

**Contributions of Arab  
and Muslim Oculists  
to  
Ophthalmology**

سنة الفجر

# Contributions of Arab and Muslim Oculists To Ophthalmology

*By*

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DAR AN-NAFAËS

دار النفايس

# **Contributions of Arab and Muslim Oculists To Ophthalmology**

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## Dedication

This book is dedicated to the late  
Professor Mohammad Rawwas Qal'aji, Ph.D

Dr. Qal'aji was the driving force that championed me to keep forging ahead when fatigue and despair drove me to the verge of quitting and collapsing.

He was my teacher, my mentor, and my role model. But first and foremost, he was my cousin and my brother.

May his soul rest in peace...

M. Zafer Wafai, MD., FICS, FACS, FRCOphth

It is my honor and pleasure to write this introduction regarding Dr. Zafer Wafai's new book entitled *Contributions of Arab and Muslim Oculists to Ophthalmology*. My association with Zafer dates back to 1983, when I had the pleasure of working with him for ten years at the King Khaled Eye specialist Hospital in Riyadh, Saudi Arabia. Our friendship and exchange of knowledge will be everlasting, God willing.

Dr. Wafai has always been interested in the history of ophthalmology, as attested to by his prolific writings and lectures, with special emphasis on Arab and Muslim contributions in the field since ancient times. This particular manuscript delves into the details of such contributions, also comparing them with those of other scholars from ancient Greece and Europe. I cannot but admire and laud the tremendous effort in researching the references and rare manuscripts at libraries all over the world. It is indeed a great scientific achievement to compile in a concise but thorough manner most of the available information regarding the aforementioned contributions. It is also interesting that this manuscript has helped clarify several misconceptions (always with the support of valid references) regarding certain breakthroughs in ophthalmology that had been erroneously attributed to European scientists, whereas Arab and Muslim scholars had described the same entities, and often more accurately, much earlier in history. The manuscript also emphasizes the fact that many of the Arab and Muslim contributions have become reliable references in other parts of the world for the diagnosis and

management (both medical and surgical) of eye disorders. A good number of these valuable references have over the years been translated into languages other than Arabic.

At this time in history when some renegade clans claiming to be devout Muslims have unfortunately blemished the divine picture of Islam by their atrocities, it is heartwarming to look back in history and be proud of what our ancestors managed, through their hard work and research, to achieve and contribute in ophthalmology, among other areas of the arts and sciences, philosophy, and the true theology. This is the real Arab and Muslim spirit that we strive to propagate.

My sincere congratulations to my brother Zafer, for this great scientific endeavor that has taken a lot of hard work. I wish him continued success in any similar future projects that he may wish to undertake.

**Karim F. Tomey, MD, FACS, FRCOphth**

Beirut, Lebanon

December 2015

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

﴿رب أوزعني أن أشكر نعمتك التي أنعمت علي وعلى والدي وأن أعمل صالحا ترضاه وأصلح لي في ذريتي اني تبث اليك واني من المسلمين﴾

سورة الأحقاف ، آية 15

In the name of Allah the most merciful, the most compassionate.

My God grant me the grace that I may thank you for the favors, which you have bestowed on me and my parents and that I may do good deeds that will please you, and grant me good children, surely I turn to you in repentance and surely I am of those who are Muslims (46:15).

“The Arabs held high the torch of medical science in all parts of the Islamic world, from the river Oxus to the Guadalquivir. They added a new knowledge at a time when in the European countries a nearly complete darkness had settled. I would like to mention here only that the European ophthalmologists of the middle-ages had no other teachers than the Arabians. I cannot deny that in relation to the extensive literature the original contributions are actually rather meager but we should not ignore them. We should compare them with the achievements of European ophthalmology from 1300 AD, when medical science began up to about 1600 AD, when the Greek texts were available in the original language and in Latin translation. Such comparison will certainly not be to the disadvantage of the Arabians.

The European physicians of the middle ages and at the beginning of the modern times knew this and appreciated it; the physicians of the middle ages knew nothing better but to copy the Arabian ophthalmology; the physicians of the early modern times deplored the decay of ophthalmology as it had occurred in the occident.

