ARABIC TEXTS AVAILABLE TO PRACTITIONERS OF THE HEALTH PROFESSIONS IN MEDIEVAL ISLAM

by

SAMI K. HAMARNEH

Curator, Diivsion of Medical Sciences, Smithsonian Institution

The sixth and seventh centuries witnessed a remarkable outburst in economic, religious, cultural and political creativity, vitality and an outreach in Arabia and the Fertile Crescent. It was after the climax of their military conquests in the eighth century, however, that leaders of the new empire turned towards organizing government and communal administrative systems and encouraged the pursuit of learning and higher living standards. By the ninth century, Arabic civilization developed into a mature and very promising position in all fields of human knowledge including the healing arts. Several elements contributed towards this remerkable achievement of which five primary factors will be outlined.

One, is due to the interest and generous patronage of caliphs, rulers and notable and wealthy citizens to propagate education, and constructive religiously oriented learning. Many other conquerers in history allowed their followers to pillage, plunder and seek booty. On the contrary, caliphs and Muslim leaders often encouraged the preserving of ancient legacies. They endeavoured to adopt and make good use of the best and most worthy accomplishments from earlier civilizations (العمران). In this early period, under real Arab leadership, the achievement was great.

Two, is the expansion or trade, industry and intercourse which brought economic prosperity. Such favorable conditions provided the atmosphere for advancement, prestige, and rich rewards to the learned.

Three, is the introduction of paper manufacturing since 794, which replaced, rather rapidly, the dependence

* delivered at the meeting held on 6.11.67.

on the expensive and cumbersome use of papyri and parchments. This took place over four centuries before paper was in wide usage in the West. Therefore, copying of texts and binding of books soon developed into a wide scale occupation for many learned and crafts men. The collecting and selling of books on all known topics of the various fields of learning prospered. Medical texts soon became available to practitioners and students in many parts of the Muslim world.

Four, which for the development and progress of the health professions can be considered the most important element, is the translation and transmission of the best available writings from Syriac, Persian, Sanskrit, Coptic and Greek into Arabic. The richest and most influential was the Greek legacy.(1)

Five, is the rise of educational and medical institutions, such as libraries, hospitals and medical schools. Generous endowments were allotted by caliphs and rulers to propagate such establishments so that their people could derive benefits from them. Rich, imperial libraries such as that of al-Hakam II (961-76) in the Moorish capital, the late tenth century library of prince Nuh b. Mansur which Ibn Sina used, and that in Cairo under the Fatimid caliph of the eleventh century are good examples.(2) Of hospital services and medical care, the story is told of a noble man who entered the hospital on the pretense that he was sick. After staying two days in the hospital, he became convinced of the truth about what he heard of the good care given to patients.

The intellectual activities of the ninth century translators in Baghdad, (most of them Arab Christians who knew Syriac and Greek), together with the availability of writing materials, and hospital and private libraries helped to establish the healing arts on a solid foundation and made provisions for continued progress. Original and translated medical texts of the ninth century helped to develop and shape up medical education, practice and ethical standards in medieval Islam.(3)

Massawayh ابو زكريا يوحنا بن ماسويه ٧٧٧ ـ ٨٥٧ م ·

for example, beside the books which he translated, authored several others on diet, bathing, headache, barley water, blood letting, cupping and on fevers. Ibn al-Nadim lists about twenty of them:(4) الكمال والتمام ، الكامل ، الحمام ، دفع ضرر الأغذية ، القولنج ، علاج الصداع ، محنة الطبيب ، ماء الشعير ، الفصد والحجامة ، السواك والسنونات ، اصلاح الادوية المسهلة ، الحميات مشجر The writings of Masawayh (Latin Masue) were widely read by practitioners and students. Most of them were translated into Latin in the late Middle Ages and were printed repeatedly during the fifteenth and sixteenth centuries.(5)

