agrestis* Possible identifications, exact identification impossible: 1. *Euphrasia* (L) 2. *Mercurialis* (L) 3. Of or affecting the wind-pipe; a medicine for the air-passages (L)
Herba impinguatiua		*herba impinguatiua*	No identification found.

English name	Arabic name	Medieval Latin name	Scientific name or other identification
Herba artetica agrestis		*herba artetica agrestis*	SEE *herba arterica* Possible identifications, exact identification impossible: 1. *Euphrasia* (L) 2. *Raphanus* (L) 3. *Armoracia* (L) 4. *Rubia* (L) 5. *Thymus* (L) 6. *Satureja* (L) 7. *Galium* (L)
Hierapicras[24]		*hiera maiora*	
Honey	*ʿasal*	*mel*	
Horehound	*farāsiyūn*	*prassium*	*Marrubium* (A, L)
Horehound medicament		*diaprassium*	Medicine containing: *Marrubium* (L)
Houseleek		*sempervivum*	1. *Sempervivum* (L) 2. *Sedum* (L)
Hydromel		*hydromel*	drink made of honey and water, hydromel (L)
Hyoscyamus		*iusquamus albus*	*Hyoscyamus* (L)
Hyssop	*zūfāʾ, zūfā*	*hysopus, ysopus*	1. *Hyssopus* (A, L) 2. *Origanum* (L)
Ink, scribes'[25]	*ḥibr*	*encaustum scriptorum*	
Iris	*sawsan*	*vreos, yreos*	1. *Iris* (A, L) 2. *Lilium* (A, L)
Iris medicament		*diairis*	Medicine containing: 1. *Iris* (L) 2. *Lilium* (L)
Iron water		*aqua ferrata*	
Jujube	*ʿunnāb*	*iuiuba*	*Zizyphus* (A, L)

[24] *Hiera*: "Farmac. Ant. Elettuario a base di aloe, cinnamomo, zafferano, spicanardi, mastice e altri ingredienti, impastati con miele o con sciroppi (= voce semidotta, lat. mediev., comp. al gr. *ieros* 'sacro' e *pikros* 'amaro')." Battaglia, 1961–2000, Vol. 6, p. 695; Vol. 7, p. 231; see Du Cange, 1937–1938, Vol. 8, p. 455.

[25] *ḥibr* = ink (Kahl, 2007, p. 325). On preparation of ink, see Beck, 2005, V:162, pp. 400–401.

English name	Arabic name	Medieval Latin name	Scientific name or other identification
Julep	*julāb*	*iulep*	rosewater-syrup[26] (A, L)
Juniper		*iuniperus*	*Juniperus* (L)
Kelim		*collyrium kelim*	No identification.
Kidney fat		*adeps renum*	
Knotgrass	*ʿaṣā al-rāʿī*	*poligonium* *virga pastoris*	1. *Polygonum* (A, L) 2. *Dipsacus* (L)
Lac	*lakk* = gummi lacca	*lacca*	lac, gum (A, L)
Ladanum	*lādhan*	*laudanum*	*Cistus* (A, L)
Laurel		*laurus*	*Laurus* (L)
Lavender	*usṭūkhūdūs*	*sticados arabicum*	*Lavandula* (A, L)
Leek	*kurrāth*	*porrum*	*Allium* (A, L)
Leek, Damascene	*kurrāth shāmī*	*porrum de scenij, porrum desceni*	*Allium* (A, L)
Lemon		*citrus*[27] *limon*[28]	1. *Citrus* (L) 2. *Callitris* (L) 3. *Melissa* (L) 4 *Citrullus* (L)
Lemongrass	*qaṣab al-dharīra*		*Andropogon* = *Cymbopogon* (A)
Lentil	*ʿadas*	*lens*	*Lens* (A, L)
Lettuce	*khass*	*lactuca*	*Lactuca* (A, L)
Licorice	*sūs*	*liquiritia, liquiricia*	*Glycyrrhiza* (A, L)
Lily	*sawsan*	*lilium*	1. *Lilium* (A, L) 2. *Iris* (A, L)
Lime(stone)		*calx*	lime, limestone (L)
Lime, gypsum	*jiṣṣ* *jiṣṣ mayyīt*[29]	*gypsum*	gypsum (hydrous calcium sulphate) (A, L)
Linen, flax	*kattān*	*linum*	*Linum* (A, L)
Liver		*iecor*	

[26] Bos, 1989. A combined drug, in most cases a sugar decoction, often sweetened rose water (Schmucker, 1969, no. 200); general name of refined and fragrant liquid, and specific name for rose water or sweets mixed with rose water (Lev and Amar, 2008, p. 562); *julāb* = julep (Kahl, 2003, p. 203; *ibid.*, 2007, p. 325).

[27] *Citrus, Callitris* or *Melissa*.

[28] *Citrus* or *Citrullus*.

[29] Slaked lime.

English name	Arabic name	Medieval Latin name	Scientific name or other identification
Lycium		*licium*	1. *Lonicera* (L) 2. *Rhamnus* (L)
Lycium, Indian	*ḥuḍaḍ hindī*	*licium indum*	1. *Acacia* (L) 2. *Berberis* (L) 3. *Lycium* (A) 4. *Rhamnus* (A, L)
Lye		*lixivium*	
Maidenhair	*barshāwshān*	*capillus veneris*	*Adiantum* (A, L)
Mallow	*khubbāzā* = *mulūkhiyya*	*conde*[30]	*Malva* (A)
Malva	*khaṭmī*	*altea*	1. *Althaea* (A, L) 2. *Malva* (L)
Mandrake	*sirāj al-quṭrub*	*candela alcotrob*[31] *mandragora*	*Mandragora* (A, L)
Manna, frankincense		*manna, manna granata*	*Boswellia* (L)
Marigold		*caput monachi*	1. *Calendula* (L) 2. *Taraxacum* (L)
Marjoram		*maiorana*	*Majorana* (L)
Mastic		*mastix*	*Pistacia* (L)
Meat	*luḥūm*	*caro, carnis*	1. meat (A, L) 2. pulp of fleshy substance of plants or their fruits, sap-wood (L)
Meat broth		*brodium*	
Meat dish	*al-halāmāt* *al-maṣūṣāt*	*alchelemet, allellemech* *almosos, almososus, almososat, almosusath* *tafea, taffea, tafeata*	*al-maṣūṣāt* = Dish of flesh-meat, cooked, and steeped in vinegar; or steeped in vinegar, and then cooked: or of the flesh of birds particularly[32]
Meat of an one-year-old solid-hoofed animal	*luḥūm al-ḥawliyyāt*		

[30] No information. Identification based on the Arabic synonymy.

[31] No information. The identification is based on the name of the plant in the original Arabic text, *sirāj al-quṭrub*.

[32] Lane, 1886–1893, p. 2718.

English name	Arabic name	Medieval Latin name	Scientific name or other identification
Meat soup	*al-isfīdbājāt*	*allifidabeget, alesfidabaget, alisfidabegi, aliffidabegi*	
Medlar	*zuʿrūr*	*zarur, azarur pomum parvulum factum sicut nespula*	1. *Mespilus* (A, L) 2. *Crataegus* (A)
Melilot		*melilotus*	*Melilotus* (L)
Melon		*melon*	*Cucumis* (L) SEE *cucumis, citroli*
Mercury		*mercurialis*	*Mercurialis* (L)
Milk	*laban* *laban al-niʿāj*	*lac*	
Milk, freshly milked	*al-laban al-ḥalīb*		
Mill dust	*ghubār al-raḥā*	*pulvis molendinis*	
Mint	*naʿnaʿ*	*menta, menta domestica*	*Mentha* (A, L)
Mithridatium[33]	*al-mithrūdīṭūs*	*methridatum*	
Mountain ash		*sorbum*	*Sorbus* (L)
Mucilage	*luʾāb*		
Mulberry	*tūt*	*morum*	1. *Morus* (A, L) 2. *Ficus* (L) 3. *Rubus* (L)
Mummy	*al-mūmiyāʾ al-khāliṣ*	*pura mumia*	asphalt (A, L)
Musk	*misk*	*muschus*	musk from *Moschus moschiferus* L. (A, L)
Musk melon	*bittīkh*		*Cucumis* (A)
Mustard	*khardal*	*sinapis*	1. *Brassica* (A, L) 2. *Sinapis* (A, L)
Myrrh	*murr*	*myrrha*	*Commiphora* (A, L)
Myrtle	*ās*	*myrtus*	*Myrtus* (A, L)
Narciss	*narjis*	*narciscus*	*Narcissus* (A, L)
Nettle	*qurrayṣ* *anjura*	*urtica*	*Urtica* (A, L)

[33] Antidote against poisons. From Greek *Mithridates*. See Glare, 1982, p. 1119; Battaglia, 1961–2000, Vol. 10, p. 617.

English name	Arabic name	Medieval Latin name	Scientific name or other identification
Nigella		*nigella*	1. *Nigella*(L) 2. *Agrostemma*(L)
Nightshade		*solatrum*	1. *Atropa* (L) 2. *Solanum* (L) 3. *Physalis* (L)
Nut	*jawz*	*nux*	1. nut (includes hazel-nut, walnut, almond, etc.) (A, L) 2. *Juglans* (A, L)
Nut grass, yellow	*suʿd*	*ciperus, cyperus*	*Cyperus* (A, L)
Oak	*ballūṭ*	*cupula glandis* *esculus* *quercus*	*Quercus* (A, L)
Olive (oil)		*oleum*	1. *Olea* (L) 2. oil in general (L)
Onion		*cepa*	*Allium* (L)
Opium	*afyūn*	*opium*	*Papaver* (A, L)
Opium, Theban		*opium thebaicum*	*Papaver* (L)
Opoponax	*jāwshīr*	*oppopanax,* *oppoponax*	1. *Opopanax, Opoponax* (A, L) 2. *Ferula* (A)
Orach(e)		*atriplex*	*Atriplex* (L)
Orange		*arancium*	*Citrus* (L)
Orpiment		*auripigmentum*	SEE *arsenicum*
Ox trotters		*pedes bovini*	
Ox's tripe		*omasum*	
Paper	*qirṭās*	*charta, carta*	1. Papyrus: 'Paper' made from papyrus (*Cyperus*), or a sheet of it (A, L) 2. material for writing (A, L)
Papyrus	*bardī*	*papyrus*	*Cyperus* (A, L)
Pasta[34]	*iṭriya, rishta*	*tri*[35]	
Pea		*pisum*	*Pisum* (L)
Peach	*mishmish*	*persica*	*Prunus* (A, L)

[34] = "a certain food, like threads, made of flour; a thing made of softened starch." Lane, 1886–1893, p. 1852.

[35] No identification, identified on the basis of the Arabic original and the Latin comments.

English name	Arabic name	Medieval Latin name	Scientific name or other identification
Pear	*kummathrā*	*pirum*	*Pyrus* (A, L)
Pellitory		*piretrum*	*Anacyclus* (L)
Pepper	*filfil*	*piper*	*Piper* (A, L)
Pepper cress See Clay, pottery	*ḥurf* *ḥurf abyaḍ*		*Lepidium* (A)
Peppermint	*fūdhanj*	*calamentum*	1. *Calamintha* (L) 2. *Mentha* (A, L) 3. *Nepeta* (L) 4. *Melissa* (L)
Peppermint medicament[36]		*diacalamentum*	Medicine containing: 1. *Calamintha* (L) 2. *Mentha* (L) 3. *Nepeta* (L) 4. *Melissa* (L)
Perch[37]		*perka*	
Pig's trotters		*pedes porcini*	
Pigeon[38]		*columba*	
Pike[39]		*lucius*	
Pine	*ṣanawbar*	*pinus*	*Pinus* (A, L)
Pistachio	*fustuq*	*fisticum*	*Pistacia* (A, L)
Pistachio resin	*ʿilk al-anbāṭ*	*gluten alimbat,* *glutinum alimbat*[40]	1. *Pistacia* L. (A) 2. turpentine (A)
Pitch	*zift*	*pix, pix liquida*	pitch (A, L)
Pitch (fluid)	*qiṭrān*	*pix liquida*	1. pitch (L) 2. mineral pitch (L) 3. bitumen (L) 4. *Cedrus* (tar) (A) 5. *Cupressus* (tar) (A) 6. *Coniferae* (tar) (A)

[36] *Diacalamento*: "Farmac. Ant. Farmaco composto di polvere medicinale confortativa, la cui base è il calamento (= voce dotta, dal lat. mediev. *dyacalamentum*, comp. dal gr. *dia* 'per mezzo di' e *calamento*)." Battaglia, 1961–2000, Vol. 4, p. 311.

[37] A perch or similar fish (*Perca fluviatilis*) (Glare, 1982, p. 1329).

[38] Dove, turtle, *Columba* or *Streptopelia* (Glare, 1982, p. 357; Battaglia, 1961–2000, Vol. 3, p. 304).

[39] Understood from the context.

[40] No identification, identified on the basis of the Arabic original and the Latin comments.

English name	Arabic name	Medieval Latin name	Scientific name or other identification
Plantain	*lisān al-ḥamal*	*arnoglossa* *plantago lanceolata* *lingua agni* *plantago* *quonquenervia*	*Plantago* (A, L)
Platanus	*dulb*	*dulb, adulb* *platanus*	*Platanus* (A, L)
Plum medicament[41]		*diaprunis*	Medicine containing: *Prunus* (L)
Plum, prune	*ijjāṣ*	*prunum*	*Prunus* (A, L)
Pomegranate	*rummān*	*granatum* *psidia*	*Punica* (A, L)
Pomegranate, wild		*malum granatum (siluestre)*	*Punica* (L)
Pomegranate flower	*jullanār*	*balaustium*	*Punica* (A, L)
Poplar		*populeonum*	*Populus* (L)
Poppy	*khashkhāsh*	*papaver*	*Papaver* (A, L)
Poppy medicament	*al-diyāqūdh* *al-sādhaj*[42]	*deiacor, deiacur,* *deuicor, deuico,* *aldeicur, aldeiacur* *anathari* *dia papaver*[43] *diacodion*[44]	Medicine containing: *Papaver* (A, L)
Poppy, black		*papaver nigrum*	*Papaver* (L)
Porridge[45]		*puls*	

41 *diapruno, diaprunis*: "Farmac. Ant. Elettuario lenitivo o solutivo basato sulla polpa delle prugne (= voce dotta, latr. mediev. *diaprunis*, comp. dal gr. *dia* 'per mezzo di' e dal lat. *prunum* 'prugna')." Battaglia, 1961–2000, Vol. 4, p. 328.

42 From the Greek *dyacodion*. *diyāqūdh* comes from the Greek *(e) dia kodion* = "[remedy made] with poppy capsules" (Kahl, 2007, p. 229, n. 119; see Liddell and Scott, 1977, p. 1016; Dozy, 1881, Vol. I, p. 480).

43 *Diapapavero*: "Farmac. Ant. Elettuario contenente papavero (= voce dotta, lat. mediev. *diapapaver*, comp. dal gr. *dia* 'per mezzo di' e dal lat. *papaver* 'papavero')." Battaglia, 1961–2000, Vol. 4, p. 327.

44 "… Confectio *Diacodion* (*e dia kodeion, kodeia*, Mohnkopf), die, nach Damokrates (Plin. 29,5) aus frischen *Mohnkapseln, Myrrha, Hypocistis* und *Honig* zusammengesetzt …" (Schelenz, 1965, p. 162); "… *item papaver nigrum unde fit diacodium* …" (Thorndike and Benjamin, 1946, p. 229).

45 A dish made by boiling crushed spelt or other grain in water, a kind of porridge (Glare, 1982, p. 1518; Battaglia, 1961–2000, Vol. 13, pp. 731, 800–801).

English name	Arabic name	Medieval Latin name	Scientific name or other identification
Prunes, wild		*prunella agrestis*	*Prunus*[46] (L)
Pumpkin	*qarʿ*	*cucurbita*	1. *Citrullus* (L) 2. *Lagenaria* (A, L) 3. *Cucurbita* (A, L)
Purslane	*baqla al-ḥamqāʾ*	*portulaca*	*Portulaca* (A, L)
	baqla		1. *Portulaca* (A) 2. *Amaranthus* (A) 3. *Corchorus* (A)
Quicklime	*nūra*	*calx viva* *nora*	1. quicklime (A, L) 2. lime (A, L)
Quince	*safarjal*	*citonium*	*Cydonia* (A, L)
Radish	*fujl*	*raphanus*	1. *Raphanus* (A, L) 2. *Armoracia* (L)
Raisin	*zabīb*	*passula* *uvae passae*	*Vitis*: dried grapes, raisins (A, L)
Rāmik	*rāmik*	*remich, remith*	Compound medicine[47]
Reed	*qaṣab*	*arundo*[48] *(caput) cannae*[49] *cannula calami*[50]	1. a reed (A, L) 2. *Bambusa* (L) 3. *Acorus* (L) 4. *Arundo* (A, L)
Resin	*qiṭrān*	*alkitran*	1. pitch (A, L) 2. *Juniperus* (L) 3. *Cedrus* (A, L) 4. *Cupressus* (A) 5. *Coniferae* (A)
Resin dregs	*durdī al-qiṭrān*	*faex alkitran*	1. pitch (A, L) 2. *Juniperus* (L) 3. *Cedrus* (A, L) 4. *Cupressus* (A) 5. *Coniferae* (A)

46 *Prunella. Prunella agrestia* could not be found from literature.

47 A certain astringent medicine, used as a remedy for dysentery (Lane, 1886–1893, pp. 1158–1159); Kahl, 2003, pp. 207, 232: *rāmik* = ramie = *Boehmeria nivea*; Kahl, 2007, p. 302, n. 251: "*rāmik* is the name of a 'perfume' which is made from unripe dates, oak galls, pomegranate rind, honey, musk, and certain other aromatics in varying proportions of mixture, and whose prevailing ingredient may serve as an additional label."

48 A reed or *Bambusa*.

49 A (small) reed.

50 A reed, *Bambusa, Acorus* or *Arundo*.

English name	Arabic name	Medieval Latin name	Scientific name or other identification
Rhubarb	*rībās*[51]	*reubarbarum*[52] *ribes*[53]	1. *Rheum* (A, L) 2. *Ribes* (L) 3. *Rumex* (L)
Rice		*risum*	*Oryza* (L)
Rob[54]	*rubūb*	*robub*	
Rose	*ward*	*rosa*	*Rosa* (A, L)
Rose honey[55]	*al-julunjubīn al-ʿasalī*	*mel rosarum*	*Rosa* (A, L)
Rose water	*al-māward*		*Rosa* (A)
Rosemary		*rosmarinus, rosismarinus*	*Rosmarinus* (L)
Rue		*ruta*	*Ruta* (L)
Rush		*iuncosa palustris*[56] *iuncus*	1. rush (L) 2. *Cyperus* (L) 3. *Scirpus* (L) 4. *Juncus* (L)
Safflower	*qurṭum*	*cartamus* *crocus (h)ortensis*	1. *Crocus* (L) 2. *Carthamus* (A, L)
Safflower medicament[57]		*diacartamus*	Medicine containing: 1. *Crocus* (L) 2. *Carthamus* (L)
Saffron	*zaʿfarān*	*crocus*	*Crocus* (A, L)
Sagapenum	*sakabīnaj*	*(gummi) serapinum*	*Ferula* (A, L)
Sage		*salvia*	*Salvia* (L)

[51] *Rheum*.
[52] *Rheum*.
[53] *Ribes* or *Rumex*.
[54] Daems, 1993, no. 412. *roob* = zur Sirupdicke eingedampfte Pflanzensäfte (Schelenz, 1965, p. 280). "*Rob, id est, sucus usque ad spisitudinem decoctus vel ad tertiam partem*" (Synonima via Thorndike and Benjamin, 1946, p. 273). Kahl, 2003, p. 207: *rubb al-sūs* = liquorice rob; *rubb al-khashkhāsh al-aswad* = black poppy mash.
[55] *julunjubīn* = rose honey (Schmucker, 1969, n. 202) *ʿasal* = honey; Dietrich, 1991, II:65, p. 109; Kahl, 2003, p. 201; *ibid*., 2007, pp. 323; Levey, 1966, p. 304; Schmucker, 1969, no. 486; Lev & Amar, 2008, p. 185; see *ibid*., 2002, n. 198, p. 258.
[56] Not found in the sources available for me; following explains *juncos*.
[57] *Diacartamo*: "Farmac. Ant: Lassativo a base de semi di cartamo (= voce dotta, lat. mediev. *diacarthamum*, comp. dal gr. *dia* 'per mezzo di' e *carthamum* 'cartamo')." Battaglia, 1961–2000, Vol. 4, p. 311.

English name	Arabic name	Medieval Latin name	Scientific name or other identification
Salsify	*liḥyat al-tays*	*barba hircina* *herba hirci* *ypoquistidos*	*Tragopogon* (A, L)
Salt[58]	*māʾ al-ramād al-mumallaḥ*	*sal*	salt (sodium chloride)
Salt, bitter[59]	*al-māʾ al-māliḥ al-murr*	*sal sapore amarum, sal amarum*	bitter-tasting salt
Saltwort	*qāqullā*	*alchachille, cachille, alkakile*[60]	1. *Bunias* (A) 2. *Salsola* (A)
Sandalwood	*ṣandal*	*sandalum*	1. *Santalum* (A, L) 2. *Pterocarpus* (A, L)
Sandalwood, red		*sandalum rubeum*	*Pterocarpus* (L)
Sebesten	*sabistān*	*sebesten*	*Cordia* (A, L)
Sesame	*ḥall*	*(oleum) sisaminum*	*Sesamum* (A, L)
Sheep trotters		*pedes mutonis*	
Sheep yearlings	*luḥūm al-ḥawliyyāt [min] al-ḍaʾn*	*annualis agnus*	
Shepherd's purse		*bursa pastoris*	*Capsella* (L)
Silk	*ḥarīra*	*sericinus*	
Silver foil		*lamina argenti*	
Soldanella		*soldanella*	1. *Calystegia* (L) 2. *Convolvulus* (L) 3. *Soldanella* (L)
Spinach		*spinachia*	1. *Spinacia* (L) 2. *Atriplex* (L) 3. *Brassica* (L)
Sponge	*isfanj*	*spongia*	*Spongia* (A, L)
Spurge		*euforbium*	*Euphorbia* (L)
Squill	*ʿunṣul*	*squilla*	1. *Scilla* (A, L) 2. *Urginea* (A, L)
Starch	*nashā*	*amidum* *amilum*	1. *Triticum (Farina Tritici)* (L) 2. amylum, starch (A, L)

---

58 'salted ash water'.

59 'bitter salt water'.

60 No information. The identification is based on the name of the plant in the original Arabic text, *qāqullā*.

English name	Arabic name	Medieval Latin name	Scientific name or other identification
Storax	*mayʿa*	*storax*	1. *Styrax* (A, L) 2. *Liquidambar* (A, L)
"Storax honey"	*ʿasal al-lubnā*	*mel storacis, mel storacis calamite*	1. *Styrax* (A, L) 2. *Liquidambar* (A, L)
Strychnine tree		*nux vomica*	*Strychnos* (L)
Sugar	*sukkar*	*zuccarum*	*Saccharum* (A, L)
Sugar cane	*qaṣab al-sukkar*	*canna zuccari*	*Saccharum* (A, L)
Sugar, crystalline	*al-sukkar al-ṭabarzadh*	*zuccarum tabarzed*	*Saccharum* (A, L)
Sugar, *fānīdh*	*fānīdh*	*penidium*,[61] *penith*[62]	sweets, candy[63]
Sugar, red		*zuccarum rubeum*	*Saccharum* (L)
Sugar, white		*zuccarum album, zuccarum albissimum*	*Saccharum* (L)
Sukk	*sukk*		Compound aromatic remedy[64]
Sulphur	*kibrīt*	*sulphur*	
Sumac	*summāq*	*sumach*	*Rhus* (A, L)
Sweets	*ḥalwāʾ*		
Sweet flag		*calamus aromaticus*	*Acorus* (L)

[61] *Penidium*: 1. "An einem Faden kristallisiert Zucker, Kandi-Zucker von: *Saccharum officinarum* L." (Daems, 1993, no. 389); 2. Zucchero d'orzo (Battaglia, 1961–2000, Vol. 12, p. 1012); *Saccharum penidiatum*, Gerstenzucker, verschieden gedrehter *Gerstenzucker* (Schelenz, 1965, p. 353); 3. "Medic. Ant. Pasticca di farina d'orzo e zucchero usata un tempo come rimedio delle affezioni delle vie respiratorie e in partic. per la tosse" (Battaglia, 1961–2000, Vol. 12, p. 1030); 4. "*Fiunt sic: aqua miscetur zucharo, fit decoctio puousque lapidi gutta superposita adeo induretur quod statim inter digitos frangatur. Post super lapidem ponatur politum ut infrigidentur et clavo aseri infixo suspendantur et ibi manibus tractentur usque dum desiccentur. Quidam superaspergunt pulverem amidi ut albi fiant*." *Circa instans via* Thorndike and Benjamin, 1946, p. 234.

[62] *Penith*: "Medic. Ant. Pasticca di farina d'orzo e zucchero usata un tempo come rimedio delle affezioni delle vie respiratorie e in partic. per la tosse." Battaglia, 1961–2000, Vol. 12, pp. 1017, 1030.

[63] Lev and Amar, 2008, p. 571; Kahl, 2003, p. 202. Schmucker, 1969, no. 520: "weiche Zuckermasse, Feinzucker, Art Pflanzenzucker, den man hauptsachlich aus dem Sussholz zu gewinnen pflegte."

[64] *sukk* = "Confection, oriental aromatic remedy composed of date juice, gallnut and Indian astringent drugs" (Lev and Amar, 2008; Meyerhof, 1940).

