

## Contributions of Arab and Muslim Oculists to Ophthalmology

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### Abstract

This article is a summary which aims to cover the main aspects of the book written by M. Zafer Wafai, and is written as a condensed reference point for those researching the contributions and influence of Arabs and Muslims to the medical field generally, and to ophthalmology specifically. The book covers the work of individuals between the 9th century AD (early 3rd century AH) and the late 14th century AD (middle 7th century AH).

The book is divided into two main parts, part one highlighting the books specialised in ophthalmology, written by ophthalmologists, and the second part discussing the chapters of ophthalmology in Arabic textbooks of general medicine. This article looks into some of the notable figures mentioned in part one of the book, focusing on their works and a summary of some major aspects in their lives.

### Introduction

In the words of Julius Hirschberg, in his book titled ‘The History of Ophthalmology’ (1): “The Arabs held high the torch of medical science in all parts of Islamic world, from the river Oxus to the Guadalquivir. They added a new knowledge at the time when in the European countries a nearly complete darkness had settled. I would like to mention here only that the European ophthalmologist is of the middle ages had no other teachers than the Arabians...

From this retrospective historical evaluation we have to recognise that the Arabian contributions to ophthalmology are permanent and will forever be engraved in the book of history.” (1).

In Daarul-Hikmah (The House of Wisdom) in Baghdad around 133 AH during the time of the Abbasid Caliph Al-Mansur master physicians and translators were employed to translate major books from the Greek, Persian, Hindu and Assyriac languages into Arabic. Among the 47 mentioned in the literature were Georgis Ibn Jebril Ibn Bukhtyashu, Hunayn Ibn Ishaq Al-Abaadi, his son Ishaq Ibn Hunayn and his nephew Hubaish Al-A’asam.

Around 400 AH (1010 AD) a new era began following the gathering of sufficient wealth of translated works and knowledge by Arabian intellectuals. During this period, numerous scholars emerged in many fields from geography, astronomy, medicine, mathematics, and

other key accomplishments in literature and history. The amalgamation of knowledge allowed for the compilation of numerous major medical encyclopaedias, the Latin translation of which remained the main – and perhaps the only – source of teaching material in European universities until the latter part of the 15th or 16th centuries.

Among those who translated from Arabic into Latin were Demetrios, and Constantini Africani who translated several medical encyclopaedias including ‘The Royal book’ by Ali Ibn ‘Abbās Al-Ahwāzi (died 994AH), ‘Al-Qānūn fī Al-Tibb’ by Ibn Sīnā, and ‘Al-Hāwi’ by Al-Rāzī. Demetrius and Constantini claimed that the knowledge in their respective translated pieces was their own, in Galeni Liber de Oculis translates a Demetrio and Liber de Oculis Constantini Africani, J. Hirschberg identifies Hunayn Ibn Ishaq as the original author, who wrote ‘Book of the Ten Treatises on the Eye’.

Among other translators was Gerard of Cremona (1147-1187 AD) who upon instructions from Emperor Friedrich II translated into Latin a number of major Arabic books such as ‘Al-Hāwi’ by Al-Rāzī, ‘Al-Qānūn’ by Ibn Sīnā, and ‘Al-tasrif’ by Abu Al-Qāsim Al-Zahrāwi. Later, in 1547, Andreas Alpago – a great admirer of Ibn Sīnā – travelled to Cyprus, Syria, and Egypt to learn Arabic and proceed to improve the translation of ‘Al-Qānūn’ which served as a primary reference to the medical profession until the late 18th century (3,4,5).

Arabian scholars therefore through their translation of the ancient scientific books had closed the gap between ancient knowledge and the Renaissance era, allowing for Latin Europe's emergence into Renaissance.

## Some of the Muslim and Arab Oculists' contributions to Ophthalmology (2, 3, 4) :

### 1. Jibrāil (Jibrīl) Ibn Bakhtyashū Ibn Georgis (Jerjis) [Died 214 AH = 828 AD]

His book is (Treatise about the Optic Nerve)

There are no known manuscripts of this book, with Al-Samarrai mentioning one manuscript in Aleppo in a private collection of Al-Jarrah.

### 2. Yūhanna Ibn Māsawayh [190-242AH = 815-865AD]

Ibn Masawayh wrote few books:

1. Daghāl Al-'Ayn (The Alteration of the Eye)
2. Knowing the ophthalmology profession questions and answers
3. A book about the structure of the eye, its diseases and medications
4. A treatise about the eye

Max Meyerhof mentions in the introduction of his book 'Ten treatises of the Eye' that two copies of the first two books above exist in Cairo, Egypt and in Leningrad, Russia. Sezgin (8), added the latter 2 books above and mentions the location in Aleppo.

