

The Contribution of the Sixteenth-Century Turkish Physician Daud al-Antaki to the Research of Medical Substances in use in the Levant (Bilad al-Sham)

16. YÜZYIL TÜRK HEKİMİ DAUD al-ANTAKI'NİN DOĞU AKDENİZ BÖLGESİ'NDE (BİLAD al-SHAM) KULLANILAN TIBBİ MADDELERİN ARAŞTIRMASINA KATKISI

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Abstract

Daud Ibn Amar al-Antaki was perhaps the pre-eminent Muslim physician of the 16th century. His medical encyclopaedia, *Tadhkirat Uli l-al-Bab wa l-Jami li-L-'Ajab al-'Ujab*, is a treasure-trove of medieval medical and pharmaceutical information.

Scholarly investigation has revealed in its pages descriptions of 73 medicinal substances known to have been in use in medieval and Ottoman Levant. The 57 plants mentioned include both wild and cultivated local species, and even imported flora. All five of the minerals identified as being in use for medicinal purposes are similarly local, and their application can be corroborated from other historical sources. al-Antaki also identifies nine animals whose body parts or by-products were used medicinally and are thus of particular interest and importance to scholars. He likewise refers to other substances whose precise origins and correct usage remain vague.

This study deals with the medical application of different substances originating in the Levant, and attempts to assess the nature of Daud al-Antaki's contribution to research into such usage in the medieval and Ottoman Levant.

Key Words: Daud al-Antaki, Medieval Medicine, Materia Medica, the Levant, Bilad al-Sham

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Özet

Daud Ibn Amar al-Antaki, 16. Yüzyılın belki de en önde gelen Müslüman hekimiydi. Onun tıbbi ansiklopedisi, *Tadhkirat Uli l-al-Bab wa l-Jami li-L-'Ajab al-'Ujab*, ortaçağın tıbbi ve ilaç bilgisinin sahiptiği hazinesidir.

Araştırma bilimsel olarak ortaçağda ve Osmanlıda Doğu Akdeniz bölgesinde kullanıldığı bilinen 73 tıbbi maddenin tanımlamalarını, kitabın sayfalarında açıklamaktadır. Bahsedilen 57 bitkiye, hem yabani, hem de yetiştirilen yerel türler ve hatta ithal edilen flora girer. Tıbbi amaçlar için kullanıldığı saptanan minerallerin beşi aynı şekilde yereldir ve onların uygulaması diğer tarihi kaynaklardan doğrulanır. Aynı zamanda al-Antaki, vücut kısımları ya da ürünlerinin tıbbi olarak kullanıldığı dokuz hayvansal maddeyi belirtir ve nitekim bunlar bilginler için özel ilgi ve önemdedir. Diğer taraftan al-Antaki, kesin kaynakların ve düzgün kullanımın belirsiz kaldığı diğer maddeler hakkında da bilgi verir.

Bu çalışma, Doğu Akdeniz bölgesinden kaynak alan farklı maddelerin tıbbi uygulamalarına değinir ve ortaçağda ve Osmanlı Doğu Akdeniz bölgesinde böyle kullanımdaki araştırmaya Daud al-Antaki'nin katkısının özelliğine girmeye teşebbüs eder.

Anahtar Kelimeler: Daud al-Antaki, Ortaçağ Tıbbi, Materia Medica, Doğu Akdeniz Bölgesi, Bilad al-Sham

One of the most important sources for learning about medicinal substances of natural origin in use among physicians and inhabitants of the Levant (Bilad al-Sham)¹ at the end of the Middle Ages and the beginning of the Ottoman is the work of the Muslim

physician, Daud Ibn Amar al-Antaki (d. 1599), who lived and practised during the second half of the 16th century.²

Blind and handicapped from birth due to a severe neurological condition, al-Antaki was unable to walk before the age of seven. His father was head of the village of Haviv al-Nagear, near Antioch, where he had built an inn for pilgrims visiting the grave of a local Muslim saint. Carried daily to the inn-yard, the young Daud caught the attention of one of the guests, a rich Persian named Mahmed Shariff. Shariff discerned the boy's intellect and academic potential and helped cure him of his physical disability by administering an aromatic massage that eventually resulted in the freeing of his limbs. Thereafter he studied logic, mathematics, Greek, and natural sciences with Shariff, and when his father died al-Antaki set out for the intellectual centres of Cairo

