

An Arab-Muslim Scientific Heritage: Islamic Medicine

©Dr. Labeeb Ahmed Bsoul

Khalifa University Department of Humanities and Social Sciences October 9th, 2016, pp. 34, footnotes 130, 6,761 words and 11, 974 with footnotes, Abstract 202 words

Abstract:- In the history of medicine, “Islamic” or “Arabic” medicine refers to the medicine that evolved and then flourished during the “golden age” of Islam, a time when Arabic was the lingua franca of scholarship and scientific knowledge. During these centuries, Islamic medicine gained and maintained its solid reputation as a result of the interaction that took place between traditional Arab medicine and external influences. The first translations of earlier medical texts represent a key factor in the formation of Islamic medicine. The translation of Arab/Islamic science-based medical texts written by al-Ra>zi>, Ibn Si>na>, al-Kindi>, al-Zahra>wi>, Ibn Zuhr, and Ibn Rushd into Latin and Hebrew had a significant impact upon the development of medicine and were the main medical texts taught at European universities and hospitals up to the sixteenth century. This study will shed light on this significant impact, examine its contribution to modern medicine, and show just how much modern medicine has benefited from these translated texts. And desire to bring awareness to the rich Arab Islamic heritage to our understanding of science in the present.

Key words: *Islamic history of Medicine, Classical Muslim physicians, al-Ra>zi>, al-Kindi>, Ibn al-Nafi>s, Ibn Rushd, al-Zahra>wi>, Ibn al-Hytham, Ibn Zuhr, classical and modern medicine literature.*

I. INTRODUCTION:

al-Ja>h}iz} (d. 255/869), reported in his book *al-Bukhla>*’ a story as an example that speak directly to the widespread sentiment of an Arab-Muslim heritage in medicine, the story about the Arab physician Asad ibn Ja>ni> (d. around 850), speak directly to this widespread sentiment. Asad was once told that his medical business was expected to flourish during the plague year, to wish he answered that it was no longer possible for someone like him to make a living. When he was asked for the reason, he said: that he was a Muslim and people always thought, even before he became a physician or he was even born, that Muslims would never succeed in medicine...¹ Gustave Le Bon once said he wished that the Muslims had taken over France so that Paris would have become like Cordoba in Andalusia (Muslim Spain).² Muslim

*Associate Professor of Humanities and Social Sciences, teaching Sciences in Islam course at Khalifa University of Science, Technology and Research, Abu Dhabi U.A.E.

A special thanks and attributes for my beloved students at Khalifa University in the Sciences in Islam course: Amla Chokri Abdallah, Ahoud al-Marzouqi, Nahla Adel Rizq, Fatima Omar Mohamed Abdul Rahman, Dina Yousri, Selwa Boularaoui, Namareq Saleh Mohamed Widatalla, Ghalia Ghassan, Amna Usman, Umlakahir Ahmed, Sara Timraz, Shaikha Faris, Nujood al-Kindi, Ghada Mohammed Alhussein, Ammar Al-Sheghri, Mohammad Humood, and Sarah Strohkorb with whom I was inspired to share my knowledge and from their interesting discussions and research topics I benefited immensely. The same goes to Dr. Kinda Khalaf, Associate Professor of BME Department at Khalifa University.* Presented in WOCMES Conference Ankara-Turkey, August 18-22 2014.¹ al-Ja>h}iz}, Abu> ‘Uthma>n ‘Umro ibn Bah}ar (2008). *al-Bukhala>*’ ed. H{asa>n al-T{i>bi> Beirut: Da>r al-Ma‘rifah, p. 99
²Gustave Le Bon, 1884. *La Civilisation des Arabes* Paris: Firmin-Didot; translated into Arabic by ‘A<dil Zu‘i>ter, 1969. *H{ad}a>rat al-‘Arab*, Cairo: Mat}ba‘at ‘Issa> al-H{alibi>. In the thirteenth century, Roger Bacon (1214-1294), known as Doctor Mirabilis (“wonderful teacher”), placed considerable emphasis on the Arab scholars’ contribution to philosophy and knowledge at large that was missing in Europe... A.

physicians made wide-ranging and significant contributions to many areas of medicine and devised medical inventions and findings that laid the basis of modern medicine.³ Despite this, however, this history continues to be denied and belittled in the West, where they are usually attributed to western scientists.⁴ For example, we cite Ibn Sina (980-1037), a physician, poet, philosopher, mathematician, and astronomer,⁵ whose *Al-Qanun fi al-Tibb* (The Canon of Medicine) was taught at European universities for about eight centuries.⁶ And then there are Ibn al-Nafis' (d. 1288) discovery of how the blood circulates,⁷ Ibn al-Haytham's (d. 1040) correct understanding of the relationship between sight and seeing things,⁸ al-Kindi's

Mark Smith, 1996. *Ptolemy's theory on visual perception: an English translation of the Optics*. American Philosophical Society, p: 58; Nader El-Bizri, (2005). "A Philosophical Perspective on Alhazen's Optics", *Arabic Sciences and Philosophy*, Vol. 15: 189-218

³Pormann, Peter E., Savage-Smith, Emilie, 2007. *Medieval Islamic Medicine*. Edinburgh: Edinburgh University Press; Shanks, Nigel J.; Dawshe, Al-Kalal, "Arabian Medicine of the Middle Ages", *Journal of the Royal Society of Medicine* 77, Issue 1, (1984), pp. 60-65.

⁴Ingrid Hehmeyer, Alia Khan, 2007. "Islam's forgotten contributions to medical science", *Canadian Medical Association Journal* (CMAJ), Vol. 176: 1467.

⁵Ibn Sina (980-1037), 1974. *Si rat al-Shaykh al-Ra'is* (The Life of Ibn Sina), ed. and trans. W.E. Gohlman, Albany, NY: State University of New York Press.

⁶Ibn Sina (980-1037), 1987. *al-Qanun fi al-Tibb* (Canon on Medicine), ed. I. Aqash, Cairo.

⁷'Ala' al-Din Abu al-Hasan 'Ali ibn Abi al-Hazm al-Qarshi al-Dimashqi (known as Ibn al-Nafis) was born in 1213 in Damascus and educated at the Medical College Hospital (Bimaristan al-Nuri) founded by Nu' al-Din al-Zanki. Apart from medicine, he learned jurisprudence, literature, and theology and became a renowned expert on Shafi'i jurisprudence as well as a reputed physician. His major significant contribution was his discovery of the blood's circulatory system, which William Harvey re-discovered in 1628. His 300-volume medical encyclopedia *al-Shamil fi al-Tibb*, which was incomplete at the time of his death, remained a milestone of science and medicine in medieval Europe. See Rihab 'Akawi, 1996. *Ibn al-Nafis 'Ali ibn al-Hazm al-Qarashi*, *Galenus al-Arab*, Beirut: Dar al-Fikr al-Arabi; Zidan Yusuf, 2008. *Tadwat Iktisha'at Ibn al-Nafis*, Cairo: Nahdat Mas'r al-Tibba'ah; Barakat Muhammad Murad, 1990. *Ibn al-nafis: wa-Itija'ha al-Tibb al-Hadith*, Cairo: al-Sadr lil-Tibba'ah; Salma Qatayyah, 1984. *al-Tabi'at al-Arabi' Ibn al-Nafis 1211-1288*, Beirut: al-Mu'asasah al-Arabiyyah lil-Dirasat.

⁸Abu 'Ali al-Hasan ibn al-Haytham (354-430/965-1045), an optical engineer known in the West as al-Hazen, was born in Basra and lived in Egypt for the rest of his life. According to al-Qaf'i's *Akhbar al-Hukama'*, Ibn al-Haytham, story with the governor of Egypt al-Hakim bi-Amr Allah, regarding the Nile river for the prosperity of the people of Egypt and claimed that he could build a dam across the great river that would control its flow and alleviate the twin problems of droughts and floods. He said "if I were giving the opportunity to be there I would make a great use of it". The governor invited Ibn al-Haytham to Egypt to learn what he could offer the country. Realizing that he could do quite a bit, Ibn al-Haytham returned to the governor and apologized for his shortcoming. In order to avoid being punished, he pretended to go mad and remained so even after the Fatimid ruler's death. He then spent his remaining time in the al-Azhar mosque as an author, investigator, and researcher in various scientific fields. His tremendous achievements, described by Ibn Abi Usaybi'ah in his, *Uyun al-Anba' fi Tabaqat al-Atfiba'*, are as follows: Ibn al-Haytham was independent, strong and intelligent, specialized in science, not matched by any other scholar during his time in the mathematical sciences. He was constantly occupied with research, both explained and summarized many of Galen's medical works, was an expert and asset to the medical industry both as regards its laws and affairs; however, did not pursue it. His most important scientific works were *The Book of Optics*, *Doubts Concerning Ptolemy*, *The Correction of the Operations in Astronomy*, among others. Some argue that Ibn al-Haytham also wrote on theology, medicine, philosophy, and other topics. See Ibn Abi Usaybi'ah, Muwafaq al-Din Abu al-Abbas ibn Sadi al-Din al-Qasim, (d. 668) *Uyun al-Anba' fi Tabaqat al-Atfiba'*, pp. 550-51; 'Ali ibn Yusuf al-Qaf'i, 1998. *Akhbar al-Ulma' bi-Akhbar al-Hukama'*, Beirut: Dar al-Athar, pp. 89-90; Jim al-Khalili, 2010. *Pathfinders the Golden Age of Arabic Science*, London: Penguin Books, pp. 152-154.

(d. 256/873), al-Razi (d. 923), al-Zahrawi (d. 404/1013), Ibn Zuhr (d. 557/1162), and Ibn Rushd (d. 1198), not to mention a whole galaxy of scholars in other academic and scientific fields.⁹ Translating earlier scientific and other works of other culture is vital to any program of innovation.¹⁰ If the research of Aristotle, Galen, and Ptolemy had been lost, it would have been lost to the world forever, as if it and they had never existed.¹¹ Arab Muslims proved that they were not satisfied with excerpt heritage of ancient Persia and the scientific heritage of Greece and synopsis by adapting the knowledge of these two non-Muslim cultures to their needs and ways of thinking in order to derive new knowledge.¹² The resulting knowledge appeared in such new (for them) fields of medicine and philosophy and was particularly evident in chemistry, astronomy, mathematics, and geography.¹³ Over time, this new knowledge produced many Arab/Muslim pioneers, researchers, and innovators in law, theology, philology, and the sciences.¹⁴ This translated literature, when added to their own knowledge, gave the Arab/Muslim mentality its own character and eventually passed into Europe via Muslim-ruled Syria, Spain, and Sicily. Gradually, this imported knowledge spread and, using it as a launching pad, European scientists and intellectuals were able to lay the foundation for progress in science and other intellectual endeavors that led to its Renaissance and gradually spread worldwide.¹⁵

II. A BRIEF OVERVIEW OF THE HISTORY OF MEDICINE:

Medicine has remained a constant human quest from the beginning of recorded history up to its latest manifestation, that of telemedicine. Among the first medical practitioners were the ancient Egyptians who, after grasping its basis, went on to develop an extensive knowledge of diagnosis, surgery, anatomy, and embalming, as evidenced in the surviving papyrus¹⁶ displayed in the museums of London, Berlin, and New York. Followed by the Babylonians, Chinese, and Indians, medicine became known to the Greeks, who joined this knowledge with its Egyptian counterpart and then expounded upon it.¹⁷ Yet Hippocrates

⁹ 'Umar Fa'ruq al-T'aba', 'Abd al-Mun'im al-Ha'shimi', 1993. *Ibn al-Haytham: Mu'assis 'Ilm al-D'u*, Beirut: Muassasat al-Ma'a'rif; Mus'afa Nad'i'f, 2008. *al-H}asan Ibn al-Haytham Buh'ufih al-Bas}ariyyah*, Beirut: Markas Dira'sa't al-Wih}dah al-'Arabiyyah; Rih}a'b 'Akka>wi>, 1997. *al-H}asan ibn al-Haytham: al-H}aki>m Bat{limus al-Tha>ni>*, Beirut: Da'r al-Fikr al-'Arabi>; Ma>hir 'Abd al-Qa>dir Muh}ammad, 1997. *al-H}asan ibn al-Haytham wa-Ta'si>s Falsafat al-'Ilm*, Alexandria: Da'r al-Ma'rifah al-Ja'mi'iyah; Ibn Abi> Us{aybi'ah,, 1998. 'Uyu>n al-Anba>' w-T}abaqa>t al-AT{ibba>', Beirut: Da'r al-Thaqa>fah.