English name	Arabic name	Medieval Latin name	Scientific name or other identification
Tabasheer	*ṭabāshīr*	*spodium*	1. burned ivory, hydroxyl apathite, $Ca_5(OH)(PO_4)_3$ (L) 2. ash (L) 3. metallic oxide produced by calcinations (L) 4. *Bambusa* (A, L) 5. chalk (A)
Tamarind	*tamr hindī*	*thamarindus*	*Tamarindus* (A, L)
Teasel		*carduus fullonum*	*Dipsacus* (L)
Terebinth	*ʿilk al-buṭm*	*terbenthina*	*Pistacia* (A, L)
Terebinth resin	*ṣamgh al-buṭm* *ʿilk al-buṭm*	*gummi albotin,* *gluten albotim* *glutinum album*[65]	1. *Pistacia* (A, L) 2. Terpentin (A, L)
Terra sigillata	*ṭīn makhtūm*	*terra sigillata*[66]	A medicinal clay containing ferrous oxide[67]
Theriac	*tiryāq*	*tyriaca*	
Thistle (*bādhāward*)	*bādhāward*		1. *Cirsium* (A) 2. *Onopordum* (A) 3. *Carduaceae* (A)
Thistle (*carduus*)		*carduus: lanugine quorundam cardonum*	Possible identifications, exact identification impossible: 1. *Atractylis (carduus)* (L) 2. *Carlina* (L) 3. *Dipsacus* (L) 4. *Carduus* (L) 5. *Silybum* (L) 6. *Cardopatium* (L) 7. *Cnicus* (L)
Thyme	*ḥāshā*	*thimum* *hasce*	1. *Thymus* (A, L) 2. *Satureja* (A, L) 3. other *Labiatae* (A)
Tragacanth	*kathīrāʾ*	*dragagantum*	*Astragalus* (A, L)

[65] No information. Identification based on the Arabic and Latin synonymy.

[66] *terra sigillata*: 1. = "*Calx est odorifferra*" (Thorndike and Benjamin, 1946, p. 313); 2. = *terra argentaria* = *terra saracenica* (*ibid*., 1946, p. 314).

[67] List and Horhammer, 1969–1979, Vol. 2, p. 1262. Cf. Kahl, 2003, p. 208: *ṭīn makhtūm* = sealing bole. *ṭīn* = clay, earth, bole (Lev and Amar, 2008, p. 149; see Lev and Amar, 2002, n. 223, p. 284).

English name	Arabic name	Medieval Latin name	Scientific name or other identification
Tragacanth medicament[68]		*diadragagantum*, *diadragantum*	Medicine containing: *Astragalus* (L)
Valerian	*sunbul al-ṭīb*, *sunbul hindī*, *sunbul*	*spica aromatica*[69] *spicenardum*[70]	1. *Valeriana* (A, L) 2. *Nardostachys* (A, L)
Vegetables	*buqūl*	*olera*	
Verdigris	*zinjār*	*flos (a)eris*	copper sulphate $CuSO_4$ = blue vitriol (A, L)
Vetch	*kirsinna*	*herbum* *orobum*	1. *Ervum* (L) 2. *Vicia* (A, L)
Vinegar	*khall*	*acetum*	vinegar (A, L)
Violet	*banafsaj*	*viola*	1. *Viola* (A, L) 2. *Matthiola* (L) 3. *Cheiranthus* (L)
Vitriol	*zāj*	*atramentum* *dragantum* *vitreolum*	1. copper vitriol, $CuSO_4.5H_2O$ (A, L) 2. zinc vitriol, $ZnSO_4.7H_2O$ (A, L) 3. ferrous sulphate $FeSO_4$ (A)
Vitriol, yellow	*qalqaṭār*	*colcathar* /*colcotar*	copper vitriol (A, L)
Water lily	*naylūfar*	*nenufar*	1. *Nymphaea* (A, L) 2. *Nuphar* (A, L)
Water mint	*fūdhanj nahrī*	*calamentum fluviale*	*Mentha* (A, L)
Wax, beeswax		*cera*	
Wax, cerate[71]	*al-qayrūṭiyyāt*	*cerotum, cerotarium*	

[68] *Diadragante*: "Farmac. Ant. Elettuario a base di dragante (= voce dotta, lat. mediev. *dyadragantum*, comp. dal gr. *dia* 'per mezzo di' e dal lat. *dragantum* 'gomma')." Battaglia, 1961–2000, Vol. 4, p. 316.

[69] *Valeriana* or *Nardostachys*.

[70] *Valeriana*; see Beck, 2005, I:7, p. 9: *nardos* = *Nardostachys jatamansi* DC.; *Patrinia scabiosifolia* Fisch.

[71] Glare, 1982, p. 302; Battaglia, 1961–2000, Vol. 2, p. 1003; Schelenz, 1965, p. 280. *cerotarium, cerotum*: "Cerotarium. Idem quod *Ceratum* vel *Cerotum* …" (Du Cange, 1937–1938, Vol. 2, p. 275). *Cerotto*: "Ant. Impiastro; unguento (= Lat. tardo *cerotum*, dal gr. *keroton* 'unguento a base di cera', neutro sostant. di *kerotos* 'di cera')" (Battaglia, 1961–2000, Vol. 2, p. 1003). *Cerotum*: "Galienus in libro *de simplici medicina* de ceroto. et est cerotum cera liquefacta cum oleo, quando est simplex. Non est de proprietate eius ut calefaciat vel infrigidet. Sed quando miscetur cum aqua, infrigidat, quoniam aqua in complexione sua facta est …" Thorndike and Benjamin, 1946, p. 4. *Qiruti* = a wax-

English name	Arabic name	Medieval Latin name	Scientific name or other identification
Wax, red[72]	*shamʿ aḥmar*	*cera rubea*	
Wax, white[73]	*shamʿ abyaḍ*		
Wheat	*ḥinṭa* *qamḥ* *khandarūs*	*triticum* *siligo* *candarusum* *spelta*	*Triticum* (A, L)
Wheat, Roman		*triticum romanum*	*Triticum* (L)
Wheat/cereals	*al-aḥsāʾ* *al-ḥinṭiyya*	*frumentum*	1. cereal plants (L) 2. *Triticum* (A, L)
Wheat/grain		*far*	1. grains in general (L) 2. *Triticum* (L)
Whey[74]	*dūgh*	*aqua distillata ex lacte acetoso*	
Willow	*khilāf*	*salix*	*Salix* (A, L)
Wine	*sharāb*	*vinum*	1. wine (A, L) 2. an analogous drink made from other fruits or vegetable products (L) 3. juice (A)
Wine vinegar		*acetum de vino*	
Wine, aromatic	*al-sharāb al-rayḥānī*	*vinum odoriferum*	
Wine, Greek		*vinum grecum*	
Wine, malvoisie[75]		*(vinum) maluisia*	

salve or cerate, from the Greek *kerute* (Dols, 1984, p. 147, n. 14). Lev and Amar, 2008, p. 565: *Qayruti* = Greek name, plaster or ointment for wounds made of olive oil, wax and sometime rose oil. Kahl, 2007, p. 273, n. 207: The term used here for "wax-liniment", i.e. *qīrūṭī*, is a transliteration of *kerote*, "cerate" (see Liddell and Scott, 1977, p. 949).

72 *cera rossa, ceralacca*: "Sostanza, usata soprattutto per sigillare, costituita da un miscuglio di sostanze resinose (trementina, gommalacca, colofonia) e di sostanze minerali (creta, carbonato di magnesio, bianco di zinco, caolino, gesso cotto, ecc.), alle quali si aggiungono sostanze coloranti diverse a seconda del colore che si vuole impartire" (Battaglia, 1961–2000, Vol. 2, pp. 982, 984). Kahl, 2003, p. 207: *shamʿ* = beeswax.

73 Kahl, 2003, p. 207: *shamʿ abyaḍ* = white beeswax; see Renaud and Colin, 1934, p. 260. On the preparation of white wax, see Beck, 2005, II:83, pp. 128–129.

74 On the preparation of whey, see Kahl, 2007, pp. 250–251, prescription n. 226.

75 *Malvasia*: "Vino bianco pregiato, originario del peloponneso; hanno lo stesso nome anche altri vini con caratteristiche in parte diverse, derivati da varieta di vitigni coltivari in Italia, Spagna, ecc. (= dal nome della cittadina greca di *Monembasia* o *Napoli di Malvasia* dei Veneziani)" (Battaglia, 1961–2000, Vol. 9, pp. 586–587); *malvesy*: Arvisium vinum, *Malvoisie* (Du Cange, 1937–1938, Vol. 5, p. 202).

English name	Arabic name	Medieval Latin name	Scientific name or other identification
Wine, Romanian[76]		*(vinum) romania*	
Wormwood		*absinthium*	*Artemisia* (L)

[76] *Romania*: "Ant. Vino bianco dolce di origine greca simile alla malvasia (= dal gr. biz. *Romania*, termine usato nel Medioevo per indicare i territori dell'Impero Romano d'Oriente, in partic. la penisola greca)" (Battaglia, 1961–2000, Vol. 17, p. 36).

GLOSSARY 2

ARABIC DRUG NAMES

ʿadas see Lentil.
adwiya bādazuhriyya see Antidote.
ʿafṣ see Gallnut.
afyūn see Opium.
akāriʿ al-baqar see Cow trotters.
anbarbārīs see Barberry.
anbāṭ, ʿilk al- see Pistachio resin.
anīsūn see Aniseed.
anjura see Nettle.
ʿankabūt, nasj al- see Cobweb.
aqāqiyā see Acacia.
arnab, khurʾ al- see Excrement of hare.
arnab, wabar al- see Hares, fur of.
ās see Myrtle.
ʿaṣā al-rāʿī see Knotgrass.
ʿasal see Honey.
ʿasal al-lubnā see "Storax honey".
ʿasālij al-karm see Grapevine tendrils.
asārūn see Asarabacca.
ʿawsaj see Buckthorn.
bādharūj see Basil.
bādhāward see Thistle (*bādhāward*).
badzahriyah, adwiyah see Antidote.
balaḥ (al-nakhl) see Dates, unripe.
balasān see Balsam.
ballūṭ see Oak.
bān see Drumstick tree / ben
banafsaj see Violet.
banj see Henbane.
baqar, akāriʿ al- see Cow trotters.
bāqillā see Fava bean.
baqla see Purslane.
baqla al-ḥamqāʾ see Purslane.
baqla yamāniyya see Amaranth.
bardī see Papyrus.
barshāwshān see Maidenhair.
bayāḍ al-bayḍ see Egg-white.
bayḍ, bayāḍ al- see Egg-white.
bayḍa see Egg.
bayḍa, ṣufrat al- see Egg yolk.
bittīkh see Musk melon.
bizr qaṭūnā see Fleawort.
buqūl see Vegetables.
buṭm, ʿilk al- see Terebinth, Terebinth resin.
buṭm, ṣamgh al- see Terebinth resin.
ḍafāḍiʿ see Frogs.
dajāj see Hen.
dajāj, dimāgh al- see Brains of chicken.
dam al-akhawayn see Dragon's blood.
ḍaʾn, luḥūm al-ḥawliyyāt see Sheep yearlings.
dār ṣīnī see Cinnamon.
dharīra, qaṣab al- see Lemongrass.
dīk, duyūk see Cock.
dimāgh al-dajāj see Brains of chicken.
diyāqūdh al-sādhaj, al- see Poppy medicament.
dūgh see Whey.
dulb see Platanus.
durdī al-qiṭrān see Cedar resin, Resin dregs.
fānīdh see Sugar, *fānīdh*.
farārīj, luḥūm al- see Chicken
farāsiyūn see Horehound.
filfil see Pepper.
fūdhanj see Peppermint.
fūdhanj nahrī see Water mint.
fujl see Radish.
fuqqāʿ see Brew.
fustuq see Pistachio.
ghubār al-raḥā see Mill dust.
ḥabaq see Basil.
halāmāt see Meat dish.
ḥall see Sesame.

ḥarīra see Silk.
ḥāshā see Thyme.
ḥawliyyāt [min] al-ḍaʾn, luḥūm al- see Sheep yearlings.
ḥawliyyāt, luḥūm al- see Meat of an one-year-old solid-hoofed animal.
ḥibr see Ink, scribes'.
ḥalwāʾ see Sweets.
ḥimār, rawth al- see Excrement of donkey.
ḥimār, sirqīn al- see Excrement of donkey.
hinnaʾ see Henna.
ḥinṭa see Wheat.
ḥinṭiyya, al-aḥsāʾ al- see Wheat/cereals.
ḥiṣrim see Grapes, unripe/sour, or their juice.
ḥuḍaḍ hindī see Lycium, Indian.
ḥulba see Fenugreek.
ḥurf see Pepper cress.
ḥurf abyaḍ see Pepper cress.
ijjāṣ see Plum, prune.
ʿilk al-anbāṭ see Pistachio resin.
ʿilk al-buṭm see Terebinth, Terebinth resin.
ʿinab see Grape.
isfanj see Sponge.
isfīdbājāt see Meat soup.
iṭriya see Pasta
jāwshīr see Opoponax.
jawz see Nut.
jiṣṣ see Lime, gypsum.
jiṣṣ mayyīt see Lime, gypsum.
jubn see Cheese.
julāb see Julep.
jullanār see Pomegranate flower.
julunjubīn al-ʿasalī, al see Rose honey.
jundbādastar see Castoreum.
kāfūr see Camphor.
kammūn see Cumin.
karm see Grapevine.
karm, ʿasālij al- see Grapevine tendrils.
kathīrāʾ see Tragacanth.
kattān see Linen, flax.
khall see Vinegar.
khandarūs see Wheat.
khardal see Mustard.
khashkhāsh see Poppy.
khass see Lettuce.
khaṭmī see Malva.
khazaf see Clay, pottery.
khilāf see Willow.
khiyār see Cucumber/melon.
khiyār shanbar see Cassia fistula.
khubbāzā see Mallow.
khurʾ al-arnab see Excrement of hare.
kibrīt see Sulphur.
kirsinna see Vetch.
kummathrā see Pear.
kundur see Frankincense.
kurrāth see Leek.
kurrāth shāmī see Leek, Damascene.
kuzbara see Coriander.
laban see Milk.
laban al-ḥalīb, al- see Milk, freshly milked.
lādhan see Ladanum.
lakk see Lac.
lawz see Almond.
lawz ḥilw see Almond, sweet.
lawz murr see Almond, bitter.
liḥyat al-tays see Salsify.
lisān al-ḥamal see Plantain.
lubnā, ʿasal al- see "Storax honey".
luʿāb see Mucilage.
luḥūm see Meat.
luḥūm al-farārīj see Chicken.
luḥūm al-ḥawliyyāt see Meat of an one-year-old solid-hoofed animal.
luḥūm al-ḥawliyyāt [min] al-ḍaʾn see Sheep yearlings.
māʾ al-ramād al-mumallaḥ see Ash water; Salt.
māʾ al-māliḥ al-murr, al- see Salt, bitter.
makānis see Broom.
māliḥ al-murr, al-māʾ al- see Salt, bitter.
maṣūṣāt see Meat dish.

māward, al- see Rose water
mawz see Banana/hydromel.
mayʿa see Storax.
maybukhtaj see Grape syrup.
mishmish see Apricot; Peach.
mithrūdīṭūs, al- see *Mithridatium*.
mulūkhiyya see Mallow.
mūmiyāʾ al-khāliṣ, al- see Mummy.
murr see Myrrh.
misk see Musk.
naʿnaʿ see Mint.
narjis see Narciss.
nashā see Starch.
nasj al-ʿankabūt see Cobweb.
naylūfar see Water lily.
nisrīn see Dog-rose.
nukhāla see Bran.
nūra see Quicklime.
qalqaṭār see Vitriol, yellow.
qamḥ see Wheat.
qāqiyā see Acacia.
qāqullā see Saltwort.
qarʿ see Pumpkin.
qaranful see Clove.
qaṣab see Reed.
qaṣab al-dharīra see Lemongrass.
qaṣab al-sukkar see Sugar cane.
qathad see Cucumber/melon.
qaṭūnā, bizr see Fleawort.
qayrūṭiyyāt see Wax, cerate.
qinna see Galbanum.
qirṭās see Paper.
qithāʾ see Cucumber.
qiṭrān see Cedar resin; Pitch (fluid); Resin.
qiṭrān, durdī al- see Cedar resin, Resin dregs.
qūfī see *Cochium, pillulis cochijs*.
qurrayṣ see Nettle.
qurṭum see Safflower.
qusṭ hindī see Costus.
quṭn see Cotton.
quṭn sāʾir mā yakhruju mina al-nabāt see Cotton-like substances from plants.
quṭrub, sirāj al- see Mandrake
raḥā, ghubār al- see Mill dust.
ramād al-mumallaḥ, māʾ al- see Ash water; Salt.
rāmik see *Rāmik*.
rawth al-ḥimār see Excrement of donkey.
rāziyānaj see Fennel.
rībās see Rhubarb.
rishta see Pasta.
rubūb see Rob.
rummān see Pomegranate.
sabistān see Sebesten.
ṣabr see Aloe.
safarjal see Quince.
sakabīnaj see Sagapenum.
samak see Fish.
ṣamgh see Gum.
ṣamgh al-buṭm, al- see Terebinth resin.
ṣamgh ʿarabī see Gum Arabic.
samn see Butter.
samn al-baqar see Butter.
ṣanawbar see Pine.
ṣandal see Sandalwood.
saraṭān see Crab.
saraṭān nahrī see Crab, river.
sawīq see Gruel.
sawīq al-shaʿīr see Barley gruel.
sawsan see Iris; Lily.
shabb see Alum.
shaʿīr see Barley.
shaʿīr, sawīq al- see Barley gruel.
shamʿ abyaḍ see Wax, white.
shamʿ aḥmar see Wax, red.
sharāb see Wine.
sharāb al-rayḥānī, al- see Wine, aromatic.
shibitt see Dill.
sirāj al-quṭrub see Mandrake.
sirqīn al-ḥimār see Excrement of donkey.
suʿd see Nut grass, yellow.
ṣufrat al-bayḍa see Egg yolk.
sukk see *Sukk*.
sukkar see Sugar.
sukkar al-ṭabarzadh, al- see Sugar, crystalline.
sukkar, qaṣab al- see Sugar cane.

summāq see Sumac.
sunbul see Valerian.
sūs see Licorice.
ṭabarzadh al-sukkar, al- see Sugar, crystalline.
ṭabāshīr see Tabasheer.
tamr see Date.
tamr hindī see Tamarind.
ṭīn see Fig.
ṭīn armanī see Clay, Armenian.
ṭīn makhtūm see *Terra sigillata*.
tiryāq see Theriac.
tuffāḥ see Apple/fruit.
turāb ḥurf abyaḍ see Clay, pottery/pepper cress.
tūt see Mulberry.
ʿunnāb see Jujube.
ʿunṣul see Squill.
usṭūkhūdūs see Lavender
wabar al-arnab see Hares, fur of.
ward see Rose.
zabīb see Raisin.
zaʿfarān see Saffron.
zāj see Vitriol.
zarāwand see Birthwort.
zift see Pitch.
zinjār see Verdigris.
zirnīh see Arsenic.
zirnīh aḥmar see Arsenic, red.
zūfāʾ, zūfā see Hyssop.
zuʿrūr see Medlar.

GLOSSARY 3

MEDIEVAL LATIN DRUG NAMES

absinthium see Wormwood.
accatia see Acacia.
acedula see Dock.
acetum see Vinegar.
acetum de vino see Wine vinegar.
acetosa see Dock.
adeps renum see Kidney fat.
adulb see Platanus.
agaricum see Agaric.
agnus, annualis see Sheep yearlings.
agresta see Grapes, unripe/sour, or their juice.
albedarogi see Basil.
albotim, gluten see Terebinth resin.
albotin, gummi see Terebinth resin.
albumen ovi see Egg-white.
alchachille see Saltwort.
alchelemet see Meat dish.
aldeiacur see Poppy medicament.
aldeicur see Poppy medicament.
alesfidabaget see Meat soup.
alfoca see Brew.
aliffidabegi see Meat soup.
alimbat, gluten see Pistachio resin.
alimbat, glutinum see Pistachio resin.
alisfidabegi see Meat soup.
alkakile see Saltwort.
alkitran see Resin.
alkitran, faex see Resin dregs.
allellemech see Meat dish.
allium see Garlic/onion.
allifidabeget see Meat soup.
almosos see Meat dish.
almososat see Meat dish.
almososus see Meat dish.
almosusath see Meat dish.
aloe see Aloe.
aloes, lignum see Eaglewood.
altea see Malva.
amidum see Starch.
amigdala see Almond.
amigdala dulcis see Almond, sweet.
amigdala amara see Almond, bitter.
amigdalum see Almond.
amilum see Starch.
anathari see Poppy medicament.
anetum see Dill.
anisum see Aniseed.
annualis agnus see Sheep yearlings.
aqua cineris see Ash water.
aqua distillata ex lacte acetoso see Whey.
aqua ferrata see Iron water.
arancium see Orange.
araneae, tela see Cobweb.
argenti, lamina see Silver foil.
aristologia see Birthwort.
aristologia rotunda see Birthwort, round.
arnoglossa see Plantain.
arsenicum see Arsenic.
arsenicum rubeum see Arsenic, red.
arundo see Reed.
asarum see Asarabacca.
asini, faex see Excrement of donkey.
asini, stercus see Excrement of donkey.
atramentum see Vitriol.
atriplex see Orach(e).
auripigmentum see Orpiment.
azarur see Medlar.
balaustium see Pomegranate flower.
balsamum see Balsam.
barba hircina see Salsify.
basilicon see Basil.
batus see Bramble.
bedzaharia see Antidote.
berberis see Barberry.
bichias, pilla see "Cough pills".
bichichia, pillula see "Cough pills".

bithica, pillula see "Cough pills".
bletum see Blite.
bolus armenius see Clay, Armenian.
bombax see Cotton.
borago see Borage.
bovini, pedes see Ox trotters.
brodium see Meat broth.
bursa pastoris see Shepherd's purse.
butyron vaccinum see Butter.
butyron see Butter.
cachille see Saltwort.
calamentum see Peppermint.
calamentum fluviale see Water mint.
calamus aromaticus see Sweet flag.
calami, cannula see Reed.
calcantum see Copper vitriol.
calcicheos see *Calcicheos*.
calx see Lime(stone).
calx viva see Quicklime.
camomila see Chamomile.
camphora see Camphor.
cancer see Crab.
cancer fluvialis see Crab, river.
candarusum see Wheat.
candela alcotrob see Mandrake.
canna zuccari see Sugar cane.
cannae, caput see Reed.
cannula calami see Reed.
capillus veneris see Maidenhair.
caput cannae see Reed.
capo see Chicken.
capreolus vitis see Grapevine tendrils.
caput monachi see Marigold.
carduus fullonum see Teasel.
carduus: lanugine quorundam cardonum see Thistle (*carduus*).
carica see Fig.
caro, carnis see Meat.
cartamus see Safflower.
carta see Paper.
caseum see Cheese.
cassia see Cassia.
cassiafistula see Cassia fistula.
castoreum see Castoreum.
cedri, gummi see Cedar resin.
cepa see Onion.
cera see Wax, beeswax.
cera rubea see Wax, red.
cerasus see Cherry.
cerebellum gallinae see Brains of chicken.
cerebrum gallinae see Brains of chicken.
cerotum see Wax, cerate.
cerotarium see Wax, cerate.
charta see Paper.
chrysomelum see Apricot.
ciclamen see Cyclamen.
cinamomum see Cinnamon.
cineris, aqua see Ash water.
ciperus see Nut grass, yellow.
citonium see Quince.
citrus see Lemon.
citrulus see Cucumber/melon.
cochium see *Cochium, pillulis cochijs*.
colcathar see Vitriol, yellow.
colcotar see Vitriol, yellow.
colloquintis see Colocynth.
collyrium kelim see *Kelim*.
columba see Pigeon.
conde see Mallow.
conium see Hemlock.
coriandrum see Coriander.
costum see Costus.
costum indum see Costus.
coton see Cotton.
crocus see Saffron.
crocus (h)ortensis see Safflower.
cucumis see Cucumber.
cucurbita see Pumpkin.
cupula glandis see Oak.
cyperus see Nut grass, yellow.
cypressus see Cypress.
dactilus see Date.
deiacor see Poppy medicament.
deiacur see Poppy medicament.
deuico see Poppy medicament.
deuicor see Poppy medicament.
dia papaver see Poppy medicament.
diacalamentum see Peppermint medicament.
diacartamus see Safflower medicament.

lamina argenti see Silver foil.
lapis sanguinaria see Hematite.
laudanum see Ladanum.
laurus see Laurel.
lens see Lentil.
leporis, pilus see Hares, fur of.
leporis, stercus see Excrement of hare.
licium indum see Lycium, Indian.
licium see Lycium.
lignum aloes see Eaglewood.
lilium see Lily.
limon see Lemon.
lingua agni see Plantain.
linum see Linen, flax.
liquiricia see Licorice.
liquiritia see Licorice.
lixivium see Lye.
lucius see Pike.
maiorana see Marjoram.
malum granatum (silvestre) see Pomegranate, wild.
malum see Apple/fruit.
maluisia (vinum) see Wine, malvoisie.
mandragora see Mandrake.
manna see Manna, frankincense.
manna granata see Manna, frankincense.
mastix see Mastic.
mel see Honey.
mel rosarum see Rose honey.
mel storacis see "Storax honey".
mel storacis calamite see "Storax honey".
melilotus see Melilot.
melon see Melon.
menta see Mint.
menta domestica see Mint.
mercurialis see Mercury.
methridatum see *Mithridatium.*
molendinis, pulvis see Mill dust.
morum see Mulberry.
mumia, pura see Mummy.
musa see Banana/hydromel.
muschus see Musk.
mutonis, pedes see Sheep trotters.
myrrha see Myrrh.
myrtus see Myrtle.
narciscus see Narciss.
nenufar see Water lily.
nespula, pomum parvulum factum sicut see Medlar.
nigella see Nigella.
nora see Quicklime.
nux see Nut.
nux vomica see Strychnine tree.
oleum see Olive (oil).
olera see Vegetables.
olibanum see Frankincense.
omasum see Ox's tripe.
opium see Opium.
opium thebaicum see Opium, Theban.
oppopanax see Opoponax.
oppoponax see Opoponax.
orobum see Vetch.
ovum see Egg.
ovi, albumen see Egg-white.
ovi, vitellum see Egg yolk.
ozimum fluviale see Basil.
palma see Date palm.
palma siluestris see Broom.
palmae, flos see Dates, unripe.
panis see Bread.
papaver see Poppy.
papaver nigrum see Poppy, black.
papyrus see Papyrus.
passae, uvae see Raisin.
passula see Raisin.
pasta see Dough.
pedes bovini see Ox trotters.
pedes mutonis see Sheep trotters.
pedes porcini see Pig's trotters.
pedes vaccini see Cow trotters.
penidium see Sugar, *fānīdh.*
penith see Sugar, *fānīdh.*
perka see Perch.
persica see Peach.
pilla bichias see "Cough pills".
pillula bichichia see "Cough pills".
pillula bithica see "Cough pills".
pilus leporis see Hares, fur of.
pinguedo see Grease.

storax see Storax.
storacis calamite, mel see "Storax honey".
storacis, mel see "Storax honey".
sula see Alfalfa.
sulla see Alfalfa.
sulphur see Sulphur.
sumach see Sumac.
tabarzed, zuccarum see Sugar, crystalline.
tafea see Meat dish.
tafeata see Meat dish.
taffea see Meat dish.
tela araneqe see Cobweb.
terbenthina see Terebinth.
terra see Clay.
terra sigillata see *Terra sigillata*.
terra siguli see Clay, pottery/pepper cress.
thamarindus see Tamarind.
thimum see Thyme.
thus see Frankincense.
tri see Pasta.
triticum see Wheat.
triticum romanum see Wheat, Roman.
tyriaca see Theriac.
uvae passae see Raisin.
uva acerba see Grapes, unripe/sour, or their juice.
vaccini, pedes see Cow trotters.
veriutum antiquum see Grapes, unripe/sour, or their juice.
vino, acetum de see Wine vinegar.
vinum see Wine.
vinum grecum see Wine, Greek.
vinum maluisia see Wine, malvoisie.
vinum odoriferum see Wine, aromatic.
vinum romania see Wine, Romanian.
viola see Violet.
virga pastoris see Knotgrass.
vitellum ovi see Egg yolk.
vitis see Grapevine.
vitis alba see Bryony.
vitis, capreolus see Grapevine tendrils.
vitreolum see Vitriol.
vitulus see Calf.
vreos see Iris.
urtica see Nettle.
vulpis, pulmo see "Fox's lungs".
ypoquistidos see Salsify.
yreos see Iris.
ysopus see Hyssop.
zarur see Medlar.
zuccarum see Sugar.
zuccarum album see Sugar, white.
zuccarum albissimum see Sugar, white.
zuccarum tabarzed see Sugar, crystalline.
zuccari, canna see Sugar cane.
zuccarum rubeum see Sugar, red.