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and Damascus, subsequently travelling extensively throughout the Levant as his studies demanded.³

al-Antaki's book, *Tadhkirat Uli l-al-Bab wa l-Jami li-L-'Ajab al-'Ujab*,⁴ is a medical and pharmaceutical encyclopaedia, containing detailed references to allied sciences, as well as fascinating discussion and deliberation relating to the field in general.⁵ The importance of this text is considerable owing to the large number (73) of medicinal substances in use in the Levant that are mentioned on its pages. Written towards the end of the 16th century, the encyclopaedia includes various quotations from physicians who pre-dated al-Antaki;⁶ however, unlike others before him, some of the treatments presented are anonymous and are introduced as follows: 'It is said...', 'It is claimed...', 'It is told...', 'It is a mistake to say...', 'In the book of experiments, it is written...'.⁷ Similar generalizations were made by classical physicians, Dioscorides for example, and Muslim writers such as Ibn Sina. But, most of the Muslim physicians of the Middle Ages named their sources, so we might suggest that although Antaki was a knowledgeable physician in his time, the general quality of the medical books was in decline. It is perhaps legitimate to state that al-Antaki's book preserves, and to some extent sums up the local medical knowledge available at his time.⁸

The book consists of an introduction and four parts. In the introduction, al-Antaki lists the sciences addressed in the main body of the work, and explains the connection of each to medicine. **Part 1** is a general preface on medical wisdom, where among other topics various diagnostic methods are discussed. **Part 2** opens with a historical survey of the development of pharmaceutical science, beginning with Dioscorides and ending with al-Antaki's contemporaries. This part of the text also describes the nature of simple and complex drugs and gives general instructions to pharmacists. **Part 3** is a list of medicinal substances set in Arabic alphabetical order. Here the author describes the application of individual substances as well as their use as an ingredient in complex drugs. The list includes hundreds of plants, minerals, and animals (and their organs). **Part 4** describes diseases, their causes and symptoms, and various specific treatments. Arranged alphabetically, this part is incomplete and contains only material corresponding to the first eight letters of the Arabic alphabet. Procedures relating to treatment, which were not according to the medical theories of that time, as usually appeared in medical books of the 16th century both in the Muslim world and in Europe, are fairly numerous.

Some of the entries seem to be summaries of whole books on medicine. This is why researchers such as Martin Plessner suggest that the book was written by someone else, perhaps one of al-Antaki's students, who also arranged the entries by a different organisational principle.⁹

This study deals with the medical application of different substances originating in the Levant. As the article progresses we will concentrate on assessing the nature of Daud al-Antaki's contribution to research into such usage in the medieval and Ottoman Levant.

Identification of the substances and tabulation of results

After a detailed examination of Antaki's book, the data pertaining to the substances mentioned as coming from the Greater Syria area were collected. The identification process includes intensive use of literature related to names and synonyms of medical substances. These works reflect the growth of the field of medicine in the Middle Ages and early Ottoman period. This literature is of great assistance in the identification of medical substances and their names in the various dialects spoken by the people of that period. Often one substance had different names and its identification varied from place to place, so these dictionaries became essential for all who studied medicine. From these dictionaries (which often serve as primary sources also) we also learned that the origin of some of the plant-derived medications was the al-Sham area. Among authors of dictionaries we cite only the important ones: al-Ghafari (12th century),¹⁰ Ibn-Rushd (1126-1198)¹¹ and Maimonides (1135-1204).¹²

The identified substances were entered in four tables according to their origin, differentiating plants, minerals, animals and their organs, and other substances.

The medicinal use of plants in the Middle Ages according to Daud al-Antaki

Among the medicinal substances mentioned in the encyclopaedia, 57 plants with medicinal applications in the Levant are described. They comprise 78.8 percent of all the substances mentioned in this category. This is not surprising because, as our findings emphasise, in lists of medicinal substances from the medieval and classical periods in the Middle East, as well as those belonging to contemporary popular medicine in the same region, this rate remains constant, ranging between 70 and 90 percent.¹³ The plants with a medicinal connection to the Levant are presented in Table 1 below.

