

# Important Contributions of Early Muslim Period To Medical Science. II. Clinical Sciences

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<http://dx.doi.org/10.5915/21-2-5514>

## Abstract

Medical scientists of the early Muslim period made spectacular contributions to the development of modern medical science. A few remarkable contributions are presented in this paper. The Middle Ages might be a "Dark Age" for the West but it was a golden age for the development of science. There were no equivalents of al-Kindī, al-Rāzī, Thābit, Sinān, 'Alī bin 'Abbās, 'Abdul Qāsim Zahrāwī, Ibn Sīnā, Ibn Haytham, al-Bīrūnī, Ibn Rushd (to name a few) and many others, in the West. The books of some of them viz. *Fardūs al-Hikmah* of al-Ṭabarī, *al-Hāwī* and *al-Manṣūrī* of al-Rāzī, *Kitāb al-Mālikī* of 'Abbās, *al-Taṣrīf* of Zahrāwī, *al-Qānūn* of Ibn Sīnā, *Dhakhīrah* of al-Jūrjānī, *Kitāb al-Manāzīr* of Ibn al-Haytham and *Kitāb al-Kulliyāt* of Ibn Rushd, were text books in medical schools, including those of western universities up to the 17th century. In addition, the following observations are noteworthy:

*Al-Rāzī* was the first to differentiate smallpox from measles and his description of the former is still accepted as unique. He was the father of dermatology, pediatrics and psychiatry.

*Ibn Sīnā* is regarded as the "Prince of Medicine" and is regarded as equal to Hippocrates and Galen. He was the greatest medical authority of the period and his book, "*al-Qānūn*", is still a text book in the *Yūnānī* system.

'*Abdul Qāsim al-Zahrāwī* was the founder of modern surgery and invented many surgical instruments that are still in use.

*Ibn al-Khātimah* and *Ibn al-Khaṭīb* were the first to describe plague accurately and declare its contagiousness.

Contributions of 'Ammār bin 'Alī, 'Alī Ibn 'Isā and Ibn al-Haytham in ophthalmology were spectacular. Muslim physicians were also pioneers in establishing hospitals for both human beings and domestic animals. *Sinān bin Thābit* introduced "licensing" examinations for practicing physicians.

**Key words:** Muslim scientists, Muslim physicians, contribution to clinical science.

Modern medical science, though mostly developed in the West, is basically the continuation of contributions made by scientists of the early Muslim period. Scientific approach to medical science began in the Greek period. After the fall of the Greeks, Romans controlled the old Greek territories. The Romans had little interest in pure science and the Greek science, including their medical science, continued to prevail in the Roman empire. Due to the antipathy of the Romans, Greek science was gradually lost, though a part of it survived by its translations into Latin and Syriac through individual efforts. A number of Greek scientists fled to Judishapur in Persia to avoid Roman torture, and they continued their pursuit of

scientific activities under the patronage of the Persian rulers. When the Muslims conquered the eastern Roman empire (Byzantium), the Muslim scientists saved the Greek knowledge from total destruction. Muslims first translated all the books of science then available, and later began to develop science further.

Muslims contributed most in the fields of philosophy, general science, technology and especially medicine. Their contributions to basic medical sciences has previously been reported.<sup>1</sup> In clinical sciences their contributions were most remarkable in the fields of general medicine, surgery, therapeutics and ophthalmology. A listing of some prominent scientists of the early Muslim period and their contributions in the different branches of clinical sciences are given below:

## Contributions to medicine

1. Al-Kindī (810/13-873 A.C.) wrote books on poisonous foods, fever with its classification, treatment of hemoptysis, leprosy, hydrophobia, and mental depression.<sup>2</sup>