GLOSSARY 4

SCIENTIFIC NAMES OF PLANTS

Acacia see Acacia; Gum arabic; Lycium, Indian.
Acorus see Reed; Sweet flag.
Adiantum see Maidenhair.
Agaricus see Agaric.
Agrostemma see Nigella.
Allium see Garlic/onion; Leek; Leek, Damascene; Onion.
Aloe see Aloe.
Aloëxylon see Eaglewood.
Althaea see Malva.
Amaranthus see Amaranth; Blite; Purslane.
Amygdalus see Almond; Almond, bitter; Almond, sweet.
Amyris see Balsam.
Anacyclus see Pellitory.
Anchusa see Borage.
Andropogon see Lemongrass.
Anethum see Dill.
Anthemis see Chamomile.
Aquilaria see Eaglewood.
Aristolochia see Birthwort; Birthwort, round; Cyclamen.
Armoracia see *Herba artetica agrestis*; Radish.
Artemisia see Wormwood.
Arundo see Reed.
Asarum see Asarabacca.
Astacus see Crab; Crab, river.
Astragalus see Tragacanth; Tragacanth medicament.
Atractylis see Thistle (*carduus*).
Atriplex see Orach(e); Spinach.
Atropa see Nightshade.
Aucklandia see Costus.
Balsamodendron see Balsam.
Bambusa see Reed; Tabasheer.
Berberis see Barberry; Lycium, Indian.
Beta see Blite.
Boletus see Agaric.
Borago see Borage.
Boswellia see Frankincense; Manna, frankincense.
Brassica see Mustard; Spinach.
Bryonia see Bryony.
Bunias see Saltwort.
Calamintha see Peppermint; Peppermint medicament.
Calamus see Dragon's blood.
Calendula see Marigold.
Callitris see Lemon.
Calystegia see Soldanella.
Capsella see Shepherd's purse.
Cardopatium see Thistle (*carduus*).
Carduaceae see Thistle (*badaward*).
Carduus see Thistle (*carduus*).
Carlina see *Calcicheos;* Thistle (*carduus*).
Carthamus see *Calcicheos*; Safflower; Safflower medicament.
Cassia see Cassia; Cassia fistula.
Castor see Castoreum.
Cedrus see Cedar resin; Pitch (fluid); Resin; Resin dregs.
Cerasus see Cherry.
Chamaemelum see Chamomile.
Chamomilla see Chamomile.
Cheiranthus see Violet.
Cichorium see Cichory.
Cicuta see Hemlock.
Cinnamomum see Camphor; Cassia; Cassia fistula; Cinnamon.
Cirsium see Thistle (*badaward*).
Cistus see Barberry; Ladanum.
Citrullus see Colocynth; Cucumber; Cucumber/melon; Lemon; Pumpkin.

Citrus see Cedar resin; Lemon; Orange.
Cnicus see Thistle (*carduus*).
Commiphora see Balsam; Myrrh.
Conium see Hemlock.
Coniferae see Cedar resin; Pitch (fluid); Resin; Resin dregs.
Convolvulus see *Diagredium*; Soldanella.
Corchorus see Purslane.
Cordia see Sebesten.
Coriandrum see Coriander.
Corydalis see Birthwort, round.
Crataegus see Medlar.
Crocus see Safflower; Safflower medicament; Saffron.
Cucumis see Colocynth; Cucumber; Cucumber/melon; Melon; Musk melon.
Cucurbita see Colocynth; Pumpkin.
Cuminum see Cumin.
Cupressus see Cedar resin; Cypress; Pitch (fluid); Resin; Resin dregs.
Cyclamen see Cyclamen.
Cydonia see Apricot; Quince.
Cymbopogon see Lemongrass.
Cyperus see Nut grass, yellow; Paper; Papyrus; Rush.
Daemonorops see Dragon's blood.
Daphne see Cassia.
Dipsacus see Knotgrass; Teasel; Thistle (*carduus*).
Dracaena see Dragon's blood.
Dryobalanops see Camphor.
Ervum see Vetch.
Eugenia see Clove.
Euphorbia see *Diagredium*; Spurge.
Euphrasia see *Herba arterica*; *Herba artetica agrestis*.
Ferula see Galbanum; Opoponax; Sagapenum.
Ficus see Fig; Mulberry.
Foeniculum see Fennel.
Galium see *Herba artetica agrestis*.
Glycyrrhiza see Licorice.
Gossypium see Cotton.
Hordeum see Barley; Barley gruel; Barley water.
Hyoscyamus see Henbane; Hyoscyamus.
Hyssopus see Hyssop.
Iris see Iris; Iris medicament; Lily.
Juglans see Nut.
Juncus see Rush.
Juniperus see Cedar resin; Cypress; Juniper; Resin; Resin dregs.
Labiatae see Thyme.
Lactuca see Lettuce.
Lagenaria see Pumpkin.
Laurus see Laurel.
Lavandula see Lavender.
Lawsonia see Henna.
Lens see Lentil.
Lepidium see Pepper cress.
Lilium see Iris; Iris medicament; Lily
Linum see Linen, flax.
Liquidambar see Storax; "Storax honey".
Lonicera see Lycium.
Lycium see Buckthorn; Lycium, Indian.
Majorana see Cassia; Marjoram.
Malus see Apple/fruit.
Malva see Mallow; Malva.
Mandragora see Mandrake.
Marrubium see Horehound; Horehound medicament.
Matricaria see Chamomile.
Matthiola see Violet.
Medicago see Alfalfa.
Melilotus see Melilot.
Melissa see Lemon; Peppermint; Peppermint medicament.
Mentha see Mint; Peppermint; Peppermint medicament; Water mint.
Mercurialis see *Herba arterica;* Mercury.
Mespilus see Medlar.
Moringa see Drumstick tree / ben.
Morus see Mulberry.
Moschus see Musk.
Musa see Banana/hydromel.

Triticum see Starch; Wheat; Wheat, Roman; Wheat/cereals; Wheat/grain.
Urginea see Squill.
Urtica see Nettle.
Valeriana see Valerian.
Vicia see Fava bean; Vetch.
Viola see Violet.
Vitis see Grape; Grape syrup; Grapes, unripe/sour, or their juice; Grapevine; Grapevine tendrils; Raisin.
Zizyphus see Jujube.

BIBLIOGRAPHY

Abad, T., McNaughton-Smith, G., Fletcher, W.Q., Echeverri, F., Diaz-Peñate, R., Tabraue, C., Ruiz de Galarreta, C.M., López-Blanco, F., and Luis, J.G. (2000) Isolation of (S)-(+)-naproxene from Musa acuminata. Inhibitory effect of naproxene and its 7-methoxy isomer on constitutive COX-1 and inducible COX-2. *Planta Medica, 66(5)*, 471–473.

Abbas, A.T., Abdel-Aziz, M.M., Zalata, K.R., and Abd Al-Galel Tel-D. (2005) Effect of dexamethasone and Nigella sativa on peripheral blood eosinophil count, IgG1 and IgG2a, cytokine profiles and lung inflammation in murine model of allergic asthma. *The Egyptian Journal of Immunology, 12(1)*, 95–102.

Abdel-Barry, J.A., Abdel-Hassan, I.A., Jawad, A.M., and al-Hakiem, M.H. (2000) Hypoglycaemic effect of aqueous extract of the leaves of Trigonella foenum-graecum in healthy volunteers. *Eastern Mediterranean Health Journal, 6(1)*, 83–88.

Abed, Sh.B. (1982–2008) Avicenna: Logic. In Yarshater, E. (ed.) *Encyclopaedia Iranica* (Vol. III, 70–73). London/Costa Mesa.

Abram, V. and Donko, M (1999) Tentative identification of polyphenols in Sempervivum tectorum and assessment of the antimicrobial activity of Sempervivum L. *Journal of Agricultural and Food Chemistry, 47(2)*, 485–489.

Achrekar, S., Kaklij, G.S., Pote, M.S., and Kelkar, S.M. (1991) Hypoglycemic activity of Eugenia jambolana and Ficus bengalensis: mechanism of action. *In Vivo, 5(2)*, 143–147.

Afnan, S.M. (1958) *Avicenna, his Life and Works: Medicine and the Natural Sciences*. London.

Ageel, A.M., Mossa, J.S., al-Yahya, M.A., al-Said, M.S., and Tariq, M. (1989) Experimental studies on antirheumatic crude drugs used in Saudi traditional medicine. *Drugs under Experimental and Clinical Research, 15(8)*, 369–372.

Aggarwal, P.K., Kumar, L., Garg, S.K., and Mathur, V.S. (1986) Effect of Rumex nepalensis extracts on histamine, acetylcholine, carbachol, bradykinin, and PGs evoked skin reactions in rabbits. *Annals of Allergy, 56(2)*, 177–182.

Agnihotri, V.K., Lattoo, S.K., Thappa, R.K., Kaul, P., Qazi, G.N., Dhar, A.K., Saraf, A., Kapahi, B.K., Saxena, R.K., and Agarwal, S.G. (2005) Chemical variability in the essential oil components of Achillea millefolium agg. from different Himalayan habitats (India). *Planta Medica, 71 (3)*, 280–283.

Aharonson, Z., Shani, J., and Sulman, F.G. (1969) Hypoglycaemic effect of the salt bush (Atriplex halimus)—a feeding source of the sand rat (Psammomys Obesus). *Diabetologia, 5(6)*, 379–383.

Akhtar, M.S., Khan, Q.M., and Khaliq, T. (1984) Effects of Euphorbia prostrata and Fumaria parviflora in normoglycaemic and alloxan-treated hyperglycaemic rabbits. *Planta Medica, 50(2)*, 138–142.

Akihisa, T., Yasukawa, K., Oinuma, H., Kasahara, Y., Yamanouchi, S., Takido, M., Kumaki, K., and Tamura, T. (1996) Triterpene alcohols from the flowers of compositae and their anti-inflammatory effects. *Phytochemistry, 43(6)*, 1255–1260.

Akpanyung, E.O., Udoh, A.P., and Akpan, E.J. (1995) Chemical composition of the edible leaves of Pterocarpus mildbraedii. *Plant Foods for Human Nutrition, 48(3)*, 209–215.

Alanko, P., Huovinen, M.-L., Kanerva, K., *et al.* (eds.) (1982) *Suomen terveyskasvit: luonnon parantavat yrtit ja niiden salaisuudet*. Helsinki.

El-Alfy, A.T., Ahmed, A.A., and Fatani, A.J. (2005) Protective effect of red grape seeds proanthocyanidins against induction of diabetes by alloxan in rats. *Pharmacological Research, 52(3)*, 264–270.

Ali, B.H., Bashir, A.K., and Tanira, M.O. (1995) Anti-inflammatory, antipyretic, and analgesic effects of Lawsonia inermis L. (henna) in rats. *Pharmacology, 51(6)*, 356–363.

Ali, N.A., Jülich, W.D., Kusnick, C., Lindequist, U. (2001) Screening of Yemeni medicinal plants for antibacterial and cytotoxic activities. *Journal of Ethnopharmacology, 74(2)*, 173–179.

Alma, M.H., Nitz, S., Kollmannsberger, H., Digrak, M., Efe, F.T., and Yilmaz, N. (2004) Chemical composition and antimicrobial activity of the essential oils from the gum of Turkish Pistachio (Pistacia vera L.). *Journal of Agricultural and Food Chemistry, 52(12)*, 3911–3914.

Álvarez-Millán, C. (2000) Practice versus Theory: Tenth-century Case Histories from the Islamic Middle East. *Social History of Medicine, 13(2)*, 293–306.

D'Alverny, M.-T. (1955) Avicenne et les medecins de Venise. In *Medioevo e Rinascimento: Studi in onore di Bruno Nardi* (175–198). Firenze.

Ibid. (1957) Les traductions d'Avicenne (Moyen Age et Renaissance). *Problemi attuali di scienza e di cultura, 40*, 71–90.

Amar, Z. (1996–1997) The Export of Theriac from the Land of Israel and its Uses in the Middle Ages. *Korot, 12*, 16–29. [Hebrew]

Amar, Z. and Buchman, Y. (eds.) (2004) *Ṣori ha-guf*. Ramat Gan.

Amoros, M., Fauconnier, B., and Girre, L. (1977) [Antiviral properties of various extracts of indigenous plants]. *Annales pharmaceutiques françaises, 35(9–10)*, 371–376.

Anawati, G.C. (1950) *Un essai de bibliographie avicennienne*. Cairo.

Andersen, D.O., Weber, N.D., Wood, S.G., Hughes, B.G., Murray, B.K., and North, J.A. (1991) In vitro virucidal activity of selected anthraquinones and anthraquinone derivatives. *Antiviral Research, 16(2)*, 185–196.

Anderson, R. (1992) The Efficacy of Ethnomedicine: Research Methods in Trouble. In Nichter, M. (ed.) *Anthropological Approaches to the Study of Ethnomedicine* (1–17). Yverdon.

André, J (1956) *Lexique des termes de botanique en latin*. Paris.

Ibid. (1985) *Les noms de plantes dans la Rome antique*. Paris.

al-Anṭākī, Dāwūd b. ʿUmar (1937) *Tadhkirat ūlī al-albāb wa-l-jāmiʿ li-l-ʿajab al-ʿujāb*. Miṣr.

Aqil, F., Khan, M.S., Owais, M., and Ahmad, I (2005) Effect of certain bioactive plant extracts on clinical isolates of beta-lactamase producing methicillin resistant Staphylococcus aureus. *Journal of Basic Microbiology, 45(2)*, 106–114.

Araújo, C., Sousa, M.J., Ferreira, M.F., and Leão, C. (2003) Activity of essential oils from Mediterranean Lamiaceae species against food spoilage yeasts. *Journal of Food Protection, 66(4)*, 625–632.

Arberry, A.J. (1951) *Avicenna on Theology*. London.

Aregheore, E.M. (1998) A review of implications of antiquality and toxic components in unconventional feedstuffs advocated for use in intensive animal production in Nigeria. *Veterinary and Human Toxicology, 40(1)*, 35–39.

D'Aronco, M.A. (2007) The Benedictine Rule and the Care of the Sick: The Plan of St Gall and Anglo-Saxon England. In Bowers, B.S. (ed.) *The Medieval Hospital and Medical Practice* (235–251). Aldershot.

D'Aronco, M.A. and Cameron, M.L. (1998) *The Old English Illustrated Pharmacopoeia*. Copenhagen.

Van Arsdall, A. (2007) Challenging the "Eye of Newt" Image of Medieval Medicine. In Bowers, B.S. (ed.) *The Medieval Hospital and Medical Practice* (195–205). Aldershot.

Ibid. (1996) The Medicines of Medieval and Renaissance Europe as a Source of Medicines for Today. In Holland, B. (ed.) *Prospecting for Drugs in Ancient and Medieval European Texts: a Scientific Approach* (19–37). Amsterdam.

Asres, K. (1993) Hypoglycemic activity of Moringa stenopetala. *Indian Drugs, 30*, 188–190.

Aufmesser, M. (2000) *Etymologische und wortgeschichtliche Erläuterungen zu* De materia medica *des Pedanius Dioscurides Anazarbeus*. Hildesheim.

Ibid. (trans.) (2002) *Pedanius Dioscurides aus Anazarba. Fünf Bücher über die Heilkunde*. Hildesheim.

Augusti, K.T. and Sheela, C.G. (1996) Antiperoxide effect of S-allyl cysteine sulfoxide, an insulin secretagogue, in diabetic rats. *Experientia, 52(2)*, 115–120.

Babakhin, A.A., Majoul, L.A., Vedernikov, A.A., Leskov, V.P., Pisarev, V.M., Babakhin, A.A., Logina, N.Yu., Gushchin, I.S., Nolte, H., and DuBuske, L.M. (1997) In vivo and in vitro immunomodulation induced by the extract of the mycelium fungus Polyporus squamosus. *Allergy and Asthma Proceedings, 18(5)*, 301–310.

Babu, P.S. and Srinivasan, K. (1997) Influence of dietary capsaicin and onion on the metabolic abnormalities associated with streptozotocin induced diabetes mellitus. *Molecular and Cellular Biochemistry, 175(1–2)*, 49–57.

Baer, R. and Ackerman, A (1988) Toxic Mexican Folk Remedies for the Treatment of *Empacho*: The Case of Azarcon, Grate, and Albayalde. *Journal of Ethnopharmacology, 24*, 31–39.

Banini, A.E., Boyd, L.C., Allen, J.C., Allen, H.G., and Sauls, D.L. (2006) Muscadine grape products intake, diet and blood constituents of non-diabetic and type 2 diabetic subjects. *Nutrition, 22(11–12)*, 1137–1145.

Bar-Sela, A, Hoff, H.E., and Faris, E. (trans.) (1964) Moses Maimonides' Two Treatises on the Regimen of Health: "*Fī Tadbīr al-Ṣiḥḥah*" and *"Maqālah fī bayān Baʿd al-Aʿrāḍ wa-al-Jawāb ʿanha." Transactions of the American Philosophical Society, n.s., 54(4)*.

Barbour, E.K., Al Sharif, M., Sagherian, V.K., Habre, A.N., Talhouk, R.S., and Talhouk, S.N. (2004) Screening of selected indigenous plants of Lebanon for antimicrobial activity. *Journal of Ethnopharmacology, 93(1)*, 1–7.

Barthakur, N.N., Arnold, N.P., and Alli, I. (1995) The Indian laburnum (Cassia fistula L.) fruit: an analysis of its chemical constituents. *Plant Foods for Human Nutrition, 47(1)*, 55–62.

Baslas, R.K., Gupta, R., and Baslas, K.K. (1971) Chemical examination of essential oils from plants of genus Anethum (Umbelliferae)-oils of seeds of Anethum graveolens, Part I. *The Flavour Industry, 2*, 241–245.

Bates, D. (ed.) (1995) *Knowledge and the Scholarly Medical Traditions*. Cambridge.

Battaglia, S. (1961–2000) *Grande dizionario della lingua italiana*. Torino.

Bautier, R.-H. (1980–1998) *Lexikon des Mittelalters*. München.

Bearman, P.J., Bianquis, Th., Bosworth, C.E., van Donzel, E., and Heinrichs, W.P. (eds.) (1960–2002) *The Encyclopaedia of Islam*. 2nd Edition. Leiden/London.

Beck, B. and Villaume, C. (1987) Nutrient homeostasis: long-term interrelations between pancreatic hormones, blood glucose and dietary wheat bran in men. *The Journal of Nutrition, 117(1)*, 153–158.

Beck, L.Y. (trans.) (2005) De materia medica *by Pedanius Dioscorides*. Hildesheim.

Beers, M.H. and Berkow, R. (ed.) (1999) *The Merck Manual of Diagnosis and Therapy*. 17th ed. Medical Services, Usmedsa, USHH. ⟨http://www.merck.com/pubs/mmanual/⟩

Benedec, D., Pârvu, A.E., Oniga, I., Toiu, A., and Tiperciuc, B. (2007) Effects of Ocimum basilicum L. extract on experimental acute inflammation. *Revista medico-chirurgicală a Societăţii de Medici şi Naturalişti din Iaşi, 111(4)*, 1065–1069.

Benhaim, P., Mathes, S.J., Hunt, T.K., Scheuenstuhl, H., and Benz, C.C. (1994) Induction of neutrophil Mac-1 integrin expression and superoxide production by the medicinal plant extract gossypol. *Inflammation, 18(5)*, 443–458.

Berendes, J. (1902) *Des Pedanios Dioscurides aus Anazarbos Arzneimittellehre in fünf Büchern*. Stuttgart.

Van Den Berghe, D.A., Ieven, M., Mertens, F., Vlietinck, A.J., and Lammens, E. (1978) Screening of higher plants for biological activities. 2. Antiviral activity. *Lloydia, 41*, 463–471.

Bergsträsser, G. (ed. and trans.) (1925) *Über die Syrischen und arabischen Galen-Ubersetzungen*. Leipzig.

Bernardshaw, S., Johnson, E., and Hetland, G. (2005) An extract of the mushroom Agaricus blazei Murill administered orally protects against systemic Streptococcus pneumoniae infection in mice. *Scandinavian Journal of Immunology, 62(4)*, 393–398.

Berthelot, M. (1893) *La chimie au Moyen Age*. Paris.

Bianco-Coletto, M.A. (1981) [Basidiomycetes in relation to antibiosis. II. Antibiotic activity of mycelia and culture liquids.] *Giornale di batteriologia, virologia ed immunologia, 74(7–12)*, 267–274.

al-Bīrūnī. See Saʿīd, 1974.

Bisignano, G., Iauk, L., Kirjavainen, S., and Galati, E.M. (1994) Anti-inflammatory, analgesic, antipyretic and antibacterial activity of Astragalus siculus Biv. *International Journal of Pharmacognosy, 32(4)*, 400–405.

Blazso, G. and Gabor, M. (1994) Anti-inflammatory effects of cherry (Prunus avium l.) stalk extract. *Pharmazie, 49*, 540–541.

Blazso, G., Gabor, M., and Rohdewald, P. (1997) Antiinflammatory activities of procyanidin-containing extracts from Pinus pinaster Ait. after oral and cutaneous application. *Pharmazie, 52(5)*, 380–382.

Boegge, S.C., Kesper, S., Verspohl, E.J., and Nahrstedt, A. (1996) Reduction of ACh-induced contraction of rat isolated ileum by coptisine, (+)-caffeoylmalic acid, Chelidonium majus, and Corydalis lutea extracts. *Planta Medica, 62(2)*, 173–174.

Borgi, W., Ghedira, K., and Chouchane, N. (2007) Antiinflammatory and analgesic activities of Zizyphus lotus root barks. *Fitoterapia, 78(1)*, 16–19.

Bos, G. (ed.) (1997a) *Ibn al-Jazzār on Fevers: a Critical Edition*. New York.

Ibid. (ed. and trans.) (2000) *Ibn al-Jazzār on Fevers: a Critical Edition of* Zād al-musāfir wa-qūt al-ḥāḍir, *Provisions for the Traveller and the Nourishment for the Sedentary, Book 7, Chapters 1–6*. London.

Ibid. (ed. and trans.) (1997b) *Ibn al-Jazzār on Sexual Diseases and their Treatment: a Critical Edition of* Zād al-musāfir wa-qūt al-ḥāḍir (*Provisions for the Traveller and Nourishment for the Sedentary, Book 6*). London.

Ibid. (ed. and trans.) (1989) *The Treatise of Qusṭā ibn Lūqā on the Regimen during the Pilgrimage to Mecca*. Amsterdam.

Boskabady, M.H., Javan, H., Sajady, M., and Rakhshandeh, H. (2007) The possible prophylactic effect of Nigella sativa seed extract in asthmatic patients. *Fundamental and Clinical Pharmacology, 21(5)*, 559–566. [Erratum in: *Fundamental and Clinical Pharmacology, 22(1)*, 105.]