### 3. Hunayn Ibn Ishāq Al-'Abādī [194-264AH = 809-877AD]

Hunayn Ibn Ishāq Al-'Abādī was born in Al-Hirā in the north-east of Syria. He studied medicine in Jundisabour in Southern Persia under Yūhanna Ibn Māsawayh, then travelled to master the Greek and Arabic languages. Names Juhannitus by Latin translators, Hunayn displayed strong demand for Syriac (his first language), Persian, Greek and Arabic.

Hunayn was one of the founders of Dārul-Hikmah (House of Wisdom) in Baghdad, and worked as a chief translator of the Greek, Syriac and Persian books in numerous fields of science, including medicine, botany, mathematics and astrology. Amongst his legacy is the Hunayn School of Translation, which his son Ishāq and his nephew Hubaysh Al-'Aasam inherited.

Additionally, Hunayn was a prominent position and ophthalmologist authoring several books (6):

1. Ten Treatises on the Eye
2. The book about the Eye in question and answer format

3. Treatise about the structure of the Eye
4. Treatise about how to choose Eye Medications
5. Treatise about the surgical treatment of Eye Diseases
6. Summary of Galen's Book on the eye diseases

The most significant of which is the 'Ten Treatises on the eye', later translated thrice, twice into Latin and once into English by Professor Max Mayerhof and published in Cairo in 1928. As aforementioned, Hirshberg refuted the claim to ownership of Demetrios and Constantini Africani, as 'Ten Treatises on the Eye' was authored by Hunayn and translated by the two.

This book in particular gained its fame as it was the first of its kind to be written very meticulously precisely what is now common in the writing of textbooks. Furthermore, it contained the first drawing of the eye with its six muscles which Hunayn added the retractor bulbi muscles – only found in certain classes of mammals – and the optic nerve. Meyerhof notes in the introduction to the English translation of 'Ten Treatises on the Eye' that it was "the oldest known book written in a scientific and academic way", and that "it is the first book to contain the first known drawings of the eye and its components, and it is much better than the drawings of European books written much later."

The book was so important that most, if not all, Arabian, Persian and Turkish authors later followed Hunayn's method of writing textbooks.

### 4. Thābit Ibn Qurrah Al-Harrānī [211–288 AH = 823–900AD]

Born and raised in Harrān, Mesopotamia, he moved to Baghdad during the reign of Caliph Al-Mu'tadid (Billāh) and enjoyed a high rank in the Caliph's court, mastering several languages including Aramaic, Greek, Syriac and Arabic. He was a philosopher, mathematician, astrologist and esteemed physician, later becoming the personal physician of Caliph Al-Mu'tadid.

His book 'The Vision and the Perception', though small in content, was quoted by most of the ophthalmologists who followed him including in the books 'Al-Hāwī' (9) and 'Al-Kāfī' (10).

Thābit Ibn Qurrah's most notable contribution was his treatment of amblyopia (lazy eye) by closing the normal eye with a patch to "force the visual spirit to go to the lazy eye in order for the vision to improve".

### 5. Abu 'Alī Khalaf Al-Tūlūnī [Died 302 AH = 914 AD]

Abu Khalaf was mentioned by Usaybi'a, "...is the first Muslim among the authors of Arabian books on ophthalmology." His book was about the final objectives and about the composition of the two eyes and the

## **6. Abū ‘Abdullāh Mohammad Ibn Sa’īd Al-Tamāmī Al-Maqdesī [Died 980 AD = 369 AH]**

A famous physician who practised in his hometown, Jerusalem, around 980 AD later moving to Egypt. He mainly specialised in the gastroenterology but authored the book ‘Treatise about the essence of ophthalmia, its types, causes and treatment’.

## **7. ‘Ammar Ibn ‘Ali Al-Mawsilī [Died 400 AH = 1010 AD]**

Born and raised in Mawsil, north of Iraq, ‘Ammar Ibn ‘Ali and gained fame after he invented and used the hollow couching needle to extract soft cataract (congenital and/or traumatic); a major breakthrough in the management of cataracts throughout history of mankind. His main book is (The Chosen of the Eye Diseases and the Treatment).

Meyerhof translated the six different techniques ‘Ammar used to treat the contract surgically, demonstrating his skills in modifying the procedure based on the presenting case. ‘Ammar’s book attracted the attention of several scholars, and all the known manuscripts have been extensively reviewed by Hirshberg, Lippert, and Mittwoch (2).