Masawayh's contemporary was al-Tabari أبو الحسن علي بن سهل بن ربن الطبرى of Marw. He was a Christian scholar in the service of Maziyar b. Qarin, with good knowledge of the Syriac language. Summoned by al-Mu'tasim (833-42) to Iraq, he there embraced Islam. His best known medical book is the Paradise of Wisdom فردوس الحكمة اتمه فى مدينة سرمن رأى فى السنة الثالثة (سنة ٨٥٠ م) من خلافة المتوكل ٠ comprising seven sections in thirty treatises in 360 chapters. It discusses the nature of man, and animal, the universe, genesis, birth and growth, motion, the body s senses and emotions, temperaments, diet, general and acute diseases, fevers, simple and compounded drugs and Indian medicine (quotations from Charaka, Susruta and others). In the introduction he lists five virtues characterizing the good physician: 1. His concern and endeavour to bring comfort, health and pleasure to others; 2. his attempts to cure «hidden» diseases; 3. need of his services to the great and to the humble; 4. the respect attributed to the profession by all nations; 5. and the human and divine mission of the gentle, contented, merciful and honest physician, who treats his patient as if he is his own, who does more than speak همته فى الفعل دون العمل and whose aim is to help and cure the sick not to gain monetary profit.(6) The *Firdaws* was widely read especially in the first two centuries after its appearance. In it, al-Tabari refers to the contributions of Hunayn

أبو زيد حنين بن اسحق العبادى (٨٠٩ ـ ٧٣ م)

one-time student to Masawayh in Bagdad. Hunayn's medical writings and translations and those of his associates constituted the sound foundations upon which the development and progress of the health professions in Islam were based.(7) Famous among them is his (in association with Hubaysh),

the *Masa'il* and the ten treatises on the eye المسائل فى الطب المتعلمين (مع زيادات حبيش بن الحسن الاعسم) ، الاسنان واللثة ، الحمام ، اللبن ، الأغذية ، العشر مقالات فى العين (مع حبيش) ، معرفة أوجاع المعـــدة ، الترياق ، وفى استخراج كمية كتب جالينـوس

In my estimate, these books of Hunayn and his students did more to define and reshape Arabic constructive, rational and progressive medical thought, its doctrines, procedures and concepts than any other similar works.

The new words and idioms applied by Hunayn, his son Ishaq, al-Kindi, their associates and contemporaries enriched the Arabic medical and philosophical terminology to embrace and become a language of science for several generations. Their works were widely used until the appearance of the the medical text of al-Razi (Latin Rhazes), ابو بكر محمد بن زكريا الرازى ٨٦٥ ـ ٩٢٥ م له الحاوى الكبير ، الفـــاخر ، المنصورى ، برء الساعة ، الطب الروحانى ، الجدرى والحصبة ، المرشد ، الشكوك على جالينوس ، النقوس ، الكناش المشجر (التقسيم والتشجير) ومقالة فى محنة الطبيب · on alchemy, where he opposed al-Kindi in asserting the possibility of transmutation كتاب فى ان صناعة الكيمياء الى الوجوب أقرب منها الى الامتناع ، كتاب الادوية الموجودة فى كل مكان ، and on pharmacy(8) and drug therapy دفع مضار الاغذية ، واطعمة المرضى ·

No sooner did the works of al-Razi become known than they were transmitted, changed hands, copied and acquired by practitioners and students throughout the Islamic world. Thus, the works of Hunayn and al-Razi influenced every student of the health professions in medieval Islam. Then when rendered into Latin in the West, they continued to influence medical teaching in Europe from the twelfth century through the Renaissance.(9)

In the late ninth century encyclopedic medical text, after the example of the *Firdaws* of al-Tabari and Razi's *al-Mansuri,* became popular. The best examples are the *Liber Regins* of al-Majusi(10 كامل الصناعة الطبية المعروف بالملكى لعلى بن العباس المجوس المتوفى سنة ٩٩٤ م · التعريف لمن عجز عن التأليـــف and the Tasrif of Abulcasim al-Zahrawi(11)