¹⁰ Ibn al-Nadi>m, 2010. Abu> al-Faraj Muh}ammad ibn Abu> Ya'qu>b Ish}a>q, 2010. *al-Fihrist*, eds. Yu>suf 'Ali> T}awi>l and Ah}mad Shams al-Di>n, Beirut: Da'r al-Kutub al-'Ilmiyyah, pp: 436-464; Dimitri Guatas, 1998. *Greek Thought, Arabic Culture: The Graeco-Arabic Translation Movement in Baghdad and Early 'Abba>sid Society (2nd-4th/8th-10th C.)*, London: Taylor & Francis Group, pp:2--8.

¹¹ Jacquart, Danielle, 1996. "The Influence of Arabic Medicine in the Medieval West", in *Encyclopedia of Arabic Science*, edited by Roshdi Rashed, London: Routledge, Vol. 3: 963-984.

¹² Piliario Pioreschi, 2003. "Medieval Medicine" in *A History of Medicine*, Vol.5, Omaha: Huratious Press, pp: 46-51.

¹³ Felicitas Opwis and David Reisman, 2012. *Islamic Philosophy, Science, Culture, and Religion: Studies in honor of Dimitri Gutas*, Leiden ; Boston : Brill.; Howard R. Turner, 1997. *Science in Medieval Islam: an Illustrated Introduction*, Austin: University of Texas Press; Seyyed Hossein Nasr, *Islamic science: an illustrated Study*, [S.l.]: World of Islam Festival Publishing Co. 1976; Alparslan Açıkgenç, 1996. *Islamic Science: Towards A Definition*, Kuala Lumpur : International Institute of Islamic Thoughts and Civilization (ISTAC),.

¹⁴ Ibn al-Nadi>m, 2010. *al-Fihrist*, edited by Yu>suf 'Ali> T}awi>l and Ah}mad Sham al-Di>n, Beirut: Da'r al-Kutub al-'Ilmiyyah, pp: 62-141, 282-323; and 397-474.

¹⁵ See A. Mark Smith, 1996. *Ptolemy's theory on visual perception: an English translation of the Optics*, American Philosophical Society,.

¹⁶ John Francis Nunn, 2002. *Ancient Egyptian Medicine*, Oklahoma: University of Oklahoma Press, pp: 42-63; Pain, Stephanie, 2007. "The pharaohs' pharmacists," *New Scientist*. 15 December, pp. 40-43; Sir William Osler, 2009. *The Evolution of Modern Medicine: A Series of Lectures Delivered at Yale University on the Silliman Foundation*, The Echo Library, pp: 14-19.

¹⁷ Sir William Osler, *The Evolution of Modern Medicine*, 31-36.

(460-365 BCE) is credited with being the “father of medicine,” for spreading and teaching it to others, and for the Hippocratic oath. His medicine-related books, statements, and words were held to be beyond question. He is also responsible for several medical axioms, among them “medicine is measure and experience,” “people eat to live, but do not live to eat,” “do not take medication unless you need it,” and “wellness is a secret property known only to those who do not possess it.”¹⁸

The medicine practiced by the pre-Islamic Arabs relied primarily upon fortunetelling, spells, and amulets as opposed to scientific knowledge and determining the cause of the disease in order to prescribe the appropriate treatment. They also had some familiarity with the medicinal properties of honey and herbs; relied on cauterization, phlebotomy, and cupping as well as diet, prevention, and providing medical advice, and their examples of medical treatment was walking that still have medicinal value as saying “the stomach home of treatment, and diet is the predominant remedy.”¹⁹

III. MEDICINE IN THE PROPHETIC ERA:

Muslims became interested in medicine during Islam’s earliest days and gave it special and careful attention. As a result, a new kind of medicine emerged – “prophetic medicine” – a collection of *ah}adi>th* (traditions) that outlined general hygienic practices, recommended treatments for some diseases, and suggested some rules related to eating, drinking, and other activities. Among the later Muslim scholars who devoted themselves to prophetic medicine was Ibn Qayyim al-Jawziyya (d. 751/1351), whose *Al-T}ib al-Nabawi>* (Prophetic Medicine) contains *ah}adi>th* that are actually tips and general guidelines rather than medical rules meant to be taken strictly.²⁰

IV. MEDICINE IN THE Umayyad ERA:

Under the Umayyads (661-750) medicine began to be influenced by Greek knowledge, for this was the initial phase of the translation of medical and chemistry texts. Initiated by Kha}lid ibn Yazid>, it was soon adopted by the Umayyad caliphs who began to patronize the Christian doctors pursuing this new (to them) medical knowledge. After Caliph ‘Umar ibn ‘Abd al-‘Azi>z ordered that medical texts be translated into Arabic, Ma>sarji>s and Yah}ya> ibn Surafu>n translated Yu>h}ana>’ *sal-Kuna>sh*.²¹ Among the most famous doctors of this era were Ibn Ata>l and Abu> al-H}akam al-Dimashqi>, both of whom were physicians to Caliph Mu‘a>wiyah ibn Abu> Sufya>n.²²

V. MEDICINE IN THE Abbasid ERA:

Under the Abbasids (750-1258), the Muslim world witnessed a boom in medicine due to the spreading translation movement.²³ The medical books of Hippocrates and Galen were translated, and the increasing number of diseases resulting from the life of luxury and the diversity of foods and drinks that the ongoing conquests enabled among the elites soon led to a growing demand and need for medicine. The caliphs used Syriac physicians for their treatments.²⁴ Caliph al-Mans}u>r summoned one well-known figure, Ibn Bikhtyashu>’, from Jundisabour to serve as his personal physician. His sons followed in his footsteps,

¹⁸ Vivian Nutton, 2004. *Ancient Medicine*, London: Routledge, pp: 53-65; Ma>hir ‘‘abd al-Qa>dir Muh}ammad ‘Ali>, 1988. *Muqadamah fi> Ta>ri>kh al-T}ibb al-‘Arabi>*, Beirut: Da>r al-‘Ulu>m al-‘Arabiyyah

¹⁹ Kama>l al-Sa>marra>’i>, 2008. *Mukhtasar Ta>ri>kh al-T}ibb ‘ind al-‘Arab*, Baghdad: Wiza>arat al-Thaqa>fah w-al- I’la>m, Vol.:1: 180, 230; Jan Retsö, 2002. *The Arabs in antiquity: their history from the Assyrians to the Umayyads*, London: Routledge.

²⁰ Ibn Qayyim al-Jawziyyah, 2012. *al-T}ibb al-Nabawi>*, ed. Muh}ammad al-Iskandara>ni>, Beirut: Da>r al-Kita>b al-‘Arabi>.

²¹ Ibn al-Nadi>m, 2010. *al-Fihrist*, pp. 465-467.

²² Ibn Abi> Us{aybi‘ah, 1998. ‘*Uyu>n al-Anba>’ fi> T}abaqa>t al-At{i}bba>’*, Beirut, Da>r al-Kutub al-‘Ilmiyyah, p: 232

²³ Gutas, Dimitri, 1998. *Greek Thought, Arabic Culture: The Graeco-Arabic Translation Movement in Baghdad and Early Abbasid Society (2nd-4th/8th-10th centuries)*, London: Routledge, pp: 54 and 152.

²⁴ Ibn al-Nadi>m, 2010. *al-Fihrist*, pp. 466.

becoming famous physicians in their own right.²⁵ Such well-known physicians as Yunana ibn Mu'sawiq, Hunayn ibn Ishraq and his son Ishraq and Thabit ibn Qura al-Hirani, and Qista ibn Luqa al-Bu'lbaki also translated medical books, especially those of Greece, into Arabic.²⁶ In the late third/ninth century, Muslim physicians absorbed these translations and started correcting the errors made by the original authors and adding their own insights.²⁷ This introduced a new phase into the evolution of Islamic medicine: the stage of creativity, innovation, and authoring.²⁸ One manifestation was the emergence of medical schools or "houses of the sick" (*bimaristan*)²⁹ and a teaching system based on theory (studying diseases and potential cures) and practice (practical training and exercise). Students in this second category met with the chief physician, observed the relevant examination techniques, learned how to prescribe treatments, and then had to pass a final exam before receiving a license to practice medicine. Specific medical specializations also began to emerge, such as general practitioners, surgeons, ophthalmologists, gynecologists, psychiatrists, and dentists.³⁰ Medicine was known to the pre-Islamic Arabs, just as it was to other peoples, because this axiomatic science is indispensable.³¹ These Arabs applied it according to their indigenous "tested" methods: Cautery/cauterization (*al-Kai*) and herbs, "witchcraft" and magic. These methods continued to be applied under the Umayyads, while those related to witchcraft were prohibited and abandoned.³² During the eighteenth century, a time when scientific modernity emerged, practitioners of the history of science flourished right along with the development and prosperity of scientific research. This continued in the following century, especially in those industrialized societies that eagerly produced and consumed science, and remains ongoing even today. The new history of science departments, as well as the new teaching and research institutes, enabled possessors to research the history of the Arab/Islamic scientific heritage. For several reasons, this research began outside the Arab/Islamic world and is still linked to international scientific research institutions. The present study is not intended to glorify the past, for a historical study is of value only if it leads people to think in the present and stay on solid foundations. The study seeks to provide objective knowledge and an accurate memory of the Arab/Islamic world's scientific past. History teaches us that each nation has a configured memory and that no nation can be renewed or preformed without knowledge. All fields of knowledge are part of the natural and human sciences and thus required rational thinking, which means that all components of rationality are among memory's most important components. The Arab/Islamic world needs a critical objective knowledge of this special memory (its "golden age"), given its current deplorable condition in almost all important fields and undertakings. While Islam's "golden age" (now considered as beginning in the eighth century and ending during the fifteenth/sixteenth century) was a time of great intellectual ferment and scientific, social, and philosophical advances. The Arab/Islamic world's greatest contribution was medicine. Muslim scholars gathered vast amounts of information from around the known world, added their own observations, and developed new techniques and procedures that would form the basis of modern medicine. For example,

²⁵ Ibid.

²⁶ Ibid, pp. 463-464.

²⁷ Seyyed Hossein Nasr, 1976. *Islamic Science: An Illustrated Study*, London: World of Islam Festival Publishing Company, pp: 151-192; De Lacy O'Leary, 1979. *How Greek Science Passed to the Arabs*, London: Routledge & Kegan Paul Ltd.,

²⁸ Ibn Abi Usaybi'ah, 1998. '*Uyun al-Anba' fi Tabaqa al-Atfiba'*', pp: 8-21.