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2. 'Alī ibn Sahl ibn Rabn al-Ṭabarī (810-850 A.C.):
  - i) He wrote the oldest surviving encyclopedia of medicine, "Fardūs al-Ḥikmah".<sup>3</sup>
  - ii) He was the first to record Indian contributions in medicine from the original source of *Sasruta* and *Charka*.<sup>4</sup>
3. Al-Rāzī (841-926 A.C.)
  - i) He is the author of two renowned encyclopedias of medicine, "al-Ḥāwī" and "al-Manṣūrī", which continued to be authoritative in the medical world until the 17th century.<sup>5</sup>
  - ii) Al-Rāzī was the first to distinguish smallpox from measles. His book on smallpox is the most original on the subject and was translated into English as late as 1848.<sup>6</sup> Al-Rāzī should be regarded the "Father of Dermatology".
  - iii) He was also the first to write a book on diseases of children and should be regarded the "Father of Pediatrics ('Abū al-'aṭfāl)".<sup>7</sup>
  - iv) Al-Rāzī was the first to discuss neuropsychiatric diseases and to successfully treat mental disorders like love sickness and lycanthropy, a delusion in which the patient believes himself to be a wolf. He declared that mental diseases were not due to evil spirits but were due to nervous breakdown and psychic disorders. This subject has been included in medical science only since the late 19th century, through the work of Freud. So al-Rāzī should rightly be honored as the "Father of Psychiatry".<sup>8</sup>
  - v) Al-Rāzī introduced treatment of poisonous insect bites by stopping the blood circulation of the area by tourniquet and removal of poison by sucking or cupping.
  - vi) Al-Rāzī disliked purgatives<sup>9</sup> and used to treat constipation by regulating diet. He gave special importance to diet and nutrition of the patient and advised the use of drugs only when dietary treatment failed.<sup>10</sup>
  - vii) Al-Rāzī introduced the use of emetics to vomit out poisonous food and drink. Later physicians introduced the use of soft tubes to remove the contents of the stomach, now known as stomach-wash tube.
4. Thābit ibn Qurrah (836-901 A.C.) was the first to mention the importance of hair in the different parts of the body and described the diseases of hair and nails in his famous book, "al-Dhakhīrah". He also discussed the guinea-worm (*Dracanculus medinensis*) infection.<sup>11</sup>
5. 'Alī ibn 'Abbās (died 994 A.C.) described the treatment of many skin diseases such as eczema, boils, elephantiasis, leprosy, albinism, favus, seborrheic dermatitis, alopecia, lupus vulgaris, smallpox, chickenpox, measles, erysipelas, etc., in his famous book on medicine, "Kitāb al-Mālikī".<sup>12</sup>
6. Al-Bīrūnī (973-850 A.C.) was second after 'Alī ibn Rabn (810-850 A.C.) to collect Indian knowledge from original sources. He personally visited India, learned the Sanskrit language and lived in India for several years to get correct information.
7. Ibn al-Wāfid (997-1978 A.C.) initially used to treat by regulating diet and gave medicine only if needed. Later he used to experiment on the effects of the medicines he used and advised other physicians to do the same.<sup>13</sup>
8. Ibn Sīnā (980-1037 A.C.), the "Prince of Medicine".
  - i) He is the author of the most famous encyclopedia of medicine, "al-Qānūn fil-Ṭibb" (The Canon of Medicine) which surpassed both in fame and usage the earlier two books of al-Rāzī, "al-Ḥāwī" and "al-Manṣūrī". "Al-Qānūn" was the required textbook of medicine in all medical universities of Europe as late as the later part of the 17th century,<sup>14</sup> and still is studied in the Yūnānī system of medicine in the East, especially on the subcontinent of India. Campell<sup>15</sup> stated that Ibn Sīnā surpassed Aristotle (4th century B.C.) and Galen (died 200 A.C.) by the presentation of his book, "al-Qānūn".<sup>15</sup>
  - ii) Like al-Rāzī he also successfully treated mental disorders some 900 years before Freud (1856-1939) in the 19th century.
  - iii) He distinguished mediastinitis from pleurisy.<sup>16</sup>
  - iv) Ibn Sīnā introduced new drugs for cardiac diseases, and his treatise, "al-'Adwiyah al-Qalbiyyah" (Cardiac Drugs), was found by Ḥakim A. Latif of Ṭibbiyyah College, Aligarh Muslim University.<sup>17</sup>
9. Ibn Zuhr (1094-1162 A.C.)
  - i) He was a great exponent of rational medicine and was opposed to superstitions such as evil spirits, astrology, and mysticism in medicine.
  - ii) Ibn Zuhr was the first to discuss intestinal phthisis (tuberculosis), pharyngeal paralysis and middle ear inflammation.<sup>18</sup>
10. 'Ismā'īl al-Jūrjānī (died 1036-1040 A.C.)
  - i) He was the first physician to write a book on personal hygiene and the importance of special care of nails, hair, and cleanliness of the body.<sup>19</sup> Islam gives special emphasis on personal hygiene which is not given its due importance even now in modern medicine.
  - ii) Al-Jūrjānī's famous book on medicine was "Dhakhīrah Khwārizmshāhī (Treasures of the Shah of Khwarizm)". It was a

voluminous book written in the Persian language just as "al-Qānūn" by Ibn Sīnā was written in the Arabic language. It did for Persian science what the Bible did for the English prose.<sup>20</sup>