Among the plants, one can identify many wild varieties commonly found in the Levant: apple cucumber (*Cucumis dudaim*), *Arbutus andrachne* (eastern strawberry tree), birthwort (*Aristolochia sp.*), carob (*Ceratonia siliqua*), castor-oil plant (*Ricinus communis*), clammy Plantain (*Plantago afra*), common fennel (*Foeniculum vulgare*), common liquorice (*Glycyrrhiza glabra*), common myrtle (*Myrtus communis*), Dead Sea apple (*Solanum incanum*), Egyptian balsam (*Balanites aegyptiaca*), gold basket (*Alyssum sp.*), great horsetail (*Equisitum telmateia*), *Gypsophila struthium* (soap root), *Hycinthus orientalis* (wild hyacinth),

Table 1. Medicinal Substances of plant origin.

Scientific Name	Common Name	Arabic Name	Antaki's Remarks
<i>Achillea sp.</i>	Yarrow	Hazanbal	'And in Jerusalem, it is a gift from heaven' p. 123
<i>Allium porrum</i>	Leek	Kurrath	'It was proven' p. 271
<i>Alyssum sp.</i>	Gold basket	Alusun	
<i>Amomum sp.</i>	Amomum	Humama	
<i>Arbutus andrachne</i>	Eastern strawberry tree	Qatil-I-abiya	
<i>Aristolochia sp.</i>	Birthwort	Zarauand	'It has been verified... It is not proven' p. 177-8
<i>Artemisia judaica</i>	Judean wormwood	Wakhshizaq	'The plant was checked' p. 339
<i>Asparagus officinalis</i>	Asparagus	Hilyawn	'The conditions it benefits are proven' p.335
<i>Balanites aegyptiaca</i>	Egyptian balsam	Zaqqum	'It is learned from experience' p. 179
<i>Bryonia certica</i>	Syrian bryony	Fashra	
<i>Bunium paucifolium</i>	Caraway	Jauz Arqam	
<i>Cassia fistula</i>	Purging cassia	Khiyar shambar	
<i>Ceratonia siliqua</i>	Carob	Kharnub	'It makes fat... From experience' p. 137
<i>Colchicum sp.</i>	Saffron, crocus	Suranjan	'It was tried ... It has been proven' p. 204
<i>Coriandrum sativum</i>	Wild coriander	Kuzbarh	'It has been proven' p. 272
<i>Cornus mas</i>	Cornelian cherry	Mu	
<i>Coronopus squamatus</i>	Watercress	Rajal al-Gharab	
<i>Croton tiglium</i>	Purging croton	Dand	
<i>Cucumis dudaim</i>	Apple cucumber	Dastabuya	
<i>Cyclamen persicum</i>	Persian cyclamen	Bukhur Maryam	'And it has been proven' p. 69
<i>Cydonia oblonga</i>	Quince	Safarjal	'It is claimed' p. 189
<i>Cyperus papyrus</i>	Paper reed	Bardi	
<i>Daucus carota</i>	Carrot	Jazar	'And this is from experience' p. 105-106
<i>Dianthus caryophyllus</i>	Pink	Zuhrah	
<i>Dorema ammoniacum</i>	Ammoniacum	Ushshaq	
<i>Doronicum scorpioides</i>	Leopardus-bane	Durunj	
<i>Dryopteris pallida</i>	Shiels wood fern	Sarkhs	'It was tried' p. 187
<i>Equisetum telmateia</i>	Great horsetail	Dhanb al-Hil	'We have not seen any flowers or fruits on the plant' p. 162
<i>Ficus sycamorus</i>	Sycamore fig	Gummaiz	'From experience' p. 108
<i>Foeniculum vulgare</i>	Common fennel	Razinaj	'It is found in Egypt ... And in our places, in spring ... It is proven' p. 165
<i>Gardenia sp.</i>	Gardenia	Aqras al-Malik	'I was told that ... but I have not tried it' p. 54
<i>Glycyrrhiza glabra</i>	Common liquorice	Sus	
<i>Gypsophilia struthium</i>	Soap root	Kundus	'The Romans also used it' p. 276
<i>Hyacinthus orientalis</i>	Wild hyacinth	Awaqinthus	
<i>Hyssopus officinalis</i>	Hyssop	Zufa yabis	
<i>Inula helenium</i>	Elecampane	Rasin	'It is proven' p. 164
<i>Iris mesopotamica</i>	Mesopotamian iris	Irsa	
<i>Juglans regia</i>	Walnut	Jawz	
<i>Juncus acutus</i>	Sharp rush	Asal	
<i>Laurus nobilis</i>	True laurel	Ghar	'It has all been checked... and it is not true' p. 243
<i>Lycoperdon sp.</i>	Deer balls	Ghushinah	
<i>Mandragora autumnalis</i>	Autumn mandrake	Luffah	'All these effects are proven and well-known' p. 283
<i>Melia azedarach</i>	Neem	Jarud, Azadarkhat	
	Black mulberry	Tuth	'From experience' p. 98
<i>Myrtus communis</i>	Common myrtle	As	'It is priceless ... From experience' p. 43
<i>Plantago afra</i>	Clammy plantain	Dufas	
<i>Polypodium lonchitis</i>	Serapias, lonchitis	Lanhitis	'People claim ... but it is rough' p. 284
<i>Prosopis fratta</i>	Mesquite	Yanbat	'It is said ... but we have not seen it' ----- 'It is proven' p. 342
<i>Pyrus communis</i>	Pear	Kummathra	
<i>Retama raetam</i>	White broom	Ratam	
<i>Ricinus communis</i>	Castor-oil plant	Kharwa	
<i>Saccharum officinarum</i>	Sugar cane	Sukkar	'It was tried and is famous in our parts... From experience' p. 194-5
<i>Solanum incanum</i>	Dead Sea apple	Hadaq	
<i>Taxus baccata</i>	Yew tree	Zarnab	'The correct thing is it is a plant...' p. 177
<i>Thapsia qarqenica</i>	Drias plant	Darias	
	Sea squill	Basal al-Ansal	'It was tried ... It heals... It was observed from experience and the truth is...' p. 76
<i>Vigna sisensis</i>	Mongo bean	Mash	