²⁹ Nagamia, Hussain, 2003. "Islamic Medical History and Current Practice", *Journal of the International Society for the History of Islamic Medicine*, 2: 19-30; Rahmani Hajar Abdu'l, 2000. "The Development of the Health Sciences and related Institutions During the First Six Centuries of Islam", *Islamic Quarterly*, (pp: 601-618).

³⁰ Miller, Andrew C. 2006. "Jundi-Shapur Bimaristans and the Rise of Academic Medical Centers", *Journal of the Royal Society of Medicine*, 99: 615-617; Md. Shamsul Alam, Mostafa Kabir Siddiqui, 2007. "The Development of the Health Sciences and Related Institutions during the First Six Centuries of Islam", *Journal of Center for Development and Research*, Vol. 3: 51-63.

³¹ Tibi, Selma, 2006. "al-Razi and Islamic Medicine in the 9th Century", *Journal of the Royal Society of Medicine* 99: 206-208.

³² Pormann, Peter E., Savage-Smith, Emilie, 2007. *Medieval Islamic Medicine*, pp. 115-144.

according to Ibn al-Nadīm's *Fihrist*, the great polymath al-Kindī (185-256/805-873)³³ wrote twenty-two books in various medical fields.³⁴ In his *Aqrabadhin (Medical Formulary)*, he described many preparations drawn from plant, animal, and mineral sources and added knowledge drawn from India, Persia, and Egypt.³⁵ Like many Islamic works, his books contained information based upon medicinal herbs, such as aromatic compounds as musk, and inorganic medicines.³⁶ It could, quite legitimately, be argued that this particular contribution represents the first divide between medicine and pharmacology as separate sciences.³⁷

Al-Rāzī (Rhazes [850–923]),³⁸ who was at the forefront of medical research, produced over 200 medical and philosophical works.³⁹ One of his most famous achievements was to hang meat in locations throughout

³³ Abu Yūsuf Ya'qūb ibn Ishāq al-Kindī (185-256/805-873), a Muslim Arab, excelled in astronomy, philosophy, chemistry, physics, medicine, mathematics, music, psychology and logic. Known in the West as Alkindus, he was one of the first itinerant Muslim philosophers and for his efforts in the Arabs and Muslims definition of ancient Greek philosophy and Hellenistic. Appointed to supervise the translation of philosophical and scientific Greek works into Arabic in the House of Wisdom, he wrote original theses on ethics and metaphysics, mathematics and pharmacy. He played an important role in introducing Indian numerals to the Muslim and Christian worlds, was a pioneer in cryptanalysis, devised new ways to penetrate blades, and conducted experiments on music therapy. His mathematical and medical status scale allowed physicians to measure a drug's effectiveness. Despite his important role in making philosophy accessible to Muslim intellectuals, his writings became irrelevant after the emergence of such scholars as Fārābī and only very few of them were studied. Yet he remains "the philosopher of the Arabs". The author of more than thirty theses in medicine, he was affected by the ideas of Galen. His most important work in this area concerns the use mathematics in medicine, especially in the field of pharmacy. For example, his scale enabled doctors to determine a given drug's efficacy and his system based on the moon's phases allowed doctors to determine the critical days of the patient's disease. In chemistry, opposed al-Kindī ideas of alchemy, view the possibility of extracting precious metals or precious gold from base metals, in a letter he called it The Book of the revocation proceedings of claims workmanship gold and silver. He also founded the al-Kindī and Geber perfume industry, and conducted extensive research and experiments in combining odors by converting plants to oils. Ibn al-Nadīm, 2010. *al-Fihrist*, pp. 414-422; Ibn Abī Usaybi'ah, 'Uyūn al-Anbā' fī Tābaqa al-Atfībbā', pp. 190-196.

³⁴ Ibn al-Nadīm, 2010. *al-Fihrist*, p: 414-421; 'Abd al-Salām al-Sayyid, 2011. *Mawsū'at 'Ulama' al-'Arab*, Beirut: al-Ahiliyya lil-Nashr wa-l Tawzi', pp: 265-268.

³⁵ Levey, Martin, 1973. *Early Arabic Pharmacology: An Introduction Based on Ancient and Medieval Sources*, Leiden: E.J. Brill.

³⁶ Ibn al-Nadīm, 2010. *al-Fihrist*, p. 418; Ibn Abī Usaybi'ah, 'Uyūn al-Anbā' fī Tābaqa al-Atfībbā', pp. 190-196; Martin Levey, 1966. *The Medical Formulary or Aqrabadhin of al-Kindī*, Madison and London: The University of Wisconsin Press,; Sami Khalaf Hamarneh, 1967. *History of Arabic medicine and pharmacy: studies based on original manuscripts*, Cairo: Dar al-Mahsin Press..

³⁷ Plinio Prioreschi, 2002. "Al-Kindī, A Precursor of the Scientific Revolution", *Journal of the International Society for the History of Islamic Medicine* 1 and 2, pp: 17-19.

³⁸ Abu Bakr Muḥammad ibn Zakariyā al-Rāzī served as president of the Bimarstan Baghdad al-Mu'tadī. He wrote approximately 200 medical books on various diseases and in all branches of medicine known at that time. All of them were translated into Latin and remained key medical references until the seventeenth century. His greatest books, *History of Medicine* and "Mansouri" in Medicine and the book "medicines single" which includes precise description of the anatomy of the body. Is the first invented surgical suture, and making ointments, and works in the pharmacy contributed to the progress of pharmacology. Has 200 books and articles in variety aspects of science. Ibn al-Nadīm's *Fihrist*, al-Qaṭībī's *Akhbar al-'Ulama' bi-Akhbar al-Hukama'*, and Ibn 'Usaybi'ah's *Tabaqa al-Atfībbā'* all state that al-Rāzī known that versions manuscript of this article have been lost and missing. He wrote 200 books, ranging from large encyclopedias to vignettes on medicine, philosophy, chemistry, and other disciplines. We should make it clear here severe unknown which afflict both *al-Hafī* and *al-Jami' al-Kabir*. Historians agree that al-Rāzī was a virtuous and well-read physician and surgeon, as well as a link between science and practice. He had courage, refuted those Greek masters of medicine whose views did not agree with clinical practice, and reflected upon his view through his works in theory and practice. This was seen as a greater share of his contribution to the field of medicine since

Baghdad to determine, by the extent of its rot, the best place to erect a hospital in Baghdad.⁴⁰ He wrote extensively on human physiology, understood how the brain and nervous system operated muscles, and only the Islamic distaste for dissection prevented him from refining his studies in this area. His main book, *al-Ha>wi> fi> 'l Tibb* (*The Comprehensive in Medicine*),⁴¹ was translated into Latin and became the main medical reference text in Renaissance-era Europe.⁴² Ibn Si>na> [Avicenna] (d. 1037) believed that many diagnoses could be made by checking one's pulse and urine.⁴³ In fact, a large part of his *Qa>nu>n fi> al-Tib* (*Canon of Medicine*) deals with making diagnoses based upon the colour, turbidity, and odour of the patient's urine.⁴⁴ His other breakthroughs were suggestions for infant care and guidelines for checking water's level of purity in order to prevent disease.⁴⁵ Ibn al-Nafi>s (1213-88)⁴⁶ was the first scholar of medicine to understand the respiratory-circulatory system.⁴⁷ Unfortunately his *al-Sha>mil fi> S{ina>'a> al-T{ibbiyya* (*The Comprehensive in Medical*

then. See Ibn al-Nadi>m, 2010. *al-Fihrist*, pp. 469-473; Jama>l al-Di>n Abu> al-H}assan 'Ali> ibn Yu>suf al-Qafqi>, 2008. *Ta>rikh al-'Ulama>*, ed. Yulus Libert, Cairo: Maktabat al-A<da>b, p: 271; Ibn Abi> Us{aybi>'ah, 'Uyu>n al-Anba>' fi> T}abaqa>t al-At{i}bba>', pp. 414-427.

³⁹Ibn al-Nadi>m, 2010. *al-Fihrist*, pp. 470-472; Jama>l al-Di>n Abu> al-H}assan 'Ali> ibn Yu>suf al-Qafqi>, 2008. *Ta>rikh al-'Ulama>*, ed. Yulus Libert, Cairo: Maktabat al-A<da>b, p.: 271; Ibn Abi> Us{aybi>'ah, *Muwafaq al-Di>n Abu> al-'Abba>s ibn Sadi>d al-Di>n al-Qa>sim* (d. 668), 'Uyu>n al-Anba>' fi> T}abaqa>t al-At{i}bba>', pp. 414-427; Ibn Jaljal, 1985. *T}{abaqa>t al-At{i}bba>' wa-l H{ukama>*, ed. Fu'a>d Sayyid. Beirut: Mu'assasat al-Ris>al, pp: 77-80.

⁴⁰Ibn Abi> Us{aybi>'ah, 1998. 'Uyu>n al-Anba>' fi> T}abaqa>t al-At{i}bba>', pp. 414-427; 'Abd al-Sala>m al-Sayyid, *Mawsu>'at 'Ulama> al-'Arab*, Beirut: al-Ahliyya li-Nashr wa-l Tawzi>', p: 27.

⁴¹Ibn al-Nadi>m, 2010. *al-Fihrist*, pp. 469-471.

⁴²*al-H{a>wi>* is considered one of the greatest pre-modern medical books. Faraj ibn Sa>lem translated it into Latin in 1279 *Liber Dictus El Havi* on the order of Charles I. Translated again in Venice in 1452, it was entitled *Continens Rasis*. It was retranslated several times after 1486. European physicians considered al-Ra>zi> the greatest clinical physician of the Middle Ages. Westerners still recognize his medical contributions. For example, Princeton University placed his name on one of its plush buildings in recognition of his grace and knowledge. See Seyyed Hossein Nasr, *Islamic science: an illustrated study*, pp. 204-207; H{arbi> 'Abba>s 'At{i}tu> Mah}mu>d, and H{assa>n H{ala>q, 1995. *al-'Ulu>m 'and al-'Arab: Us{u>laha, Mala>mih}uha> al-H{ad}a>riyyah*, Beirut: Da>r al-Nahd}ah al-'Arabiyyah, pp: 291-293; Donald Campbell, 2001. *Arabian Medicine and Its Influence on the Middle Ages: Trubner's Oriental Series*, Routledge.

⁴³William I. White, 1991. "A New Look at the Role of Urinalysis in the History of Diagnostic Medicine", *Clinical Chemistry*, vol. 37, p: 121.

⁴⁴Gruner Oskar Cameron, 1970. *A treatise on the canon of medicine of Avicenna*, London: Luzac, p: 331; Krueger Haven C., 1963. *Avicenna's poem on medicine*. Springfield, IL: Thomas, p: 39; Browne Edward G., 1921. *Arabian Medicine*, Cambridge: Cambridge University Press, pp: 45-52.

⁴⁵Ibn Si>na>, 1987. *al-Qa>nu>n*, edited by Edward al-Qash, Beirut: Mu'assasat 'Izz al-Di>n lil-T{iba>'ah wa-l-Nashr, , Vol. I, pp: 150-153.