Bowers, B.S. (ed.) (2007) *The Medieval Hospital and Medical Practice*. Aldershot.

Brockelmann, C. (1898–1902) *Geschichte der arabischen Literatur*. Weimar.

Ibid. (1937–1942) *Geschichte der arabischen Litteratur, Supplement*. Leiden.

Broekaert, W.F., Marien, W., Terras, F.R., De Bolle, M.F., Proost, P., Van Damme, J., Dillen, L., Claeys, M., Rees, S.B., Vanderleyden, J., *et al.* (1992) Antimicrobial peptides from Amaranthus caudatus seeds with sequence homology to the cysteine/glycine-rich domain of chitin-binding proteins. *Biochemistry, 31(17)*, 4308–4314.

Van Den Broucke, C.O. and Lemli, J.A. (1981) Pharmacological and chemical investigation of thyme liquid extracts. *Planta Medica, 41*, 129–135

Browne, E.G. (1921) *Arabian Medicine*. Cambridge.

Browner, C.H. (1985) Criteria for selecting herbal remedies. *Ethnology, 24*,13–32.

Browner, C.H., Ortiz de Montellano, B.R., and Rubel, A.J. (1988) A methodology for cross-cultural ethnomedical research. *Current Anthropology, 20*, 681–702.

von Bruchhausen, F *et al.* (ed.) (1990–2000) *Hagers Handbuch der Pharmazeutischen Praxis*. 5. vollst. neubearb. Berlin/Heidelberg/New York.

Budavari, S. and Windholz, M. (ed.) (1989) *The Merck Index: an Encyclopedia of Chemicals, Drugs, and Biologicals*. 11th ed. Rahway, NJ.

Buenz, E.J., Bauer, B.A., Johnson, H.E., Tavana, G., Beekman, E.M., Frank, K.L., and Howe, C.L. (2006) Inspiration: Searching historical herbal texts for potential new drugs. *BMJ, 333*, 1314–1315.

Buenz, E.J., Johnson, H.E., Beekman, E.M., Motley, T.J., and Bauer, B.A. (2005) Bioprospecting Rumphius's Ambonese herbal: volume I. *Journal of Ethnopharmacology, 96(1–2)*, 57–70.

Buenz, E.J. and Schnepple, D.J. (2007) Hold on to your memories: How recent findings will impact plant-based drug discovery. *Journal of Ethnopharmacology, 114(3)*, 279–280.

Buenz, E.J., Schnepple, D.J., Bauer, B.A., Elkin, P.L., Riddle, J.M., and Motley, T.J. (2004) Techniques: bioprospecting historical herbal texts by hunting for new leads for old tomes. *Trends in Pharmacological Sciences, 25*, 494–498.

Burkert, W. (1984). *Die orientalisierende Epoche in der griechischen Religion und Literatur*. Heidelberg.

Burnett, C. (1994) *Constantine the African and ʿAlī ibn al-Abbās al-Magūsī: the Pantegni and Related Texts*. New York.

Ibid. (1982–1989) Translation and Translators, Western European. In Strayer, J.R. (ed.) *Dictionary of the Middle Ages* (Vol. 12, 136–142). New York.

Ibid. (2005) Translation Norms and Practices. In Glick, T.F., Livesey, S.J., and Wallis, F. (eds.) *Medieval Science, Technology, and Medicine: an Encyclopedia* (486–488). New York.

Caceres, A., Alvarez, A.V., Ovando, A.E., and Samayoa, B.E. (1991) Plants used in Guatemala for the treatment of respiratory diseases. 1. Screening of 68 plants against gram-positive bacteria. *Journal of Ethnopharmacology, 31(2)*, 193–208.

Cáceres, A., Figueroa, L., Taracena, A.M., and Samayoa, B. (1993) Plants used in Guatemala for the treatment of respiratory diseases. 2: Evaluation of activity of 16 plants against gram-positive bacteria. *Journal of Ethnopharmacology, 39(1)*, 77–82.

Campbell, S., Hall, B., and Klausner, D. (eds.) (1992) *Health, Disease and Healing in Medieval Culture*. New York.

Du Cange, Ch.D.F. (1937–1938) *Glossarium mediæ et infimæ latinitatis, cum supplementis integris d. P. Carpenterii, Adelungii*, aliorum, suisque, digessit G.A.L. Henschel. Paris.

Lo Cantore, P., Iacobellis, N.S., De Marco, A., Capasso, F., and Senatore, F. (2004) Antibacterial activity of Coriandrum sativum L. and Foeniculum vulgare Miller Var. vulgare (Miller) essential oils. *Journal of Agricultural and Food Chemistry, 52(26)*, 7862–7866.

Capasso, R., Evidente, A., Schivo, L., Orru, G., Marcialis, M.A., and Cristinzio, G. (1995) Antibacterial polyphenols from olive oil mill waste waters. *Journal of Applied Bacteriology, 79(4)*, 393–398.

Castilla, P., Echarri, R., Dávalos, A., Cerrato, F., Ortega, H., Teruel, J.L., Lucas, M.F., Gómez-Coronado, D., Ortuño, J., and Lasunción, M.A. (2006) Concentrated red grape juice exerts antioxidant, hypolipidemic, and antiinflammatory effects in both hemodialysis patients and healthy subjects. *The American Journal of Clinical Nutrition, 84(1)*, 252–262.

Cemek, M., Kağa, S., Simşek, N., Büyükokuroğlu, M.E., and Konuk, M. (2008)

Antihyperglycemic and antioxidative potential of Matricaria chamomilla L. in streptozotocin-induced diabetic rats. *Natural Medicines. Shōyakugaku zasshi, 62(3)*, 284–293.

Chan, Y., Chang, T., Chan, C.H., Yeh, Y.C., Chen, C.W., Shieh, B., and Li, C. (2007) Immunomodulatory effects of Agaricus blazei Murill in Balb/cByJ mice. *Journal of Microbiology, Immunology, and Infection. Wei mian yu gan ran za zhi, 40(3)*, 201–208.

Chan, K., Islam, M.W., Kamil, M., Radhakrishnan, R., Zakaria, M.N., Habibullah, M., and Attas, A. (2000) The analgesic and anti-inflammatory effects of Portulaca oleracea L. subsp. Sativa (Haw.) Celak. *Journal of Ethnopharmacology, 73(3)*, 445–451.

Chandelier, J. (2005) Gentile da Foligno. In Glick, T.F., Livesey, S.J., and Wallis, F. (eds.) *Medieval Science, Technology, and Medicine: an Encyclopedia* (185–186). New York.

Chaurasia, S.C. and Jain, P.C. (1978) Antibacterial activity of essential oils of four medicinal plants. *Indian Journal of Hospital Pharmacy, 15*, 166–168.

Chen, F., Nakashima, N., Kimura, I., and Kimura, M. (1995) [Hypoglycemic activity and mechanisms of extracts from mulberry leaves (folium mori) and cortex mori radicis in streptozotocin-induced diabetic mice.] *Yakugaku Zasshi. Journal of the Pharmaceutical Society of Japan, 115(6)*, 476–482.

Cherian, S., Kumar, R.V., Augusti, K.T., and Kidwai, J.R. (1992) Antidiabetic effect of a glycoside of pelargonidin isolated from the bark of Ficus bengalensis Linn. *Indian Journal of Biochemistry and Biophysics*, *29(4)*, 380–382.

Chi, T.C., Chen, W.P., Chi, T.L., Kuo, T.F., Lee, S.S., Cheng, J.T., and Su, M.J. (2007) Phosphatidylinositol-3-kinase is involved in the antihyperglycemic effect induced by resveratrol in streptozotocin-induced diabetic rats. *Life Sciences, 80(18)*, 1713–1720.

Chipman, L.N.B. (2002) How effective were cough remedies known to medieval Egyptians. *Korot, 16*, 135–157.

Ibid. (2005) Minhāj al-dukkān *by Abu ʾl-Munā al-Kūhīn al-ʿAṭṭār: Aspects of pharmacy and pharmacists in Mamluk Cairo*. Unpublished Ph.D. Dissertation. The Hebrew University of Jerusalem.

Chithra, P., Sajithlal, G.B. and Chandrakasan, G. (1998) Influence of Aloe vera on collagen characteristics in healing dermal wounds in rats. *Molecular and Cellular Biochemistry, 181(1–2)*, 71–76.

Cho, E.J., Yokozawa, T., Kim, H.Y., Shibahara, N., and Park, J.C. (2004) Rosa rugosa attenuates diabetic oxidative stress in rats with streptozotocin-induced diabetes. *The American Journal of Chinese Medicine, 32(4)*, 487–496.

Choi, E.M. and Hwang, J.K. (2003) Investigations of anti-inflammatory and antinociceptive activities of Piper cubeba, Physalis angulata and Rosa hybrida. *Journal of Ethnopharmacology, 89(1)*, 171–175.

Choi, Y.H., Yan, G.H., Chai, O.H., Choi, Y.H., Zhang, X, Lim, J.M., Kim, J.H., Lee, M.S., Han, E.H., Kim, H.T., and Song, C.H. (2006) Inhibitory effects of Agaricus blazei on mast cell-mediated anaphylaxis-like reactions. *Biological and Pharmaceutical Bulletin, 29(7)*, 1366–1371.

Choi, J.S., Yokozawa, T., and Oura, H. (1991) Improvement of hyperglycemia and hyperlipemia in streptozotocin-diabetic rats by a methanolic extract of Prunus davidiana stems and its main component, prunin. *Planta Medica, 57(3)*, 208–211.

Clifford, S.C., Arndt, S.K., Popp, M., and Jones, H.G. (2002) Mucilages and polysaccharides in Ziziphus species (Rhamnaceae): localization, composition and physiological roles during drought-stress. *Journal of Experimental Botany, 53(366)*, 131–138.

Conrad, L.I. (1995b). The Arab-Islamic medical tradition. In Conrad, L.I., *The Western Medical Tradition, 800 BC to AD 1800* (93–138). Cambridge.

Ibid. (ed.) (1995a), *The Western Medical Tradition, 800 BC to AD 1800*. Cambridge.

Conte, A., Speranza, B., Sinigaglia, M., and Del Nobile, M.A. (2007) Effect of lemon extract on foodborne microorganisms. *Journal of Food Protection, 70(8)*, 1896–1900.

Court, W.E. (1985) Squill—energetic diuretic. *Pharmaceutical Journal, 235*, 194–197.

Crisciani, Ch. (1990) History, Novelty and Progress in Scholastic Medicine. *Osiris*, *2nd ser., 6*, 118–139.

Cruz, M.C., Santos, P.O., Barbosa, A.M. Jr., de Mélo, D.L., Alviano, C.S., Antoniolli, A.R., Alviano, D.S., and Trindade, R.C. (2007) Antifungal activity of Brazilian medicinal plants involved in popular treatment of mycoses. *Journal of Ethnopharmacology, 111(2)*, 409–412.

Cullen, W.P., LaLonde, R.T., Wang, C.J., and Wong, C.F. (1973) Isolation and in vitro antifungal activity of 6,6'-dihydroxythiobinupharidine. *Journal of Pharmaceutical Sciences, 62(5)*, 826–827.

Cunnane, S.C., Ganguli, S., Menard, C., Liede, A.C., Hamadeh, M.J., Chen, Z.Y., Wolever, T.M., and Jenkins, D.J. (1993) High alpha-linolenic acid flaxseed (Linum usitatissimum): some nutritional properties in humans. *British Journal of Nutrition*, *69(2)*, 443–453.

Daems, W.F. (1967) *Boec van medicinen in Dietsche*. Leiden.

Ibid. (1993) *Nomina simplicium medicinarum ex synonymariis medii aevi collecta. Semantische Untersuchungen zum Fachwortschatz hoch- und spätmittelalterlicher Drogenkunde*. Leiden.

Dafallah, A.A. and al-Mustafa, Z. (1996) Investigation of the anti-inflammatory activity of Acacia nilotica and Hibiscus sabdariffa. *American Journal of Chinese Medicine, 24(3–4)*, 263–269.

Dar, M.S., Ikram, M., and Fakouhi, T. (1976) Pharmacology of Quercus infectoria. *Journal of Pharmaceutical Sciences, 65(12)*, 1791–1794.

Davidson, J.R. and Ortiz de Montellano, B.R. (1983) The Antibacterial Properties of an Aztec Wound Remedy. *Journal of Ethnopharmacology, 8*, 149–161.

Davis, R.H., DiDonato, J.J., Johnson, R.W., and Stewart, C.B. (1994) Aloe vera, hydrocortisone, and sterol influence on wound tensile strength and anti-inflammation. *Journal of the American Podiatric Medical Association, 84(12)*, 614–621.

Davis, R.H., Leitner, M.G., Russo, J.M., and Byrne, M.E. (1989) Wound healing. Oral and topical activity of Aloe vera. *Journal of the American Podiatric Medical Association, 79(11)*, 559–562.

Degirmenci, I., Ustuner, M.C., Kalender, Y., Kalender, S., and Gunes, H.V. (2005) The effects of acarbose and Rumex patientia L. on ultrastructural and biochemical changes of pancreatic B cells in streptozotocin-induced diabetic rats. *Journal of Ethnopharmacology, 97(3)*, 555–559.

Desalen', T.L., Tsepaeva, O.V., Sosnina, N.A., El'kina, G.I., Levandovskii, I.V., Bravova, G.B., Ofitserov, E.N., and Lapin, A.A. (1997) [Isolation of pectin from Amaranthus cruentus and study of its effect on the function of isolated rat heart]. *Biulleten eksperimentalnoi biologii i meditsiny, 123(1)*, 91–94.

Dhanabal, S.P., Raja, M.K., Ramanathan, M., and Suresh, B. (2007) Hypoglycemic activity of Nymphaea stellata leaves ethanolic extract in alloxan induced diabetic rats. *Fitoterapia, 78(4)*, 288–291.

Dietrich, A. (1954) *Zum Drogenhandel im islamischen Ägypten*. Heidelberg.

Ibid. (ed. and trans.) (1988) Dioscurides triumphans. *Ein anonymer arabischer Kommentar (Ende 12. Jahrh. n. Chr.) zur* Materia medica. Göttingen.

Ibid. (ed. and trans.) (1991) *Die Dioskurides-Erklärung des Ibn al-Baiṭār. Ein Beitrag zur arabischen Pflanzensynonymik des Mittelalters*. Göttingen.

Dogasaki, C., Murakami, H., Nishijima, M., Ohno, N., Yadomae, T., and Miyazaki, T. (1994) Biological activity and structural characterization of alkaline-soluble polysaccharides from the kernels of Prunus mume Sieb. et Zacc. *Biological and Pharmaceutical Bulletin, 17(3)*, 386–390.

Dolev, E. (1996) Medicine in the Crusaders' Kingdom of Jerusalem. In Waserman, M. and Kottek, Sh. (ed.) *Health and Disease in the Holy Land: Studies in the History and Sociology of Medicine from Ancient Times to the Present* (157–172). Lewiston.

Dols, M.W. (1984) *Medieval Islamic Medicine*. Berkeley.

Dorsch, W. and Wagner, H. (1991) New antiasthmatic drugs from traditional medicine? *International Archives of Allergy and Applied Immunology, 94(1–4)*, 262–265.

Dowling, H.F. (1973) *Medicines for Man*. New York.

Dozy, R. (1881) *Supplement aux dictionnaires arabes*. Leiden.

Dragendorff, G. (1898) *Die Heilpflanzen der verschieden Völker und Zeiten*. Stuttgart.

Drozd, J. and Anuszewska, E. (2003) The effect of the Melissa officinalis extract on immune response in mice. *Acta poloniae pharmaceutica, 60(6)*, 467–470.

Dubler, C. (1953) *La "Materia médica" de Dioscórides: transmisión medieval y renacentista*. Barcelona.

Duke, J.A. (1992a) *Handbook of biologically active phytochemicals and their activities*. Boca Raton.

Ibid. (1992b) *Handbook of phytochemical constituents of GRAS herbs and other economic plants*. Boca Raton.

Duke, J.A. and Beckstrom-Sternberg, S.M., *Dr. Duke's Phytochemical and Ethnobotanical Databases*. Phytochemical Database, USDA—ARS—NGRL, Beltsville Agricultural Research Center, Beltsville, Maryland. ⟨http://www.ars-grin.gov/cgi-bin/duke/chemical_activity.pl⟩

Ebana, R.U., Madunagu, B.E., Ekpe, E.D., and Otung, I.N. (1991) Microbiological exploitation of cardiac glycosides and alkaloids from Garcinia kola, Borreria ocymoides, Kola nitida and Citrus aurantifolia. *Journal of Applied Bacteriology, 71(5)*, 398–401.

Ebringerová, A., Kardosová, A., Hromádková, Z., and Hribalová, V. (2003) Mitogenic and comitogenic activities of polysaccharides from some European herbaceous plants. *Fitoterapia, 74(1–2)*, 52–61.

Eddouks, M., Lemhadri, A., Zeggwagh, N.A., and Michel, J.B. (2005) Potent hypoglycaemic activity of the aqueous extract of Chamaemelum nobile in normal and streptozotocin-induced diabetic rats. *Diabetes Research and Clinical Practice, 67(3)*, 189–195.

Eddouks, M., Maghrani, M., and Michel, J.B. (2005) Hypoglycaemic effect of Triticum repens P. Beauv. in normal and diabetic rats. *Journal of Ethnopharmacology, 102(2)*, 228–232.

Edelstein, L. (1967) The Dietetics of Antiquity. In Temkin, O. and Temkin C.L. (eds.) *Ancient Medicine: selected papers of Ludwig Edelstein* (303–316). Baltimore.

Eidi, M., Eidi, A., and Zamanizadeh, H. (2005) Effect of Salvia officinalis L. leaves on serum glucose and insulin in healthy and streptozotocin-induced diabetic rats. *Journal of Ethnopharmacology, 100(3)*, 310–313.

Elawad, A.A., Abdel-Bari, E.M., Mahmoud, O.M. and Adam, S.E. (1984) The effect of Citrullus colocynthis on sheep. *Veterinary and Human Toxicology, 26(6)*, 481–485.

Elfellah, M.S., Akhter, M.H., and Khan, M.T. (1984) Anti-hyperglycaemic effect of an extract of Myrtus communis in streptozotocin-induced diabetes in mice. *Journal of Ethnopharmacology*, *11(3)*, 275–281.

Elgood, C. (1962) Tibb-ul-Nabbi or Medicine of the Prophet. Being a Translation of Two Works of the Same Name …, *Osiris, 14*, 33–192.

Elisha, E., Twaij, H., and Ali, N. (1987) The anthelmintic activity of some Iraqi plants of the Curcurbitaceae. *International Journal of Crude Drug Research, 25*, 153–157.

Elkhadem, H. (ed. and trans.) (1990) *Le "Taqwīm al-ṣiḥḥa" (Tacuini sanitatis) d'Ibn Buṭlān: Un traité médical du XIe siècle*. Leuven.

Englberger, W., Hadding, U., Etschenberg, E., Graf, E., Leyck, S., Winkelmann, J., and Parnham, M.J. (1988) Rosmarinic acid: a new inhibitor of complement C3-convertase with anti-inflammatory activity. *International Journal of Immunopharmacology, 10(6)*, 729–737.

Ergin, O. (1956) *Ibni Sina Bibliografyasi*. Istanbul.

Estes, J.W. (1979) Making Therapeutic Decisions with Protopharmacologic Evidence. *Transactions and Studies of the College of Physicians of Philadelphia 1(2)*, 116–137.

Etkin, N.L. (1988) Ethnopharmacology: Biobehavioral approaches in the anthropological study of indigenous medicines. *Annual Review of Anthropology, 17*, 23–42.

Ibid. (1979b) Indigenous Medicine Among the Hausa of Northern Nigeria: Laboratory Evaluation for Potential Therapeutic Efficacy of Antimalarial Plant Medicinals. *Medical Anthropology, 3(4)*, 401–429.

Ibid. (1979a) Introduction. Biomedical Evaluation of Indigenous Medical Practices. *Medical Anthropology, 3(4)*, 393–400.

Faccin, L.C., Benati, F., Rincão, V.P., Mantovani, M.S., Soares, S.A., Gonzaga, M.L., Nozawa, C., and Carvalho Linhares, R.E. (2007) Antiviral activity of aqueous and ethanol extracts and of an isolated polysaccharide from Agaricus brasiliensis against poliovirus type 1. *Letters in Applied Microbiology, 45(1)*, 24–28.

Fagerberg, S. (1982) Effects of a bulk laxative (Metamucil) on fasting blood glucose, serum lipids and other variables in constipated patients with non-insulin dependent adult diabetes. *Current Therapeutic Research, 31*, 166–172.

Fancy, N.A.G. (2006) Pulmonary Transit and Bodily Resurrection: The Interaction of Medicine, Philosophy and Religion in the Works of Ibn al-Nafīs (d. 1288). *Electronic Theses and Dissertations*, University of Notre Dame. http://etd.nd.edu/ETD-db/theses/available/etd-11292006–152615/

Fararh, K.M., Atoji, Y., Shimizu, Y., Shiina, T., Nikami, H., and Takewaki, T. (2004) Mechanisms of the hypoglycaemic and immunopotentiating effects of Nigella sativa L. oil in streptozotocin-induced diabetic hamsters. *Research in Veterinary Science, 77(2)*, 123–129.

Farnsworth, N.R. (1984) The Role of Medicinal Plants in Drug Development. In Krogsgaard-Larsen, P., Christensen, S.B., and Kofod, H. (ed.) *Natural Products and Drug Development* (17–30). Copenhagen.

El-Fatatry, H.M. (1975) Isolation and structure assignment of an antimicrobial principle from the volatile oil of Nigella sativa L. seeds. *Pharmazie, 30(2)*, 109–111.

Al-Fatimi, M., Wurster, M., Kreisel, H., and Lindequist, U. (2005) Antimicrobial, cytotoxic and antioxidant activity of selected basidiomycetes from Yemen. *Pharmazie, 60(10)*, 776–780.

Al-Fatimi, M., Wurster, M., Schröder, G., and Lindequist, U. (2007) Antioxidant, antimicrobial and cytotoxic activities of selected medicinal plants from Yemen. *Journal of Ethnopharmacology, 111(3)*, 657–666.

Fehri, B., Aiache, J.M., Memmi, A., Korbi, S., Yacoubi, M.T., Mrad, S., and Lamaison, J.L. (1994) [Hypotension, hypoglycemia and hypouricemia recorded after repeated administration of aqueous leaf extract of Olea europaea L.] *Journal de pharmacie de Belgique*, *49(2)*, 101–108.

Fehri, B., Aiache, J.M., Mrad, S., Korbi., S., and Lamaison, J.L. (1996) Olea europaea L.: stimulant, anti-ulcer and anti-inflammatory effects. *Bollettino Chimico Farmaceutico, 135*, 42–49.

Fellmann, I. (1986) *Das Aqrābāḏīn al-Qalānisī. Quellenkritische und begriffsanalytische Untersuchungen zur arabisch-pharmazeutischen Literatur*. Beirut.

Fernando, M.R., Thabrew, M.I., and Karunanayake, E.H. (1990) Hypoglycaemic activity of some medicinal plants in Sri-Lanka. *General Pharmacology, 21(5)*, 779–782.

Fiad, S. and El-Hamidi, M. (1993) Vitamin E and trace elements. *Seifen, Oele, Fette und Wachse, 119*, 25–26, 28.

Fierro, M. and Samsó, J. (eds.) (1995) *The Formation of al-Andalus. Part 2: Language, Religion, Culture and the Sciences*. Aldershot.

Flashar, H. (1966) *Melancholie und Melancholiker in den medizinischen Theorien der Antike*, Berlin.

Fleischner, A.M. (1985) Plant extracts: to accelerate healing and reduce inflammation. *Cosmetics and Toiletries, 100*, 45–46, 48–51, 54–55, 58.

Fluckiger, F.A. and Hanbury, D. (1874) *Pharmacographia*. London.

Forster, H.B., Niklas, H., and Lutz, S. (1980) Antispasmodic effects of some medicinal plants. *Planta Medica, 40(4)*, 309–319.

Foster, G.M. and Anderson, B.G. (1978) *Medical Anthropology*. New York.

Freire, C.M., Marques, M.O., and Costa, M. (2006) Effects of seasonal variation on the central nervous system activity of Ocimum gratissimum L. essential oil. *Journal of Ethnopharmacology, 105(1–2)*, 161–166.

Fulton, J.E. Jr. (1990) The stimulation of postdermabrasion wound healing with stabilized aloe vera gel-polyethylene oxide dressing. *Journal of Dermatologic Surgery and Oncology, 16(5)*, 460–467.

Gabrieli, G. (1923) Biographie e bibliographie di scienziati arabi: Avicenna. *Archivio di storia della scienza, 4*, 258–270.

Galati, E.M., Monforte, M.T., Kirjavainen, S., Forestieri, A.M., Trovato, A., and Tripodo, M.M. (1994) Biological effects of hesperidin, a citrus flavonoid. (Note I): antiinflammatory and analgesic activity. *Farmaco, 40(11)*, 709–712.

Gamez, M.J., Jimenez, J., Risco, S., and Zarzuelo, A. (1987) Hypoglycemic activity in various species of the genus Lavandula. Part 1. Lavandula stoechas L. and Lavandula multifida L. *Pharmazie, 42*, 706–707.

Gamez, M.J., Zarzuelo, A., Risco, S., Utrilla, P., and Jimenez, J. (1988) Hypoglycemic activity in various species of the genus Lavandula. Part 2. Lavandula dentata and Lavandula latifolia. *Pharmazie, 43*, 441–442.

Garbers, K. (ed.) (1977) *Isḥāq b. ʿImrān's* Maqāla fī l-Mālīḫūliyā. Hamburg.

Garcia, R., Lemus, I., Rivera, P., and Erazo, S. (1997) Biological and chemical study of paico (Chenopodium chilense, Chenopodiaceae). *Journal of Ethnopharmacology, 57(2)*, 85–88.