Note. Table 1 is alphabetically ordered according to scientific name.

Inula helenium (elecampane), Judean wormwood (*Artemisia judaica*), *Juncus acutus* (sharp rush), *Laurus nobilis* (true laurel), Leopardus-bane (*Doronicum scorpioides*), *Mandragora autumnalis* (autumn mandrake), paper reed (*Cyperus papyrus*), Persian cyclamen (*Cyclamen persicum*), pink (*Dianthus caryophyllus*), saffron (*Colchicum sp.*), sea squill (*Urginea maritima*), serapias (*Polypodium*

sp.), sycamore fig (*Ficus sycamorus*), Syrian bryony (*Bryonia certica*), watercress (*Coronopus squamatus*), white broom (*Retama raetam*), yarrow (*Achillea sp.*) and yew tree (*Taxus baccata*).

The list also includes typical agricultural crops that according to al-Antaki also had medicinal uses. Crops mentioned include: asparagus (*Asparagus officinalis*),

black mulberry (*Morus nigra*), Caraway (*Bunium paucifolium*), carrot (*Daucus carota*), Coriandrium sativum (wild coriander), hyssop (*Hyssopus officinalis*), leek (*Allium porrum*), mongo bean (*Vigna sesensis*), pear (*Pyrus communis*), purging cassia (*Cassia fistula*), quince (*Cydonia oblonga*), sugar cane (*Saccharum officinarum*) and walnut (*Juglans regia*).

Other plants, such as *Amomum sp.* (amomum), *Cornus mas* (Cornelian cherry), *Croton tiglium* (purging croton), *Dorema ammoniacum* (ammoniacum), *Gardenia sp.* (gardenia), *Melia azedarach* (neem) and *Thapsia qarnqenica* (drias plant), were brought to the area specifically for their medicinal applications. Ferns were also used medicinally, and the list mentions species such as *Lycopodium sp.* (deer balls), *Polypodium sp.* (serapias), and *Dryopteris pallida* (Shiels wood fern).