⁴⁶'Ala>' al-Di>n Abu> al-H{asan 'Ali> ibn Abi> al-H{azm al-Qarshi> al-Dimashqi> (known as Ibn al-Nafis) was born in 1213 in Damascus. Educated at Nu>ral-Di>n al-Zanki>'s Medical College Hospital (Bimaristan Al-Nu>ri>), in 1236 he traveled to Egypt and worked in the al-Nassiri> and al-Mans}u>ri hospitals. He eventually became the chief of physicians and the sult}a>n's personal physician. Prior to his death he donated his house, library, and clinic to the Mans}uriyyah Hospital. A serious student of jurisprudence, literature, and theology, he was considered an expert on Sha>fi>'i> jurisprudence as well as a reputed physician. His foremost medical contribution was his discovery of the blood's circulatory system, William Harvey re-discovered three centuries later William Harvy. His uncompleted 300-volume medical encyclopedia *al-Sha>mil fi al-Tibb* remained a milestone of science and medicine during the medieval period. See Qatayyah, S., 1984. *The Arabic Physician Ibn Nafis*, Beirut: Arabic Corporation for Studies and Publication, pp: 37-43.

⁴⁷Abdul Nasser Kaadan and Chadi Khatib, 2009-2010. "Compound Drugs used in Diseases Treatment in "al-Muja>z fi al-T{ibb" book of Ibn al-Nafi>s", *Journal of the International Society for the History of Islamic Medicine*, Vol. 8-9, pp: 2-7.

Industry), which was designed to be a 300-volume encyclopedia, was incomplete at the time of his death.⁴⁸ The first scholar to correctly describe the heart's division into two halves and the lack of pores connecting them, which contradicted Galen's teaching,⁴⁹ Ibn al-Nafī's also stated that blood could only travel from one side of the heart to the other by passing through the lungs.⁵⁰ Al-Zahrawi (322-404/936-1013), the "father of surgery" who uprooted cancers and stopping bleeding, was the author of *al-Tasrif li-ma 'Ajiza 'an al-Ta'li* (The Method of Medicine or He who is not skilled in Anatomy), in Latin title *Concessio ei data qui componere haud valet*, the most celebrated work of the Middle Ages on the subject.⁵¹ An important part of it deals with pharmacology, obstetrics, pediatrics and midwifery, as well as general human anatomy.⁵²

The surgeon al-Zahrawi (d.404/1013) was born in the Andalusian city of Zahra, grew up in Cordoba, and spent his life there. It is reported that he was the personal physician of caliph Abd al-Rahman III. Ibn Abi Usaybi'ah mentions in his *'Uyun al-Anba' fi Tabaqa al-Atibba'* (Essential/Sources of Information on the Classes of Physicians)⁵³ that al-Zahrawi was a virtuous doctor and an expert in devising compound drug treatments. It has popular categories in the medical industry best great book known as *al-Tasrif li-ma 'Ajiza 'an al-Ta'li*.⁵⁴ He is often known in the West by the Latinized forms of

⁴⁸ See Youssuf Ziedan, *'Ala al-Din (Ibn Nafī's) al-Qarasī 'al-Shamil fi Sifina 'a al-Tibbiyya*, Abu Dhabi: Cultural Foundation Publications.

⁴⁹ Galen's says that the venous system is separate from the arterial system, except when they come into contact via unseen pores. See Gordon E. J., 1991. "William Harvey and the circulation of the blood", *South Med Journal*, 84, pp: 1439-1444; Allan Chapman, 1995. "William Harvey and the Circulation of the Blood", *Journal of Laboratory and Clinical Medicine*, 126, pp: 423-27. Ibn al-Nafī's based his knowledge in anatomy and scientific thinking ... the blood from the right chamber of the heart must arrive at the left chamber but there is no direct pathway between them. The thick septum of the heart is not perforated and does not have visible pores or invisible pores as Galen thought. According to Ibn al-Nafī's, the blood from the right chamber must flow through the vena arteria (pulmonary artery) to the lungs, spread through its substances, be mingled there with air there with air, pass through the arteria venosa (pulmonary vein) to reach the left chamber of the heart and there form the vital spirit. See Yu'suf Zaydan, 2008. *I'adat Iktisha' Ibn al-Nafī's*, Cairo: Nahd'ah Mas'r lil-T'iba' 'ah wa-l Nashr.; Akkawi Rihab, 1996. *Ibn al-Nafī's, 'Ali' ibn Abi' al-Hazem al-Qarashi' "Jalinus al-Arab"*. Beirut: Da'r al-Fikr al-'Arabi' lil-T'iba' 'ah wa-l-Nashr.

⁵⁰ Allan Chapman, 1995. "William Harvey and the Circulation of the Blood," *Journal of Laboratory and Clinical Medicine* 126, pp: 423-27; Gordon, E. J., 1991. "William Harvey and the Circulation of the Blood", *South Med J*, Vol. 84, pp:1439-44; Haddad, S.E. & Khairallah A. A., 1936. "A Forgotten Chapter in the Circulation of the Blood", *Ann Surg*, pp: 104:1-8; Coppola, E. D., 1957. "The Discovery of the Pulmonary Circulation: A New Approach", *Bull Hist Med*, Vol. 31, pp:44-77.

⁵¹ Muh'ammad al-Gharbi al-Khit'a'bi, 1988. *al-T'ibb w-al- AT'ibba' fi al-Andalus al-Isla'miyya: Dira'sah wa Tara'jim wa Nus'u's*, Beirut: Da'r al-Gharb al-Isla'mi, , Vol. 1, pp: 113-120.

⁵² Abu' al-Qasim Khalaf ibn 'Abbas al-Zahrawi (d. 404/1013) the surgeon world, was born in the Andalusian city of Zahra, he grew up in Cordoba and spent his life. It is reported that the doctor tile caliph Abd al-Rahman III. Ibn Abi Usaybi'ah, mentions in his *'Uyun al-Anba' fi Tabaqa al-Atibba'*, he was a doctor virtuous, expert single and good compound drug treatment. It has popular categories in the medical industry best great book known as *al-Tasrif li-ma 'Ajiza 'an al-Ta'li*. See Ibn H'azm, 'Ali' ibn Ah'mad, 1980. *Risa'lah fi Fazl al-Andalus wa-Di'kir Rija'liha*, ed. Ih'san 'Abba's, Beirut: al-Mu'asassah al-'Arabiyyah lil-Dira'sa't, Vol. 2, pp: 185; Ami'r al-Naja'r, 1986. *Fi' Tarikh al-T'ibb fi al-Dawlah al-Isla'miyya*, Cairo: Da'r al-S'ah' wah, pp: 221; Shawqi' Abu' Khali'l, 2004. *'Ulama' al-Andalus Ibd'a' a'tihum al-Mutamayizah wa-Atharuha' fi al-Nahd'ah al-Uru'biyyah*, Damascus: Da'r al-Fikr, pp: 31; Jala'l Maz'har, 1974. *H'ad'a rat al-Isla'm wa-Atharuha' fi al-Taraqi' al-'A'lami*, Cairo: Maktabat al-Kha'nji, pp: 331-332; 'Ali' 'Abdulla'h al-Dafa', 1998. *Ruwa'd 'Ilm al-T'ibb fi al-H'ad'ah al-Isla'miyyah*, Beirut: Mu'asassat al-Risa'lah lil-T'iba' 'ah wa-l Nashr, pp: 5.

⁵³ Ibn Abi Usaybi'ah, 1998. *'Uyun al-Anba' fi Tabaqa al-Atibba'*, pp:232, 466.

⁵⁴ Ibn H'azm, 'Ali' ibn Ah'mad, 1980. *Risa'lah fi Fazl al-Andalus wa-Di'kir Rija'liha*, ed. Ih'san 'Abba's, Beirut: al-Mu'asassah al-'Arabiyyah lil-Dira'sa't, Vol. 2, p: 185; Ami'r al-Naja'r, 1986. *Fi'*

his name: Alsharavius, Albucasis, and Abulcasis.⁵⁵ Al-Zahra>wi>'s most important book, *al-Tas}ri>f liman 'Ajiza 'an al-Ta'li>f*, is a 1,500-page compendium of knowledge related to internal medicine, pharmaceuticals, food, chemistry, pharmacology, and surgery (the book's most important sections).⁵⁶ This work contributed to the spread of Arab/Islamic surgery throughout Europe after Gerard De Cremona (d. 1187) translated it into Latin in Toledo.⁵⁷ Divided into thirty articles, the first (and longest) one discusses the faculties of medicine and its origin; the second article mentions 325 sequentially diseases from head to toe; articles three to twenty-six are short means pharmacopoeias and single medicines composite and preparation. In the twenty-sixth article, he addresses the diets and adequate foods associated with curing specific diseases. The twenty-seventh article, an alphabetical listing of individual drugs, and the advantage of this chapter of the book corrects validity to pronounce doubtful words of what the contents of errors in the development of sound alphabet movements. The twenty-ninth article specializes in weights and measures, and the last article is devoted to surgery, the compendium's most important subject.⁵⁸

This medical encyclopedia features research in various branches of medicine, dentistry, abdominal surgery, obstetrics and gynecology, orthopedic bone fractures, urinary and in-kind contributions, and promissory notes. For example, his section on dentistry describes congenital bad shapes that affect the jaws, recommends cleaning one's teeth and removing tartar, points to the possibility of re-implanting sound teeth after decaying, and warns of unprofessional extraction methods (*juha>al al-h}aja>mi>n*).⁵⁹ In abdominal surgery, he described his method of stitching up intestinal wounds and eradicating tumors. As regards urinary system diseases, he explained at length how to catheter the bladder and its treatment or vaginal lithotomy, and the dismantling of urethral stones and punctured a special drill devised.⁶⁰ In obstetrics and gynecology, he describes several types of vaginal laparoscopic, the status Trendelenburg, the extraction of conjoined placenta and delivering twins, as well as a case of the ectopic pregnancy that ended with a large abscess was extracted through the bones of the dead fetus. Al-Zahra>wi> proposes that varicose veins be treated by making incisions convergent and eradicating the veins through it. He also describes (ie inflammation) osteomyelitis and the treatment of chronic surgical removal of shrapnel and fistulae.⁶¹

With respect to orthopedics, Al-Zahra>wi> initiated the installation of straps saturated fractures with albumen egg and suggested that holes be made in the bandages placed over fractures so that they could be cleaned and discharge pus. He was the first to use the practiced technique of the Re shoulder dislocations (known today as the Kosher maneuver) and to eradicate the patella in order to treat multiple fractures. This

Ta>rikk al-T{ibb fi> al-Dawlah al-Isla>miyya, Cairo: Da>r al-S{ah}wah, pp: 221; Shawqi> Abu> Khali>l, 2004. 'Ulama>' al-Andalus Ibd>a>'a>tihum al-Mutamayizah wa-Atharuha> fi> al-Nahd}ah al-Uru>biyyah, Damascus: Da>r al-Fikr, pp: 31; Jala>l Maz}har, 1974. H{ad}a>rat al-Isla>m wa-Atharuha> fi> al-Taraqi> al-'A<lami>, Cairo: Maktabat al-Kha>nji>, pp: 331-332; 'Ali> 'Abdulla>h al-Dafa>', 1998. Ruwa>d 'Ilm al-T{ibb fi> al-H{ad}a>rah al-Isla>miyyah, Beirut: Mu'asassat al-Risa>lah lil-T{iba>'ah wa-l Nashr, pp: 362.

⁵⁵ Tabanelli, Mario, 1961. *Albucasi, un chirurgo arabo dell'alto Medio Evo: la sua epoca, la sua vita, la sua opera*, Firenze, L.S. Olschki; Hamarneh, Sami Khalaf, 1963. *A pharmaceutical view of Abulcasis al-Zahrawi in Moorish Spain, with special reference to the "Adhean"*, Leiden: E.J. Brill,.