Garcia-Ballester, L., Ferre, L., and Feliu, E. (1990) Jewish Appreciation of Fourteenth-Century Scholastic Medicine. *Osiris, 6*, 85–117.

Garcia-Ballester, L., Paniagua, J.A., and McVaugh, M.R. (eds.) (1975) *Arnaldi de Villanova Opera medica omnia*, Vol. II. Granada.

García Sánchez, E. (2002) Dietic Aspects of Food in al-Andalus. In Waines, D. (ed.) *Patterns of Everyday Life* (275–288/1–14). Aldershot.

Garijo, I. (1995) Ibn Juljul's Treatise on Medicaments Not Mentioned by Dioscorides. In Fierro, M. and Samsó, J. (eds.) *The Formation of al-Andalus. Part 2: Language, Religion, Culture and the Sciences* (419–430). Aldershot.

Gauthier, L. (1939) *Antécédents Greco-Arabes de la Psychophysique*. Beyrouth.

El Gazzar, M., El Mezayen, R., Nicolls, M.R., Marecki, J.C., and Dreskin, S.C. (2006) Downregulation of leukotriene biosynthesis by thymoquinone attenuates airway inflammation in a mouse model of allergic asthma. *Biochimica et Biophysica Acta, 1760(7)*, 1088–1095.

Al-Ghāfiqī. See Meyerhof and Sobhy, 1932.

Al-Ghāfiqī. See Meyerhof, 1933.

Gibbs, A., Green, C., and Doctor, V.M. (1983) Isolation and anticoagulant properties of polysaccharides of Typha Augustata and Daemonorops species. *Thrombosis Research, 32(2)*, 97–108.

Gil, A., De La Fuente, E.B., Lenardis, A.E., Lopez Pereira, M., Suarez, S.A., Bandoni, A., Van Baren, C., Di Leo Lira, P., and Ghersa, C.M. (2002) Coriander essential oil composition from two genotypes grown in different environmental conditions. *Journal of Agricultural and Food Chemistry, 50(10)*, 2870–2877.

Gilani, A.H., Aziz, N., Khurram, I.M., Chaudhary, K.S., and Iqbal, A. (2001) Bronchodilator, spasmolytic and calcium antagonist activities of Nigella sativa seeds (Kalonji): a traditional herbal product with multiple medicinal uses. *Journal of the Pakistan Medical Association, 51(3)*, 115–120.

Gilani, A.H., Khan, A.U., Jabeen, Q., Subhan, F., and Ghafar, R. (2005) Antispasmodic and blood pressure lowering effects of Valeriana wallichii are mediated through K+ channel activation. *Journal of Ethnopharmacology, 100(3)*, 347–352.

Gilani, A.H., Shah, A.J., and Yaeesh, S. (2007) Presence of cholinergic and calcium antagonist constituents in Saussurea lappa explains its use in constipation and spasm. *Phytotherapy Research., 21(6)*, 541–544.

Gillispie, C. (ed.) (1970–1990) *Dictionary of Scientific Biograph*y. New York.

Giner-Larza, E.M., Máñez, S., Giner-Pons, R.M., Carmen Recio, M., and Ríos, J.L. (2000) On the anti-inflammatory and anti-phospholipase A(2) activity of extracts from lanostane-rich species. *Journal of Ethnopharmacology*, *73(1–2)*, 61–69.

Glare, P.G.W. (1982) *Oxford Latin Dictionary*. Oxford.

Glick, T.F. (2005b) Translation Movements. In Glick, T.F., Livesey, S.J., and Wallis, F. (eds.) *Medieval Science, Technology, and Medicine: an Encyclopedia* (482–486). New York.

Glick, T.F., Livesey, S.J., and Wallis, F. (eds.) (2005a) *Medieval Science, Technology, and Medicine: an Encyclopedia*. New York.

Gohlman, W.E. (1974) *The Life of Ibn Sina*. Albany.

Goichon, A.M. (1960–2002) *Ibn Sīnā*. In Bearman, P.J., Bianquis, Th., Bosworth, C.E., van Donzel, E., and Heinrichs, W.P. (eds.) *The Encyclopaedia of Islam*. 2nd Edition (Vol. III, 941–947). Leiden/London.

Goitein, S.D. (1966) *Letters and Documents on the India Trade in Medieval Times*. Leiden.

Ibid., (1967). *A Mediterranean Society: The Jewish Communities of the Arab World as Portrayed in the Documents of Cairo Geniza. Vol. 1: Economic Foundations*. Berkeley.

Gokhale, A.B., Damre, A.S., Kulkami, K.R., and Saraf, M.N. (2002) Preliminary evaluation of anti-inflammatory and anti-arthritic activity of S. lappa, A. speciosa and A. aspera. *Phytomedicine, 9(5)*, 433–437.

Gong, Q.M., Wang, S.L., and Gan, C. (1989) [A clinical study on the treatment of acute upper digestive tract hemorrhage with wen-she decoction]. *Chung Hsi I Chieh Ho Tsa Chih / Chinese Journal of Modern Developments in Traditional Medicine, 9(5)*, 272–273, 260.

Goodman, L.E. (1992) *Avicenna*. London.

Goodwin, J.S. and Goodwin, J.M. (1984) The tomato effect: Rejection of highly efficacious therapies. *Journal of the American Medical Association, 251*, 2387–2390.

Goodyer, J. (trans.) and Gunther, R.T. (ed.) (1934) *The Greek Herbal of Dioscorides*. London and New York.
Gourevitch, D. (1984) *Le mal d'être femme: la femme et la médecine dans la Rome antique*. Paris.
Gracious Ross, R., Selvasubramanian, S., and Jayasundar, S. (2001) Immunomodulatory activity of Punica granatum in rabbits—a preliminary study. *Journal of Ethnopharmacology, 78(1)*, 85–87.
Greenspan, P., Bauer, J.D., Pollock, S.H., Gangemi, J.D., Mayer, E.P., Ghaffar, A., Hargrove, J.L., and Hartle, D.K. (2005) Antiinflammatory properties of the muscadine grape (Vitis rotundifolia). *Journal of Agricultural and Food Chemistry, 53(22)*, 8481–8484.
von Groth, R. (1889) Ueber die in der hippokratischen Schriftensammlung enthaltenen pharmakologischen Kenntnisse. In Kobert, R. (ed.) *Historische Studien zur Pharmakologie der Griechen, Romer und Araber: Kobert's historische Studien aus dem Pharmakologischen Institute der Universitat Dorpat* (Vol. I, 58–133). Halle an der Saale.
Grover, J.K., Yadav, S., and Vats, V. (2002) Medicinal plants of India with antidiabetic potential. *Journal of Ethnopharmacology, 81(1)*, 81–100.
Gruner, O.C. (1930) *A Treatise on the Canon of Medicine of Avicenna, incorporating a Translation of the First Book*. London.
Guenther, E. (1948–1952) *The Essential Oils*. New York.
Guevara, J.M., Chumpitaz, J., and Valencia, E. (1994) [The in vitro action of plants on Vibrio cholerae]. *Revista de gastroenterologia del Peru, 14(1)*, 27–31.
Gundidza, M. and Sibanda, M. (1991) Antimicrobial activities of ziziphus abyssinica and berchemia discolor. *The Central African Journal of Medicine, 37(3)*, 80–83.
Gupta, I., Parihar, A., Malhotra, P., Singh, G.B., Ludtke, R., Safayhi, H., and Ammon, H.P. (1997) Effects of Boswellia serrata gum resin in patients with ulcerative colitis. *European Journal of Medical Research, 2(1)*, 37–43.
Gupta, P.P., Srimal, R.C., and Tandon, J.S. (1993) Antiallergic activity of some traditional Indian medicinal plants. *International Journal of Pharmacognosy, 31(1)*, 15–18.
Gutas, D. (1988) *Avicenna and the Aristotelian Tradition: Introduction to Reading Avicenna's Philosophical Works*. Leiden.
Ibid. (1982–2008) Avicenna: Biography. In Yarshater, E. (ed.) *Encyclopaedia Iranica* (Vol. III, 66–70). London/Costa Mesa.
Ibid. (1982–2008) Avicenna: Mysticism. In Yarshater, E. (ed.) *Encyclopaedia Iranica* (Vol. III, 79–83). London/Costa Mesa.
Ibid. (2000) *Greek Philosophers in the Arabic Tradition*. Aldershot.
Ibid. (1998) *Greek Thought, Arabic Culture: the Graeco-Arabic Translation Movement in Baghdad and Early Abbasid Society (2nd–4th/8th–10th Centuries)*. London.
Ibid. (1983) Paul the Persian on the Classification of the Parts of Aristotle's Philosopy: A Milestone between Alexandria and Baghdad. *Der Islam, 60(2)*, 231–267.
Ibid. (1994) Pre-Plotinian Philosophy in Arabic (Other than Platonism and Aristotelianism): A Review of the Sources. In Haase, W. and Temporini, H.

(eds.) *Aufstieg und Niedergang der Römischen Welt*, Part II, Vol. 36.7. *Rise and Decline of the Roman World* (4939–4973). Berlin/New York.

Habbal. O.A., Al-Jabri, A.A., El-Hag, A.H., Al-Mahrooqi, Z.H., and Al-Hashmi, N.A. (2005) In-vitro antimicrobial activity of Lawsonia inermis Linn (henna). A pilot study on the Omani henna. *Saudi Medical Journal, 26(1)*, 69–72.

Habtemariam, S., Harvey, A.L., and Waterman, P.G. (1993) The muscle relaxant properties of Portulaca oleracea are associated with high concentrations of potassium ions. *Journal of Ethnopharmacology, 40(3)*, 195–200.

al-Hader, A.A., Hasan, Z.A., and Aqel, M.B. (1994) Hyperglycemic and insulin release inhibitory effects of Rosmarinus officinalis. *Journal of Ethnopharmacology, 43(3)*, 217–221.

Haefele, C., Bonfils, C., and Sauvaire, Y. (1997) Characterization of a dioxygenase from Trigonella foenum-graecum involved in 4-hydroxyisoleucine biosynthesis. *Phytochemistry, 44(4)*, 563–566.

Hager. See von Bruchhausen *et al.*, 1990–2000.

Hager. See List and Horhammer, 1969–1979.

Hamarneh, S.Kh. and Sonnedecker, G. (1963) *A Pharmaceutical View of Abulcasis al-Zahrāwī in Moorish Spain with Special Reference to the "Adhān"*. Leiden.

Hanafy, M.S. and Hatem, M.E. (1991) Studies on the antimicrobial activity of Nigella sativa seed (black cumin). *Journal of Ethnopharmacology, 34(2–3)*, 275–278.

Harig, G. (1976) Der Begriff der lauen Wärme in der theoretischen Pharmakologie Galens. *NTM, 13*, 70–76.

Ibid. (1974) *Die Bestimmung der Intensität im medizinischen System Galens: Ein Beitrag zur theoretische Pharmakologie, Nosologie und Therapie in der Galenischen Medizin*. Berlin.

Ibid. (1966). Die Galenschrift "De simplicium medicamentorum temperamentis ac facultatibus" und die "Collectiones medicae" des Oreibasios. *NTM, 7*, 3–26.

Ibid. (1973) Verhältnis zwischen den Primar- und Sekundarqualitäten in der theoretischen Pharmakologie Galens. *NTM, 10*, 64–81.

Harborne, J.B. and Baxter, H. (eds.) (1983) *Phytochemical Dictionary: a Handbook of Bioactive Compounds from Plants*. London.

Hasan, A., Ahmed, I., Jay, M., and Voirin, B. (1995) Flavonoid glycosides and an anthraquinone from Rumex chalepensis. *Phytochemistry, 39(5)*, 1211–1213.

Heinrich, M. (2000) Ethnobotany and its role in drug development. *Phytotherapy Research, 14*, 479–488.

Heinrich, M., Kuhnt, M., Wright, C.W., Rimpler, H., Phillipson, J.D., Schandelmaier, A., and Warhurst, D.C. (1992b) Parasitological and microbiological evaluation of Mixe Indian plants (Mexico). *Journal of Ethnopharmacology, 36*, 81–85.

Heinrich, M., Rimpler, H. and Antonio, B.N. (1992a) Indigenous phytotherapy of gastrointestinal disorders in a Mixe lowland community (Oaxaca, Mexico): Ethnopharmacological evaluation. *Journal of Ethnopharmacology, 36*, 63–80.

Hikino, H., Takahashi, M., Konno, C., Ishimori, A., Kawamura, T., and Namiki, T. (1985) Effect of glycans of Saccharum officinarum on carbohydrate and lipid metabolism of rats. *Journal of Ethnopharmacology, 14(2–3)*, 261–268.

Hill, D.R. (1993) *Islamic Science and Engineering*. Edinburgh.

Hiltunen, R. and Holm, Y. (1994) *Luonnonlääkkeet*. Helsinki/Lahti.

Himes, N.E. (1936) *Medical History of Contraception*. Baltimore.

Hinz, W. (1970) *Islamische Masse und Gewichte, umgerechnet ins metrische System*. Reprint with corrections and additions. Leiden/Köln.

Hirschberg, J. and Lippert, J. (1902) *Die Augenheilkunde des Ibn Sīnā*. Leipzig.

Holland, B. (1996b). Overview: Prospecting for drugs in ancient and medieval texts. In Holland, B. (ed.) *Prospecting for Drugs in Ancient and Medieval European Texts: a Scientific Approach* (1–5). Amsterdam.

Ibid. (ed.) (1996a). *Prospecting for Drugs in Ancient and Medieval European Texts: a Scientific Approach*. Amsterdam.

Ibid. (1994) Prospecting for drugs in ancient texts. *Nature 369*, 702.

Hollman, P.C., van Trijp, J.M., Mengelers, M.J., de Vries, J.H., and Katan, M.B. (1997) Bioavailability of the dietary antioxidant flavonol quercetin in man. *Cancer Letters, 114(1–2)*, 139–140.

Hopkins, K. (1965–1966) Contraception in the Roman Empire. *Comparative Studies in Society and History, 8*, 124–151.

Hoppe, H.A. (1975–1987) *Drogenkunde*. Berlin.

Ibid. (1981) *Taschenbuch der Drogenkunde*. Berlin.

Hort, A. (trans.) (1961) *Theophrastus: Enquiry into plants*. Cambridge, Mass.

Hou, C.C., Lin, S.J., Cheng, J.T., and Hsu, F.L. (2003) Antidiabetic dimeric guianolides and a lignan glycoside from Lactuca indica. *Journal of Natural Products, 66(5)*, 625–629.

Houghton, P.J., Zarka, R., de las Heras, B., and Hoult, J.R. (1995) Fixed oil of Nigella sativa and derived thymoquinone inhibit eicosanoid generation in leukocytes and membrane lipid peroxidation. *Planta Medica, 61(1)*, 33–36.

Huang, K.C. (1993) *The Pharmacology of Chinese Herbs*. Boca Raton.

Huang, L., Ye, W., Cai, B., Li, D., Liu, J., and Liu, M. (1990) [A preliminary study on the pharmacology of the compound prescription huangqin tang and its component drugs] *Zhongguo Zhong Yao Za Zhi, 15(2)*, 115–117, 128.

Ḥunayn ibn Isḥāq. See Meyerhof, 1928.

Iashan, I.A., Iaremenko, I.I., Masik, A.F., and Maevskaia, I.A. (1976) [Inhalation of an extract from the leaf buds of the deltoid poplar during the early period following tonsillectomy.] *Zhurnal ushnykh, nosovykh i gorlovykh boleznei, Jul-Aug(4)*, 82–83.

Iauk, L., Ragusa, S., Rapisarda, A., Franco, S., and Nicolosi, V.M. (1996) In vitro antimicrobial activity of Pistacia lentiscus L. extracts: preliminary report. *Journal of Chemotherapy, 8(3)*, 207–209.

Ibn Buṭlān. See Elkhadem, 1990.

Ibn al-Nafīs, ʿAlāʾ al-Dīn ʿAlī ibn abī al-Ḥazm al-Kurashī (1997) *Al-Mūjaz fī al-Ṭibb*. al-Qāhira.

Ibn Sīnā, Abū ʿAlī al-Ḥusayn b. ʿAbd Allāh [sine anno] *Kitāb al-Qānūn fī al-Ṭibb*. Bayrut, repr. of Būlāq 1294 H.

Ibid. (1505) *Liber Canonis Avicenne*. Trans. Gerard of Cremona. Venetiis.

Ibid. (ca. 1505) *Tertius Canonis Avicenne cum dilucidissimis expositoribus Gentile Fulginate nec non Jaco. de Partibus*. Venice.

Ibn Sīnā. See von Sontheimer, 1845.

Inamori, Y., Ogawa, M., Tsujibo, H., Baba, K., Kozawa, M., and Nakamura, H. (1991) The inhibitory effect of 3,3',4,5'-tetrahydroxystilbene, a constituent of Cassia garrettiana, on anti-IgE-induced histamine release from human basophils in vitro. *Chemical and Pharmaceutical Bulletin, 39(3)*, 805–807.

Innami, S., Ishida, H., Nakamura, K., Kondo, M., Tabata, K., Koguchi, T., Shimizu, J., and Furusho, T. (2005) Jew's mellow leaves (Corchorus olitorius) suppress elevation of postprandial blood glucose levels in rats and humans. *International Journal for Vitamin and Nutrition Research, 75(1)*, 39–46.

IPA (International Pharmaceutical Abstracts). By The American Society of Health-System Pharmacists. [Database.]

Iskandar, A.Z. (1967) *A Catalogue of Arabic Manuscripts on Medicine and Science in the Wellcome Historical Medical Library*. London.

Ibid. (1970–1990) Ibn al-Nafīs. In Gillispie, C. (ed.) *Dictionary of Scientific Biography* (Vol. IX, 602–607).

Ivorra, M.D., Payá, M., and Villar, A. (1989) A review of natural products and plants as potential antidiabetic drugs. *Journal of Ethnopharmacology, 27(3)*, 243–275.

Jacquart, D. (1990a) *La medecine arabe et l'Occident medieval*. Paris.

Ibid. (1980) Le regard d'un médecin sur son temps: Jacques Despars (1380?-1458). *Bibliothèque de l'Ecole des Chartes, 138*, 35–86.

Ibid. (1990b) Theory, everyday practice, and three fifteenth-century physicians. *Osiris, 2nd series, 6*, 140–160.

Jager, A.K., Hutchings, A., and van Staden, J. (1996) Screening of Zulu medicinal plants for prostaglandin-synthesis inhibitors. *Journal of Ethnopharmacology, 52(2)*, 95–100.

al-Jaghmīnī, Maḥmūd b. Muḥammad b. ʿUmar (1894) *Qānūnja fī al-ṭibb*. St. Petersburg.

Janssen, A.M., Scheffer, J.J., Ntezurubanza, L., and Baerheim-Svendsen, A. (1989) Antimicrobial activities of some Ocimum species grown in Rwanda. *Journal of Ethnopharmacology, 26(1)*, 57–63.

Jarcho, S. (1970) Galen's Six Non-Naturals: A Bibliographic Note and Translation. *Bulletin of the History of Medicine, 44*, 372–377.

Jimenez-Misas, C.A., Rojas-Hernandez, N.M., Lopez-Abraham, A.M. (1979) [Biological evaluation of Cuban plants. V]. *Revista Cubana de medicina tropical, 31(1)*, 37–43.

Jin, R., Wan, L.L., and Mitsuishi, T. (1995) [Effects of shi-ka-ron and Chinese herbs in mice treated with anti-tumor agent mitomycin C.] *Chung Kuo Chung Hsi I Chieh Ho Tsa Chih, 15(2)*, 101–103.

Johnstone, P. (1981) Galen in Arabic: The Transformation of Galenic Pharmacology. In Nutton, V. (ed.) *Galen: Problems and Prospects* (207–209). London.

Jöchle, W. (1974) Menses-inducing drugs: Their Role in Antique, Medieval and Renaissance Gynecology and Birth Control. *Contraception, 10*, 425–439.

Jouad, H., Lemhadri, A., Maghrani, M., Burcelin, R., and Eddouks, M. (2003) Hawthorn evokes a potent anti-hyperglycemic capacity in streptozotocin-induced diabetic rats. *Journal of Herbal Pharmacotherapy, 3(2)*, 19–29.

Jouad, H., Maghrani, M., and Eddouks, M. (2002) Hypoglycaemic effect of Rubus fructicosis L. and Globularia alypum L. in normal and streptozotocin-induced diabetic rats. *Journal of Ethnopharmacology, 81(3)*, 351–356.

Jung, K.H., Kim, M.J., Ha, E., Uhm, Y.K., Kim, H.K., Chung, J.H., and Yim, S.V. (2006) Suppressive Effect of Punica granatum on the Production of Tumor Necrosis Factor (Tnf) in BV2 Microglial Cells. *Biological and Pharmaceutical Bulletin, 29(6)*, 1258–1261.

Kahl, O. (ed. and trans.) (2007) *The Dispensatory of Ibn at-Tilmīḏ: Arabic text, English translation, study and glossaries*. Leiden/Boston.

Ibid. (ed.) (1994) *Sābūr ibn Sahl*: Dispensatorium parvum (Al-Aqrābādhīn al-ṣaghīr). Leiden.

Ibid. (trans.) (2003) *The small dispensatory*. Leiden/Boston.

Kanter, M., Coskun, O., and Uysal, H. (2006) The antioxidative and antihistaminic effect of Nigella sativa and its major constituent, thymoquinone on ethanol-induced gastric mucosal damage. *Archives of Toxicology, 80(4)*, 217–224.

Karwatzki, B., Herget, A., Beerhues, L., and Wiermann, R. (1993) In situ localization of chalcone synthase in tannin-containing plants. *Phytochemistry (Oxford), 32(3)*, 585–590.

Katterman, F.R. and Shattuck, V.I. (1983) An effective method of DNA isolation from the mature leaves of Gossypium species that contain large amounts of phenolic terpenoids and tannins. *Preparative Biochemistry, 13(4)*, 347–359.

Katz, S.R., Newman, R.A., and Lansky, E.P. (2007) Punica granatum: heuristic treatment for diabetes mellitus. *Journal of Medicinal Food, 10(2)*, 213–217.

Kavitha, J.V., Rosario, J.F., Chandran, J., Anbu, P., Bakkiyanathan (2007) Hypoglycemic and other related effects of Boswellia glabra in alloxan-induced diabetic rats. *Indian Journal of Physiology and Pharmacology, 51(1)*, 29–39.

Keil, G. (1982) *Festschrift für Willem F. Daems*. Pattensen.

Ibid. (1980–1998) Jacques Despars. In Bautier, R.-H. (ed.) *Lexikon des Mittelalters* (Vol. 3, 730–731). München.

al-Khalil, S., Aqel, M., Afifi, F., and al-Eisawi, D. (1990) Effects of an aqueous extract of Ferula ovina on rabbit and guinea pig smooth muscle. *Journal of Ethnopharmacology, 30(1)*, 35–42.

al-Khazraji, S.M., al-Shamaony, L.A., and Twaij, H.A. (1993) Hypoglycaemic effect of Artemisia herba alba. I. Effect of different parts and influence of the solvent on hypoglycaemic activity. *Journal of Ethnopharmacology, 40(3)*, 163–166.

Kim, E.J., Jung, S.N., Son, K.H., Kim, S.R., Ha T.Y., Park, M.G., Jo, I.G., Park, J.G., Choe, W, Kim, S.S., and Ha, J. (2007) Antidiabetes and antiobesity effect of cryptotanshinone via activation of AMP-activated protein kinase. *Molecular Pharmacology, 72(1)*, 62–72.

Kim, W., Khil, L.Y., Clark, R., Bok, S.H., Kim, E.E., Lee, S., Jun, H.S., and Yoon, J.W. (2006) Naphthalenemethyl ester derivative of dihydroxyhydrocinnamic acid, a component of cinnamon, increases glucose disposal by enhancing translocation of glucose transporter 4. *Diabetologia, 49(10)*, 2437–2448.

Kim, G.Y., Lee, M.Y., Lee, H.J., Moon, D.O., Lee, C.M., Jin, C.Y., Choi, Y.H., Jeong, Y.K., Chung, K.T., Lee, J.Y., Choi, I.H., and Park, Y.M. (2005) Effect of water-soluble proteoglycan isolated from Agaricus blazei on the maturation of murine bone marrow-derived dendritic cells. *International Immunopharmacology, 5(10)*, 1523–1532.

Kim, D.W., Son, K.H., Chang, H.W., Bae, K., Kang, S.S., and Kim, H.P. (2004) Anti-inflammatory activity of Sedum kamtschaticum. *Journal of Ethnopharmacology, 90(2–3)*, 409–414.

Kimura, I., Yoshikawa, M., Kobayashi, S., Sugihara, Y., Suzuki, M., Oominami, H., Murakami, T., Matsuda, H., and Doiphode, V.V. (2001) New triterpenes, myrrhanol A and myrrhanone A, from guggul-gum resins, and their potent anti-inflammatory effect on adjuvant-induced air-pouch granuloma of mice. *Bioorganic and Medicinal Chemistry Letters, 11(8)*, 985–989.

Klein-Franke, F. (1984) *Iatromathematics in Islam: A Study on Yūḥannā Ibn aṣ-Ṣalt's Book on Astrological Medicine*. Hildesheim.

Ibid. (1982) *Vorlesungen über die Medizin im Islam*. Wiesbaden.

Klibansky, R., Panofsky, E., and Saxl, F. (1964) *Saturn and Melancholy: Studies in the History of Natural Philosophy, Religion and Art*. London.

König, G.M., Wright, A.D., Keller, W.J., Judd, R.L., Bates, S., and Day, C. (1998) Hypoglycaemic activity of an HMG-containing flavonoid glucoside, chamaemeloside, from Chamaemelum nobile. *Planta Medica, 64(7)*, 612–614.

de Koning, P. (1903) *Trois Traités d'Anatomie Arabe*. Leide.