‘Ammar was very sure of himself, and this is clear in the beginning of the book when he states, “for my ability and knowledge of this field surpasses everybody else’s”, and often he would finish this chapters is with, “... and I say...”, indicating that his stance was the most correct one. Wafai mentions numerous other examples where ‘Ammar appeared overconfident in his knowledge and experience, which caused some other authors to accuse him of arrogance. However, the author seems to have a generally positive outlook on ‘Ammar notably for his clinical skills, though addresses the major shortcoming of the book being the lack of illustrations, anatomical and surgical instruments, and that he did not explain the mechanism or causes of strabismus, nor the pathologies associated with vitreous or the retina.

## **8- ‘Ali Ibn ‘Isā Al-Kahhāl [Died 400 AH = 1010AD]**

‘Ali Ibn ‘Isā spent his life in Baghdad, writing the first academically arranged book in the field of ophthalmology titled “Memorandum Book for Ophthalmologists”. This is known to be the oldest textbook of ophthalmology that has been entirely preserved in its original language. To European translators, he is known as ‘Jesu Hal’ and his book “Tractatus de Oculis”, which preserved the information in the lost works of ancient Grecian authors. ‘Ali Ibn ‘Isā emphasised meticulousness and caution in the performance of surgery which was not present in the Grecian books.

What made this book unique and unsurpassable for over

800 years is the manner in which it was written, covering the anatomy of the eye, over 130 eye conditions from external eye diseases and their treatment, unapparent diseases of the eye such as pathologies of the visual mechanism, crystalline fluid, vitreous, optic nerve, day and night blindness, and abnormalities of the extra-ocular muscles. The final section of the book lists 143 simple medications alphabetically, along with their effect on the eye, and a further 80 prescriptions of compounded medication.

In 1936, the book was translated by Casey A. Wood, USA, the most recent edition being published in 1964 (7).

## **9. Ahmed Ibn ‘Abdul-Rahmān Ibn Mandawayh Al-Asfahānī [Died 410 AH = 1019 AD]**

He wrote two main books:

- A. Treatise about the structure of the eye’s coats
- B. Treatise about the treatment of Mydriasis

Little is known about this author amongst historians except Usaybi’a who mentions the aforementioned two books on Ophthalmology. However, Samarrai wrote a more thorough biography of Al-Asfahānī, naming thirty three of his work in almost all aspects of medicine, which include the two books mentioned by Usaybi’a.

What is unique about Al-Asfahānī is that he is considered to be the first to write about paediatric ophthalmology in his book, “Treatise about the Illness in Children”, and therefore a founder of paediatric ophthalmology (3).

## **10. Ali Ibn Ibrāhīm Ibn Bukhtyashū’ Al-Kafartabī [Died 460 AH = 1067 AD]**

Born and raised in Kafartab, a small town in northern Syria, Ali Ibn Ibrāhīm is a virtually unknown author or practicing physician. He was a descendant of a Christian family that produced many scholars throughout the ‘Abbāsīd Dynasty, beginning with Georges Ibn Bakhtyashū, who was hired by Caliph Al-Mansūr as his personal physician. He wrote a book with the title of (Anatomy of the eye, its shape and treatment of its diseases).

Ali Ibn Ibrāhīm’s father accepted Islam, as the name indicates, and this may have led to him being considered an outcast by his wealthy Christian family; the reason why historians know very little about him.

The title of his book is “Anatomy of the eye, its shape and treatment of its diseases” (3, 8).

## References

1. Julius Hirschberg. The History of Ophthalmology - Volume II, The Middle Ages. Germany: J. P. Wayenborgh Verlag; 1985.
2. Julius Hirschberg, J. Lippert and E. Mittwoch. The Arabian Ophthalmologists. Riyadh, Saudi Arabia: King Abdul Aziz City for Science and Technology (KACST); 1993.
3. Ibn Abi Usayb'ah. 'Uyūn Al-Anbā' Fī Tabaqat Al-Atibba'. Beirut, Lebanon: Al-Hayat; 1965.
4. Al-Sammarrā'i, M.D. Kamal. Abstract of the History of Arabian Medicine. Baghdad, Iraq: Dar Al-Nidal; 1985.
5. Ibn Sīnā, Abū 'Alī Al-Husayn Ibn 'Alī. Al-Qānūn Fī Al-Tib. Beirut, Lebanon: Dar Sader.
6. Hunayn Ibn Ishāq Al-'Abādī. Ten Treatises on the Eye. Cairo, Egypt: Al-Amiriyah Press; 1928.
7. 'Alī Ibn 'Isā Al-Kahhāl Al-Baghdādī. Memorandum Book of a 10th Century Oculist. Chicago, USA: North Western University Press; 1936.
8. Fuat Sezgin. The History of Arabic Literature, Volume III. Riyadh, Saudi Arabia: The King Saud University; 2009.