⁵⁶ M. S. Spink and G. L. Lewis, 1973. *Albucasis on surgery and instruments*; a definitive edition of the Arabic text with English translation and commentary, London: Wellcome Institute of the History of Medicine, pp: 2-3.

⁵⁷ Max Meyerhof, 1968. *Science and Medicine: The Legacy of Islam*, Oxford: Oxford University Press, pp: 331; M. S. Spink and G. L. Lewis, 1973. *Albucasis on surgery and instruments*; a definitive ed. of the Arabic text with English translation and commentary, Berkeley: University of California Press; Donald Campbell, 2001. *Arabian Medicine and Its Influence on the Middle Ages: Trubner's Oriental Series*, Routledge.

⁵⁸ Ibn Abi> Us{aybi>'ah, 'Uyu>n al-Anba>' fi> T}abaqa>t al-At{i}bba>', pp: 232; al-Zarkali>, Khayr al-Di>n, 1990. *al-A'la>m*, Beirut: Da>r al-'Ilm lil-Mala>yi>n, , Vol. 2: 310.

⁵⁹ Al-Zahra>wi>, Abu> al-Qa>sim Khalaf ibn 'Abba>s, *al-Tas}ri>f liman 'Ajiza 'an al-Ta'li>f*, p: 3.

⁶⁰ Ibid., pp. 129-133; 'Abdul Nasser Kaadan, 2004. "Abulcasis and Extraction of Bladder Stone", *Journal of International Society for the History of Medicine*, Vol. 3: 28-30.

⁶¹ M. S. Spink and G. L. Lewis, *Albucasis on surgery and instruments*, pp: 169, and 480.

gradually became the accepted pattern among modern surgeons.⁶² What is unique about the features of al-Zahra's methodology applied to all of the subjects discussed therein: smooth and enhance compound of pictures and forms for more than 200 machines and tools he used – among them scalpels, scissors and nipper, grapples, hooks, tongs, saws, rasps, irons, techniques, tongue cholinesterase, tongs, speculums, and catheters – most of which he devised and invented. Made from wood, metal, leather, glass, or porcelain, their overall simplicity demonstrates the genius of their designer and crafts.⁶³

Al-Zahra excel RPR particularized among the surgeons of his time by emphasizing the necessity to perfect surgical methods and techniques, to master the knowledge of physiology (e.g., its forms and links to each other, and what it contains from the bones, nerves, muscles, arteries, and veins). Al-Zahra, who witnessed medical disasters due to the surgeons' lack of experience with the human anatomy, advised young surgeons, warned them against vanity, and exhorted them to be prudent and diligent and exert every effort to serve their patients. He presented this advice and manners to young surgeons in the guise of a knowledgeable teacher who has benefited from his wide personal experiences. Which emphasizes on the thirty articles of *al-Tasrif* which considers the most important chapters, ninety-seven subjects effortlessly addresses all needs of surgeon practices, treatment of the eyes with kohl and orthopedist in his daily operations, including simple easy circumcision and aphaeresis including complex and challenging eradication of large tumors and eye operations and gynecology.⁶⁴

After Gerard de Karim translated *al-Tasrif*, this work was translated into Hebrew and other languages and appeared ten other translations between the 1494-1544.⁶⁵ In 1778, John Chening of Oxford translated it into Latin and kept the original Arabic text.⁶⁶ A complete translation of *al-Tasrif* contains thirtieth articles under the name Al-saharavius, which is proven by Lucien Leclerc and supported his claim via locate the translation of various sections of the *al-Tasrif* along with the names of its translators and date of the transmitters of *al-Tasrif* and Lucien Leclerc mentions among those translated and transmitters of al-Zahra's *al-Tasrif* amongst them the French Guy de Holjk Guy de Chauillac which cited statements of al-Zahra more than two hundred times in his book *Major Surgery*, and Henri de Mondeville king of France surgeon, in addition to the Italian Mathieu de Gradibus and Santes de ardoynis de Pesaro and others.⁶⁷ Thus, al-Zahra's surgery spread throughout Europe, and his *al-Tasrif* became widely available to its physicians and medical students.⁶⁸ After the printing press' invention in 1450, this book was one of the four books printed in Venice in 1471.⁶⁹ After that date, it was reprinted in various editions and translations and thus became a reference for all authors who have written about surgery between the twelfth and sixteenth centuries.⁷⁰ Some authors documented the material they

⁶² al-Shat'i, Ahmad Shawkat, 1981. *Ta'rikh al-Tibb wa-Ada'ibi wa-A'la'mihi*, Aleppo: Mudiriyyat al-Kutub w-al Mat'bu'at al-Jami'iyyah biJa'mi'at H{alab, pp: 279-282, 299.

⁶³ Ibid, pp. 121-140.

⁶⁴ Ibid, pp. 1-2.

⁶⁵ F. Ramen, 2005. *Albucasis (Abu Al-Qasim Al-Zahrawi): Renowned Muslim Surgeon of the Tenth Century*, New York: Rosen Publishing Group.

⁶⁶ Hamarneh, Sami Khalaf, and Glenn Sonnedecker, 1963. *A pharmaceutical view of Abulcasis al-Zahra in Moorish Spain*, Leiden: E.J. Brill, p: 28.

⁶⁷ Lucien Le Clerc, 1876. *Histoire de la Medecine arabe*, Paris: E Leroux, pp: 390, 454-455, 883; Hamarneh, Sami Khalaf, and Glenn Sonnedecker, 1963. *A pharmaceutical view of Abulcasis al-Zahra in Moorish Spain*, pp. 28, 38, and 43.

⁶⁸ Mah}mu}d Mas}ri} and Muh}ammad Hisha}m al-Na}sa}n, 2005. *al-Jira}h}ah fi} al-T}ibb al-Andalusi}*, Abu Dhabi: *al-Mujama' al-Thaqafi}*, pp: 73-76; Nabri I. A., 1983. "El Zahrawi (936-1013 AD), the father of operative surgery", *Annals of the Royal College of Surgeons of England*, Vol. 65, pp:132-134; Al-Rodhan, N. R. F., Fox, J. L., 1986. "Al-Zahrawi and Arabian neurosurgery, 936-1013 AD", *Surgical Neurology*, Vol.26, pp:92-95.

⁶⁹ Hamarneh, Sami Khalaf, and Glenn Sonnedecker, 1963. *A pharmaceutical view of Abulcasis al-Zahra in Moorish Spain*, p. 27.

⁷⁰ Donald Campbell, 2001. *Arabian Medicine and Its Influence on the Middle Ages: Trubner's Oriental Series*, London: Routledge, Vol. 3: 14-31.

quoted from the *al-Tas}ri>f*, whereas others did not.⁷¹ That those who confessed attributes and benefitted from the work of al-Zahra>wi> more than that can be designated, of whom Guy Ducholyack, and Haller, who confirmed that Abu> Qa>sim al-Zahra>wi>, practiced the linking arteries before Ambroise Pare, and Portal Portal said that that Abu> Qa>sim al-Zahra>wi> was the first person uses needle-nose for a tonsillectomy eradication and nasal polyposis,⁷² and is consider al-Zahra>wi>the master of surgery, and given him credit for alerting surgeons who read his book to places of danger in the operations, and the need for extreme caution.⁷³ Sprengel says that al-Zahra>wi> was the first to enforce the lithotomy urinary method among women,⁷⁴ and Malgaigne says that al-Zahra>wi>, the first to put ordinary dressings about open fractures, also said that al-Zahra>wi> the first one to address and treated chronic dislocations, and historians of medicine recognized that al-Zahra>wi> was a contest in use Catgut suture intestine and connecting arteries,⁷⁵ which al-Zahra>wi>'s idea of using cotton bandages to stop bleeding after tooth extraction, and made of the tampons in vaginal pelvic fractures, which is the first mention of Hemophilia and tried to be treated it.⁷⁶ al-Zahra>wi> work retained in major libraries in the world with two forty-copies of the Arabic original manuscript, and there are twenty-seven manuscripts of Latin translations possession most famous museums and libraries throughout the world have pride of it, and there are also Twenty-seven ancient editions of al-Zahra>wi>'s *al-Tas}ri>f* in Latin, Arabic and English, Spanish and Hebrew as an accessories of those libraries.⁷⁷

The attention of al-Zahra>wi> medical achievements did not stop as seen in modern times, the study of al-Zahra>mi>'s surgery resumed, due to its contain of creativity and entrepreneurship.⁷⁸ That was found in the work of French scholar Lucien Leclerc in 1862, which transferred the article thirty into French under the title "La chirurgie d'Albucasis"⁷⁹ and followed by dozens of studies in the last century, of the most important research Dr. Fari>d Sa>mi> H{adda>d's more than fifteen studies most of its topics in the *al-Tas}ri>f*, which was delivered at international conferences for the History of Medicine, or published in specialized journals in addition to his father research Sa>mi> H{adda>d.⁸⁰ Also appeared in Sa>mi> Khalaf H{ama>rneh and his colleague Soni Decker a book entitled "A Pharmaceutical View of Abulcasis

⁷¹ Martine-Arguz, C., Bustamante-Martinez, Ajo V., Fernandez-Armayor, J. M., and Mereno-Martinez, 2002. "Neuroscience in Al-Andalus and its Influence on Medieval Scholastics Medicine", *Revista de neurología*, Vol. 34, pp: 877-892.

⁷² Al-Benna, Sammy, "Albucasis, a tenth-century scholar, physician and surgeon: His role in the history of plastic and reconstructive surgery", *European Journal of Plastic Surgery*, (29 September 2011) 35 (5): 379-387; Hamarneh, Sami Khalaf, and Glenn Sonnedecker, 1963. *A pharmaceutical view of Abulcasis al-Zahra>wi> in Moorish Spain*,p: 26.

⁷³Kaf Al-Ghazal, 2002. "Al-Zahrawi and Plastic Surgery",*ArabMed Journal*, Vol. 2, pp: 16-18; Tschanz, David W. 1997. "The Arab Roots of European Medicine", *Aramco World*, May-June,pp: 20-31; Nabri, I. A., 1983. "El Zahrawi (936-1013 AD), the father of operative surgery", *Annals of the Royal College of Surgeons of England*,.Vol.6:132-134.

⁷⁴ Khairallah, A. A., 1942. "Arabic Contributions to Anatomy and Surgery", *Ann. Med. Hist.* ,Vol. 4: 409-15.

⁷⁵ John S. Billings, 1895. *The History and Literature of Surgery*, Philadelphia: Lee Brothers and Co.,: 36-39; Haddad, S. I., 1942. "Arabian Contribution to Medicine", *Anna Med. Hist.*,Vol. 3:60-72.

⁷⁶ Hamarneh, Sami Khalaf, 1963. *A pharmaceutical view of Abulcasis al-Zahrawi in Moorish Spain, with special reference to the "Adhean"*, Leiden: E.J. Brill,pp: 24-27, 150.

⁷⁷ Max Meyerhofi, 1968. *Science and Medicine: The Legacy of Islam*, Oxford: Oxford University Press,p: 331.

⁷⁸ M. S. Spink and G. L. Lewis,1973. *Albucasis on surgery and instruments*; a definitive ed. of the Arabic text with English translation and commentary, Berkeley, University of California Press,p: 26.

⁷⁹ Ibid, pp: 26-27.