لابى القاسم خلف بن عباس الزهراوى المتوفى بعد الاربعماية هـ ·

The works of these two men, together with those of al-Razi, ranked high as each has added important personal observa-

tions and original contributions to medicine. The caliber of the available medical text in Arabic thus reached its highest expression and exhibited a great thrust towards advancement, independent and valuable achievements. Unfortunately, this high professional standard of attainment, with its tendency to further progressive steps and promising future was soon curtailed. It was overshadowed by the writings of Ibn Sina (Avicenna الشيخ الرئيس ابو على الحسين بن عبد الله بن سينا ٩٨٠ ـ ١٠٣٧ م وله كتاب القانون فى الطب والارجوزة والادوية القلبية والسكنجبين

Ibn Sina's al-Qanun comprises five books. I. on general principles of the healing art (Colliget), natural matters, causes and and symptoms of diseases, on hygiene and laws of therapeutics. II. on simple drugs, their properties and uses, arranged in alphabetical order. With sections which are on cosmetology, fevers and antidotes. III. on specific diseases الامراض الجزئية from the head to the foot with anatomy and physiology of body's organs. IV. on diseases not generally particular to certain body's organ, where he once more discusses cosmetology, fevers, poisons and antidotes. V. on compounded drugs serving as a medical formulary of the various pharmaceutical dosage forms and in what ailments they are best utilized. Despite the elegance in style and presentation of the Canon, it lacks objective organization, a fact that denotes unfamiliarity in clinical and applied medical treatment by the compiler. Subject matter in one book occasionally overlaps another in the second book and the classification of sections and chapters is cumbersome and verbose also. It was not yet the period of decline in Iran, however. Two of Ibn Sina's contemporaries, for example, Ahmad ibn Miskawayh (d. 1930), and Abu al-Rayhan al-Biruni (d. 1048) contributed greatly towards the progress of the health professions, educational methodology, ethics and medical historiography. (12) The prestige that Ibn Sina gained and the great shadow which he overcast turned the eyes of medical students and practitioners to look up to his writings for guidance, inspiration and help in the complexities and challenges of the profession. Unfortunately, his supporters and admirers became the more confused and the less productive. The more commentaries on the Canon, the more the problem became acute.

شرح القانون ، شرح الكليات ، قانونجة ، الموجز الطلب ، حل الموجـز

Medical thought, in areas where the influence of Ibn Sina overshadowed other influences, stagnated and the teaching of the healing art began to decline rapidly.

In Syria, Egypt and al-Andalus, from the eleventh through the thirteenth centuries, the picture seemed brighter for the health professions. About the middle of the eleventh century, Ibn Butlan(13) أبو الحسن المختار بن الحسن بن عبدون بن بطلان النصراني البغدادى وله كتاب كناش الاديرة والرهبان ، وتقويم الصحة بالاسباب الستة ، ودعوة الاطباء .
He was an ardent promoter of the healing art and devoted to learning. He is the author of the poem in which he says that at his death only books and learned circles will mourn him:
ولا أحـد ان مت يبكى لميتتى سوى مجلسى فى الطب والكتب باكيا
His contemporary Ibn Ridwan of Egypt excelled other Egyptian physicians of his time in his methodical approach to medicine, physical fitness, exercises and the causes and ways of prevention of plagues. He was the author of several treatises and epistles on philosophy and the natural sciences including the health field. 14.

In Damascus, about the middle of the twelfth century, the establishment of the Nuri hospital became a landmark. It served not only as a place to care for the sick but as an educational center of great significance as well. Medicine was taught here and among its many graduates, several became famous educators and authors who contributed towards the progress of their profession. Ibn al-Naqqash for example, هو الشيخ أبو الحسن على بن عبد الله مهذب الدين بن النقاش المتوفى سنة ٥٧٤ هـ سنة ١١٧٩ م
although he studied medicine in Baghdad under the tutorage of Ibn al-Tilmidh, he served at the Nuri hospital in Damascus for many years. موفق الدين ابو نصر اسـعد بن ابى الفتح العباسى بن المطران المتوفى سنه ١١٩١ م Ibn al-Matran, the son of a physician in Damascus where he was born, studied and practiced. There he also wrote most of his books including his Bustan بستان الاطباء وروضة الالباء which exists now in at least three copies, والمقاله الناصرية فى حفظ الأمور الصحيه which he decicated to his patron Saladin (Salah al-Din, d. 1193). 15 The Crusades conflict not only challenged but also awakened interest in education and advanced medical practice in Syria and neighboring countries. As a result, during the

thirteenth century, other famous hospitals and private medical schools were established and prospered. Graduates from the Nuri hospital, such as the famous Ibn al-Nafis traveled to Cairo to teach and practice the healing art.