- iii) He described for the first time the diseases of the esophagus in his "Dhakhīrah".
- iv) He was also the first to note the relationship between goiter and protrusion of the eyeballs (proptosis), which is now known as Parry's disease or Grave's disease, named in 1825. It should be renamed "Ismā'il's disease" or "Jūrjāni's disease" in his honor, as al-Jūrjāni described it 600 years before Parry.
11. Ibn Rushd (1126-1196 A.C.) wrote "Kitāb al-Kulliyāt (Colliget)" which was an encyclopedia of medicine in the West (Liber Universalis de Medicina).<sup>21</sup>
12. Fakhrudīn al-Rāzī or Imām Rāzī (1140-1209 A.C.)
  - i) Imām Rāzī was a famous religious authority (Mujaddid of the 6th Hijrī century) as well as a great scientist, a rare combination nowadays. He wrote two voluminous books on medicine, "Hifz al-Sihhah (Preservation of Health)" and "al-Ṭibb al-Kabīr (the Great Medicine)", as well as the famous commentary on al-Qur'ān, "Tafsīr al-Kabīr".
  - ii) Imām Rāzī discussed the diseases of animals and their treatment for which he should be honored as the pioneer of veterinary science.<sup>22</sup>
  - iii) Imām Rāzī described the different organs of the human body and tried to show the importance of divine and religious aspects in understanding their functions. Because of combined study of the theology and physical science, Imām Rāzī should be regarded as the pioneer of the modern subject, science in Islam.
13. Mūsā Khātīmah al-'Anṣārī (1323-1369 A.C.) His most important contribution to medicine was a book on plague "Tahsil Gharad al-Qāsid fī Tafṣīl al-Maraḍ al-Wāfid". He wrote the book when his native land, Almeria in Muslim Spain, was under the grip of plague epidemic in 1348-49. He described all aspects of plague from his personal observations and, as such it is a unique book in the history of medicine. Sarton<sup>23</sup> writes about this book, "this treatise is remarkable not only because of its earliness but also because of its goodness."
14. Ibn al-Khaṭīb al-Salmānī (1313-1374 A.C.) was a contemporary of Ibn al-Khātīmah. He was the last of the Spanish Muslim scientists and one of the greatest scientists of all time.<sup>24</sup> In his book, "Manfa'at al-Sā'ilīn fī Maraḍ al-Ḥīl", he gave a

full description of the epidemic of plague in Granada in 1348. This was as important as the book of Ibn al-Khātīmah on the same subject because both of them witnessed the epidemic.<sup>25</sup>

### Contributions to surgery (general and special)

1. Al-Rāzī (841-926 A.C.)
  - i) Al-Rāzī described the technique of reduction of fractures by the use of machines.<sup>26</sup>
  - ii) He was the first to use plates in amputation to avoid laceration of the part above the line of incision.<sup>27</sup>
  - iii) He was the first to use strings of the gut of sheep for suturing abdominal wounds. He actually used the strings of his musical instrument for the purpose.<sup>28</sup> Al-Rāzī is thus the forerunner of modern surgical suturing (catgut sutures). He also used silk threads for stitching wounds.
  - iv) Al-Rāzī devised the use of alcohol in surgery which is still used.<sup>29</sup> Without knowing about microorganisms, al-Rāzī introduced the concept of aseptic techniques in surgery, though this credit is given to the 19th century surgeon, Lister.
  - v) Al-Rāzī was acquainted with the operative procedures of tracheotomy, tonsillectomy, as well as with operations for lachrymal fistula, burns, necrosis, harelip, etc. He also recognized fracture of penis.<sup>30</sup>
  - vi) In obstetrics and gynecology, he dealt with subjects like retroversion of the uterus, hydrometra, molar pregnancy, and embryotomy for the relief of obstructed labor.<sup>31</sup>
2. 'Alī ibn 'Abbās (died 994 A.C.) was the first to advocate bandage in surgery.<sup>32</sup>
3. 'Abdul Qāsim al-Zahrāwī (936-1013 A.C.)
  - i) He was the greatest Muslim surgeon. He exerted a very deep influence upon the development of European surgery up to the Renaissance (16th century).<sup>33</sup> In fact he was the greatest surgeon of all time and the founder of modern surgery, the "Father of Surgery". His renowned medical encyclopedia, "al-Taṣrīf", consisted of 30 sections and contained illustrations of surgical instruments.<sup>34</sup>
  - ii) Al-Zahrāwī was the founder of surgical anatomy. The second part of his book, "al-Taṣrīf", was the textbook of surgery in both the East and the West for centuries. He valued anatomy as an important aid in the practice of surgery.<sup>35</sup>
  - iii) Al-Zahrāwī was the first to recognize an abdominal pregnancy discharging by external suppuration.<sup>36</sup> He removed this pregnancy surgically. He was also able to perform

craniotomy in obstructed labor.

