Contributions to anatomy by Muslim men of medicine

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The Arabic Muslim leadership in sciences existed between the 8th and 14th centuries. Their sources of knowledge were mainly Greek and Indian, hence they named their Medical Sciences UNANI - Greek and Mathematics HINDISA - of Indian origin. They gave Science its present temper, not only in its method but also in its form. In medicine, Razi, Ibn Sena, Zuhrawi, Ibn Nafees are some of the authors whose writings are well known and still available. The format of their books is strikingly modern. Ibn Sena's "Canoon", contains the definition and scope of medicine, followed by the description of general principles of the then known Sciences, which is followed by Anatomy and physiology. Only after this, Pathology, clinical features and management of the diseases are described.

The Arab and Muslim Anatomy was mainly based on Galen's teaching. The most notable original contribution is that of Ibn Nafees who described the lesser circulation in the 13th century, about 250 years before William Harvey. Zuhrawi (10th and 11th centuries) emphasized that every surgeon should have a thorough knowledge of Anatomy before undertaking Surgery. The Muslim contributions on the Anatomy of the eye are in many respects original.

The study of Anatomy was being pursued for many centuries before Islam. Ancient writings are available mainly in:

(a) Papyrus of Egypt

(b) Sushrat Samhita of India

(c) Galen's writing which summarize the Greek, Egyptian and Roman knowledge.

The Arabs started on this academic adventure in the 8th century. They got the Indian and Greek words translated into Arabic and these formed the foundation of the future edifice of Science in the centuries to come.

The first Arabic work in Anatomy was that of **Abdul Malik Asmaee**[1] in the 8th century. He was a famous writer and philologist. He wrote several books on Zoology and his book "KITAB KHALO AL INSAN" describes the anatomy and physiology of Man. Notwithstanding its literary style, it contaiins many useful informations on Anatomy.

Yuhanna ibn Masawayh[1,2,3] was nearly a contemporary of Abdul Malik Asmaee. He lived between 740-831 A.D. He performed dissections on monkeys. Caliph al-Mutasim procured for him a particular species of ape which was considered to resemble man most closely. He wrote several books on Anatomy, two of which have been quoted by historians of the subject. They are:

(1) KITAB-UL TASHRIH

(2) TASHRI KHALO AL INSAN WA AJZA WA ADAD AAZA WA MAFASILA WA AZAMANA WA OORUOA WA MARIFAT ASBAB AL ADJA.

Hunain Bin Ishao[1,2,4] lived between 809-872 A.D. He was an outstanding intellectual and translated many books on science into Arabic. His knowledge of Anatomy was of a very high order. He wrote "Closure or narrowing of the mouth of the gallbladder by stone or swelling would cause bile to enter blood and spread to all parts of the body to give rise to jaundice. This we have learnt on the basis of dissections." He wrote an illustrated treatise on the Anatomy of the eye. On the importance of learning Anatomy, he wrote, "If there is a disease in any visible part of the body it can be appreciated by examination, but to learn about the disease of the internal organs, one has to rely on the knowledge of Anatomy, which is necessary for the understanding of the functions of the organs."

His books on Anatomy were:

1. JAWAME KITAB AL MANI AL JALINUS
2. KITAB FI HALAT AL AZA
3. KITAB FI TASHRIH AL ALAT AL GHIZA

Habish Bin Al Asam[1] lived in 9th century and was a student of Hunain bin Ishaq. He translated Galen's Anatomy into Arabic.

Sabit Bin Karah[1] lived between 838-901 A.D. He belonged to a family of renowned physicians whose genius and contributions to Arabic Medicine have been recognized by all. He wrote many books on Anatomy and was also interested in Comparative Anatomy. His book "KITAB FI TASHRIH BAZ AL TAYUR" is probably the FIRST Arabic book on the anatomy of birds. His other books on the subject were:

1. JAWAME KITAB TASHRIH UR RAHEM LE JALINUS
2. JAWAME KITABE JALINUS FIL MAULUDIN SABAT AL ASHAR.
3. MAQALATA FI SANAAT KAUN AL JUNAIN
4. JAWAME KITABUL AZA AL ALATLE JALINUS

Abubakr Muhammad Ibn Zakariyya of Ray-Zakaria Ar Razi[1,2,5] (840-923 A.D., 850-932 A.D.) needs no introduction. It is said that he was the first to describe the LARYNGEAL branch of the Recurrent Laryngeal nerve. He further stated that sometimes there are 2 of these nerves on the right side. He also described the functions of the CILIARY BODY.

Ali Bin Abbas Majusi[1,2] lived in the 10th century. The second and third chapters of his celebrated book "KAMIL UL SANAAI" translated in Latin as Liber Regivs deals with anatomy. He discovered CAPILLARY CIRCULATION. He disagreed with Hippocrates that the fetus comes out of the womb on its own. He said that the cause of expulsion of the fetus was the contraction of the Uterine Muscles.