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

The History of Ophthalmology

Julius Hirschberg,

Volume II: The Middle Ages.

J. D. Wayenborgh Verlag,

Postfach 200646.

D-5300 Bonn 2 W. Germany

1985.

Translated by:

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# Introduction

In the name of Allah, the most merciful, the most compassionate.

1. Read; in the name of thy Lord, who creates,
2. Created man from a clot;
3. Read; and thy Lord, the most bounteous;
4. Who taught by the pen;
5. Taught man that which he knew not;

(Qur'an 96: 1-5)



With those few sentences, the archangel Gabriel revealed the glorious Qur'an to the illiterate Prophet Muhammad Ibn Abdullāh (PBUH) in 710 AD in Mecca. Less than one century later, the entire Arabian Peninsula, Mesopotamia, the Middle East, North Africa, Spain, Asia Minor, Sicily, and the southern parts of Italy were repeating in the newly widespread language of Arabic, "God is the greatest (Allah Akbar)." They were praying five times a day, facing Mecca, the cradle of the new Islamic civilization.

Islam inspired the Muslims and enhanced their natural talent in memorizing poetry and speeches. Verses from the Qur'an encouraged and mandated the Muslims to seek knowledge, "Only those fear Allah, from among His servants, who have knowledge" **انما يخشى الله من عباده العلماء** (Qur'an 35: 28). The Prophet (PBUH) encouraged Muslims to "seek knowledge from the cradle to the grave." **اطلب العلم من المهد إلى اللحد**. He further observed, "Seeking knowledge is an article of faith... the ink of the scholar is more holy than the blood of the martyr. **مداد العالم أكرم عند الله من دم الشهيد**." The expected release of a non-Muslim prisoner of war, who teaches a Muslim reading and writing, demonstrates Islam's respect for knowledge.

Once secure borders, stable economy, and well-trained armies became ubiquitous in the Islamic empire, the Caliphs started to encourage scientific ambition among eager Islamic scientists. The very first attempt to translate information to Arabic began when Caliph Al-Manṣūr **الخليفة المنصور** established Darul-Hikmah, House of Wisdom **بيت الحكمة**, in Baghdad around 133 AH (749 AD) after the collapse of the Umayyad dynasty **الدولة الأموية** and the rise of the 'Abbāsīd dynasty. Caliph Al-Ma'mun **المأمون** inherited an empire from his father, Haroun Al-Rashid **هارون الرشيد**, the borders of which extended from the southern Chinese borders in the East to the southern French-Spanish borders in the West. He wisely expanded the House of Wisdom, attracting scientists and translators from Jundisabour in Southern Persia to translate major books from Greek, Persian, Hindu and Assyriac languages

into Arabic. He assigned students to assist the translators, learn the languages, and spread knowledge among the Muslims.

It is noteworthy to observe that ever since the first human beings settled in communities around major rivers, such as the Nile, Euphrates, and Tigris, they stressed the importance of two sciences: the first being the moral, ethical behavior and spiritual belief, and the second being the health and wellbeing of the settlers. It is clear that the first was responsible for the organization of relations, and communities adopted rules and regulations to control relations in order to solve any dispute that could arise. As for the second science of health, it was important to keep the individuals strong and fit enough, both physically and mentally, in order to survive in the wilderness and to maintain the existence of the human race.

The first person who could be recognized as a physician in the history of mankind was Asclepius I اسقليبيوس الأول, who lived around 5500 BC in ancient Greece. Succeeding Asclepius, the Pharaoh Amun الفرعون أمنحوتب in ancient Egypt was considered a God to the Egyptians due to his ability to treat a multitude of diseases and cure patients. Throughout history, hundreds of healers, or physicians, followed Asclepius and Pharaoh Amun, including Horus حوروس, Menes مينيس, Bermanedes برمانيدس, Plato افلاطون, Asclepius II اسقليبيوس الثاني, Hippocrates ابقراط, and Galen جالينوس, to mention only a few. Hippocrates and Galen became the main sources of knowledge for Arabian

physicians, who studied the translation of their works and copied most of their prescriptions. During the early days of Islam, traditional healers practiced primitive medicine and surgery based upon knowledge inherited from their ancestors or personal experience, and were able to cure some endemic diseases and treat wounded soldiers in the battlefield. The Umayyad Dynasty followed with a few shy attempts to translate scientific books, mainly chemistry, but these translations were not extensive enough to make any tangible impact on the practice of medicine.