Plants that appear in the list were either used as simple drugs, or frequently as one ingredient in a more complex medication. al-Antaki's book is important for research because he both describes the plant and explains the way it was used by the classical and Arab physicians who went before him. A deeper investigation into the use of plants for medicinal treatment reveals that as found in other historical pharmaceutical works, all parts of the plants were used medicinally. al-Antaki describes the uses of fruits (for example, walnut and gardenia), roots (carrot and autumn mandrake), resins (ammoniacum), flowers and their parts (quince), and leaves (neem and Egyptian balsam). Often (23 times)¹⁴ al-Antaki adds a personal impression or an original recipe of his own. This individual written evidence confirms the physician's expertise in the medicinal application of plants growing in the area, and further suggests a comprehensive, first-hand general understanding of nature in the Levant.

The medicinal use of animals and their organs

In his book, al-Antaki describes the use for medicinal purposes of a number of animals, among which we have identified nine that share a medicinal connection with the Levant. These animals are presented in Table 2.

Among the animals used medicinally, some were clearly domesticated (such as cattle) and used either for food or for work. According to al-Antaki, the cheese produced from cow's milk was used to treat scabies, to relieve burning sensations in the urinary tract, to treat kidney problems, and as an aphrodisiac. al-Antaki claims that the best cheese 'comes from Cyprus and is renowned in Egypt and the Levant'.¹⁵ The internal organs of the mule were used to prevent inflammation of the joints and similar conditions, as well as being prized as painkillers. Eating a mule's heart was supposed to purify the body, eating its liver prevented pregnancy, and drinking its urine stopped excessive tears. al-Antaki specifies that the mule should be born to a particular mare common in the Levant.¹⁶

The silkworm, though mainly used, of course, to produce silk, is common in regions that enjoy a temperate climate, such as the Levant, and has several medicinal properties. According to al-Antaki: (a) its ashes were used to treat wounds; (b) its liquids were used to eliminate scars; (c) its boiled body was used to treat swellings, throat infections, and racing heartbeat.

The stinking bug, a common parasite at that time, was used to treat headaches, uterine problems, coughing, and fever, to dissolve kidney stones, and to open blocked urinary tract.¹⁷

One of the most interesting entries is that referring to the 'Sidon fish', whose medicinal application was likewise mentioned by other contemporary writers, yet whose identification was not positive until recently. al-Antaki describes the 'Sidon fish' as coming 'from a spring in the village of Takuv in the Shakif region which is found in the vicinity of Sidon...this fish resembles the human shape, and swims in a file during the winter months. The fish in question was one with a small striped head, the male only having a long tail. When this fish is annoyed, foam comes out of its mouth. This foam and the flesh of the fish are used as strong aphrodisiacs...'. From this detailed description, and from additional material in a variety of historical sources,¹⁸ as well as from its reproductive cycle and behavioural

Table 2. Medicinal substances of animal origin.

Scientific Name	Common Name	Arabic Name	Antaki's Remarks
<i>Bombyx mori</i>	Silkworm	Dud al-Qaz	
<i>Bos taurus</i>	Cattle, cheese	Jaban	-
<i>Chamydotis undulata</i>	Bustard	Hubrah	-
<i>Cimex lectularius</i>	Stinking bug	Baq, Fasfas	'It is proven' p. 81
<i>Equus asinus X</i>	Mule	Baghal	'From experience' p. 79
<i>Equus caballus</i>			
<i>Lampyris sp.</i>	Firefly	Habhab	'It is proven' p. 115
<i>Merops sp.</i>	Bee-eater	Shaqraq	
<i>Muscicapa sp.</i>	Flycatcher	Hataf	'>From experience' p.141
<i>Titurus vittatus</i>	Sidon Fish	Samakah sayda	

Note. Table 2 is alphabetically ordered according to scientific names.

patterns, we can now identify the 'Sidon fish'¹⁹ as the amphibious *Triturus vittatus* (striped triton) found in the north of Israel and Lebanon.²⁰

al-Antaki mentions three wild birds: the bee-eater, the flycatcher, and the bustard. The bustard, according to al-Antaki, is a big bird that 'eats watermelons in Bilad al-Sham', and was used to prevent or eliminate phlegm, treat pneumonia, dissolve kidney stones, and remove cataracts, together with additional applications that are strain credibility. In his entry for the bustard, al-Antaki outlines the use of the bird's flesh, fat, blood, and internal organs (such as the stomach), ashes from its feathers, its eyes, and claws.²¹ Secondly, he mentions the flycatcher as a bird that 'nests in Greater Syria and in Egypt'. Parts of it were used as a drug to dissolve blood clots, to treat jaundice and infected spleens, to dissolve kidney stones, and to cure eye and skin diseases.²² Finally, the bee-eater is described as 'a bird as big as a dove that spends its summers in the Levant'. It was used to eliminate odour, treat colds and skin diseases, and remove phlegm.²³