⁸⁰Farid Sami Haddad, 1973. "Arab contribution to medicine", *Lebanese Medical. Journal*, Vol.26 ,p: 331; Farid Sami Haddad, 1968. "Pioneers of Arabian Medicine", *Lebanese Medical Journal* , Vol. 21: 2.

Al-Zahrawi in Moorish Spain”,⁸¹ followed by the subsequent publication of a study entitled, “the evolution of surgery in Arabic Medicine” during medieval Surgical Development in Medieval Arabic Medicine.⁸² Perhaps one of the most prominent publications about al-Zahrawi’s surgery is German scholar Sigrud Hunke’s *Allahs sonne uber dem abendland unser Arabisches erbe*, which was translated into Arabic as *Shams al-‘Arab Tast’a’ ‘ala> al-Gharb* (Arabs sun Shines on the West). In her discussion of surgery, she remarked that: This field specifically belong to the Arabs in its lead and ascension surprise advancement of rank of professions despicable profane which are almost is like executioners and butchers professions, to the summit known at the works of the Arabs,⁸³ and this was the decision of Church which deprives the teaching of medicine in medical schools and declares that all physicians who practice this profession are despicable.⁸⁴ Therefore, the Arabs alone is credited in raising this great art to the level it deserves, and to them thanks to the survival of this branch of science, and only the branch of medicine that has hopes.⁸⁵ His discussion on the health of mothers and children, as well as of midwifery, is of immense interest to those studying the historical development of nursing. Ibn Zuhr (484-557/1072-1162) (Avenzoar)⁸⁶ was the other renowned Andalusian physician who left an indelible mark on the development of Arab/Muslim clinical medicine and therapeutics. Abu> Marwan Ibn Zuhr was the son of Abu> Ala>, a skilled physician in diagnosis and treatment, and the grandson of a physician. Born in Seville in 465/1072, he studied literature, jurisprudence, and the Shari>’ah sciences before studying medicine under his father. A prolific writer and highly successful medical practitioner, he was a friend of the well-known and popular jurist, physician, and philosopher Ibn Rushd (d. 595/1198).⁸⁷ In his famous and monumental work *al-Taysi>r fi> al-Mudawat wa al-Tadbi>r* (*On Preventive Regimen and Treatment*), Ibn Zuhr explained how to diagnose and treat diseases. His scientific contributions were exceptional even during his own time. In addition to his wide-ranging knowledge, he specialized in and practiced medicine throughout his life and was well-known for his descriptions of internal and skin diseases as well as surgery. In addition, he investigated the causes and treatments of head diseases and sores; diseases of the ears, nose, mouth, lips, teeth, eyes; diseases of the neck, lungs, and heart; and types of fevers and epidemic diseases. He also described inflammation membrane heart, and get between him and pneumonia.⁸⁸ During his career, Ibn Zuhr relied on experimental practical and scientific research and recorded his observations. This methodology enabled him to detect previously unrecognized diseases. For example, he studied lung diseases and performed the

⁸¹ Hamarneh, Sami Khalaf, 1963. *A pharmaceutical view of Abulcasis al-Zahrawi in Moorish Spain, with special reference to the “Adhean”*, Leiden: E.J. Brill.

⁸² Davis, Audrey, and Toby Appel, 1979. *Bloodletting Instruments in the National Museum of History and Technology*, Washington, D.C.: Smithsonian Institute; Hilton-Simpson, H. M., 1922. *Arab Medicine and Surgery: A Study of the Healing Arts in Algeria*, London: Oxford University Press.; Spink, M. S., and G. L. Lewis, 1973. *Albucasis on Surgery and Instruments*, London: Wellcome Institute.

⁸³ Zagrid Honke, 1981. *Allahs sonne uber dem abendland unser Arabisches erbe*, translated into Arabic by Fa>ru>q Bayd>u>n and Kama>l Dasu>q>, *Shams al-‘Arab Tast’a’ ‘ala> al-Gharb: Athar al-H{ad}a>rah al-‘Arabiyyah fi> Uru>ba>*, Beirut: Da>r al-Afa>q, pp:288-290.

⁸⁴ Ibid, pp: 220-225.

⁸⁵ Ibid, pp: 310-315.

⁸⁶ Abd al-Ma>lik ibn Zuhr al-Andalusi>, a noted scientist and researcher, inherited the study and practice of medicine from his father. Considered the greatest teacher in clinical medicine after Abu> Zakaria al-Ra>zi>, he was the first one to have the idea of respiratory surgery. He also conducted original research in foods, drugs, fractures, and many other fields. Ibn Zuhr left us a great scientific wealth, perhaps the most important of which is his *al-Taysi>r fi> al-Muda>wa>t w-al-Tadbi>r* (*Facilitation in Therapeutics and Measure*). This book on scientific medicine went beyond the realm of opinion and theory by focusing on direct observation. It also provides descriptions of pericarditis, inflammation of the middle ear, and throat paralysis, as well as the process of extracting gravel from the kidney and performing a tracheostomy. Ibn Abi> Us{aybi>’ah, 1998. *‘Uyu>n al-Anba>’ fi> T}abaqa>t al-At{i}bba>’*, pp: 278-291; Muh}ammad S{a>diq al-‘Afi>fi>, 1976. *Tat}awur al-Fikr al-‘Ilmi> ‘anda al-Muslimi>n*, Cairo: Maktabat al-Kha>nji>, p: 201.

⁸⁷ Ibn Abi> Us{aybi>’ah, 1998. *‘Uyu>n al-Anba>’ fi> T}abaqa>t al-At{i}bba>’*, 517-21, and 530.

⁸⁸ Ibn Zuhr, 1983. *Kita>b al-Taysi>r fi> al-Muda>wa>h w-al Tadbi>r*, ed. Michael Khouri>, Damascus: Da>r al-Fikr, pp: 6, 106, 233, 277, 289, 326, 388, 389.

trachea leading to the lungs.⁸⁹ He was the first to feed patients through injections, one of the first to study diseases in a particular environment (e.g., he spoke about diseases commonly found in Marrakech), and the first to indicate the value of honey in medicine and food.⁹⁰ Understandably, he was admired by many of his contemporaries, especially by his friend Ibn Rushd, who stated in his *al-Kulliyah* as that Ibn Zuhr was the greatest physician after Galen. This unparalleled physician of Andalusia⁹¹ had a major impact on the development of European medicine until the seventeenth century, thanks to the translation of his work into Latin and Hebrew.⁹² According to historiographer Ibn Abi 'Usaybi'ah's *'Uyūn al-Anbā'* *fi Tābaqa al-Atība*, Ibn Zuhr's books and literature were crucial medical publications. After gifting his medical encyclopedia *al-Taysir fi al-Mudawwa al-Tadbi* to his friend Ibn Rushd, the latter wrote his *al-Kulliyah* such a way that the two books completed one another.⁹³ *al-Taysir fi al-Mudawwa al-Tadbi*,⁹⁴ translated into Latin and Hebrew in 1490, had a major impact on European medicine until the seventeenth century. Copies of it now reside in various places, including the Royal Treasury of Rabat, Paris, Oxford (UK), and Florence (Italy).⁹⁵ In 1991, the Academy of the Kingdom of Morocco printed it as part of its Heritage Series after it was edited by Muhammad ibn 'Abdullah al-Rawda'ni.⁹⁶ *Hisal-Iqtisā' d fi Isjlāh al-Anfus w-al Ajsād* (The Treatment and Healing of the Soul and the Body) or *Fi al-Zinah* (On Beautification) is a compendium of diseases, medications, the need to remain healthy, and psychiatry.⁹⁷ Several manuscript copies of it are in existence, one of which is in the Royal Treasury in Rabat. Another of his important books, *al-Aghdhiyyah wa-l Adwiyyah* (Dietetics and Medicine), contains descriptions of various types of foods and drugs and their effects on health⁹⁸ and was translated into Latin.⁹⁹ It is still a manuscript, two copies were found in the Royal Treasury in Rabat.¹⁰⁰ Ibn Rushd (Averroes [1125-98]), another multitalented Andalusian scholar, was more of a philosopher-theologian and scholar of the Qur'anic sciences than a physician.¹⁰¹ Nevertheless, his medical works are

⁸⁹ Henry A. Azar, 2008. *The Sage of Seville: Ibn Zuhr, his time, and his medical legacy*, Cairo: The American University of Cairo Press, pp:37-39.

⁹⁰ Ha'jjī Khali'fah, 1982. *Kashf al-Zunūn*, vol. 1, Beirut: Da'r al-Fikr, p: 354; Ibn 'Ud'ari' Muhammad al-Marakishi, 1983. *al-Bayān al-Mugharab fi Akhbār al-Andalus wa-l Maghrib*, ed. Ihsān 'Abbas, Beirut: Da'r al-Thaqāfah, Vol. 4: 60-68.

⁹¹ al-Marakishi, Abu 'Abdallah Muhammad al-Ansari, 1984. *al-Dhyal w-al Takmilah li Kita' bayi al-Mawsū'ah wal-Sīlah*, ed. Muhammad bin Shari'fah, Rabat: Kingdom of Morocco Academy, p: 668.

⁹² Nasr, S. A., 1968. *Science and civilization in Islam*. Lahore: Suhail Academy, p: 21.

⁹³ Ibn Abi 'Usaybi'ah, 1998. *'Uyūn al-Anbā'* *fi Tābaqa al-Atība*, pp:530-533; Ibn Zuhr, 1983. *Kita'b al-Taysir fi al-Mudawwa w-al Tadbi*, p: 7.

⁹⁴ This was mentioned in Ibn Zuhr, 1983. *Kita'b al-Taysir fi al-Mudawwa w-al Tadbi*, pp: 282, 385.

⁹⁵ Sarton, George, 1975. *Introduction to the History of Medicine*, New York: Robert E. Krieger Publishing Company, Inc., Vol. II, part I, pp: 231-234; Azar, H. A., McVaugh, M. R., Shatzmiller, J., 2002. "Ibn Zuhr (Avenzoar)'s description of verrucous malignancy of the colon (with an English translation from Arabic and notes on its Hebrew and Latin versions)", *Can Bull Med Hist*, Vol. 19: 431-440.

⁹⁶ Ibn Zuhr, Abu Marwan 'Abd al-Malik, 1991. *Kita'b al-Taysir fi al-Mudawwa w-al Tadbi*, ed. Muhammad ibn 'Abdallah al-Rawda'ni, Rabat: Kingdom of Morocco Academy "Silsalat al-Turath".

⁹⁷ 'Abd al-Karīm al-Baqi, 1982. *Ma'ālim Fikriyyah fi Tārīkh al-Hādārah al-'Arabiyyah al-Islāmiyyah*, Damascus: Munshurāt al-Sharkah al-Mutah'idah, p: 115.

⁹⁸ Ibn Abi 'Usaybi'ah, 1998. *'Uyūn al-Anbā'* *fi Tābaqa al-Atība*, p: 291; Muhammad al-'Arabi' al-Khitābi, 1991. *al-Aghdhiyyah wa-l Adwiyyah 'and Mu'alifi' al-Gharb al-Islāmi*, Beirut: Da'r al-Gharb al-Islāmi, pp: 79-165; Rosa Kuhne Brabant, 1971. *El-Kita'b al-Iqtisā' d de Avenzoar según el- MS. No. 834 de la Biblioteca del Real Monasterio de San Lorenzo de El Escorial*. Ph.D. thesis, Madrid: Facultad de Filosofía y Letras..