Ibn al-Quff of Jordan هو الحكيم امين الدولة أبو الفرج بن موفق الدين يعقوب بن اسحق بن القف المسيحى الكركى (ولد سنة ٦٣٠ هـ أو سنة ١٢٣٣ م وتوفى سنة ١٢٨٦ م) started his medical education with Usaybi'ah, the great historian of medicine (d. 1270), and later at the Nuri hospital. He was a prolific writer and his 'Umdah العمدة فى صناعة الجراح in twenty treatises is the most comprehensive Arabic surgical text in medieval Islam. 16 In it he showed the connection between arteries and veins and spoke of the capillaries as the unseen pores. He also defined and explained the anatomical function of the cordial valves. His also was the first recorded appeal for the unification of weights and measure standards in the Arab states. 17 Baghdad did not lag much behind during most of this same period. In the twelfth century, the fame of the chief physician, Ibn al-Tilmidh أمين الدولة أبو الحسن هبة الله بن ابى العلاء صاعد بن ابراهيم بن التلميذ drew a great أوحد زمانه فى صناعه الطب المتوفى سنه ١١٦٥ م audience of medical students to the Abbasid capital to attend his lectures. He also authored several books on pharmacy, medicine and minor surgery. 18 المقالة اقربا ذينة العشرين بابا ، الأمينية فى الادوية البيمارستانية ، اختيار كتاب الحاوى للرازى ، اختيار (اختصار) مسكويه فى الأشربة ، شرح مسائل حنين ومقالة فى الفصد These books were widely read and circulated. His contemporary Abu al-Barakat was a competent physician, philosopher and natural scientist. Soon after him Ibn Hubal 19. أبو الحسن على بن احمد بن هبل البغدادى الخلاطى علامة زمانه فى صناعة الطب وفى العلوم الحكمية المتوفى سنة ٩١٠ هـ أو سنة ١٢١٣ م became a leading figure in medical education. His *al-Mukhtar* was published in 2 vols. in Hyderabad, India المختارات فى الطبع طبع سنة ١٣٦٢ ـ ٦٤ هـ In it (pp. 3-7), the author argues that the study of medicine should not be confined to certain families but be the privilege of the talented and the qualified. He emphasized the high ethical standards of the profession according to the Hippocratic oath. In it, he also gives chapters on the formation of the embryo, on birth, on diet, on body and mouth hygiene,

on minor surgery, on simple and compounded drugs, weights and measures, and the treatment of diseases and against poisoning.

His contemporary al-Samarqandi (d. in Heret, 1222), was author of several books. 20

نجيب الدين ابو حامد محمد بن علي بن عمر
السمرقندي وله اغذية المرضى ، والأسباب والعلامات وكتاب الاقرباذين

He compiled much of their subject matter from earlier writings such as those of al-Razi, al-Majusi, Ibn Sina and the translated works of Hippocrates. Besides the writings of al-Kutubi (d. ca. 1311),

يوسف بن اسماعيل بن الياس الجويني (الخوري) البغدادي الكتبي جامع
كتاب مالايسع الطبيب جهله ومنه عدة مخطوطات باقية لعصرنا هذا ·

medical education and progress in Iraq came to a standstill. 21 The decline was rapid after the fall and destruction of Baghdad by the Tartars in 1258. In Persia and eastward, the tradition of the Unani medicine continued with no original additions. The texts used were commentaries on earlier works, such as the *Canon* of Ibn Sina, the *Mujiz* of Ibn al-Nafis and the *Qanunjah* of the Jighmini. These Arabic commentaries were followed by translations from Arabic into Persian, Urdo and Turkish. In Syria and Egypt there was a thin line of continuation, be it insignificant. The late thirteenth century was a promising era with the works of Ibn al-Quff and Ibn al-Nafis. Continuation of their tradition, however, was soon curtailed with few exceptions. Arabic medical contributions in this period came to a close.