The firefly is identified as possessing special medicinal properties, and was used to dissolve kidney stones and to heal haemorrhoids.²⁴ As far as we know, its application for these specific conditions is described only in al-Antaki's encyclopaedia, and there are few other references to its use throughout medieval literature. Here, as elsewhere, al-Antaki's personal touch is significant: from the nine animals mentioned above, the writer describes the medicinal applications of four that he himself had tried.²⁵

The medicinal use of minerals and metals in the medieval Levant according to al-Antaki

Among the minerals that were in use medicinally, al-Antaki describes five that are connected to the Levant. They are listed in Table 3.

Like many other early writers, al-Antaki describes the use of asphalt in medicine, and states that in the Levant it is called *Kafar al-Yahud*.²⁶ Asphalt was used medicinally to stop racing heartbeat, strengthen the stomach, treat infections in the spleen and liver, and stop diarrhoea. It was also taken as an aphrodisiac.

An additional mineral mentioned is the Jew's stone, also called *Zaitun bani Israil* which al-Antaki identifies as 'a stone found in Jerusalem and Greater Syria'.²⁷ Further on, the writer describes it as being 'a round or rectangular soft stone, the best of which contains irregular lines ... it dissolves kidney and bladder stones ... its powder treats wounds ... Mixed with honey it softens calluses and hard skin'. Ibn Sina gives a similar descriptions of the substance.²⁸

Iron rust was used to treat skin and eye conditions, as well as being in demand as a cosmetic. Rust was also used

as a contraceptive and to eliminate haemorrhoids, and in treatments against diarrhoea.²⁹ al-Antaki's book is among the few who described the existence of Iron in al-Sham, and its medicinal uses. Earlier source, al-Muqadisi (10th century), mention the existence of Iron in the mountains of Beyroth, but without any information concerning its medicinal uses.³⁰

Elsewhere, the writer mentions the medicinal use of *Turab* (dry earth), particularly 'Sidon earth' or 'connecting earth', which comes from a cave outside the city of Sidon. This earth was renowned for being very efficient in knitting together fractured bones.³¹ Another type of earth or clay is the mineral haematite, identified by its red/yellow hues. This substance was imported from 'the land of the Romans'³² and, according to al-Antaki, was used to stop haemorrhaging and diarrhoea, to treat skin diseases and high fever, to reduce swellings, and to clean infected sores. al-Antaki especially emphasises that women in Bilad al-Sham used to drink this mineral with sugar to make them very fat.³³

Other medicinal substances

In al-Antaki's book, two additional substances appear that are also mentioned as being used medicinally in the Levant. Since their origin is unclear, they are presented separately in Table 4.

Mumiya was an imported substance, about whose origins scholars remain divided. There are two prevailing theories: (a) it was a part of a mummified body, which had medicinal applications as a result of the substances used in the mummifying process; and (b) it was a black liquid substance similar to the bitumen (a combination of carbon and hydrogen) which forms in nature from organic material. al-Antaki explains the word *mumiya* as deriving from

Table 3. Medicinal substances of mineral origin.

Common Name	Arabic Name	Antaki's Remarks
Asphalt	Kafar al-Yahud	-
Clay, earth	Turab sayda	'It was said... but we have not seen it' p. 91
Haematite	Mughra	'It is also proven' p. 311-2
Iron	Hadid	-
Jew's stone (Cidaris sp.)	Hajar al-Yahud	-

Note. Table 3 is alphabetically ordered according to common names.

Table 4. Medicinal substances of different origins.