- iv) Al-Zahrāwī introduced cautery for arterial hemorrhage when complete division of the vessel and styptics failed. He also used ligation of arteries in their continuity.<sup>37</sup>
  - v) Al-Zahrāwī used the threads scraped from the intestinal coat for the suture of the intestine, while al-Razi used strings of musical instruments for the purpose. Al-Zahrāwī also used different forms of sutures.
  - vi) Al-Zahrāwī described the operative procedures for goiter and aneurysm.
  - vii) Al-Zahrāwī used silver catheter instead of copper for relieving the retention of urine and used oil as lubricant.
  - viii) Al-Zahrāwī advocated the operation of lithotomy in women to be performed by a midwife under the direction of a physician. He gave elaborate description of the operation<sup>38</sup>, that involved breaking urinary bladder stone and removal of pieces through the urethra.
  - ix) Al-Zahrāwī was the first to describe the operation of circumcision. So he made circumcision a surgical procedure instead of leaving it to unskilled persons.
  - x) Al-Zahrāwī recognized gangrenous epidemic erysipelas, and warty excrescences.<sup>39</sup>
  - xi) Al-Zahrāwī was the first to make artificial teeth from beef-bone.<sup>40</sup>
4. Māsawiyyah al-Mārdīnī (925-1015 A.C.)
- i) Al-Mārdīnī evolved the system of filling cavities in teeth and for the first time used gold for this purpose.<sup>41</sup>
  - ii) Al-Mārdīnī was the first to use anesthetics for inducing sleep in patients before operation. The name of the anesthetic was "anesthetic sponge".<sup>42</sup>
5. Ibn Sīnā (980-1037 A.C.)
- i) He recommended the use of soft malleable catheter in acute cystitis for which he used leather as well as silver.
  - ii) Ibn Sīnā advocated dry poulticing wounds for rapid healing.
  - iii) Ibn Sīnā advocated the removal of cancerous structures along with "veins of the adjoining area".<sup>43</sup>
6. 'Abū al-Ḥakam al-Kirmānī (died 1080 A.C.) devised some fine instruments for surgery.<sup>44</sup>
7. Sa'īd ibn Hibat-ul-lāh (1044-1101 A.C.)
- In his book, "Kitāb Khalk il-'Insān" (Book of the Creation of Humans), he discussed procreation, pregnancy, delivery, nutrition, decay and death. This was one of the earliest books on obstetrics.<sup>45</sup>
8. Ibn Zuhri (1094-1162 A.C.)
- i) He gave a detailed description of

tracheotomy in his book "Kitāb al-Taysīr". Tracheotomy was unknown to the Greeks.<sup>46</sup>

- ii) In case of difficulty in deglutition as in carcinoma of esophagus, he used tubes of silver or tin to feed the patient.<sup>47</sup> Nowadays, stainless steel and artificial materials are used for that purpose.
  - iii) He was the first to perform total hysterectomy, though the uterus was mistakenly thought to be an abscess.<sup>48</sup>
9. Ibn al-Khatīb (1313-1374 A.C.) discussed abortion and suggested its use only in case of danger to the mother's life.
10. Mūsā ibn Maymūn (1135-1204 A.C.) introduced an improved method of circumcision.