As previously mentioned, the translations began at the House of Wisdom in Baghdad, where master physicians and translators were employed. Among the 47 mentioned in the literature were Georgis Ibn Jebrīl Ibn Bakhtyashū‘ , the famous Ḥunayn Ibn Ishāq Al-Abādī **جورجيس بن جبرائيل بن بختيشوع** , his son Ishāq Ibn Ḥunayn, **حنين بن اسحق العبادي** and his nephew Hubaish Al-Aasam<sup>1</sup> **حبيش الأاسم**.

Once the Arabian intellectuals gathered enough wealth of translated works and knowledge, a new era began around 400 AH (1010 AD), during which an enormous number of scholars emerged and excelled in many fields, such as geography, astronomy, medicine, and mathematics, among other major accomplishments in literature and history. Amalgamating knowledge from the books translated from Greek, Persian, Indian, and Syriac allowed for the

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<sup>1</sup> Kamal Al-Samrāi, *The brief history of the Arabian medicine*, vol. 1, 488.

compilation of several major medical encyclopedias. The Latin translation of those books remained the main, and maybe the only, source of teaching material in the European Universities until the latter part of the 15th or 16th centuries. Among those who translated from Arabic into Latin were Demetrios **ديميتريوس** and Constantini Africani, **قسطنطين الافريقي** famous translators of several medical encyclopedias, such as *The Royal Book* (**الكتاب الملكي**) **كامل الصناعة الطبية** by ‘Alī Ibn ‘Abbās Al-Ahwāzī **علي ابن عباس الأهوازي** (died 994 AD), *Al-Qanūn Fī Al-Ṭibb* **القانون في الطب** by Ibn Sīnā **ابن سينا**, and *Al-Ḥāwī* **الحاوي** by Al-Rāzī **الرازي**. While Demetrius and Constantini Africani claimed the knowledge in their respective works, *Galeni Liber de Oculis translatus a Demetrio* and *Liber de Oculis Constantini Africani*, to be their own, J. Hirschberg identified Ḥunayn Ibn Ishāq as the original author. Demetrius and Constantini Africani merely translated Ḥunayn Ibn Ishāq’s *Book of the Ten Treatises on the Eye*.<sup>1</sup> **العشر مقالات في العين لحنين بن اسحق**

Gerard of Cremona **جيرارد الكريموني** (1147-1187 AD) spent a few years of his life in Toledo studying Arabic, and upon instructions from Emperor Friedrich II, he translated into Latin several major Arabic books, such as *Al-Ḥāwī* by Al-Rāzī, *Al-Qanūn* by Ibn Sīnā, and *Altasrif* by Abu Al-Qāsim Al-Zahrawy. **التصريف لمن عجز عن التأليف لأبي القاسم خلف بن عباس الزهراوي**

Four centuries later, in 1547, Andreas Alpago<sup>2</sup> traveled

1 J. Hirschberg, History of Ophthalmology, vol. 2, 22.

2 Hirschberg, 23.

to Cyprus, Syria, and Egypt to learn Arabic and was a great admirer of Ibn Sīnā. Alpago published an improved translation of *Al-Qanūn*, which served as a primary reference to medical students and practitioners until the late 18<sup>th</sup> century.

Most of the Greek literature was translated into Arabic, initially by Nestorian Christians, who were financially compensated by the caliphs into leaving the University City of Jundishapur (founded around 500 AD) in the southern part of Persia (Iran). These scholars translated the vast majority of books written by philosophers, mathematicians, astronomers, and very prominent physicians, such as Hippocrates and Galen.<sup>1</sup>

It is imperative to stress the fact that the Arabian scholars closed the gap between ancient knowledge and the Renaissance era, as they contributed their own knowledge and provided the basis for Latin Europe's emergence into the Renaissance. Without the Arabic translation of ancient scientific books, these works may have been lost forever. As Hirschberg stated, "The antique Greek, Hellenistic world are for us the cores of all science, but the Arabian civilization was its conduit."<sup>2</sup>

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1 Ibid, 26.