⁹⁹ See Henry A. Azar, 1988. Ibn Zuhr (Avenzoar) "Supreme in the Science of Medicine since Galen": The Translation of his Work into Latin and His Image in Medieval Europe, Ph.D. Dissertation, University of North Carolina at Chapel Hill, 1998, Ann Arbor: UMI.

¹⁰⁰ Henry A. Azar, 2008. *The Sage of Seville: Ibn Zuhr, his time, and his medical legacy*, Cairo: The American University of Cairo Press, pp: 23, 32-36, 69-74.

¹⁰¹ Seyyed Hossein Nasr and Oliver Leaman, 1996. *History of the Islamic Philosophy*, London: Routledge, pp: 334-336; Leaman, O., 1988. *Averroes and His Philosophy*, Oxford: Clarendon Press; 2nd

remarkable. In fact his *Kulliyat fi Tibb*, which deals with the general rules of medicine, was translated into Latin in 1255.¹⁰² His philosophical, religious, and legal works, however, have received far more attention.¹⁰³ Among his teachers in medicine were ‘Ali ibn Ja‘far ibn Harun al-Tarrajani (d. 557/1180)¹⁰⁴ and Abu Marwan ibn H{azbu}.¹⁰⁵ His major medical work, *al-Kulliyat* (Generalities”, i. e. general medicine), known in its Latin translation as *Colliget* was written between 1153-69,¹⁰⁶ and leans heavily upon Galen; occasionally Hippocrates is mentioned. It is subdivided into seven parts: *Tashrih al-a‘d‘a* (Anatomy of Organs), *al-Sihah* (Health), *al-Marad* (Sickness), *al-‘Alamāt* (Symptoms), *al-Adwiyah w-al-Aghdhiyah* (Drugs and Foods), *H{ifz} al-Sihah* (Hygiene), and *Shifa al-Amrad* (Therapy).¹⁰⁷

This section focuses on Ibn Rushd’s *Kulliyat*, one of the books classified *situat* Put to debate the subject of scientific thinking in medicine. Ibn Rushd dealt with the theoretical lesson assets the study of medicine, without engaging into the detailed of the particulars, I guess he left this matter for specialized people in this science he refer to them as *as}h}a}b al-kanannish*/specialized scholars in the writings of details of particulars, treatments for each disease that affects body parts, i.e. the work of Ibn Zuhr in this science.¹⁰⁸

The importance of Ibn Rushd’s approach lies in his adoption of an unfamiliar methodology to address medical matters, which was not the norm and thus raised speculation and concern among researchers. This is what captured my attention while reading his *al-Kulliyat fi Tibb*. In the last part of this book, Ibn Rushd alerted the reader to the fact that his work contained a treatment for all types of diseases as opposed to addressing the healing of each disease separately. Because this is the work and the approach adopted by the *kanannish*/specialized, since this work required a devoted quality of time to address these matters, he was not able to do that because he was occupied with other things. Yet for the concern readers of *al-Kulliyat*, who desired to read and know beyond his book such as the partial of medicine, he referred them to the work of Ibn al-Zuhr, *Kitaab al-Taysir*.¹⁰⁹

Ibn Rushd promoted the work of Ibn Zuhr and his *Kitaab al-Taysir* due to their friendship, which was manifested on many levels, most notably the scientific level. It subsequently spread far and wide. In fact,

edn, Richmond: Curzon, 1997; Fakhry, M. 1958. *Islamic Occasionalism and Its Critique by Averroes and Aquinas*, London: Allen & Unwin,.

¹⁰² Seyyed Hossein Nasr, 1987. *Science and Civilization in Islam*, Cambridge: Harvard University Press, , pp: 184-229; George S{aliba}, 1998. *al-Fikr al-‘Ilmi> al-‘Arabi>: Nash‘atuha wa Tat}wurahu*, Beirut: Jami‘at Belmont, pp: 163-190; idem., 2007. *Islamic Science and the Making of the European Renaissance*, MIT, , pp: 194-197; M. Levey, 1966. *The Medical Formulary or Aqrabadhin of al-Kindi*. Madison: University of Wisconsin Press; Hassa}n H{allaq, H{arbi} ‘Abba}s Mah}mu}d, 1995. *al-‘Ulu}m ‘ind al-‘Arab: Us}ju>laha wa- Mala}mih}}uha al-H{ad}a>riyya*, Beirut: Da}r al-Nahd}ah,.; Howard R. Turner, 1997. *Sciences in Medieval Islam*, Austin: University of Texas Press; O’Leary De Lacy, 1979. *How Greek Science Passed to the Arabs*, Chicago: Ares Publishers; Joel L. Kraemer, 1993. *Humanism in the Renaissance of Islam: The Cultural Revival During the Buyid Age* Leiden: E. J. Brill, pp: 1 and 148; Ahmad Y Hassan, 1996. “Factors Behind the Decline of Islamic Science After the Sixteenth Century”, *Islam and the Challenge of Modernity*, Kuala Lumpur, International Institute of Islamic Thought, pp: 351-389.

¹⁰³ Seyyed Hossein Nasr and Oliver Leamna, 1996. *History of Islamic Philosophy*, London: Routledge, pp: 334-336.

¹⁰⁴ Ibn Abi} Us{aybi}‘ah, `1998. ‘*Uyu}n al-Anba>’ fi} T}abaqa>t al-At{i}bba>’*, pp: 24-25.

¹⁰⁵ Ibid., pp: 279-281; al-Dhahabi}, Shams al-Di}n Muh}ammad ibn Ah}mad, 1987-1992. *Ta>ri>kh al-Isla>m wa- Wafiya>t al-Mashahi>r w-al-A’la>m*, ed. ‘Umar ‘Abd al-Sala>m Tadmuri}, Beirut: Da>r al-Kita>b al-‘Arabi}, , vols. 9: 239, vol. 42: 197 and vol. 61: 197.

¹⁰⁶ Ibn Rushd, 1989. *al-Kuliyat fi} al-T}ib*, ed., Sa’i}d Shayba>n and ‘Ama>r al-T{a}libi}, Cairo: al-Majlis al-‘A>la>lil-Thagq>fah, pp: 14-15.

¹⁰⁷ Ibid, pp. 19-22.

¹⁰⁸ Ibn Abi} Us{aybi}‘ah, 1998. ‘*Uyu}n al-Anba>’ fi} T}abaqa>t al-At{i}bba>’*, p: 487; Ibn Rushd, 1989. *al-Kuliyat fi} al-T}ib*, p: 422.

¹⁰⁹ Ibn Rushd, 1989. *al-Kuliyat fi} al-T}ib*, p: 422; Ibn Zuhr, 1991. Abu} Marwa>n ‘Abd al-Malik, *Kita>b al-Taysir fi} al-Muda>wa>h w-al Tadbi>r*, ed. Muh}ammad ibn ‘Abdallah al-Rawada>ni}, Rabat: Kingdom of Morocco Academy “Silsalat al-Turath”; Henry A. Azar, 2008. *The Sage of Seville: Ibn Zuhr, his time, and his medical legacy*, p: 77.

both books so complemented each other that they can be said to form a complete medical textbook. It is not the view of Abi> Us{aybi'ah that he goes a claiming that Ibn Rushd when he finished with his book *al-Kulliyah* universal, intent from Ibn Zuhr to compose a book on topics of particulars to fulfill what lacks i.e., the particulars. As stated in *'Uyun al-Anba' fi Tabaqa al-Attaba'*.¹¹⁰

Historical evidence does not support Abi> Us{aybi'ah's claims, since Ibn Rushd recommended and referred to *al-Taysir* in his own *al-Kulliyah*, it appears that the former is first to emerge. It also appears that Ibn Rushd wrote his book *al-Kulliyah* two years after *al-Taysir* appeared. And during the life of the latter, as it appears from the context of Ibn Rushd text toward his last chapter of *al-Kulliyah*, that Ibn Zuhr died in 557/1162, it means that *al-Kulliyah* were written much before that date, and that *al-Taysir* was written before the death of his author at least three to four years.¹¹¹

Given the context of Ibn Zahr's *sal-Taysir*, it is clear that he wrote it in response to the orders of Caliph 'Abd al-Mu'min ibn 'Ali.¹¹² On the other hand, it should be noted that *al-Taysir* does not follow the methodology of those specialists who dealt with the details of particulars, treatments for each disease that affects body parts entirely, but dispose of some act. Perhaps this is what Ibn Rushd meant by saying in his last chapter of his *al-Kulliyah* that Ibn Zahr's book combined in his book the treatment with drugs. Ibn Zahr himself confirmed this in the foreword to *al-Taysir* as referred to his combining, however, what was followed by *al-Kanannish* approached which coordinates diseases and listed their drugs along with them to make it easier for the command authored of the book to handle and that was the way he describes as blameworthy in other ways and scientific matters in the medical record, did not limit it to the matter when only may be in force only.¹¹³

It is clearly reflected from the context of this discussion that way *al-Kanannish*'s approach is not similar to the overall approaches; it is lesser; since its method does not dwell in the search for scientific theories and construct the results on its causes. The ratio of the first to the second is as *furu'* /branches in the jurisprudence to the *usul* /origins. This is an old tradition in the field of medical classification such as Greek physicians. Galen for example, points out that the purpose of the book of *Small Industry* (*al-Sifna'ah al-Saghirah*) did not describe all the partial things, but mentioned what was explained in his other books.¹¹⁴ What meant by the intended partial matters here, is what is in the books individual drugs, which refers to what was written in this regard. The mention of Galen book, in order to illustrate the similarity of methodology approached that identify with Ibn Rushd's *sal-Kulliyah* to the point we can say that the methodological structure is identical, since both discussed the original theory to the science of medicine.¹¹⁵

Galen, tended in his "small industry", a systematic trend based on the analysis of limit and is fair to call this as an education instead limit analysis, and explaining of the limit. What is meant by the explanation of the limit, according to the context of the book, the numerator and interpretation, the extension of the concept of medicine and its interpretation. The latter aware of things that attributed to health and disease, and the case that a person cannot conclude where the health or sickness.¹¹⁶

The physician intended to know the reasons for health and the causes of the disease, and the types of treatments. The evidence of the present case called the function, and what is indicative of the future, which will be located, and it called alarming, or an indication of what went on, and called the memorandum. The greater need of a physician is to diagnose the present and future situation. Signs indicate the state of how the body and its organs function. This is what made Galen devote several pages of his book of discussion about the organs. Constitute what the logical order behind governing the chapters of Galen book "Small Industry" (*al-Sifna'ah al-Saghirah*) and its paragraphs. It is safe to conclude that the work of Ibn Rushd's *al-Kulliyah* falls by the nature of its theme, within this category of authorship. And extrapolate

¹¹⁰ Ibn Abi> Us{aybi'ah, 1998. *'Uyun al-Anba' fi Tabaqa al-Attaba'*, p: 487.

¹¹¹ Henry A. Azar, 2008. *The Sage of Seville: Ibn Zuhr, his time, and his medical legacy*, pp:78-79; Ibn Rushd, 1989. *al-Kulliyah* p: 422.

¹¹² Ibn Zuhr, 1991. *al-Taysir*, p: 38

¹¹³ Ibid, p: 35.

¹¹⁴ Galen, 1988. *al-Sifna'ah al-Saghirah*, translated by Ishaq ibn H{unayn, edited by Muhammad Sali> Sa>lim, Cairo: pp: 181-182.

¹¹⁵ Ibid, pp. 2-3.

¹¹⁶ Ibid, p. 7.

logical order governing the chapters and paragraphs confirms this, with some conduct consisting of an add chapters or other expansion.