Mention has been made about several important texts which represented the reading and teaching material available and recommended to medical students and practitioners alike. On *materia medica* and properties of drugs from animal, mineral and plant origins, there were also several texts worth mentioning. 22 After the translation of Dioscoride's five books from the Greek, both in Baghdad and in Cordova, Muslim medical botanists and physicians were challenged to write on the topic. In the tenth century, Ibn Juljul in the Andalusian capital wrote on drugs not mentioned by Dioscorides. Al-Zahrawi recommended simple and compounded drugs used in certain diseases. During the eleventh century in Moorish Spain, Ibn Samajun and Ibn Abi al-Salt each wrote a book

on simples كتاب الادوية المفردة The best text on *materia medica* of the twelfthcentury, however, was that of al-Ghafiqi (d. 1165) bearing the same Arabic title.

أبو جعفر احمد بن محمد بن السيد الغافقي

In the late twelfth century, Ibn al-'Awwam devoted a big part of his book on agriculture to medicinal plants. 23 كتاب الفلاحة لابى زكريا يحيى ابن العوام الاشبيلى

In his materia medica, al-Suri in the early thirteenth century describes many medicinal plants for the first time with illustrations. His book, unfortunately, is lost. Soon thereafter, Ibn al-Baytar (d. 1248) جامع مفردات الادوية والاغذية لضياء الدين ابو محمد عبد الله بن أحمد بن البيطار gave in his *Jami* a great amount of information compiled from earlier works on drugs and diets and their characteristics and pharmacological action on the human body in therapy. His work was commented upon and abridged in al-Kutubi's previously mentioned text. 24

Medical formularies started with the *Aqrabadhin* of Sabur ibn Sahl (d. 869), followed by *al-Dukkan* of Ibn 'Abd Rabbin in the first half of the tenth century. One of the best treatises on the art of the apothecary is *al-Saydanah* of al-Biruni (973-1048) written in Ghazna (now Afghanistan). These medical formularies were superseded by the magnus *Aqrabadhin* of Ibn al-Tilmidh (d. 1165). The most comprehensive of these texts, however was the *Minhaj* of Abu al-Muna Koben ibn 'Attar completed in Cairo about 1260. 25

In regard to veterinary medicine, there has been several useful manuals available. Many of them were beautifully and artistically illustrated. Horses, mules, camels and other domestic animals have been treated with care and objectivity for their domestic utilities, their use in wars *(al-jihad)* and for religious and humanistic convictions. Famous among the early texts was *al-Khayl,* by Abu Sa'id al-Asma'i (d. 833). This was followed in about 870 by the more comprehensive *al-Furusiyah* by Ibn Akhi Hizam الفروسية والبيطرة لابى يوسف يعقوب بن اسحق بن اخى حزام

The art of the farriers continued to advance, especially in Syria and Egypt up to the fourteenth century as seen in the large works of al-Dimyati and al-Baytar both of Egypt

فضل الخيل لعبد المنعم الدمياطى ، كامل الصناعتين البيطرة والزرطقة لابى بكر البيطار اهداه للسلطان الناصر محمد بن قلاوون (حوالى سنة ١٣٣٠م) لذلك سمى بالناصرى ·

In his dedicatory introduction the Baytar states :

« Because of the king's love to learning, and to learned men, and because of his devotion to horses and the attention and care he gives to them, the glory they bring, and the religious reward and satisfaction they give as recorded in tradition, the Qur'an, and in historical annals... I decided to compile for his library this comprehensive text containing all what is needed in the art of the farriery and for horsemanship... It contains what I have tried personally, and what my late father mentioned and I have tried, and seen experts in farriery do both in Egypt and in Syria, and what I copied from authorities on the subject. »

This well-rounded manual comprises ten treatises and discusses horsemanship, characteristics of horses, habits, colors exercises, and their diseases and treatment. 26

Texts on surgery and anatomy were mainly based on Hunayn's translation of the writings of the Greeks. The most worthy Arabic contributions were those containing experiments and additions made by al-Zahrawi, Ibn al-Quff, and Ibn al-Nafis, mentioned earlier.