### Contributions to ophthalmology

1. Yūḥanna ibn Māsawīh (780-857 A.C.) was the author of the first Arabic book on ophthalmology, "Kitāb Daghi al-'īn" (Disorders of the Eyes).<sup>49</sup>
2. Thābit bin Qurrah (836-901 A.C.) used a general anesthetic before operating on eyes.
3. Al-Rāzī's (841-926 A.C.) knowledge in ophthalmology was considerable. He was acquainted with the operative procedures in trichiasis (ingrowing of eye lashes), entropion and ectropion of the eyelids, and extraction of the opaque lens in cataract.<sup>50</sup>
4. 'Ammār ibn 'Alī al-Mawṣilī (died early 11th century) was the most original "ophthalmologist" of his time. Although his contemporary 'Alī ibn 'Īsā, is better known, Mawṣilī's writings on the anatomy of the eye, description of eye diseases and their treatment, were more clear. He described six methods of cataract operations including suction of the soft cataract.<sup>51</sup> For this he used a special kind of hollow needle. The modern cryoextraction with a cryoprobe is merely an improvement of his technique.
5. 'Alī ibn 'Īsā (died 1010 A.C.)
  - i) 'Alī wrote a comprehensive book on ophthalmology, "Kitāb Tadhkirat al-Kaḥḥālīn". His is the most complete textbook on eye diseases which the Arab school ever produced, besides being the most original of all the early treatises written on the subject.<sup>52</sup> This book was the textbook of ophthalmology in Europe for 700 years, though there is some doubt as to the real author of this Arabic book. It was very detailed and comprehensive. In this book, 130 eye diseases were carefully discussed and 143 drugs were described.<sup>53</sup>
  - ii) Ibn 'Īsā was the first to point out that the causes of eye diseases might be outside the eyes. That eye disease could be a manifestation of systemic disease became well

established.

- iii) Ibn 'Isā introduced the use of local anesthesia in eye surgery. He also used opium to induce sleep. The name of the local anesthetic he used was "Tanwīm", (inducing sleep) but nothing more is known about it.<sup>54</sup>

#### 6. Ibn al-Haytham (965-1039 A.C.)

- i) He is famous for his book, "Kitāb al-Manāzīr", a comprehensive book on ophthalmology.<sup>55</sup>
- ii) He was the first to declare that the power of vision lies in the retina at the back of the inside of the eyeball. He was the first to describe the theory of the mechanism of vision. He declared that light from an object falls on the retina and the stimulus passes through the optic chiasma to the back of the brain, and then one can see the object.<sup>56</sup>
- iii) He was also the first to discover that light travels in a straight line.<sup>57</sup>
- iv) He gave clear anatomical pictures of the eyeball and the optic chiasma. He gave the eye lens the Arabic name "adasah", which in Latin is "lenticulum", from which "lens" is derived.<sup>58</sup>
- v) Modern physiological optics began with Ibn al-Haytham. He was within an ace of the discovery of spectacles.<sup>59</sup> In fact, he was the forerunner of the discovery of spectacles and magnifying glasses, which were produced three centuries later in Italy, a place heavily influenced by Arab science.<sup>60</sup>

#### 7. Khalīfah ibn 'Abī al-Muhsin (13th Century)

His book on ophthalmology, "Kitāb al-Kāfi fi'l-Kuḥl", has made him famous for all time. In this book he gave a large number of pictures showing the anatomy of eyes and 36 types of instruments used in ophthalmic surgery, which was unique. He was so confident of himself that he did not hesitate to operate on the one-eyed person for cataract.<sup>61</sup>

#### 8. Ibn al-'Aqfānī (died 1348/49 A.C.)

His book on eye diseases, "Kashf al-Rin fi 'Ahwāl al-'in", contains a detailed description of the anatomy of eyes and all eye diseases.<sup>62</sup>

- 9. 'Ibrāhīm al-Shādhli (14th Century) described four types of trachoma and was the first to mention eyelid cancer.<sup>63</sup>

#### Miscellaneous contributions

##### 1. Sinān bin Thābit bin Qurrah (died 943 A.C.)

- i) Sinān bin Qurrah tried to improve medical service to the people by encouraging the Muslim rulers (Caliphs) and their ministers to establish more charitable hospitals.
- ii) Sinān bin Qurrah was the first to establish a hospital for animals in Baghdad in 910. Thus

he was the founder of the first veterinary hospital.<sup>64</sup>

- iii) Sinān bin Qurrah helped to make laws to prevent people from loading excessive weight on to beasts of burden.<sup>65</sup>

- iv) Sinān bin Qurrah was appointed by the Khalīfah, as examiner of the practicing physicians in Baghdad. He examined all of them, more than 800, and issued certificates to the successful ones.<sup>66</sup> In those days physicians learned their trade from senior practicing physicians; institutional teaching began much later. Consequently this sort of examination helped to weed out quacks.

- 2. Ibn Zuhr's (12th century) family produced the first woman doctors, probably in the whole world. His daughter and granddaughter were obstetricians of repute. It is interesting to note that female doctors were unknown in both the Western world and the Indian subcontinent until the early 20th century.