2 Ibid, 40.

# Preface

The main purpose of this book is to list, discuss, and highlight the contributions made by Muslim and Arabian oculists between the 9<sup>th</sup> century AD (early 3<sup>rd</sup> century AH) and the late 14<sup>th</sup> century AD (middle 7<sup>th</sup> century AH). This book is based upon my personal efforts to collect microfilms and photocopies of manuscripts from public libraries around the world (Syria, Egypt, Turkey, Tunisia, Saudi Arabia, Morocco, Rome, Paris, London, and the Escorial in Spain). Professor M. Rawwas Qal'aji and I had the opportunity to edit most of these manuscripts, which various organizations had published.

In part one, I will highlight the most important contributions to what was known prior to each specific book. This part will deal chronologically with books specialized in ophthalmology, written by ophthalmologists.

In part two, I will discuss chronologically the chapters about ophthalmology in Arabic textbooks of general medicine.

## Outline of Part One:

1. Jibrāil Ibn Bakhtyashū‘ Ibn Georges (D 213 AH = 828 AD)
  - Treatise about the ophthalmic nerve. رسالة في عصب العين
2. Yūḥannah Ibn Māsawayh (D 243 AH = 857 AD)
  - Daghal Al-‘Ayn دخل العين
  - Knowing the Oculist profession questions and answers. معرفة مهنة الكحالين
3. Ḥūnayn Ibn Ishāq Al-‘Abādī (D 255 AH = 878 AD)
  - Ten Treatises on the Eye. العشر مقالات في العين
4. Thābit Ibn Qurrah Al-Ḥarrānī (D 288 AH = 900 AD)
  - Vision and Perception. البصر والبصيرة
5. Abū ‘Alī Khalaf Al-Ṭulūnī (D 302 AH = 914 AD)
  - The end and the sufficient in the structure of the eyes, their shape, treatment and remedies  
النهاية والكفاية في تركيب العينين وخلقتهما وعلاجهما وأدويتهما
6. Abū ‘Abdullāh Moḥammad Ibn Sa‘īd Al-Tamīmī Al-Maqdesī (D 370AH=980AD)
  - Treatise about the nature of ophthalmia, its classification, causes and treatments.  
رسالة في ماهية الرمد وأنواعه وأسبابه وعلاجه.

7. A‘yan Ibn A‘yan (D 373 AH = 995 AD)  
-A book about the eye diseases and their management  
كتاب في أمراض العيون ومداواتها
8. ‘Alī Ibn ‘Isā of Baghdādī (D 400 AH = 1010 AD)  
-Memorandum book for ophthalmologists  
تذكرة الكحالين
9. ‘Ammār Ibn ‘Alī Al-Mawṣilī (D400AH-1010AD)  
-The selected of eye disease المنتخب في علم العين
10. Aḥmad Ibn ‘Abdul-Raḥmān Ibn Mandawayh Al-Aṣḥāhānī (D 410 AH =1019 AD)  
-Treatises about the structure of the eye coats  
رسائل في تركيب طبقات العين  
-Treatise about the treatment of Mydriasis.  
رسالة في علاج انتشار العين
11. ‘Alī Ibn Ibrāhīm Ibn Bakhtyashū ‘Al-Kafarṭābī (D 460 AH = 1063 AD)  
-A book about the anatomy of the eye, its shape and treatment of its diseases.  
كتاب في تشريح العين وأشكالها ومداواة أعلالها
12. Abū Sa‘īd Ibn Mansūr Ibn Nā‘isah (D 460 AH = 1067 AD)  
-A book about the eye diseases and its treatment.  
كتاب في أمراض العين ومداواتها