In the introduction to the book of the ten treatises on the eye by Hunayn Ibn Ishaq (published in Cairo, Government Press, 1928), M. Meyerhof gives very useful coverage of most of the important works by oculists and physicians on ophthalmology and the anatomy and treatment of eye diseases up to the eleventh century. In the twelfth century, Daniyal Ibn Sha'ya wrote an abridgement of 'Ali ibn 'Isa's *Theaurus of the Oculists*. A century later Ibn al-Hawafir completed his *Natijah*. The climax was reached in the fourteenth century in the comprehensive and charted *Kashf*, of Ibn al-Akfani (d. 1348). 27 كشف الرين فى أحوال العين لشمس الدين محمد بن برهان الدين بن ابراهيم بن ساعد الانصارى الشهير بابن الاكفانى ·

Most important in this period is the appearance of several note-worthy texts on the history of medicine with biographies of physicians, scholars and sages and bibliographies of their writings. They range from the famous tenth century Fihrist

of Ibn al-Nadim to the Mir'at of al-Yafi'i (d. 1366)

مرآة الجنان وعبرة اليقظان في معرفة ما يعتبر
من حوادث الزمان لابي محمد عبد الله بن أسعد بن علي اليافعي اليمني
الملكي المتوفى سنة ٧٦٨ هـ طبع في ٣ أجزاء بمطبعة المعارف ، حيدر
اباد سنة ١٣٣٨ هـ .

and *al-Durar* by al-Asqalani (d. 1448)

الدرر الكامنه في اعيان المايه الثامنة
لشهاب الدين أحمد بن علي بن حجر العسقلاني المتوفى سنة ٨٥٢ هـ ،
مطبعة المعارف العثمانية ، حيدر أباد سنة ١٣٤٨ هـ .

and the seventeenth century *Kashf* by Hajji Khalifah

كشف الظنون عن اسامي الكتب والفنون لمصطفى بن عبد الله كاتب المشهور
بحاجي خليفة (١٦٠٩ ـ ٥٧) ، طبع مرارا .

In surveying extant works on Arabic medicine, pharmacy and the allied sciences, one realizes the tremendous literary productivity in this medieval period. Arabic Culture, unlike that of Europe did not suffer the pangs of a renaissance or the modern periods until the nineteenth century. In addition, one can easily realize that a great portion of the Arabic legacy in medicine and allied sciences from the ninth through the thirteenth centuries were lost through wars, fires, bigotry, and natural disasters. Extant works in national and private libraries are, nonetheless still too many. Only a fraction of them has been catalogued. The task of evaluating Arabic contributions to the progress of medical sciences remains incomplete until these repositories of historical documents and manuscripts are adequately studied and their original contents, when discovered, are evaluated.

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نوادر الطب ليوحنا بن ماسويه الى تلميذه حنين بن اسحق
Selectio ra medicamenta Joannis b. Mesue ad Honain exaratum a Guodam Garsia f. Joannis de Estrella, 1424.

6) النديم ، **الفهرست** ، ٤٢٦ ، ومحمد زبير الصديقى ، **فردوس الحكمة** ، لابى الحسن على الطبرى ، طبع برلين ١٩٢٨ ، ص ١ ـ ٨ ٥٣٧ ـ٥٥٧.