Ibn Zuhr recommended milk as a cure for tuberculosis.<sup>67</sup> In modern times before broad-spectrum antibiotics were discovered, intramuscular milk injection was a common practice for inducing resistance in chronic infections.

- 3. Fakhrudīn al-Rāzī (1149-1209 A.C.) was a pioneer in describing the diseases of domestic animals, including horses, and their treatment.<sup>68</sup>

- 4. Ibn al-Qiftī (172-1248 A.C.) was the first to compile the life history of 414 renowned scientists and philosophers up to his time.<sup>69</sup> The name of this book is "Tārīkh al-Ḥukamā'".

- 5. Ibn 'Abī 'Uṣaybi'ah (1203-1270 A.C.) was the first to publish, in 1245, the biography of famous physicians beginning from prehistoric period up to his time. The name of his book is "Uyūn al-'Anbā' fi Ṭabaqāt al-'Atibbā'", now available in Arabic. 'Uṣaybi'ah was the first historian of Arab medicine<sup>70</sup>, as the book of al-Qiftī was not the history of physicians alone.

- 6. Ibn al-'Aqfānī (died 1348/49 A.C.) introduced some medical terms and names of diseases which are still in use for example, phlegmon (inflammation), carbuncle (Persian fire), cramps, and twitching.<sup>71</sup>

##### 7. Attitude of Islam to medical science

Islam places greater emphasis upon preventive medicine than curative practice.<sup>72</sup> Muslim physicians gave special emphasis on personal hygiene and cleanliness. The practices of regular bathing and the use of "ḥammām" (bathing place) were introduced by the Muslims in the West. Even up to the time of the first Crusade (1099 A.C.), the European courtiers and clergy regarded bathing as a pagan custom.

## Conclusions

From the above short account, it is evident that the early Muslim period (7th-15th centuries), the so-called Middle Ages of the West, was a golden age for the development of science in general and medicine in particular. According to Sarton,<sup>73</sup> the greatest achievements of antiquity were due to the Greek Western genius (pre-Christian mostly). The Middle Ages were "dark ages" for the western world only, and the medievalists did not do justice when they based their discussion of the Middle Ages only on the Latin writings of that period. These were few, and ignored important works in Greek and Eastern languages, but more importantly, they ignored those works written in Arabic. The most valuable, the most original, and the most pregnant works were written in Arabic. From the second half of the 8th century to the end of the 11th century, Arabic was the scientific and the progressive language of mankind. It is sufficient to evoke a few glorious names (mentioned in this article already) lacking contemporary equivalents in the West: Jābir, Khwārizmī, Rāzī, Thābit, Fārābī, Sinān, Ṭabarī, 'Abbās, Qāsim, Bīrūnī, Ibn Sīnā, Haytham, Ghazālī, Khayyām (to name only a few)! This is a magnificent array of names that is not difficult to extend. If any one tells you that the Middle Ages were scientifically sterile, just name these men to him, all of whom flourished within a relatively short period, between 750 and 1100.<sup>74</sup>

The list of important contributions of the early Muslim period given in this report is not complete. The information given above was obtained from Western sources. We should study the original manuscripts and translations to get more detailed information about the contributions of the period. There are innumerable manuscripts in Escorial Library in Spain, and in libraries in Istanbul, Cairo, Baghdad, Beirut, Aligarh, Hyderabad, Patna, London, Berlin, Paris, etc. Muslim states should make concerted effort to collect photocopies of all these manuscripts and make arrangements to study them. In Bangladesh, some of us are trying to compile a book on the contributions of the early Muslim period to science and technology, under the patronage of the Islamic Foundation, Dhaka. Ali<sup>75</sup> already has published several books on the subject, 1-9 volumes during the last few decades.

This short account should inspire the present generation of the Muslim 'Ummah to work hard and reoccupy their lost glorious position in the fields of science, technology, and philosophy. Let me remind them of a statement made by Hanafy et al,<sup>76</sup> that "Ibn Sīnā and his compatriots were engaged in medical cure of various diseases with remarkable exactness, in well-equipped hospitals and clinics, at a time when the European countries were practicing a mixture of witchcraft and superstitions". Unless we

are engaged in pursuit of knowledge in all branches, our position will not be better than the Europeans of the Middle Ages. With great encouragement for learning in the Holy Qur'ān and the traditions of the Prophet (PBUH), the Muslims should have no hindrance or obstruction in this regard.

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