13. Abū Al-Faraj ‘Abdullāh Ibn Al-Ṭayeb (D 468 AH = 1075 AD)  
-Comments about the eye. **تعاليق في العين**
14. Abū Al-Muṭarrīf ‘Abdul-Raḥmān Ibn Wāfid Al-Lakhamī (D 468 AH = 1075 AD)  
-A book about careful search in the eye diseases.  
**تدقيق النظر في علاج حاسة البصر**
15. Zarrin-Dast (D 480 AH = 1087 AD)  
-The light of the eyes. **نور العيون**
16. Abū Al-Faḍāil Ibn Al-Nāqid (D 577 AH = 1181 AD)  
-A book about the experienced in the eye  
**كتاب المجربات في العين**
17. Moḥammad Ibn Qassūm Ibn Aslam Al-Ghāfiqī (D 595 AH = 1197 AD)  
-The Guide in ophthalmology. **المرشد في الكحل**
18. ‘Abdullāh Ibn Qāsim Al-Ḥarīrī Al-Ishbīlī Al-Baghdādī (D 646 AH = 1248 AD)  
-The end of thoughts and the pleasure of vision.  
**نهاية الأفكار ونزهة الأبصار**
19. Faṭḥ Al-Dīn Ibn Hibatullāh Al-Qaysī (D 657 AH = 1259 AD)  
-The Final thought about the treatment of the eye diseases. **نتيجة الفكر في علاج أمراض البصر**

20. Khalīfāh Ibn Abī Al- Maḥāsen Al-Ḥalabī (D 664 AH = 1265 AD)  
-The sufficient in ophthalmology. **الكافي في الكحل**
21. ‘Alī Ibn Abī Al-Ḥazm Al-Qarashī( (Ibn Al-Nafīs) (D 687 AH = 1288 AD)  
-The well versed in ophthalmology.  
**المهذب في الكحل المجرب**
22. Ṣalāh Al-Dīn Al-Kaḥḥāl Al-Ḥamwī (D 696 AH = 1296 AD)  
-The Light of the eyes and the compilation of the arts.  
**نور العيون و جامع الفنون**
23. Ibn Al-Akfānī, Abū ‘ Abdullāh Moḥammad Ibn Ibrāhīm Ibn Ṣā‘ed Al-Anṣārī Al-Sinjārī (D 749 AH = 1348 AD)  
-Uncovering the unknown in the eyes condition.  
**كشف الرين في أحوال العين**
24. Ṣadaqah Ibn Ibrāhīm Al-Maṣrī Al-Ḥanafī Al-Shāthilī (D 751 AH = 1350 AD)  
-The ophthalmic support for diseases of the visual organ  
**العمدة الكحلية في الأمراض البصرية.**
25. ‘Alā’ Al-Dīn Al-Kaḥḥāl Al-Ṣafadī (D 786 AH = 1384 AD)  
-The rules in ophthalmology. **كتاب القانون في أمراض العين**

## Part Two

In this part of the book, I would like to briefly discuss the ophthalmological contents of major medical books, written by prominent Arabic/ Islamic authors between the 9<sup>th</sup> and 11<sup>th</sup> century.

### Outline of Part Two:

26. ‘Alī Ibn Sahl Raban Al-Ṭabarī (D 247 AH = 861 AD)  
-The paradise of Wisdom. **فردوس الحكمة**
27. Al-Rāzī, Abu Bakr Moḥammad (D 235-319 AH = 850-932 AD)  
-Continens (Al-Ḥāwī). **الحاوي في الطب**
28. Yūḥanna Ibn Sarabyūn (D 222AH = 935 AD)  
-Practica. **الكناش الكبير**
29. Abū Al-Ḥasan Aḥmad Ibn Moḥammad Al-Ṭabarī (D 366 AH = 976 AD)  
-The Hippocratic treatments. **المعالجات البقراطية**
30. ‘Alī Ibn Al-‘Abbās (D 383 AH = 994 AD)  
-The Royal book. **(الكتاب الملكي) كامل الصناعة الطبية**
31. Abū Al-Qāsim Khalaf Ibn ‘Abbās Al-Zahrāwī (D 500 AH = 1013 AD)  
-The Explanation (Al-Taṣreef). **التصريف لمن عجز عن التأليف**

32. Ibn Sīnā, Princeps **الشيخ الرئيس** Abū ‘Alī Al-Ḥussayn Ibn ‘Abdullāh Ibn ‘Alī Ibn Sīnā (D 346-428 AH = 958-1037 AD)  
-The Dogma (Al-Qanūn Fī Al-Ṭībb). **القانون في الطب**
33. Ibn Al-Haytham, Abū ‘Alī Moḥammad Ibn Al-Ḥasan (350-430AH=961-1039AD)  
-Al-Manāẓir **المناظر**