7) النديم ، **الفهرست** ، ص ٤٢٣ ـ ٤ ، احمد بن خلكان ، **وفيات الأعيان** ج ١ (١٨٨٥) ، ص ٢٠٩ ـ ٢١٠ ، وظهير الدين البيهقى **تاريخ حكماء الأسلام** ، نشر محمد كرد على ، دمشق الترقى ، ١٩٤٦ ، ص ١٦ ـ ٢٠
Casimir Petraitis, *The Arabic Version of Aristotle's*

Meteorology, Beirut, al-Machreq, 1967, pp. 32-65 speaks also of the pre-Hunayn period (mainly early ninth century) notable translations. See also D. Talbot Rice, «The Oxford excavation at Hira», *Ars Islamica, 1* (1934), 51-73.

8) القنطى ، **اخبار** ، ١٧٨ ـ ٨٢ ، سليمان بن حسان بن جلجل ، **طبقات الاطباء والحكماء** تحقيق فؤاد السيد ، القاهرة ١٩٥٥ ، ص ٦٥ ـ ٧٩ ، ابن خلكان ، **وفيات الاعيان** ، ٢ : ١٠٢ ، وحاجى خليفة، **كشف الظنون** القـــاهرة ، ١٨٥٨ ، ج ١ : ٢٩٧ ، ج ٢ : ١٦٢ ، والاب ج · شحاتة قنواتى **تاريخ الصيدلة والعقاقير** ، دار المعارف المصرية ، ١٩٥٩ ، ص ١٢٩ ـ ١٤٨

9) Gerhard Baader, «Zur Terminologie des Constantinus Africanus,» *Medizin historisches Jour., 2* (1967), 36-52; Ludwig Choulant, *Handbutch der Bûcherkunde fuer dir Altere Medicin,* Leipzig, 1841, 340-45; Leclerc, *Histoire,* 1:337-54 ; and Cyril Elgood, *A Medical History of Persia,* Cambridge Univ. Press, 1951, 196-209. Razi's treatise on small pox and measles was translated into Latin, English (by William A. Greenhill, London Sydenham Soc., 1848), German by Karl Opitz, Leipzig, 1911, French and other languages.

10) كامل الصـــناعة الطبية لعلى بن عباس المجوسى طبع فى مجلدين بالقاهرة سنة ١٢٩٤ هـ والحاجة ماسة لطبعة جديدة مع تحقيق · See Julius Wiberg, «The anatomy of the Brain in the works of Galen and 'Ali 'Abbas.» *Jamus, 19 (1914),* 17-32, 84-104 ; and Donald Campbell, *Arabian Medicine,* London, vol. 1, 1926, 74-77.

11) Hamarneh and Glenn Sonnedecker, *A Pharmaceutical View of Abulcasis al-Zahrawi,* Leiden, Brill, 1963, pp. 35-67. The anonymous medicinal recipes in *Codex Berolinensis arabicus Glaser* 8, have a large section copied from *al-Tasrif* of al-Zahrawi.

12) **تهذيب الاخلاق** لابى على احمـد بن محمد بن مسـكويه طبع سنة ١٨٩٩ بالقاهرة وله **كتاب الاشربة ، والطبيخ والأدوية المفردة وتجارب الأمم** · اما أبو الريحان محمد بن أحمد البيرونى المتوفى سنة ٤٤٠ هـ فله **الجماهر فى معرفة الجواهر** ، طبع سنة ١٣٥٥ هـ بحيدر أباد ، عثمانية ، وبها طبع كتابه **رسائل البيرونى فى الرياضيات وعلم الفلك** سنة ١٣٦٧ هـ (١٩٤٨ م) ·

See David S. Margoliouth, *lectures on Arabic Historians,* Univ. of Calcutta, India, 1930, pp. 128-143.

13) القفطى ، **اخبار** ، ١٩٢ ـ ٢٠٧ ، ابن ابى أصيبعة ، **عيون الانبـاء** طبع سنة ١٨٨٢ م بالقاهرة ج ٢ : ٩٩ ـ ١٠٥ .
Samira Jadon wrote her doctoral dissertation on Ibn Butlan's treatise on health and medical treatment of monks in monastic life (univ. of CALIF. Los Angeles).
أما كتاب **دعوة الاطباء**
لابن بطلان فقد نشره زلزل بالاسكندرية فى مطلع هـذا القرن .