Kostrikova, E.V. (1989) [Experimental study of wound-healing effect of the preparation "Aekol" (artificial sea buckthorn oil)]. *Ortopediia travmatologiia i protezirovanie, 1*, 32–36.

Kothari, S.K., Bhattacharya, A.K., and Ramesh, S. (2004) Essential oil yield and quality of methyl eugenol rich Ocimum tenuiflorum L.f. (syn. O. sanctum L.) grown in south India as influenced by method of harvest. *Journal of Chromatography, A, 1054(1–2)*, 67–72.

Kottek, Samuel (Professor of History of Medicine, Hebrew University) (2002) Oral communication. 10.6.2002.

Kovacevic, N., Miric, M., and Savin, K. (1991) Fatty oil, vitamin C and sugars in the fruit of buckthorn and alder buckthorn. *Arhiv za Farmaciju, 41(5)*, 181–184.

Kraus, P. (1932) Eine arabische Biographie Avicennas. *Klinische Wochenschrift, 11*, 1880b–1882b.

Kretzschmar, R., Meyer, H.J., Teschendorf, H.J., and Zollner, B. (1969) [Spasmolytic effect of aryl-substituted alpha-pyrones and aqueous extracts of Piper methysticum Forst.] *Archives internationales de pharmacodynamie et de thérapie, 180(2)*, 475–491.

Krogsgaard-Larsen, P., Christensen, S.B., and Kofod, H. (ed.) *Natural Products and Drug Development*. Copenhagen.

von Kruedener, S., Schneider, W., and Elstner, E.F. (1995) A combination of Populus tremula, Solidago virgaurea and Fraxinus excelsior as an anti-inflammatory and antirheumatic drug. A short review. *Arzneimittelforschung, 45(2)*, 169–171.

Kubo, M., Matsuda, H., Tokuoka, K., Ma, S., and Shiomoto, H. (1994) Anti-inflammatory activities of methanolic extract and alkaloidal components from Corydalis tuber. *Biological and Pharmaceutical Bulletin, 17(2)*, 262–265.

Kudlien, F. (1973) The Old Greek Concept of Relative Health. *Journal of the History of Behavioral Sciences, 9*, 52–59.

Kuhne Brabant, R. (2002) Al-Rāzī on When and How to Eat Fruit. In Waines, D. (ed.) *Patterns of Everyday Life* (317–327/164–174). Aldershot.

Kumar, V.P., Chauhan, N.S., Padh, H., and Rajani, M. (2006) Search for antibacterial and antifungal agents from selected Indian medicinal plants. *Journal of Ethnopharmacology, 107(2)*, 182–188.

Kunzemann, J. and Herrmann, K. (1977) [Isolation and identification of flavon(ol)-O-glycosides in caraway (Carum carvi L.), fennel (Foeniculum vulgare Mill.), anise (Pimpinella anisum L.), and coriander (Coriandrum sativum L.), and of flavon-C-glycosides in anise. I. Phenolics of spices (author's transl.)] *Zeitschrift für Lebensmittel-Untersuchung und Forschung, 164(3)*, 194–200.

Lane, E.W. (1886–1893) *An English-Arabic Lexicon*. London.

Langermann, Y.Tz. (2003) Another Andalusian Revolt? Ibn Rushd's Critique of the Pharmacological Computus of al-Kindī. In Sabra, A.I. and Hogendijk, J.P. (eds.) *The Enterprise of Science in Islam* (351–372). Cambridge, Mass.

Ibid. (2005) Ibn Kammūna and the 'New Wisdom' of the Thirteenth Century. *Arabic Sciences and Philosophy, 15(2)*, 277–327.

Lanhers, M.C., Fleurentin, J., Dorfman, P., Mortier, F., and Pelt, J.M. (1991) Analgesic, antipyretic and anti-inflammatory properties of Euphorbia hirta. *Planta Medica, 57(3)*, 225–231.

Lansky, E.P. and Newman, R.A. (2007) Punica granatum (pomegranate) and its potential for prevention and treatment of inflammation and cancer. *Journal of Ethnopharmacology, 109(2)*, 177–206.

Lauer, H.H. (1980–1998) Gentile da Foligno. In Bautier, R.-H. (ed.) *Lexikon des Mittelalters* (Vol. 4, 1247–1248). München.

Lawn, B. (1993) *The Rise and Decline of the Scholastic* Quaestio disputata: *with special emphasis on its use in the teaching of medicine and science*. Leiden.

Ibid. (1963) *The Salernitan Questions; An Introduction to the History of Medieval and Renaissance Problem Literature*. London.

Leclerc, L. (1876) *Histoire de la médicine arabe*. Paris.

Lee, N.K., Choi, S.H., Park, S.H., Park, E.K., and Kim, D.H. (2004) Antiallergic activity of hesperidin is activated by intestinal microflora. *Pharmacology, 71(4)*, 174–180.

Lee, S.J., Yeo, W.H., Yun, B.S., and Yoo, I.D. (1999) Isolation and sequence analysis of new peptaibol, boletusin, from Boletus spp. *Journal of Peptide Science, 5(8)*, 374–378.

Leibowitz, J.O. and Marcus, S. (1974) *Moses Maimonides on the causes of symptoms*. Berkeley.

Ibid. (eds. and trans.) (1984) *Sefer Hanisyonot: The Book of Medical Experiences Attributed to Abraham ibn Ezra; Medical Theory, Rational and Magical Therapy; A Study in Medievalism*. Jerusalem.

Lemhadri, A., Zeggwagh, N.A., Maghrani, M., Jouad, H., and Eddouks, M. (2004) Anti-hyperglycaemic activity of the aqueous extract of Origanum vulgare growing wild in Tafilalet region. *Journal of Ethnopharmacology, 92(2–3)*, 251–256.

Lermioglu, F., Bagci, S., Onderoglu, S., Ortac, R., and Tugrul, L. (1997) Evaluation of the long-term effects of oleum origani on the toxicity induced by administration of streptozotocin in rats. *Journal of Pharmacy and Pharmacology, 49(11)*, 1157–1161.

Leslie, Ch. (1976) *Asian Medical Systems: A Comparative Study*. Berkeley/Los Angeles/London.

Letchamo, W., Ward, W., Heard, B., and Heard, D. (2004) Essential oil of Valeriana officinalis L. cultivars and their antimicrobial activity as influenced by harvesting time under commercial organic cultivation. *Journal of Agricultural and Food Chemistry, 52(12)*, 3915–3919.

Lev, E. (2006) Ethno-diversity within current ethno-pharmacology as part of Israeli traditional medicine—a review. *Journal of Ethnobiology and Ethnomedicine, 2(4)*, 1–12.

Ibid. (2003) *Medicinal Substances in Jerusalem from Early Times to Present Day*. Oxford.

Lev, E. and Amar, Z. (2008) *Practical Materia Medica of the Medieval Eastern Mediterranean According to the Cairo Genizah*. Leiden.

Ibid. (2002) *Semamaney ha-marpe ha-masortiyim be-Eretz Israel*. Jerusalem.

Levey, M. (1973) *Early Arabic Pharmacology*. Leiden.

Ibid. (1966) *The Medical Formulary or the ʿAqrābādhīn of al-Kindī*. Madison.

Ibid. (1962) *Medieval Arabic Bookmaking and Its Relation to Early Chemistry and Pharmacology*. Philadelphia.

Ibid. (1971) *Substitute Drugs in Early Arabic Medicine. With special reference to the texts of Māsargawaih, al-Rāzī and Pythagoras*. Stuttgart.

Levey, M. and al-Khaledy, N. (trans.) (1967). *The Medical Formulary of al-Samarqandī and the Relation of Early Arabic Simples to those found in the Indigenous Medicine of the Near East and India*. Philadelphia.

Lewis, W.H. and Elvin-Lewis, M.P.F. (1977) *Medical Botany: Plants Affecting Man's Health*. New York.

Li, X.Y. (1991) Immunomodulating Chinese herbal medicines. *Memorias do Instituto Oswaldo Cruz, 86(Suppl. 2)*, 159–164.

Li, P.B., Ma, Y., Wang, Y.G., and Su, W.W. (2006) [Experimental studies on antitussive, expectorant and antiasthmatic effects of extract from Citrus grandis var. tomentosa.] *Zhongguo Zhong Yao Za Zhi, 31(16)*, 1350–1352.

Li, Y., Xu, C., Zhang, Q., Liu, J.Y., and Tan R.X. (2005) In vitro anti-Helicobacter pylori action of 30 Chinese herbal medicines used to treat ulcer diseases. *Journal of Ethnopharmacology, 98(3)*, 329–333.

Lichtenthaler, H.K., and Kleudgen, H.K. (1975) [Phytochrome system and synthesis of lipoquinones in the plastids of etiolated hordeum seedlings]. *Zeitschrift für Naturforschung. Section C. Biosciences, 30(1)*, 64–66.

Liddell, H.G. and Scott, R. (1977) *A Greek-English Lexicon*. Oxford.

Lieber, E. (1981) Galen in Hebrew: the transmission of Galen's works in the mediaeval Islamic world. In Nutton, V. (ed.) *Galen: Problems and Prospects*. London.

Lima, E.O., Gompertz, O.F., Giesbrecht, A.M., and Paulo, M.Q. (1993) In vitro antifungal activity of essential oils obtained from officinal plants against dermatophytes. *Mycoses, 36(9–10)*, 333–336.

Lin, Y.S., Chiang, H.C., Kan, W.S., Hone, E., Shih, S.J., and Won, M.H. (1992) Immunomodulatory activity of various fractions derived from Physalis angulata L extract. *The American Journal of Chinese Medicine, 20(3–4)*, 233–243.

Lin, N., Sato, T., Takayama, Y., Mimaki, Y., Sashida, Y., Yano, M., and Ito, A. (2003) Novel anti-inflammatory actions of nobiletin, a Citrus polymethoxy flavonoid, on human synovial fibroblasts and mouse macrophages. *Biochemical Pharmacology, 65(12)*, 2065–2071.

Lindberg, D.C. (ed.) (1978) *Science in the Middle Ages*. Chicago.

Lisa, M., Leifertova, I., Haladova, M., Buckova, A., and Eisenreichova, E. (1990) Antifungal effect of Lilium candidum L. *Farmaceuticky obzor, 59*, 49–56.

List, P.H. and Horhammer, L. (1969–1979) *Hagers Handbuch der Pharmazeutischen Praxis*. 4. Neuausgabe. Berlin.

Löw, I. (1924–1934) *Die Flora der Juden*. Wien.

Luo, H., Lin, S., Ren, F., Wu, L., Chen, L., and Sun, Y. (2007) Antioxidant and antimicrobial capacity of Chinese medicinal herb extracts in raw sheep meat. *Journal of Food Protection, 70(6)*, 1440–1445.

Ma, T.S. and Roper, R. (1968) Microchemical investigation of medicinal plants. I. The antitubercular principle in Prunus mume and Schizandra chinensis. *Mikrochimica Acta, 1*, 167–181.

McCue, P., Vattem, D., and Shetty, K. (2004) Inhibitory effect of clonal oregano extracts against porcine pancreatic amylase in vitro. *Asia Pacific Journal of Clinical Nutrition, 13(4)*, 401–408.

McCutcheon, A.R., Roberts, T.E., Gibbons, E., Ellis, S.M., Babiuk, L.A.; Hancock, R.E., and Towers, G.H. (1995) Antiviral screening of British Columbian medicinal plants. *Journal of Ethnopharmacology, 49(2)*, 101–110.

McDaniel, W.B. (1948) The medical and magical significance in ancient medicine of things connected with reproduction and its organs. *Journal of History of Medicine and Allied Sciences, 3*, 525–546.

McKenna, D.J., Hughes, K., and Jones, K. (2000) Green Tea Monograph. *Alternative Therapies, 6(3)*, 61–82.

Mackenzie, D.N. (1971) *A Concise Pahlavi Dictionary*. London.

McVaugh, M.R. (1975) *Aphorismi de gradibus*. In Garcia-Ballester, L., Paniagua, J.A. and McVaugh, M.R. (ed.) *Arnaldi de Villanova Opera medica omnia*, Vol. II.

Ibid. (1993) *Medicine before the Plague: Practitioners and their Patients in the Crown of Aragon, 1285–1345*. Cambridge.

Ibid. (1982–1989) Medicine, History of. In Strayer, J.R. (ed.) *Dictionary of the Middle Ages* (Vol. 8, 247–254). New York.

Madar, Z. and Stark, A.H. (2002) New legume sources as therapeutic agents. *The British Journal of Nutrition, 88(Suppl 3)*, S287–292.

Mahdavi, Y. (1954) *Bibliographie d'Ibn Sina*. Teheran.

Mahmoud, M.J., Jawad, A.L., Hussain, A.M., Al-Omari, M., and Al-Naib, A. (1989) In vitro antimicrobial activity of Salsola rosmarinus and Adiantum capillus-veneris. *International Journal of Crude Drug Research, 27*, 14–16.

Mahran, G.H., Abel-Wahab, S.M., and Attia, A.M. (1976) Phytochemical study of date palm pollen. *Planta Medica, 29*, 171–175.

Maimonides. See Bar-Sela, Hoff, and Faris (1964).

Maimonides. See Leibowitz and Marcus (1974).
Maimonides. See Meyerhof, 1940.
Maimonides. See Meyerhof, 1979.
Major, R.H. (1959) *Classical Descriptions of Disease*. 3rd ed., 5th printing. 1st ed. 1932. Springfield, Ill.
Malcolm, S.A. and Sofowora, E.A. (1969) Antimicrobial Activity of selected Nigerian Folk Remedies and Their Constituent Plants. *Lloydia, 32*, 512–517.
Malek, F., Boskabady, M.H., Borushaki, M.T., and Tohidi, M. (2004) Bronchodilatory effect of Portulaca oleracea in airways of asthmatic patients. *Journal of Ethnopharmacology, 93(1)*, 57–62.
Marín, M. (2002) Pots and Fire: The Cooking Processes in the Cookbooks of al-Andalus and the Maghreb. In Waines, D. (ed.) *Patterns of Everyday Life* (289–302/1–14). Aldershot.
Marmura, M.E. (1982–2008) Avicenna: Metaphysics. In Yarshater, E. (ed.) *Encyclopaedia Iranica* (Vol. III, 73–79). London/Costa Mesa.
Marrif, H.I., Ali, B.H., and Hassan, K.M. (1995) Some pharmacological studies on Artemisia herba-alba (Asso.) in rabbits and mice. *Journal of Ethnopharmacology, 49(1)*, 51–55.
Martindale, W. and Reynolds, J.E.F. *et al.* (ed.) (1989) *The Extra Pharmacopoeia*. 29th ed. London.
Martindale, W., Wade, A. and Reynolds, J.E.F. (1982) *The Extra Pharmacopoeia: incorporating Squire's "Companion"*. 28th ed. London.
Martínez-Vázquez, M., Ramírez Apan, T.O., Lastra, A.L., and Bye, R. (1998) A comparative study of the analgesic and anti-inflammatory activities of pectolinarin isolated from Cirsium subcoriaceum and linarin isolated from Buddleia cordata. *Planta Medica, 64(2)*, 134–137.
Maruyama, K., Goto, C., Numata, M., Suzuki, T., Nakagawa, Y., Hoshino, T., and Uchiyama, T. (1996) O-acetylated xyloglucan in extracellular polysaccharides from cell-suspension cultures of Mentha. *Phytochemistry, 41(5)*, 1309–1314.
Matsuda, H., Murakami, T., Ikebata, A., Yamahara, J., and Yoshikawa, M. (1999) Bioactive saponins and glycosides. XIV. Structure elucidation and immunological adjuvant activity of novel protojujubogenin type triterpene bisdesmosides, protojujubosides A, B, and B1, from the seeds of Zizyphus jujuba var. spinosa (Zizyphi Spinosi Semen). *Chemical and Pharmaceutical Bulletin, 47(12)*, 1744–1748.
Matsuda, H., Tokuoka, K., Wu, J., Tanaka, T., and Kubo, M. (1995) Inhibitory effects of methanolic extract from corydalis tuber against types I–IV allergic models. *Biological and Pharmaceutical Bulletin, 18(7)*, 963–967.
Mediratta, P.K., Sharma, K.K., and Singh, S. (2002) Evaluation of immunomodulatory potential of Ocimum sanctum seed oil and its possible mechanism of action. *Journal of Ethnopharmacology, 80(1)*, 15–20.
MEDLINE, U.S. National Library of Medicine, *http://www.nlm.nih.gov/databases/databases_medline.html*
Melo, J.S. and D'Souza, S.F. (2004) Removal of chromium by mucilaginous seeds of Ocimum basilicum. *Bioresource Technology, 92(2)*, 151–155.

Menon, M.K. and Kar, A. (1971) Analgesic and psychopharmacological effects of the gum resin of Boswellia serrata. *Planta Medica, 19*, 333–341.

Mertz, W., Roginski, E.E., Gordon, W.A., Harrison, W.W., Shani, J., and Sulman, F.G. (1973) In vitro potentiation of insulin by ash from saltbush (Atriplex halimus). *Archives internationales de pharmacodynamie et de thérapie, 206(1)*, 121–128.

Meyerhof, M. (ed. and trans.) (1928) *The Book of the Ten Treatises on the Eye Ascribed to Hunain ibn Is-hâq. the earliest existing systematic textbook of Ophthalmology*. Cairo.

Ibid. (1934) La decouverte de la circulation pulmonaire par Ibn-an-Nafīs. *Bulletin de l'Institut d'Egypte, 16*, 33–46.

Ibid. (1935a) Ibn an-Nafīs (XIIIth cent.) and his theory of the lesser circulation. *Isis*, 23, 100–120.

Ibid. (1933a) Die Materia medica des Dioscorides bei den Arabern. *Quellen und Studien zur Geschichte der Naturwissenschaften und Medicine, 3*, 280–292.

Ibid. (1938) Mediaeval Jewish Physicians in the Near East, from Arabic Sources. *Isis, 28*, 432–460.

Ibid. (1933b) *L'ophtalmologie de Moḥammad al-Ghâfiqî*. Barcelone.

Ibid. (ed.) (1940) *Sharḥ asmāʾ al-ʿuqqār* (L'Explication des noms de drogues; un glossaire de matière médical composé par Maïmonide). Cairo.

Ibid. (1935b) Thirty-three clinical observations by Rhazes (circa 900 AD). *Isis, 23*, 321–372.

Meyerhof, M. (trans.) and Rosner, F. (ed.) (1979) *Maimonides, Moses: Glossary of Drug Names*. Philadelphia.

Meyerhof, M. [and Schacht, J.] (1960–2002) Ibn al-Nafīs. In Bearman, P.J., Bianquis, Th., Bosworth, C.E., van Donzel, E., and Heinrichs, W.P. (eds.) *The Encyclopaedia of Islam*. 2nd Edition (Vol. III, 897–898). Leiden/London.

Meyerhof, M., and Schacht, J. (eds. and trans.) (1968) *The Theologus Autodidactus of ibn al-Nafīs*. Oxford.

Meyerhof, M. and Sobhy, G.P. (1932) *The Abridged Version of "The Book of Simple Drugs" of Aḥmad ibn Muḥammad al-Gâfiqî, by Gregorius Abu'l-Farag (Barhebraeus)*. Cairo.

Miceli, N., Taviano, M.F., Giuffrida, D., Trovato, A., Tzakou, O., and Galati, E.M. (2005) Anti-inflammatory activity of extract and fractions from Nepeta sibthorpii Bentham. *Journal of Ethnopharmacology, 97(2)*, 261–266.

Miller, J.I. (1969) *The spice trade of the Roman Empire, 29 BC to AD 641*. Oxford.

Mimica-Dukic, N., Bozin, B., Sokovic, M., and Simin, N. (2004) Antimicrobial and antioxidant activities of Melissa officinalis L. (Lamiaceae) essential oil. *Journal of Agricultural and Food Chemistry, 52(9)*, 2485–2489.

Mishra, A.K. and Dubey, N.K. (1990) Fungitoxic properties of Prunus persica oil. *Hindustan Antibiotics Bulletin, 32(3–4)*, 91–93.

Moharram, F.A. and El-Shenawy, S.M. (2007) Antinociceptive and anti-inflammatory steroidal saponins from Dracaena ombet. *Planta Medica, 73(10)*, 1101–1106.

Mondal, S.K., Ray, B., Thakur, S., and Ghosal, P.K. (2001) Isolation, purification and some structural features of the mucilaginous exudate from Musa paradisiaca. *Fitoterapia, 72(3)*, 263–271.

Mongelli, E., Desmarchelier, C., Coussio, J., and Ciccia, G. (1995) [Antimicrobial activity and interaction with DNA of medicinal plants from the Peruvian Amazon region] *Revista Argentina de Microbiologia, 27(4)*, 199–203.

Morsi, N.M. (2000) Antimicrobial effect of crude extracts of Nigella sativa on multiple antibiotics-resistant bacteria. *Acta Microbiologica Polonica, 49(1)*, 63–74.

Mossa, J.S. (1985) Study on the crude antidiabetic drugs used in Arabian folk medicine. *International Journal of Crude Drug Research, 23*, 137–145

Moulin-Traffort, J., Giordani, R., and Regli, P. (1990) Antifungal action of latex saps from Lactuca sativa L. and Asclepias curassavica L. *Mycoses, 33(7–8)*, 383–392.

Mousa, O., Vuorela, P., Kiviranta, J., Wahab, S.A., Hiltunen, R., and Vuorela, H. (1994) Bioactivity of certain Egyptian Ficus species. *Journal of Ethnopharmacology, 41(1–2)*, 71–76.

Moussaieff, A., Fride, E., Amar, Z., Lev, E., Steinberg, D., Gallily, R., and Mechoulam, R. (2005) The Jerusalem Balsam: From the Franciscan Monastery in the Old City of Jerusalem to Martindale 33. *Journal of Ethnopharmacology, 101(1–3)*, 16–26.

Mulkens, A. and Kapetanidis, I. (1988) Eugenylglucoside, a new natural phenylpropanoid heteroside from Melissa officinalis. *Journal of Natural Products, 51*, 496–498.

Muller-Limmroth, W. and Frohlich, H.H. (1980) [Effect of various phytotherapeutic expectorants on mucociliary transport.] *Fortschritte derMedizin, 98(3)*, 95–101.

Muniappan, M. and Sundararaj, T. (2003) Antiinflammatory and antiulcer activities of Bambusa arundinacea. *Journal of Ethnopharmacology, 88(2–3)*, 161–167.

Muntner, S. (ed.) (1957) *Regimen sanitatis*. [Hanhagat habberiʾut; Kitāb tadbīr al-ṣiḥḥa]. Jerusalem.

Musallam, B. (1982–2008) Avicenna: Biology and Medicine. In Yarshater, E. (ed.) *Encyclopaedia Iranica* (Vol. III, 94–99). London/Costa Mesa.

Naik, V.R., Agshikar, N.V., and Abraham, G.J. (1980) Analgesic and anti-inflammatory activity in alcoholic extracts of Cucumis trigonus Roxburghii. A preliminary communication. *Pharmacology, 20(1)*, 52–56.

Naismith, D.J., Mahdi, G.S., and Shakir, N.N. (1991) Therapeutic value of barley in the management of diabetes. *Annals of Nutrition and Metabolism, 35(2)*, 61–64.

Nasr, H.S (1982–1989) Ibn Sīnā. In Strayer, J.R. (ed.) *Dictionary of the Middle Ages* (Vol. 11, 302–307). New York.

Navarro, V., Villarreal, M.L., Rojas, G., and Lozoya, X. (1996) Antimicrobial evaluation of some plants used in Mexican traditional medicine for the treatment of infectious diseases. *Journal of Ethnopharmacology, 53(3)*, 143–147.

Nichter, M. (ed.) (1992a) *Anthropological Approaches to the Study of Ethnomedicine*. Yverdon.

Ibid. (1992b) Ethnomedicine: Diverse Trends, Common Linkages. In Nichter, M. (ed.) *Anthropological Approaches to the Study of Ethnomedicine* (223–259). Yverdon.

Niebyl, P.H. (1971) The Non-Naturals. *Bulletin of the History of Medicine*, *XLV*, 486–492.

Niermeyer, J.F. (1954–1976) *Mediae Latinitatis lexicon minus: lexique latin medieval-francais/anglais*. Leiden.

Nogueira, D.G. and Pereira, N.A. (1986) Effect of an alcoholic extract from the epicarp of roma (Punica granatum L.) on insulin hypoglycemia. *Revista Brasileria de Farmacia, 67*, 59–61.

Nojima, H., Kimura, I., Chen, F.J., Sugihara, Y., Haruno, M., Kato, A., and Asano, N. (1998) Antihyperglycemic effects of N-containing sugars from Xanthocercis zambesiaca, Morus bombycis, Aglaonema treubii, and Castanospermum australe in streptozotocin-diabetic mice. *Journal of Natural Products, 61(3)*, 397–400.

Noonan, J.T. (1966) *Contraception: A History of Its Treatment by the Catholic Theologians and Canonists*. Cambridge, Mass.

Nordeide, M.B., Hatloy, A., Folling, M., Lied, E., and Oshaug, A. (1996) Nutrient composition and nutritional importance of green leaves and wild food resources in an agricultural district, Koutiala, in southern Mali. *International Journal of Food Sciences and Nutrition, 47(6)*, 455–468.

Nosálova, G., Strapkiá, A., Kardosová, A., Capek, P., Zathurecký, L., and Bukovská, E. (1992) Antitussive action of extracts and polysaccharides of marsh mallow (*Althaea officinalis* L. var. *robusta*). *Pharmazie, 47(3)*, 224–226.

Nostro, A., Cannatelli, M.A., Crisafi, G., and Alonzo, V. (2001) The effect of Nepeta cataria extract on adherence and enzyme production of Staphylococcus aureus. *International Journal of Antimicrobial Agents, 18(6)*, 583–585.