Common Name	Arabic Name	Antaki's Remarks
Mummy		'It was checked and was correct' p. 325-326
Soap	Sabun	'From experience' p. 221

Greek, meaning 'that which preserves bodies'. He also writes that 'it originates in waters as black as tar and it is found in Persia and marketed from there. However, a similar substance was seen in Morocco on the seashore, in Spain, in the Yemen, and in Syria in the heart of trees'.³⁴ *Mumiya*, also called *Mumiyat al-Kaburia*, was used in a wide range of medical prescriptions: to heal fractured bones, to treat headaches and dizziness, to treat paralysis and epilepsy, and to remedy coughs, suffocation, poisoning, various pains, and skin diseases.³⁵ We also learn about the use of *Mumiya* in Jerusalem from the writings of Franciscan monks, and in particular from the work of Frederic Hasselquist, a Swedish botanist who visited the Franciscan pharmacy in Jerusalem in 1750.³⁶

Another additional substance appearing in al-Antaki's book is soap, manufactured in the area from olive oil and exported to many countries, particularly Egypt.³⁷ al-Antaki describes the medicinal use of soap in the Halab and Bilad al-Sham regions, and specifically mentions soap manufactured from the *Ricinus communis* (castor-oil plant).³⁸ This soap was used as a dehydrator, to treat intestinal infections and swollen joints, to kill intestinal worms, and to induce both diarrhoea and abortions.

Conclusion

The contribution of the physician and writer Daud al-Antaki to our understanding of the medicinal tradition in the Levant is considerable. The large number (73) of substances mentioned in connection with medicine in this region provides a comprehensive database and a yardstick against which the reliability of other historical sources can be measured. In fact, al-Antaki's text documents in detail 28 percent of all the substances (286) known to have been in use in the Levant at the time, according to all sources known to date.³⁹ This fact alone is testament to the quality of the physician's work in preserving medical knowledge in general, and the local medical tradition in particular.

However, it is also worth noting, as we have already seen, that not all the information given is original. In keeping with common practice at the time, the writer often asserts that 'it is claimed...' or 'it is said...', and then proceeds to list various applications for a substance without giving the source of his information. In other cases the writer quotes classical physicians such as Dioscorides and Galen, and medieval physicians such as al-Kindi and Ibn Amran. Nevertheless, in such a comprehensive book there are also numerous innovative statements that confirm the writer's own status as a groundbreaking figure in his field. The originality of some of the entries in al-Antaki's encyclopaedia, particularly concerning the use of animals and their organs in medicine, greatly contributes to our understanding of this issue. The inclusion of animals such as fireflies, flycatchers, bustards, mules, and bee-eaters,

whose use was rare and which are mentioned in very few other sources of that period, is highly significant in the assessment of al-Antaki's contribution to research into medicinal substances in use in the medieval and Ottoman Levant.

From the historical geographic aspect, al-Antaki mentions the names of various places that were centres for the manufacture, production, and application of medicinal substances. Among the important locations mentioned in the Levant are Sidon, Beirut, Lebanon, Gaza, Jerusalem, the mountains of Jerusalem, and the Temple Mount. Similar names were also cited by physicians and writers who studied medicine and life-sciences in the medieval Levant; in the future, it may be necessary to research the issue of manufacturing and marketing centres if we wish to reach a better understanding of medicine in the region.

The fact that Daud al-Antaki wrote his book at the end of the 16th century is also of considerable significance. Its appearance ushers in a subsequent period of stagnation in research and medical innovation in the Levant. It also represents the end of an era in which only natural Old World substances were used in medicine. Of course, this is not to say that we cannot also learn from sources written in a time of decline and stagnation, as even an eclectic book with few credible sources can be enlightening on various subjects. It enables the dedicated researcher to draw conclusions and extract useful scientific knowledge.

To conclude, Daud al-Antaki's knowledge and experience, as evinced in his encyclopaedia, reflect the richness of a medicinal tradition that utilised substances present locally and well known in the Levant. This richness bears witness to our claim that the Levant had an independent, well-developed medical tradition that was part of a larger Arab medical tradition in the East, at least as sophisticated as, if not far superior to, its counterpart in the West.

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14. See table 1.
15. al-Antaki, (n. 4) *Tadhkirat Uli l-al-Bab*, p. 103.
16. *Ibid.*, pp. 89-90.
17. *Ibid.*, p. 159.
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31. *Ibid.*, pp.91-92. Also a similar description in Ibn al-Baytar, (n.15) *Kitab ak-Jami'*, I. 147.
32. Probably meaning Asia Minor (Byzantium).
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