Abu Sahel Masihi[1,6] lived in the 10th century. The third and the fourth chapter of his famous book "MATE MASIHI" deals with Anatomy. He gave a detailed account of the Gastric juice.

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Ibn Haytham[1,7] (965-1030) is famous for his KITAB AL MANAZIR which deals with optics. He gave a detailed account of the anatomy of the eye which is surprisingly modern. He writes: "Eye is the organ of sight on the face, which enables man to see the external objects. The outer covering of the eye is a dense layer of tissue called SCLERA. The front of this layer is transparent and is called CORNEA. The Sclera covers another layer which is called CHOROID. The front part of this layer is mobile and is called IRIS. Behind the iris is the LENS. Opposite the lens, there is the third layer of the eye which is called the RETINA to which is connected the optic nerve. There is a fluid between the lens and the cornea which is called Aqueous Humour. Similarly there is a fluid between the lens and retina called the VITREOUS HUMOUR. It may be noted that in Arabic, the lens is called 'ADSA', pertaining to ADS which means Lentil, which resembles a grain. In latin ADSA was translated as lens which was derived from the Latin translation of adsa. Ibn Haitam was the first **person to say that the retina and not the lens was the receptor of light.**

Ibn Sina[1,8] (980-1037) was the most outstanding Scientist, philosopher and theorist of medicine in the medieval period. The format of his book 'CANOON' which remained a reference source for centuries in Europe, Asia and Africa is remarkably contemporary. He has described diseases organwise and in each case he has first given a description of Anatomy and Physiology of the organ. Moreover, an entire chapter of the book is devoted to the systemic anatomy of the body.

Ali Bin Isa[1] lived in the first half of the 11th Century. He was an Eye specialist. In his celebrated work "TAZKIRA TUL KUHALIN", the complete text of the book is still available, he deals with the anatomy and physiology of the eye at length in the first part of the book. It was translated into Latin in 1499, in French in 1903 and in German in 1904.

Abdul Latif Baghdadi[1,9] (1162-1231) was the most outstanding Arab student of Anatomy. He came across a mound of human skeletons in Egypt and made a very careful study of two thousands skeletons. On the basis of this observation he opined that the Mandible consisted of one and not two bones as described by Galen. Similaryly he pointed out that the Sacrum was one bone and not six as described by Galen. His book "AL IKADA WAL AITIBAR FIL UMOOR AL MUSHAHIDA TAL HAWADIS AL MAANIA FIL ARZA MISR" based on observations during his Egyptian visit was translated into Latin and was published from Oxford in 1800. German and French translations were published from Paris in 1810.

Sharfuddin Bin Rahbi[1] (1187-1268) wrote a comprehensive book on Anatomy and Physiology entitled "KITAB FI KHALO AL INSAN WA HAYET AZA WA MANGHAATHA. He was a student of Abdul Latif Baghdadi.

Ibn Ul Ouf[1] (1233-1286) wrote the world famous "AL UMDA FIL JARAHA". It is in two volumes. The second and the third chapters of the first volume deal with Anatomy which occupies altogether 120 pages.

Ibn Nafees[1,10] (1210-1288). He was the first person to say that blood is mixed with air in the lungs and the blood, in passing from right to the left side of the heart passed through the lungs. He therefore differed from the teachings of Galen and Avecenna (Ibn Sena who had taught that blood passed from the right to the left side through invisible pores in the septum separating the two sides). He made these observations in his book "MOOJIZ AL CANOON" which was translated into Latin as "Epitome of the Canoon". His description of circulation of blood antedates by 250 years that of Harvey and Serveteus.

Kamaluddin Farsi[1] was an eye specialist of the 14th century. He wrote "TANKEEHUL MANAZIR" in 1320. It had 985 pages out of which 91 pages were devoted to anatomy and physiology.

Mansoor Bin Mohammad[1] **wrote an illustrated book of Anatomy in 1396. At first the book was without any name. Later on, it came to be called "TASHRIH BIL TASWEER".**

Barhanuddin Nafis[1] who died in 1437 wrote commentaries on "MOOJIZ AL CANOON OF IBN NAFEES AND NAJIBUDDIN SAMAR KANDI'S book 'ASHAB WA ALAMAT'.

The basic contribution of the Arab Anatomists was the compilation of the available knowledge of the subject and making it a basis for the Science and art of medicine. Before the Arabs, the practice of Medicine could not be separated from magic. Not only did they separate it from magic but by making Anatomy and Physiology the basis of Medicine, they laid the foundation of modern Scientific Medicine.

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