It is important to emphasize here that the comparison between *al-Kulliyah* and “small industry” (*al-Sifina* ‘ah *al-Sagi*rah) is not necessarily valid, especially if the focus is limited to outlook only. It is true that Galen is mentioned thirty-two times in *al-Kulliyah*, but this does not mean that Ibn Rushd used him as his primary reference, he cited many other scholars in the field such as Aristotle, Hippocrates, Ibn Sina, and Ibn Zuhr in Ibn Rushd work in medicine.¹¹⁷ The latter had thoroughly studied Galen’s works, accepted them within the limits, and often confronted his teachings with those of the first teacher Aristotle.¹¹⁸ For example, if, as Galen claimed, women had “female testicles,” they apparently had no influence on procreation. Yet according to Aristotle, women become pregnant without emitting any sperm. Ibn al-Rushd was more in agreement with Aristotle than with Galen.¹¹⁹ Occasionally Ibn Rushd depended upon Aristotle’s views in his *al-Kulliyah*, but even in his summary of Galen’s works, such as *al-Istiqsa* and *al-Maza*j,¹²⁰ the latter, as well as *al-Kulliyah*, were full of redress and observations that were often traceable to Aristotle or Ibn Rushd. Received the art of the medical principles from the natural science to that Ibn Rushd transmitting on two books of Aristotle, namely, *al-Kawn w-al-Fasad* (The Universe and Corruption) and *al-Athar al-Alwiyyah* (The Upper Archaeology), citing that those principles found in these two books and other appropriate demonstrative hearsay, contrary to what physicians do who do not speak in this thread only inappropriate hearsay such as dialectic. Therefore often resulted in their fatwas false hearsay as Galen did in his *Maza*j book (Book of the mood) more than once, which sometimes Ibn Rushd accused Galen of being in stage of illusion.¹²¹

On the point claimed Galen that my women role in the formation of the fetus and birth, refuted Ibn Rushd this claim and accept vehemently the opinion of Aristotle first who confirmed that women may carry without emitting sperms, and then his personal curiosity which was based on direct question to several women, they stressed that sperms has nothing to do with pregnancy.

Two significant positions can be drawn from his medical practice and writings: (1) Ibn Rushd did not accept anything that lacked evidence/scientific evidence, for his desire to attach with evidence as represented originally by Aristotle, free of impurities, and Aristotelian scientific systems; and (2) the desire to fulfill the essence of the art of medical industry, which remains represented by experience and experiments. This is why he favored and recommended Ibn Zuhr’s *sal-Taysir*, because the latter sought to make practical, as opposed to theoretical/philosophical contributions to medicine.¹²²

VI. CONCLUDING REMARKS:

During the early centuries of Islam, Muslims were pioneers in terms of knowledge at large and subsequently transmitted many of their scientific achievements to Europe. According to many leading orientalist, this notion appeal and especially in the field of medicine. The Arab/Muslim role in Europe’s scientific renaissance, not to mention how it enabled Europe’s subsequent scientific progress, remains largely unacknowledged and unknown in the West. The role of Arab/Muslim science and philosophy in the Renaissance should not be forgotten. Therefore, the demand for researchers familiar with Latin and Hebrew, specialists in medieval culture, and those with an adequate knowledge of Arab/Muslim heritage in science and philosophy.¹²³ We hope make such knowledge available to the younger generations of university researchers. Since Arabs/Muslims have for a long time been forced to consume the “knowledge” produced by neo-orientalists and Arabists and those interested in this topic of European

¹¹⁷ Henry A. Azar, 2008. *The Sage of Seville: Ibn Zuhr, his time, and his medical legacy*, p: 77

¹¹⁸ Ibid.

¹¹⁹ Ibn Rushd, 1989. *al-Kulliyah* fi *al-Tibb*, pp: 70-71; Henry A. Azar, 2008. *The Sage of Seville: Ibn Zuhr, his time, and his medical legacy*, p: 148.

¹²⁰ Ibn Abi Usaybi‘ah, 1998. ‘*Uyun al-Anba’ fi Tabaqa al-Atifibba’*’, p: 478.; Ibn Rushd, 1987. *Rasa’il Ibn Rushd al-Tibbiyyah*, edited George Shiha, Sa’id Zayid, Cairo: al-Hay’ah al-Masriyyah al-‘Ammah lil-Kita’b,.

¹²¹ Ibn Rushd, 1989. *al-Kulliyah* fi *al-Tibb*, p: 341.

¹²² Ibid, pp: 316-341

¹²³ Rushdi Rashid, 2010. *Dirasa fi Tarikh al-Lum al-Arabiyyah wa-Falsafatuha*, Beirut: Markaz Dirasa al-Wihdah al-Arabiyyah, pp: 375-398.

scholars. Perhaps the most important research done recently on the subject is that what I have cited in the above pages throughout this study.¹²⁴

Ibn Rushd's division of medicine into "theoretical" and "clinical" was adopted by the many of the Muslim physicians mentioned above. The first branch analyzes a person's health and symptoms, disease and its causes, and treatments. The second branch is left to the decision of the medical industry, which considers how to preserve/promote health under what circumstances, healing and how to be free from any diseases, and recoveries practiced by modern medicine in Europe today.

Finally, all of the above-mentioned Muslim physicians recognized the work of their predecessors regardless of their faith, for what mattered to them most was their ongoing quest for theoretical knowledge, examining its ideas, and recording new findings through scientific evidence. It was the approach and learning mechanism of all and to illustrate the new finding. In modern scholarship, it is rare to see any scientist mention the origin of his/her ideas. In contrast, and despite their differences and other things, Ibn Rushd frequently mentioned Galen in his works. While it is a privilege to be exposed to modern scientific achievements and advancements, which continue to expand, it would be even better to connect the past with the present by acknowledging the work of others regardless of the latter's faith, culture and language – even they happened to be Muslims – similar to the practice of Muslims scholars throughout Islam's "golden age." Such acknowledgment is much healthier and more professional, which eventually led to the European Renaissance.¹²⁵ Muslims are even more ready to remember their past glory when confronted by the negative present.¹²⁶ Our contemporary reality differs significantly from that of the past few centuries. In fact, contemporary western civilisation still denies many Arabs/Muslims their rights¹²⁷ while paying lip service to the historic importance of their contributions and leadership in various modern scientific fields, particularly medicine.

The medical books cited above were taught in medical schools for centuries. Those of Ibn Sina, Ibn Zuhr al-Razi, Ibn Rushd, Ibn al-Nafis, Ibn al-Haytham, al-Kindi and al-Zahrawi had a major impact on medicine in Europe during its Middle Ages, a time when Arabs/Muslims were the first to classify medicine as a branch of natural philosophy influenced by the ideas of Aristotle and Galen. They defined and designated numerous medical specializations, such as ophthalmology, anatomy, therapy, dentistry, physiology, surgery, and gynecology. Muslims scholars of that time were open to new ideas and revered the ancient texts, which enhanced the progress of medicine. They added to the ancient medical ideas and techniques of other civilizations, developed medical science and related areas, and then strengthened the medical field through their own contributions in many areas (e.g. surgery and the human body). And yet many western scholars continue to neglect their significant contributions to and impact upon medicine as we know it today, because western scholars claim that Muslims played no such role because they were dependent upon Roman and Greek medicine and did no more than translate it and pass it onto Europe. Some western scholars, among them George Sarton, have begun to reject such claims. Indeed medievalists have given us an entirely distorted view of the middle ages, because of their failure to consider the evolution of positive knowledge and technique, and taking in to account the enormous intellectual activity of Islam... From the eighth to the eleventh century the main intellectual efforts were made under the patronage of Islam...¹²⁸ In short, he argues that these traditional claims are mistaken because without the Arab/Muslim transformation of ancient Greek knowledge and their significant commentary upon it, there would be no modernity and scientific treasure for future scholarship and advancement.¹²⁹ And is al-

¹²⁴ Ibid, pp: 7-11.

¹²⁵ See the "Islam and Science: The road to renewal", *The Economist*, June 26, 2013.

¹²⁶ Muh}ammad Ba>sha> al-Makhzu>mi>, 1980. *Kha>t}jira>t Jama>l al-Di>n al-Afgha>ni> al-Hussini>*, Beirut: Da>r al-H{aqi>qah, p: 290.

¹²⁷ Ah}mad Sali>m S'i>da>n, 1988. *Muqadama li-Ta>ri>kh al-Fikr al-'Ilmi> fi> al-Isla>m*, Kuwait: al-Majlis al-Wat}ani> lil-Tagha>fah wa-l-Funu>n al-Ada>b, pp: 114-125; Albert Hourani, 1980. *Arabic Thought in the Liberal Age: 1798-1939*, Cambridge: Cambridge University Press, pp: 103-129.

¹²⁸ George Sarton, 1988. *Introduction to the History of Science*, with recollections and reflections by Robert K. Merton, New Brunswick, p: 140

¹²⁹ Ibid., p. 90, 92; Shanks, Nigel J., Dawshe, Al-Kalai, 1984. "Arabian Medicine in the Middle Ages", *Journal of the Royal Society of Medicine*, Vol. 77, pp: 60-65; Jim al-Khalili, 2010. *Pathfinders the Golden Age of Arabic Science*, London: Penguin Books.

Ja>h}iz} story still an anecdote or a kernel of truth? Alsoal-×asan Ibn al-Haytham(d. 450/1040) said with respect to the field of knowledge at large the following: The seeker after truth is not one who studies the writings of the ancient and, following his nature disposition, puts his trust in them, but rather the one who suspect his faith in them and questions what gathers from them, the one who submits to arguments and demonstration and not the saying of human beings whose nature is fraught with all kinds of imperfection and deficiency. Thus the duty of the man, who investigates the writings of scientists, if learning the truth is his goal, is to make himself an enemy of all that he reads, and, applying his mind to the core and margins of its content, attack it from every side. He should also suspect himself as he performs his critical examination of it, so that he may avoid falling into either prejudice or leniency.¹³⁰

¹³⁰ Jim al-Khalili, in his work title *pathfinders: The Golden Age of Arabic Science* London: Penguin Books, 2010: 152; See also, Ibn al-QaffĪĒ, AbĒ al-×asan ‘AlĒ (d. 1248). *AkĥbĒr al-‘UlamĒ’ bi AkĥbĒr al-×ukamĒ’* Cairo: Maktabat al-ÓdĒb, 2008: 114-115; Ibn al-‘AbrĒ, Gregorias al-MalĪĒ (d. 1286). *TĒrĒkh MukĥtaĪr al-Duwal* Cairo: DĒr al-ÓfĒq, 2001: 182; Ibn AbĒ UĪaybi’a AlĪmad ibn QĒssim (d. 1270/668). *‘UyĒn al-AnbĒ’ fĒĪabaĒt al-AĪibĒ’* ed. MuĪammadBĒsil and ‘AbbĒs AlĪmad al-BĒzz, Beirut: DĒr al-Kutub al-‘Ilmiyya, n.d.: 506; MuĪlafĒ NaĒĒf (1942). *Al-×asab ibn al-Haytham: BuĪĒthuh waKushĒfuhu al-BaĪariyya* Cairo: MaĪba‘at NĒrĒ, p. 12; ‘Abd al-×alĒm MuntaĪr (1981). *TĒrĒkhal-‘Ilm wa dawr al-‘UlamĒ’ al-‘Arab fĒ Taqadumuh*, Cairo: DĒr al-Ma‘Ērif, p.149;