# Part one

## 1/1: Jibrāil Ibn Bakhtyashū' Ibn Georgis (D 214 AH = 828 AD)

جبرائيل بن بختيشوع بن جيورجيس  
(ت ٢١٤هـ = ٨٢٨م)

*Treatise about the Optic Nerve*

رسالة في عصب العين

Ibn Georgis wrote one book titled *Treatise about the Optic Nerve*. Unfortunately, there are no known manuscripts of this book. However, Al-Samarrai mentioned one manuscript in Aleppo in a private collection of Al-Jarrah, listed in Paul Sbath 1/8 #12. The lack of information regarding this private collection is the cause for the inability to verify the manuscript.<sup>1,2,3,4</sup>

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1 Al-Samarrai, vol. 1, 338-343.

2 Usaybi'a. 187-201.

3 N. Hamarne and I. Rajab, 122.

4 F.Sezgin,vol.3,p.343

## 1/2: Yūḥanna Ibn Māsawayh (190-242 AH = 815-865 AD)

يوحنا بن ماسويه (١٩٠-٢٤٢ هـ = ٨١٥-٨٦٥ م)

Yūḥanna Ibn Māsawayh, known to Latin translators as Mesue Senior or Janus Demascenus, was an enlightened Christian from Jundisabour where he served as the director. For half a century, he was the personal physician and eye doctor (Kaḥḥāl) of several Caliphs, including Al-Ma'mūn , Al-Mu'tasim بالله المعتصم بالله , Al-Wāthiq بالله الواثق بالله , and Al-Mutawakkil المتوكل على الله .

He wrote two books on ophthalmology<sup>1,2,3</sup>:

1. *Daghal Al-Iyn (The Alteration of the Eye)* دغل العين
2. *Knowing the Ophthalmology Profession questions and answers* معرفة مهنة الكحالين السؤال و الجواب

Max Meyerhof mentioned in the introduction of his book *Ten Treatises on the Eye* that two copies of each book exist in Cairo, Egypt (Taymour) and in Leningrad, Russia, without mentioning the numbers of the manuscripts.<sup>4</sup> I have in my private collection a microfilm of each of those books obtained from the national archives in Cairo.

1 Usaybi'a, 246-254.

2 Al-Samarrai, vol. I, 365-374.

3 N. Hamarne and I. Rajab, 124.

4 Meyerhof, *The Book of the Ten Treatises on the Eye*, ascribed to Ḥunayn Ibn Ishāq, (Cairo: The Government Press, 1928), X.

Sezgin, however, added two more books :

A book about the structure of the eye, its diseases and medications, and, **كتاب في تركيب العين وعللها وأدويتها**

A treatise about the eye. **رسالة في العين.**

and mentioned their location in Aleppo: Ḥakīm, Sbath: I,19,95, and 96 respectively<sup>1</sup>