Nostro, A., Cannatelli, M.A., Morelli, I., Cioni, P.L., Bader, A., Marino, A., and Alonzo, V. (2002) Preservative properties of Calamintha officinalis essential oil with and without EDTA. *Letters in Applied Microbiology, 35(5)*, 385–389.

Novaes, A.P., Rossi, C., Poffo, C., Pretti Júnior, E., Oliveira, A.E., Schlemper, V., Niero, R., Cechinel-Filho, V., and Bürger, C. (2001) Preliminary evaluation of the hypoglycemic effect of some Brazilian medicinal plants. *Therapie, 56(4)*, 427–430.

Nutton, V. (ed.) (1981) *Galen: Problems and Prospects*. London.

Ibid. (1995). Medicine in the Greek world, 800–50 BC. In Conrad, L.I., *The Western Medical Tradition, 800 BC to AD 1800* (11–38). Cambridge.

Obertreis, B., Giller, K., Teucher, T., Behnke, B., Schmitz, H. (1996a) [Anti-inflammatory effect of Urtica dioica folia extract in comparison to caffeic malic acid.] *Arzneimittelforschung, 46(1)*, 52–56.

Obertreis, B., Ruttkowski, T., Teucher, T., Behnke, B., and Schmitz, H. (1996b) Ex-vivo in-vitro inhibition of lipopolysaccharide stimulated tumor necrosis factor-alpha and interleukin-1 beta secretion in human whole blood by extractum urticae dioicae foliorum [published erratum appears in *Arzneimittelforschung* (1996b), *46(9)*, 936] *Arzneimittelforschung, 46(4)*, 389–394.

Occhiuto, F., Circosta, C., and Costa De Pasquale, R. (1989) Studies on some medicinal plants of Senegal: effects of isolated guinea pig ileum. *Journal of Ethnopharmacology, 26*, 205–210.

Ohtani, K., Okai, K., Yamashita, U., Yuasa, I., and Misaki, A. (1995) Characterization of an acidic polysaccharide isolated from the leaves of Corchorus olitorius (Moroheiya). *Bioscience, Biotechnology, and Biochemistry, 59(3)*, 378–381.

Okwuasaba, F., Ejike, C., and Parry, O. (1987) Effects of extracts of Portulaca oleracea on skeletal muscle in vitro. *Journal of Ethnopharmacology, 21(1)*, 55–63.

Orav, A., Stulova, I., Kailas, T., and Muurisepp, M. (2004) Effect of storage on the essential oil composition of Piper nigrum L. fruits of different ripening states. *Journal of Agricultural and Food Chemistry, 52 (9)*, 2582–2586.

Orhan, I., Küpeli, E., Aslan, M., Kartal, M., and Yesilada, E. (2006a) Bioassay-guided evaluation of anti-inflammatory and antinociceptive activities of Pistachio, Pistacia vera L. *Journal of Ethnopharmacology, 105(1–2)*, 235–240.

Orhan, N., Aslan, M., Orhan, D.D., Ergun, F., and Yeşilada, E. (2006b) In-vivo assessment of antidiabetic and antioxidant activities of grapevine leaves (Vitis vinifera) in diabetic rats. *Journal of Ethnopharmacology, 108(2)*, 280–286.

Ortiz de Montellano, B. (1990) *Aztec Medicine, Health, and Nutrition*. New Brunswick.

Ibid. (1975) Empirical Aztec Medicine. *Science, 188 (4185)*, 215–220.

Ortiz de Montellano, B.R. and Browner, C.H. (1985) Chemical bases for medicinal plant use in Oaxaca, Mexico. *Journal of Ethnopharmacology, 13*, 57–88.

Otsuka, H., Fujioka, S., Komiya, T., Mizuta, E., and Takamoto, M. (1982) [Studies on anti-inflammatory agents. VI. Anti-inflammatory constituents of Cinnamomum sieboldii Meissn (author's transl).] *Yakugaku Zasshi. Journal of the Pharmaceutical Society of Japan, 102(2)*, 162–172.

Ottosson, P. (1984) *Scholastic Medicine and Philosophy: a Study of Commentaries on Galen's Tegni (ca. 1300–1450)*. Neapel.

Paavilainen, H.M. (2006) Psychoactive Drugs in Maimonides' *Regimen Sanitatis* and *De Causis Accidentium*. *Korot, 18*, 25–54.

Pal, D.K., Mandal, M., Senthilkumar, G.P., and Padhiari, A. (2006) Antibacterial activity of Cuscuta reflexa stem and Corchorus olitorius seed. *Fitoterapia, 77(7–8)*, 589–591.

Palanichamy, S. and Nagarajan, S. (1990) Analgesic activity of Cassia alata leaf extract and kaempferol 3-O-sophoroside. *Journal of Ethnopharmacology, 29(1)*, 73–78.

Palanichamy, S., Nagarajan, S., and Devasagayam, M. (1988) Effect of Cassia alata leaf extract on hyperglycemic rats. *Journal of Ethnopharmacology, 27*, 81–90.

Panizzi, L., Flamini, G., Cioni, P.L., and Morelli, I. (1993) Composition and antimicrobial properties of essential oils of four Mediterranean Lamiaceae. *Journal of Ethnopharmacology, 39(3)*, 167–170.

Park, S.H., Park, E.K., and Kim, D.H. (2005) Passive cutaneous anaphylaxis-inhibitory activity of flavanones from Citrus unshiu and Poncirus trifoliata. *Planta Medica, 71(1)*, 24–27.

Patel, M.M., Chauhan, G.M., and Patel, L.D. (1987) Mucilages of Lepidium sativum, Linn (Asario) and Ocimum canum sims (Bavchi) as emulgents. *Indian Journal of Hospital Pharmacy, 24*, 200–202.

Peake, P.W., Pussell, B.A., Martyn, P., Timmermans, V., and Charlesworth, J.A. (1991) The inhibitory effect of rosmarinic acid on complement involves the C5 convertase. *International Journal of Immunopharmacology, 13(7)*, 853–857.

Pennella, R.J. and Hall, T.S. (1973) Galen's *'On the Best Constitution of our Body.' Bulletin of the History of Medicine, 47*, 282–296.

Perez, C. and Anesini, C. (1994) Antibacterial activity of alimentary plants against Staphylococcus aureus growth. *The American Journal of Chinese Medicine, 22(2)*, 169–174.

Perho, I. (1995) *The Prophet's Medicine*. Helsinki.

Petit, P., Sauvaire, Y., Ponsin, G., Manteghetti, M., Fave, A., and Ribes, G. (1993) Effects of a fenugreek seed extract on feeding behaviour in the rat: metabolic-endocrine correlates. *Pharmacology, Biochemistry, and Behavior, 45(2)*, 369–374.

Peungvicha, P., Thirawarapan, S.S., Temsiririrkkul, R., Watanabe, H., Kumar-Prasain, J., Kadota, S. (1998) Hypoglycemic effect of the water extract of Piper sarmentosum in rats. *Journal of Ethnopharmacology, 60(1)*, 27–32.

Pietro, R.C., Kashima, S., Sato, D.N., Januário, A.H., and França, S.C. (2000) In vitro antimycobacterial activities of Physalis angulata L. *Phytomedicine, 7(4)*, 335–338.

Pike, K.L. (1967) *Language in Relation to a Unified Theory of the Structure of Human Behavior*. 2nd rev. ed. The Hague.

Pinent, M., Blay, M., Bladé, M.C., Salvadó, M.J., Arola, L., and Ardévol, A. (2004) Grape seed-derived procyanidins have an antihyperglycemic effect in streptozotocin-induced diabetic rats and insulinomimetic activity in insulin-sensitive cell lines. *Endocrinology, 145(11)*, 4985–4990.

Pines, Sh. (1986) *Studies in Arabic Versions of Greek Texts and in Medieval Science*. Jerusalem.

Pitkänen, A., Hietala, H., Elo, U, Simonen, O., *et al.* (1996) *Terveyttä luonnosta. Parantavat lääkekasvit ja täydentävät hoidot*. Helsinki.

Popp, F.D., Wefer, J.M., Chakaroborty, D.P., Rosen, G. and Casey, A.C. (1968) Investigations of African Plants for Alkaloids, Antimalarial Agents, and Antineoplastic Agents. *Planta Medica, 16*, 343–347.

Pormann, P.E. (2004) *The Oriental Tradition of Paul of Aegina's* Pragmateia. Leiden.

Pormann, P.E. and Savage-Smith, E. (2007) *Medieval Islamic Medicine*. Edinburgh.

Prakash, D., Joshi, B.D., and Pal, M. (1995) Vitamin C in leaves and seed oil composition of the Amaranthus species. *International Journal of Food Sciences and Nutrition, 46(1)*, 47–51.

Puschmann, Th. (ed. and trans.) (1878–1879) *Alexander von Tralles: Original-Text und Übersetzung nebst einer einleitenden Abhundlung: ein Beitrag zur Geschichte der Medicin*. Wien.

Rajagopas, K. and Sasikala, K. (2008) Antihyperglycaemic and antihyperlipidaemic effects of Nymphaea stellata in alloxan-induced diabetic rats. *Singapore Medical Journal, 49(2)*, 137–141.

Rao, R.V.K., Rao, J.V.L.N.S., and Vimaladevi, M. (1979) Phytochemical investi-

gation of Cassia absus (roots and leaves). *Lloydia, 42*, 299–300.
Rather, L.J. (1968) The "Six Things Non-Natural"; A Note on the Origins and Fate of a Doctrine and a Phrase. *Clio Medica, 3*, 337–347.
Raut, N.A. and Gaikwad, N.J. (2006) Antidiabetic activity of hydro-ethanolic extract of Cyperus rotundus in alloxan induced diabetes in rats. *Fitoterapia, 77(7–8)*, 585–588.
al-Rāzī, Abū Bakr Muḥammad ibn Zakariyyāʾ, *Kītāb al-Ḥāwī fī al-ṭibb*. Beirut.
Ibid. (1888) *Kitāb Manāfiʿ al-aghdhiya wa-ḍafʿ maḍārri-ha*. Cairo.
Renaud, H.P.J. and Colin, G.S. (1934) *Tuḥfat al-aḥbāb: glossaire de la matiere medicale marocaine*. Paris.
Ribes, G., Sauvaire, Y., Da Costa, C., Baccou, J.C., and Loubatieres-Mariani, M.M. (1986) Antidiabetic effects of subfractions from fenugreek seeds in diabetic dogs. *Proceedings of the Society for Experimental Biology and Medicine, 182(2)*, 159–166.
Richler, B.Z. (1982–1989) Translation and Translators, Jewish. In Strayer, J.R. (ed.) *Dictionary of the Middle Ages* (Vol. 12, 133–136). New York.
Riddle, J.M. (1985a) Ancient and Medieval Chemotherapy for Cancer. *Isis*, *76*, 319–330.
Ibid. (1992) *Contraception and Abortion from the Ancient World to the Renaissance*. Cambridge, Mass.
Ibid. (1985b). *Dioscorides on Pharmacy and Medicine*. Austin.
Ibid. (1997) *Eve's Herbs: a History of Contraception and Abortion in the West*. Cambridge, Mass.
Ibid. (1987). Folk Tradition and Folk Medicine: Recognition of Drugs in Classical Antiquity. In Scarborough, J. (ed.) *Folklore and Folk Medicines* (33–61). Madison.
Ibid. (1996) The Medicines of Greco-Roman Antiquity as a Source of Medicines for Today. In Holland, B. (ed.) *Prospecting for Drugs in Ancient and Medieval European Texts: a Scientific Approach* (7–15). Amsterdam.
Ibid. (2007) Research Procedures in Evaluating Medieval Medicine. In Bowers, B.S. (ed.) *The Medieval Hospital and Medical Practice* (3–17). Aldershot.
Ibid. (1974) Theory and Practice in Medieval Medicine. *Viator, 5*, 157–184.
Robin, A. (1913) Rapport sur un travail de M. le Dr Dinguizli (de Tunis), intitule Diabete sucre et son traitement sans regime, d'apres les auteurs arabes anciens. *Bulletin de l'Académie de Médecine (Paris), 3. ser., 70*, 629–635.
Román Ramos, R., Alarcón-Aguilar, F., Lara-Lemus, A., and Flores-Saenz, J.L. (1992) Hypoglycemic effect of plants used in Mexico as antidiabetics. *Archives of Medical Research, 23(1)*, 59–64.
Roman-Ramos, R., Flores-Saenz, J.L., and Alarcon-Aguilar, F.J. (1995) Antihyperglycemic effect of some edible plants. *Journal of Ethnopharmacology, 48(1)*, 25–32.
Rosenberg, C.E. (1977) The Therapeutic evolution: Medicine, Meaning, and Social Change in Nineteenth-Century America. *Perspectives in Biology and Medicine, 20*, 485–506.
Rosenthal, F. (1975) *The Classical Heritage in Islam*. London.
Rosser, R., Holbert, R., Lewis, G., Achenbach, K., and Demesa, J. (1989) 2-Camphanone in the treatment of hemorrhoids: double blind, placebo con-

trolled study. *Current Therapeutic Research, 46*, 660–666.
Rudloff, G. and Hochheim (1893) Die Astronomie des … Gaġmīnī. *Zeitschrift der Deutschen Morgenlaendischen Gesellschaft, xlvii*, 213–275.
Rufinus. See Thorndike and Benjamin.
Russo, E.B. (1992) Headache Treatments by Native Peoples of Ecuadorian Amazon: A Preliminary Cross-Disciplinary Assessment. *Journal of Ethnopharmacology, 36*, 192–206.
Sabra, A.I. and Hogendijk, J.P. (eds.) (2003) *The Enterprise of Science in Islam* (351–372). Cambridge, Mass.
Sadek, M.M. (ed. and trans.) (1983) *The Arabic Materia medica of Dioscorides*. Quebec.
Saeed, A. and Hamdy, A.A. (1996) Phenolic acids from Nymphaea hybrida Tach. V. and antimicrobial activity. *Egyptian Journal of Pharmaceutical Sciences, 37(1–6)*, 629–633.
Saʿīd, H.M. (ed. and trans.) (1973) *Al-Bīrūnī's Book on Pharmacy and Materia Medica*. Karachi.
Saito, S.Y., Tanaka, M., Matsunaga, K., Li, Y., and Ohizumi, Y. (2004) The combination of rat mast cell and rabbit aortic smooth muscle is the simple bioassay for the screening of anti-allergic ingredient from methanolic extract of Corydalis tuber. *Biological and Pharmaceutical Bulletin, 27(8)*, 1270–1274.
Saliba, G. (1982–2008) Avicenna: Mathematics and Physical Sciences. In Yarshater, E. (ed.) *Encyclopaedia Iranica* (Vol. III, 88–92). London/Costa Mesa.
Sanchez De Medina, F., Gamez, M.J., Jimenez, I., Jimenez, J., Zarzuelo, A., *et al.* (1994) Hypoglycemic activity of juniper berries. *Planta Medica, 60(3)*, 197–200.
Sangameswaran, B. and Jayakar, B. (2008) Anti-diabetic, anti-hyperlipidemic and spermatogenic effects of Amaranthus spinosus Linn. on streptozotocin-induced diabetic rats. *Natural Medicines. Shōyakugaku zasshi, 62(1)*, 79–82.
Sarbhoy, A.K., Varshney, J.L., Maheshwari, M.L., and Saxena, D.B. (1978) Efficacy of some essential oils and their constituents on few ubiquitous molds. *Zentralblatt für Bakteriologie, Parasitenkunde, Infektionskrankheiten und Hygiene. Zweite naturwissenschaftliche Abteilung: Mikrobiologie der Landwirtschaft der Technologie und des Umweltschutzes, 133(7–8)*, 723–725.
Sarton, G. (1927–1947) *Introduction to the History of Science*. Baltimore.
Saunders, J.B. (1963). *The Transition from Ancient Egyptian to Greek Medicine*. Lawrence, Kansas.
Savage-Smith, E. (1988) Gleanings from an Arabist's Workshop: Current Trends in the Study of Medieval Islamic Science and Medicine. *Isis, 79(2)*, 246–266.
Ibid. (1980) Ibn al-Nafīs's Perfected Book on Ophthalmology and His Treatment of Trachoma and Its Sequelae. *Journal for the History of Arabic Science, 4*, 147–204.
Ibid. (2000) The Practice of Surgery in Islamic Lands: Myth and Reality. *Social History of Medicine, 13(2)*, 307–321.
El-Sayed, A.M., Al-Yahya, M.A., and Hassan, M.M. (1989) Chemical composition and antimicrobial activity of the essential oil of Chenopodium botrys growing in Saudi Arabia. *International Journal of Crude Drug Research, 27*, 185–188.

Sayyah, M., Hadidi, N., and Kamalinejad, M. (2004) Analgesic and anti-inflammatory activity of Lactuca sativa seed extract in rats. *Journal of Ethnopharmacology, 92(2–3)*, 325–329.

Scarborough, J. (ed.) (1987a) *Folklore and Folk Medicines*. Madison.

Ibid. (2005a) Introduction. In Beck, L.Y. (trans.) De materia medica *by Pedanius Dioscorides* (xiii–xxi). Hildesheim.

Ibid. (1987b) Introduction. In Scarborough, J. (ed.) *Folklore and Folk Medicines* (1–9). Madison.

Ibid. (1997) The Life and Times of Alexander of Tralles. *Expedition, 39(2)*, 51–60.

Ibid. (2005b) Teaching Surgery in Late Byzantine Alexandria. *XIIth Colloquium Hippocraticum*. Universiteit Leiden, 24–26 August 2005.

Scarborough, J. and Nutton, V. (1982) The Preface of Dioscorides' *De materia medica*: Introduction, Translation, Commentary. *Transactions and Studies of the College of Physicians in Philadelphia, 4(3)*, 187–227.

Scarpa, A. (1981) Pre-Scientific Medicines: Their Extent and Value. *Social Science and Medicine, 15A*, 317–326.

Schalick, W.O. (2005) Despars, Jacques. In Glick, T.F., Livesey, S.J., and Wallis, F. (eds.) *Medieval Science, Technology, and Medicine: an Encyclopedia* (151–152). New York.

Schelenz, H. (1965) *Geschichte der Pharmazie*. Hildesheim.

Schipperges, H. (1959). Die arabische Medizin als Praxis und als Theorie. *Sudhoffs Archiv für Geschichte der Medizin und der Naturwissenschaften, 43*, 317–328.

Ibid. (1964) *Die Assimilation der arabischen Medizin durch das lateinische Mittelalter*. Wiesbaden.

Schmucker, W. (1969). *Die pflanzliche und mineralische Materia medica im Firdaus al Ḥikma des Ṭabarī*. Bonn.

Segura, A., Moreno, M., Molina, A., and García-Olmedo, F. (1998) Novel defensin subfamily from Spinach (Spinacia oleracea). *FEBS Letters, 435(2–3)*, 159–162.

Sehgal, R., Ackers, J.P., and Warhurst, D.C. (1994) Looking for Drugs in Ancient Texts. *Nature, 372*, 124.

Sendl, A., Mulinacci, N., Vincieri, F.F., and Wagner, H. (1993) Anti-inflammatory and immunologically active polysaccharides of Sedum telephium. *Phytochemistry, 34(5)*, 1357–1362.

Seo, W.G., Pae, H.O., Oh, G.S., Chai, K.Y., Kwon, T.O., Yun, Y.G., Kim, N.Y., and Chung, H.T. (2001) Inhibitory effects of methanol extract of Cyperus rotundus rhizomes on nitric oxide and superoxide productions by murine macrophage cell line, RAW 264.7 cells. *Journal of Ethnopharmacology, 76(1)*, 59–64.

Sepehri, H., Roghani, M., and Houdebine, M.L. (1998) Oral administration of pectin-rich plant extract enhances C3 and C4 complement concentration in woman colostrum. *Reproduction, Nutrition, Development, 38(3)*, 255–260.

Sertie, J.A., Basile, A.C., Panizza, S., Matida, A.K., and Zelnik, R. (1990) Anti-inflammatory activity and sub-acute toxicity of artemetin. *Planta Medica, 56(1)*, 36–40.

Sezgin, F. (1970) *Geschichte des arabischen Schrifttums*. Vol. III. Medizin-Pharmazie-Zoologie-Tierheilkunde bis ca. 430 H. Leiden.

Shabana, M.M., Mirhom, Y.W., Genenah, A.A., Aboutabl, E.A., and Amer, H.A. (1990) Study into wild Egyptian plants of potential medicinal activity. Ninth communication: hypoglycaemic activity of some selected plants in normal fasting and alloxanised rats. *Archiv für Experimentelle Veterinärmedizin, 44(3)*: 389–394.

Shah, M.H. (1958) Avicenna: his life and works. *Hamdard Medical Digest*, *2(4)*, 1–6.

Ibid. (1966) *The general principles of Avicenna's "Canon of Medicine"*. Karachi.

al-Shamaony, L., al-Khazraji, S.M., and Twaij, H.A. (1994) Hypoglycaemic effect of Artemisia herba alba. II. Effect of a valuable extract on some blood parameters in diabetic animals. *Journal of Ethnopharmacology, 43(3)*, 167–171.

Shani, J., Ahronson, Z., Sulman, F.G., Mertz, W., Frenkel, G., and Kraicer, P.F. (1972) Insulin-potentiating effect of salt bush (Atriplex halimus) ashes. *Israel Journal of Medical Sciences, 8(6)*, 757–758.

Shapiro, A.K. (1959) The Placebo Effect in the History of Medical Treatment: Implications for Psychiatry. *American Journal of Psychiatry, 116*, 298–304.

Sharma, V.K. (1990) Tuberculostatic activity of henna (Lawsonia inermis Linn.). *Tubercle, 71(4)*, 293–295.

Shcherbanovsky, L.R. and Kapelev, I.G. (1975) [Volatile oil of Anethum Graveolens L. as an inhibitor of yeast and lactic acid bacteria]. *Prikladnaia biokhimiia i mikrobiologiia, 11(3)*, 476–477.

Sheela, C.G., Kumud, K., and Augusti, K.T. (1995) Anti-diabetic effects of onion and garlic sulfoxide amino acids in rats. *Planta Medica, 61(4)*, 356–357.

Sheu, S.Y., Tsuang, Y.H., Hsu, F.L., Lu, F.J., and Chiang, H.C. (1997) Superoxide anion scavenge effect of Quercus glauca Thunb. in whole blood of patients with ankylosing spondylitis. *American Journal of Chinese Medicine, 25(3–4)*, 307–315.

Shukla, K., Narain, J.P., Puri, P., Gupta, A., Bijlani, R.L., Mahapatra, S.C., and Karmarkar, M.G. (1991) Glycaemic response to maize, bajra and barley. *Indian Journal of Physiology and Pharmacology, 35(4)*, 249–254.

Shunying, Z., Yang, Y., Huaidong, Y., Yue, Y., and Guolin, Z. (2005) Chemical composition and antimicrobial activity of the essential oils of Chrysanthemum indicum. *Journal of Ethnopharmacology, 96(1–2)*, 151–158.

Siddiqi, M.Z. (1968) The Unani Tibb (Greek Medicine) in India. *Islamic Culture, XLII*, 161–172.

Siegel, R.E. (1970). *Galen on Sense Perception*. Basel/New York.

Ibid. (1968). *Galen's System of Physiology and Medicine*. Basel.

Simopoulos, A.P., Norman, H.A., Gillaspy, J.E., and Duke, J.A. (1992) Common purslane: a source of omega-3 fatty acids and antioxidants. *Journal of the American College of Nutrition, 11(4)*, 374–382.

Singh, S. (1999) Mechanism of action of antiinflammatory effect of fixed oil of Ocimum basilicum Linn. *Indian Journal of Experimental Biology, 37(3)*, 248–252.

Singh, M., Singh, N., Khare, P.B., and Rawat, A.K. (2008) Antimicrobial activity

of some important Adiantum species used traditionally in indigenous systems of medicine. *Journal of Ethnopharmacology*, *115(2)*, 327–329.
Siraisi, N.G. (1987) *Avicenna in Renaissance Italy: the Canon and Medical Teaching in Italian Universities after 1500*. Princeton.
Ibid. (1985) The Changing Fortunes of a Traditional Text: Goals and Strategies in Sixteenth-Century Latin Editions of the *Canon* of Avicenna. In Wear, A., French, R.K. and Lonie, I.M. (eds.) *The Medical Renaissance of the Sixteenth Century* (16–41). Cambridge.
Ibid. (1990) *Medieval and early renaissance medicine: an introduction to knowledge and practice*. Chicago.
Sirota, T.V., Eliseeva, O.P., Khunderiakova, N.V., Kaminskiĭ, D.V., Makhotina, O.A., and Kondrashova, M.N. (2007) [Activity of oil isolated from Amaranth seeds on energetic functions of rat liver mitochondria after adrenaline introduction.] *Ukraïns'kyĭ biokhimichnyĭ zhurnal, 79(5)*, 196–203.
Skoler, M.J. (1984) Acupuncture: An Old Art Coming of Age in America? *Medical World News, May*, 50–61.
Smith, W.D. (trans.) (1994) *Epidemics*. Cambridge, Mass./London.
Ibid. (1979). *The Hippocratic Tradition*. Ithaca.
Sonboli, A., Salehi, P., and Yousefzadi, M. (2004) Antimicrobial activity and chemical composition of the essential oil of Nepeta crispa Willd. from Iran. *Zeitschrift für Naturforschung, C, 59(9–10)*, 653–656.
von Sontheimer, J. (1845) *Zusammengesetzte Heilmittel der Araber. Nach dem fünften Buch des Canons von Ebn Sina aus dem arabischen übersetzt*. Freiburg.
Sorensen, J.M. and Katsiotis, S.T. (2000) Parameters influencing the yield and composition of the essential oil from Cretan Vitex agnus-castus fruits. *Planta Medica, 66 (3)*, 245–250.
Sorimachi, K., Ikehara, Y., Maezato, G., Okubo, A., Yamazaki, S., Akimoto, K., and Niwa, A. (2001) Inhibition by Agaricus blazei Murill fractions of cytopathic effect induced by western equine encephalitis (WEE) virus on VERO cells in vitro. *Bioscience, Biotechnology, and Biochemistry, 65(7)*, 1645–1647.
Sotohy, S.A., Muller, W., and Ismail, A.A. (1995) "In vitro" effect of Egyptian tannin-containing plants and their extracts on the survival of pathogenic bacteria. *DTW. Deutsche tierarztliche Wochenschrift, 102(9)*, 344–348.
Sparg, S.G., van Staden, J., and Jäger, A.K. (2002) Pharmacological and phytochemical screening of two Hyacinthaceae species: Scilla natalensis and Ledebouria ovatifolia. *Journal of Ethnopharmacology, 80(1)*, 95–101.
Spencer, C.F., Koniuszy, F.R. Rogers, E.F. Jr, Shavel, J., Easton, N.R., Kaczka, E.A. Jr, Kuehl, F.A., Phillips, R.F., Walti, A., Folkers, K., Malanga, C., and Seeler, A.O. (1947) Survey of Plants for Antimalarial Activity. *Lloydia, 10*, 145–174.
Spink, M.S. and Lewis, G.L. (eds. and trans.) (1973) *Albucasis on Surgery and Instruments: a definitive edition of the Arabic text with English translation and commentary*. London.
Sreelekha, T.T., Vijayakumar, T., Ankanthil, R., Vijayan, K.K., and Nair, M.K. (1993) Immunomodulatory effects of a polysaccharide from Tamarindus indica. *Anticancer Drugs, 4(2)*, 209–212.