14) القفطى ، **اخبار** ، ٢٨٨ ، وبدار الكتب نسختان لكتاب ، **دفع مضار الابدان بارض مصر** لعلى بن رضـوان المتوفى سنة ٤٥٣ هـ ، طب ٣٦ ، ومصطفى فاضل ١٨
See Carl Brockelmann, *Geschichte der arabischen Litteratur,* vol. 1, Leiden, Brill, 1943, pp. 637-8 ; and *Supplement,* 1:886.

15. ابن ابى اصبعة ، **عيون الانباء** ، ٢ : ١٧٥ ـ ١٨١
See Hamarneh» «Arabic Historiography as related to the Health Professions in Medieval Islam, «*Sudhoffs Archiv, 50* (1966), 14-15.

16) *Ibid.,* «Thirteenth century physician interprets connection between arteries and veins,» *Sudhoffs Archiv, 46* (1962), 17-26.

17) *Ibid.,* «The first recorded appeal for unification of weights and measure standards in Arabic medicine, *Physis, 5* (1963), 230-48.

18) ابن ابى أصيبعة ، **عيون الانباء** ، ج ١ : ٢٥٩ ـ ٧٦ ، ٢٧٨ ـ ٨٠
See A. Z. Iskandar, *A Catalogue of Arabic Manuscripts on Medicine and Science,* London, the Wellcome Historical Library, 1967, 78 and 129-32.

19) **المختارات فى الطب** ، لمهذب الدين على بن هبل المتوفى سنة ٦١٠ فى مجلدين بحيدر اباد الدكن ، ١٣٦ ـ ٦٤ ، وانظر ايضا ابن ابى أصيبعة **عيون الانباء** ، ج ١ : ٣٠٤ ـ ٣٠٦
See Brockelmann, *GAL.,* 1:646 : and *Supplement,* 1:895.

20) I consulted several manuscripts of the works of al-Samarqandi including *Tibb* 1, National Library of Cairo and many others.
See Brockelmann, *GAL.,* 1:646-7, and *Supplement,* 1:895-6.

21) Hamarneh, *History of Arabic Medicine and Pharmacy,* Cairo, 1967, pp. 38-41.

22) Meyerhof, «Arabian Pharmacology,» *Ciba Symposia, 6* (1944), pp. 1847-72 ; Martin Levey, *Medieval Arabic Toxicology,* Trans. Am. Phil. Soc., N. S. vol. 56, Part 7, Phila., Pa., 1966, pp. 6-19.

23) Sarton, *Introduction, 2* (1931), 424-5. I also consulted the *Filahah* copy of al-'Awwam at the British Museum, Add. 10, 461.

24) ابن ابى أصيبعة ، **عيون الانباء** ، ج ٢ : ٤٦ ـ ٦٢ ، وجلال الدين السيوطى **حسن المحاضرة** ، طبع سنة ١٢٩٩ هـ بالقـاهرة ، ج ١ : ٣١٣ ، واحمد عيسى ، **معجم الاطباء** ، القاهرة ١٩٤٢ م ، ص ٥٢٤

25) Several copies of the *Minhaj* are still extant, see Sarton, *Introduction, 2:* 1097-8 ; Iskandar, *Catalogue,* Wellcome, pp. 133-35 ; and Brockelmann, *GAL.,* 1:648, and *Supplement,* 1:897.

26) سامى حمارنه ، **تاريخ الطب والصيدلة عند العرب** ، القاهرة مطبعة التجليد الفنى ، ج ١ : ٣٢ ـ ٣٧ ، ج ٢ : ١٥ ـ ١٦ ٠
See Sarton, *Introduction,* 2:89; and C. Rien, *British Museum Catalog.* p. 460.

27) I consulted several manuscripts of the *Kashf by al-Akfani :* Tibb Tal'at no. 482 comprising the 3 treatises in 115 fols., dates 1252 A.H., the Haddad's in Beirut, the British Museum (OR. 5657) copies.