Stannard, J. (1999a) *Herbs and Herbalism in the Middle Ages and Renaissance*. London.

Ibid. (1961) Hippocratic pharmacology. *Bulletin of the History of Medicine, 35(6)*, 497–518.

Ibid. (1987) Medieval Herbalism and Post-medieval Folk Medicine. In Scarborough, J. (ed.) *Folklore and Folk Medicines* (10–20). Madison.

Ibid. (1974a) Medieval Herbals and their Development. *Clio Medica*, *9*, 23–33.

Ibid. (1982) The Multiple Uses of Dill (*Anethum graveolens* L.) in Medieval Medicine. In Keil, G. *Festschrift für Willem F. Daems* (411–424). Pattensen.

Ibid. (1999b) *Pristina Medicamenta: Ancient and Medieval Medical Botany*. London.

Ibid. (1974b) Squill in Ancient and Medieval Materia Medica. *Bulletin of the New York Academy of Medicine, 50*, 684–713.

Steingass, F.J. (1947) *A Comprehensive Persian-English Dictionary*. London.

Strayer, J.R. (ed.) (c1982–c1989) *Dictionary of the Middle Ages*. New York.

Strohmaier, G. (1999) *Avicenna*. München.

Ibid. (1960–2002) Ḥunayn b. Isḥāk al-ʿIbādī. In Bearman, P.J., Bianquis, Th., Bosworth, C.E., van Donzel, E., and Heinrichs, W.P. (eds.) *The Encyclopaedia of Islam*. 2nd Edition (Vol. III, 578–581). Leiden/London.

Strzelecka, M., Bzowska, M., Koziel, J., Szuba, B., Dubiel, O., Riviera Núńez, D., Heinrich., M., and Bereta, J. (2005) Anti-inflammatory effects of extracts from some traditional Mediterranean diet plants. *Journal of Physiology and Pharmacology, 56(Suppl 1)*, 139–156.

Stuart, R.W., Lefkowitz, D.L., Lincoln, J.A., Howard, K., Gelderman, M.P., and Lefkowitz, S.S. (1997) Upregulation of phagocytosis and candidicidal activity of macrophages exposed to the immunostimulant acemannan. *International Journal of Immunopharmacology, 19(2)*, 75–82.

Subash Babu, P., Prabuseenivasan, S., and Ignacimuthu, S. (2007) Cinnamaldehyde—a potential antidiabetic agent. *Phytomedicine, 14(1)*, 15–22.

Subramoniam, A., Pushpangadan, P., Rajasekharan, S., Evans, D.A., Latha, P.G., and Valsaraj, R. (1996) Effects of Artemisia pallens Wall. on blood glucose levels in normal and alloxan-induced diabetic rats. *Journal of Ethnopharmacology, 50(1)*, 13–17.

Suter, H. (1899) Zur Frage über die Lebenszeit des … Gaġmīnī. *Zeitschrift der Deutschen Morgenlaendischen Gesellschaft, liii*, 539.

Suter, H.-[Vernet, J.] (1960–2002) Al-Gaghmīnī. In Bearman, P.J., Bianquis, Th., Bosworth, C.E., van Donzel, E., and Heinrichs, W.P. (eds.) *The Encyclopaedia of Islam*. 2nd Edition (Vol. II, 378). Leiden/London.

Swamy, S.M. and Tan, B.K. (2000) Cytotoxic and immunopotentiating effects of ethanolic extract of Nigella sativa L. seeds. *Journal of Ethnopharmacology, 70(1)*, 1–7.

Swanston-Flatt, S.K., Day, C., Bailey, C.J., and Flatt, P.R. (1990) Traditional plant treatments for diabetes. Studies in normal and streptozotocin diabetic mice. *Diabetologia, 33(8)*, 462–464.

Sylla, E. (1971) Medieval quantifications of qualities: the 'Merton School,' *Archive for the History of the Exact Sciences, 8*, 9–39.

Szallasi, A. and Blumberg, P.M. (1989) Resiniferatoxin, a phorbol-related diterpene, acts as an ultrapotent analog of capsaicin, the irritant constituent in red pepper. *Neuroscience, 30(2)*, 515–520.

Tabata, M., Tanaka, S., Cho, H.J., Uno, C., Shimakura, J., Ito, M., Kamisako, W., and Honda, C. (1993) Production of an anti-allergic triterpene bryonolic acid, by plant cell cultures. *Journal of Natural Products, 56(2)*, 165–174.

Takahashi, M., Konno, C., and Hikino, H. (1985) Isolation and Hypoglycemic Activity of Saccharans A, B, C, D, E and F, Glycans of Saccharum officinarum Stalks. *Planta Medica, 51(3)*, 258–260.

Talbot, Ch.H. (1978) Medicine. In Lindberg, D.C. (ed.) *Science in the Middle Ages* (391–428). Chicago.

Tam, C.U., Yang, F.Q., Zhang, Q.W., Guan, J., and Li, S.P. (2007) Optimization and comparison of three methods for extraction of volatile compounds from Cyperus rotundus evaluated by gas chromatography-mass spectrometry. Journal of pharmaceutical and biomedical analysis. *Journal of Pharmaceutical and Biomedical Analysis, 44(2)*, 444–449.

Tang, W. and Eisenbrand, G. (1992) *Chinese Drugs of Plant Origin: Chemistry, Pharmacology, and Use in Traditional and Modern Medicine*. Berlin.

Taniguchi, H., Kobayashi-Hattori, K., Tenmyo, C., Kamei, T., Uda, Y., Sugita-Konishi, Y., Oishi, Y., and Takita, T. (2007a) Effect of Japanese radish (Raphanus sativus) sprout (Kaiware-daikon) on carbohydrate and lipid metabolisms in normal and streptozotocin-induced diabetic rats. *Phytotherapy Research, 20(4)*, 274–278.

Taniguchi, H., Muroi, R., Kobayashi-Hattori, K., Uda, Y., Oishi, Y., and Takita, T. (2007b) Differing effects of water-soluble and fat-soluble extracts from Japanese radish (Raphanus sativus) sprouts on carbohydrate and lipid metabolism in normal and streptozotocin-induced diabetic rats. *Journal of Nutritional Science and Vitaminology, 53(3)*, 261–266.

Tariq, M., Ageel, A.M., Al-Yahya, M.A., Mossa, J.S., Al-Said, M.S., and Parmar, N.S. (1986) Anti-inflammatory activity of Commiphora molmol. *Agents and Actions, 17(3–4)*, 381–382.

Taylor, R.S., Hudson, J.B., Manandhar, N.P., and Towers, G.H. (1996) Antiviral activities of medicinal plants of southern Nepal. *Journal of Ethnopharmacology, 53(2)*, 97–104.

Temkin, O. (1962) Byzantine Medicine: Tradition and Empiricism. *Dumbarton Oaks Papers, 16*, 95–115.

Ibid. (1964) The classical roots of Glisson's doctrine of irritation. *Bulletin of the History of Medicine, 38(4)*, 297–328.

Ibid. (1973) *Galenism; Rise and Decline of a Medical Philosophy*. Ithaca, N.Y.

Temkin, O. and Temkin C.L. (eds.) (1967) *Ancient Medicine: selected papers of Ludwig Edelstein*. Baltimore.

Teuber, H. and Herrmann, K. (1978) [Flavonol glycosides of leaves and fruits of dill (Anethum graveolens L.). II. Phenolics of spices (author's transl)]. *Zeitschrift für Lebensmittel-Untersuchung und Forschung, 167(2)*, 101–104.

Theophrastus. See Hort, 1961.

Thies, Hans-Jürgen (1971) *Der Diabetestraktat ʿAbd al-Laṭīf al-Baghdādī's. Untersuchungen zur Geschichte des Krankheitbildes in der arabischen Medizin*. Bonn.

Thorndike, L. and Benjamin, F.S. (eds.) (1946) *The herbal of Rufinus*. Chicago.

Tibi, S. (2006) *The Medicinal Use of Opium in Ninth-Century Baghdad*. Leiden/Boston.

Tomoda, M., Shimizu, N., Gonda, R., Kanari, M., Yamada, H., and Hikino, H. (1990) Anti-complementary and hypoglycemic activities of the glycans from the seeds of Malva verticillata. *Planta Medica*, *56(2)*, 168–170.

Totelin, L. (2004) Mithradates' Antidote – A Pharmacological Ghost. *Early Science and Medicine, 9*, 1–19.

Touvay, C., Vilain, B., Sirois, P., Soufir, M., and Braquet, P. (1987) Gossypol: a potent inhibitor of PAF-acether- and leukotriene-induced contractions of guinea-pig lung parenchyma strips. *Journal of Pharmacy and Pharmacology, 39(6)*: 454–458.

Touwaide, A. (2007) Byzantine Hospital Manuals (*Iatrosophia*) as a Source for the Study of Therapeutics. In Bowers, B.S. (ed.) *The Medieval Hospital and Medical Practice* (147–173). Aldershot.

Ibid. (2005) Dioscorides. In Glick, T.F., Livesey, S.J., and Wallis, F. (eds.) *Medieval Science, Technology, and Medicine: an Encyclopedia* (152–154). New York.

Toyada-Ono, Y., Maeda, M., Nakao, M., Yoshimura, M., Sugiura-Tomimori, N., Fukami, H., Nishioka, H., Miyashita, Y., and Kojo, S. (2005) A novel vitamin C analog, 2-O-(beta-D-Glucopyranosyl)ascorbic acid: examination of enzymatic synthesis and biological activity. *Journal of Bioscience and Bioengineering, 99(4)*, 361–365.

Toyoda-Ono, Y., Maeda, M., Nakao, M., Yoshimura, M., Sugiura-Tomimori, N., and Fukami, H. (2004) 2-O-(beta-D-Glucopyranosyl)ascorbic acid, a novel ascorbic acid analogue isolated from Lycium fruit. *Journal of Agricultural and Food Chemistry, 52(7)*, 2092–2096.

Treyvaud Amiguet, V., Arnason, J.T., Maquin, P., Cal, V., Sanchez Vindas, P., and Poveda, L. (2005) A consensus ethnobotany of the Q'eqchi' Maya of southern Belize. *Economic Botany, 59(1)*, 29–42.

Trivedi, C.P., Modi, N.T., Sarin, R.K., and Rao, S.S. (1986) Bronchodilator and anti-inflammatory effect of glycosidal fraction of Acacia farnesiana. *Indian Journal of Physiology and Pharmacology, 30(3)*, 267–268.

Tschan, G.A., König, G.M., Wright, A.D. and Sticher, O. (1996) Chamaemeloside, a New Flavonoid Glycoside from Chamaemelum anthemis. *Phytochemistry, 41*, 643.

Ubillas, R.P., Mendez, C.D., Jolad, S.D., Luo, J., King, S.R., Carlson, T.J., and Fort, D.M. (1999) Antihyperglycemic furanosesquiterpenes from commiphora myrrha. *Planta Medica, 65(8)*, 778–779.

Ullmann, M. (1978). *Islamic Medicine*. Edinburgh.

Ibid. (1970). *Die Medizin im Islam*. Leiden.

Ibid. (1972) *Die Natur- und Geheimwissenschaften im Islam*. Leiden.

Ibid. (1975) Review on *The Life of Ibn Sina* by W.E. Gohlman. *Der Islam, 52*, 148–151.

Ibid. (1971) Yūḥannā Ibn Sarābiyūn, Untersuchungen zur Uberlieferungsgeschichte seiner Werke. *Medizinhistorisches Journal, 6*, 278–296.

Vajda, G. (1959) Une version hebraique du "al-Mulakhkhaṣ fī al-hay'a" de Maḥmūd B. Muḥammad B. ʿUmar Al-Gaġmīnī. *Journal Asiatique, 247*, 471–478.

Valencia, E., Feria, M., Diaz, J.G., Gonzalez, A., and Bermejo, J. (1994) Antinociceptive, anti-inflammatory and antipyretic effects of lapidin, a bicyclic sesquiterpene. *Planta Medica, 60(5)*, 395–399.

Vaziri, A. (1975) Antimicrobial action of galbanum. *Planta Medica, 28*, 370–373.

Vazquez, B., Avila, G., Segura, D., and Escalante, B. (1996) Antiinflammatory activity of extracts from Aloe vera gel. *Journal of Ethnopharmacology, 55(1)*, 69–75.

Vieira, A.T., Pinho, V., Lepsch, L.B., Scavone, C., Ribeiro, I.M., Tomassini, T., Ribeiro-dos-Santos, R., Soares, M.B., Teixeira, M.M., and Souza, D.G. (2005) Mechanisms of the anti-inflammatory effects of the natural secosteroids physalins in a model of intestinal ischaemia and reperfusion injury. *British Journal of Pharmacology*, *146(2)*, 244–251.

Vigneau, C.H., Tsao, J., Chamaillard, C., and Galzot, J. (1982) Accidental absorption of daffodils (Narcissus jonquilla): two common intoxicants. *Veterinary and Human Toxicology, 24(Suppl)*, 133–135.

Viljoen, A.M., Subramoney, S., van Vuuren, S.F., Baser, K.H., and Demirci, B. (2005) The composition, geographical variation and antimicrobial activity of Lippia javanica (Verbenaceae) leaf essential oils. *Journal of Ethnopharmacology, 96 (1–2)*, 271–277.

Villaume, C., Beck, B., Gariot, P., Desalme, A., and Debry, G. (1984) Long-term evolution of the effect of bran ingestion on meal-induced glucose and insulin responses in healthy man. *The American Journal of Clinical Nutrition, 40(5)*, 1023–1026.

Vohora, S.B. (1986) Unani Joshandah drugs for common cold, catarrh, cough and associated fevers. *Journal of Ethnopharmacology, 16(2–3)*, 201–211.

Voigts, L.E. and Hudson, R.P. (1992) "A drynke ÐaT men callen dwale to make a man to slepe whyle men kerven him": a surgical anesthetic from late medieval England. In Campbell, S., Hall, B., and Klausner, D. (eds.) *Health, Disease and Healing in Medieval Culture* (34–56). New York.

Vullers, J.A. (1962) *Lexicon Persico-Latinum etymologicum: cum linguis maxime Cognatis sanscrita et Zendica et Pehlevica comparatum accedit appendix vocum dialecti Antiquioris, Zend et Pazend dictae*. [Reprint of Bonn, 1855 ed.] Graz.

Wadood, A., Wadood, N., and Shah, S.A. (1989) Effects of Acacia arabica and Caralluma edulis on blood glucose levels of normal and alloxan diabetic rabbits. *Journal of the Pakistan Medical Association, 39(8)*, 208–212.

Wagner, H. (1982) *Pharmazeutische Biologie. Vol. 2. Drogen und ihre Inhaltsstoffe*. Stuttgart.

Ibid. (1989) Search for new plant constituents with potential antiphlogistic and antiallergic activity. *Planta Medica, 55*, 235–241.

Waines, D. (2002b) Abū Zayd al-Balkhī on the Nature of Forbidden Drink: a Medieval Islamic Controversy. In Waines, D. (ed.) *Patterns of Everyday Life* (329–344/111–126). Aldershot.

Ibid. (1989) *In a Caliph's Kitchen*. London.

Ibid. (ed.) (2002a) *Patterns of Everyday Life*. Aldershot.

Waines, D. and Marín, M. (2002) *Muzawwar*: Counterfeit Fare for Fasts and

Fevers. In Waines, D. (ed.) *Patterns of Everyday Life* (303–315/289–301). Aldershot.

Waller, D.P. (1993) Methods in ethnopharmacology. *Journal of Ethnopharmacology, 38*, 189–195.

Walzer, R. (1960–2002) Djālīnūs. In Bearman, P.J., Bianquis, Th., Bosworth, C.E., van Donzel, E., and Heinrichs, W.P. (eds.) *The Encyclopaedia of Islam*. 2nd Edition. Vol. II. Leiden/London (*s.v.*).

Ibid. (1962). *Greek into Arabic*, Oxford.

Wang, H.L. and Jiao, D.H. (1985) [A study of rhubarb's constituents and the mechanism of their hemostatic effect]. *Chung Hsi I Chieh Ho Tsa Chih. Chinese Journal of Modern Developments in Traditional Medicine, 5(9)*, 555–557, 516.

Wang, H.X. and Ng, T.B. (2007) An antifungal peptide from red lentil seeds. *Peptides, 28(3)*, 547–552.

Wang, H., and Ng, T.B. (2002) Isolation of lilin, a novel arginine- and glutamate-rich protein with potent antifungal and mitogenic activities from lily bulbs. *Life Sciences, 70(9)*, 1075–1084.

Wang, W.J. and Zhu, X.Y. (1989) [The antiinflammatory and immunostimulating activities of S-4001–a polysaccharide isolated from Lei Wan (Polyporus mylitiae).] *Yao Hsueh Hsueh Pao. Acta Pharmaceutica Sinica, 24(2)*, 151–154.

Wannissorn, B., Jarikasem, S., Siriwangchai, T., and Thubthimthed, S. (2005) Antibacterial properties of essential oils from Thai medicinal plants. *Fitoterapia, 76(2)*, 233–236.

Waserman, M. and Kottek, S. (ed.) (1996) *Health and Disease in the Holy Land: Studies in the History and Sociology of Medicine from Ancient Times to the Present*. Lewiston.

Wasfi, I.A., Bashir, A.K., Abdalla, A.A., Banna, N.R., and Tanira, M.O. (1995) Anti-inflammatory activity of some medicinal plants of the United Arab Emirates. *International Journal of Pharmacognosy 33(2)*, 124–128.

Wassel, G.M., Abdelwahab, S.M., Aboutabl, E.A., Ammar, N.M., and Afifi, M.S. (1992) Phytochemical examination and biological studies of *Acacia nilotica* (L.) Willd and *Acacia farnesiana* (L.) Willd growing in Egypt. *Egyptian Journal of Pharmaceutical Sciences, 33(1–2)*, 327–340.

Wasserstein, A. (1982) *Galen's commentary on the Hippocratic treatise, Airs, waters, places in the Hebrew translation of Solomon Ha-Meati*. Jerusalem.

Watson, A. (2002) The Arab Agricultural Revolution and its Diffusion, 700–1100.

In Waines, D. (ed.) *Patterns of Everyday Life* (247–274/8–35). Aldershot.

Watson, G. (1966) *Theriac and Mithridatium: A Study in Therapeutics*. London.

Watt, J.M. and Breyer-Brandwijk, M.G. (1962) *The Medicinal and Poisonous Plants of Southern and Eastern Africa*. Edinburgh.

Watt, W.M. (1972) *The Influence of Islam on Medieval Europe*. Edinburgh.

Wear, A., French, R.K. and Lonie, I.M. (eds.) (1985) *The Medical Renaissance of the Sixteenth Century*. Cambridge.

Wickersheimer, E. (1936) *Dictionnaire biographique des médicins en France au moyen âge*. Paris. With *Supplément*, ed. by Danielle Jacquart. Geneva, 1979.

Wren, R.C., Williamson, E.M. and Evans, F.J. (1988) *Potter's New Cyclopaedia of Botanical Drugs and Preparations*. Essex.

Wimmer, F. (ed.) (1964) *Theophrastus: Opera quae supersunt omnia*. Frankfurt am Main.

Wolever, T.M., Vuksan, V., Eshuis, H., Spadafora, P., Peterson, R.D., Chao, E.S., Storey, M.L. and Jenkins, D.J. (1991) Effect of method of administration of psyllium on glycemic response and carbohydrate digestibility. *Journal of the American College of Nutrition, 10(4)*, 364–371.

Woodings, A.F. (1971) The Medical Resources and Practice of the Crusader States in Syria and Palestine 1096–1193. *Medical History, 25*, 268–277.

Wright, O. (1982–2008) Avicenna: Music. In Yarshater, E. (ed.) *Encyclopaedia Iranica* (Vol. III, 92–94). London/Costa Mesa.

Xie, C., Kokubun, T., Houghton, P.J., and Simmonds, M.S. (2004) Antibacterial activity of the Chinese traditional medicine, Zi Hua Di Ding. *Phytotherapy Research, 18(6)*, 497–500.

Xue, W.L., Li, X.S., Zhang, J., Liu, Y.H., Wang, Z.L., and Zhang, R.J. (2007) Effect of Trigonella foenum-graecum (fenugreek) extract on blood glucose, blood lipid and hemorheological properties in streptozotocin-induced diabetic rats. *Asia Pacific Journal of Clinical Nutrition, 16(Suppl 1)*, 422–426.

Yamatake, Y., Shibata, M., and Nagai, M. (1976) Pharmacological studies on root bark of mulberry tree (Morus alba L.). *Japanese Journal of Pharmacology, 26(4)*, 461–469.

Yarshater, E. (ed.) (1982–2008) *Encyclopaedia Iranica*. London/Costa Mesa.

Yesilada, E., Ustun, O., Sezik, E., Takaishi, Y., Ono, Y., and Honda, G. (1997) Inhibitory effects of Turkish folk remedies on inflammatory cytokines: interleukin-1alpha, interleukin-1beta and tumor necrosis factor alpha. *Journal of Ethnopharmacology, 58(1)*, 59–73.

Yoshikawa, M., Shimada, H., Saka, M., Yoshizumi, S., Yamahara, J., Matsuda, H. (1997) Medicinal foodstuffs. V. Moroheiya. (1): Absolute stereostructures of corchoionosides A, B, and C, histamine release inhibitors from the leaves of Vietnamese Corchorus olitorius L. (Tiliaceae). *Chemical and Pharmaceutical Bulletin, 45(3)*, 464–469.

Young, M.J.L. (1961) Some Observations on the use of Arabic as a scientific language as exemplified in the Mūjiz al-Qānūn of Ibn al-Nafīs (d. 1288). *Abr-Nahrain, 1*, 68–72.

Yun, D.J., Zhao, Y., Pardo, J.M., Narasimhan, M.L., Damsz, B., Lee, H., Abad, L.R., D'Urzo, M.P., Hasegawa, P.M., and Bressan, R.A. (1997) Stress proteins on the yeast cell surface determine resistance to osmotin, a plant antifungal protein. *Proceedings of the National Academy of Sciences of the United States of America, 94(13)*, 7082–7087.

Zakaria, Z.A., Sulaiman, M.R., Gopalan, H.K., Abdul Ghani, Z.D., Raden Mohd Nor, R.N., Mat Jais, A.M., and Abdullah, F.C. (2007) Antinociceptive and anti-inflammatory properties of Corchorus capsularis leaves chloroform extract in experimental animal models. *Yakugaku Zasshi, 127(2)*, 359–365.

Zaydan, Y. (ed.) (1991) *Mukhtaṣar fī ʿilm uṣūl al-ḥadīth*. Cairo.

Zepernick, B., Langhammer, L. and Lüdcke, J. (1983) *Lexikon der offizinellen Arzneipflanzen*. De Gruyter.

Zhang, L., Huang, Y., Qian, Y., and Xiao, P. (1995) [Effect of deoxynupharidine on immune function in vitro.] *Chung Kuo I Hsueh Ko Hsueh Yuan Hsueh Pao. Acta Academiae Medicinae Sinicae, 17(5)*, 343–348.

Zhang, X., Lan, Z., Dong, X.P., Deng, Y., Hu, X.M., Peng, T., and Guo, P. (2007) [Study on the active components of Nardostachys chinensis.] *Zhong Yao Cai, 30(1)*, 38–41.

Zhang, Y. and Lewis, K. (1997) Fabatins: new antimicrobial plant peptides. *FEMS Microbiology Letters, 149(1)*, 59–64.

Zhou, H. and Jiao, D. (1990) [312 cases of gastric and duodenal ulcer bleeding treated with 3 kinds of alcoholic extract rhubarb tablets]. *Chung Hsi I Chieh Ho Tsa Chih. Chinese Journal of Modern Developments in Traditional Medicine, 10(3)*, 150–151, 131–132.

Ziablitskii, V.M., Romanovskaia, V.N., Umurzakova, R.Z., Starosel'skaia, A.N., and Mikhal'skaia, T.Iu. (1996) [Modification to the functional status of the hemostatic system with the use of berberine sulfate]. *Eksperimentalnaia i klinicheskaia farmakologiia, 59(1)*, 37–39.

GENERAL INDEX