فهرس اسماء الكتب المرقوم	
هذا الكتاب المعروف بدليل العين تأليف يحيى بن ماسويه الكلبى	
في مائة العين وكيفية تركيبها وعللها وادويتها وجميعها	
وعملها ومصنعها واهتمامها ومنتفعة كل واحد منها وادويتها	
ابتدائها والما بين اثنائها وجميع الادوية الصالحة لكل	
واحد منها وبلغ ذلك بشرح موجز مختصر وادوية الالفين	
تقريبه هذا الآن يتقدم ذكر تفصيل هذه الكتاب وموجبه في جردت	
الفصل الاول	
القائمه	في جهة العين وادويتها
على امر ماء	الفصل الثاني
الرابع	على فعل العين وادويتها
على فعل الزفرة الرضابية	الفصل الثالث
السادس	على فتنمة الزفرة السرية
على فعل الزفرة البيضاء	الفصل الرابع
الفصل الخامس	على فعل الجباب العين
على فعل الجباب العين	الفصل السادس
على فعل الجباب العين	الفصل السابع
على فعل الجباب العين	الفصل الثامن
على فعل الجباب العين	الفصل التاسع
على فعل الجباب العين	الفصل العاشر
على فعل الجباب العين	الفصل الحادي عشر
على فعل الجباب العين	الفصل الثاني عشر
على فعل الجباب العين	الفصل الثالث عشر
على فعل الجباب العين	الفصل الرابع عشر
على فعل الجباب العين	الفصل الخامس عشر
على فعل الجباب العين	الفصل السادس عشر
على فعل الجباب العين	الفصل السابع عشر
على فعل الجباب العين	الفصل الثامن عشر
على فعل الجباب العين	الفصل التاسع عشر
على فعل الجباب العين	الفصل العشرون
على فعل الجباب العين	الفصل الحادي والعشرون
على فعل الجباب العين	الفصل الثاني والعشرون
على فعل الجباب العين	الفصل الثالث والعشرون
على فعل الجباب العين	الفصل الرابع والعشرون
على فعل الجباب العين	الفصل الخامس والعشرون
على فعل الجباب العين	الفصل السادس والعشرون
على فعل الجباب العين	الفصل السابع والعشرون
على فعل الجباب العين	الفصل الثامن والعشرون
على فعل الجباب العين	الفصل التاسع والعشرون
على فعل الجباب العين	الفصل الثلاثون

فهرس اسماء الكتب المرقوم	
هذا الكتاب المعروف بدليل العين تأليف يحيى بن ماسويه الكلبى	
في مائة العين وكيفية تركيبها وعللها وادويتها وجميعها	
وعملها ومصنعها واهتمامها ومنتفعة كل واحد منها وادويتها	
ابتدائها والما بين اثنائها وجميع الادوية الصالحة لكل	
واحد منها وبلغ ذلك بشرح موجز مختصر وادوية الالفين	
تقريبه هذا الآن يتقدم ذكر تفصيل هذه الكتاب وموجبه في جردت	
الفصل الاول	
القائمه	في جهة العين وادويتها
على امر ماء	الفصل الثاني
الرابع	على فعل العين وادويتها
على فعل الزفرة الرضابية	الفصل الثالث
السادس	على فتنمة الزفرة السرية
على فعل الزفرة البيضاء	الفصل الرابع
الفصل الخامس	على فعل الجباب العين
على فعل الجباب العين	الفصل السادس
على فعل الجباب العين	الفصل السابع
على فعل الجباب العين	الفصل الثامن
على فعل الجباب العين	الفصل التاسع
على فعل الجباب العين	الفصل العاشر
على فعل الجباب العين	الفصل الحادي عشر
على فعل الجباب العين	الفصل الثاني عشر
على فعل الجباب العين	الفصل الثالث عشر
على فعل الجباب العين	الفصل الرابع عشر
على فعل الجباب العين	الفصل الخامس عشر
على فعل الجباب العين	الفصل السادس عشر
على فعل الجباب العين	الفصل السابع عشر
على فعل الجباب العين	الفصل الثامن عشر
على فعل الجباب العين	الفصل التاسع عشر
على فعل الجباب العين	الفصل الثلاثون

<sup>1</sup> F. Sezgin, vol.3, 352-361

## 1/3: Ḥunayn Ibn Ishāq Al-'Abādī (194-264 AH = 817-887 AD)

حنين بن اسحق العبادي  
(١٩٠-٢٤٢هـ = ٨١٥-٨٦٥م)

*Ten Treatises on the Eye*

العشر مقالات في العين

Ḥunayn Ibn Ishāq Al-'Abādī was born in Al-Ḥirā, (الحيرة) in the northeastern part of Syria. He studied medicine in Jundisabour in Southern Persia under the famous teacher Yūḥanna Ibn Māsawayh. He then travelled around to master the Greek language and to Basra, Iraq to perfect his Arabic language. He displayed strong command of four languages: Syriac (his first language), Persian, Greek, and Arabic. Medieval Latin translators called him Juhannitus.

Ḥunayn was one of the founders of the House of Wisdom in Baghdad. He worked as a chief translator of the Greek, Syriac, and Persian books in many fields of science, including medicine, botany, mathematics, and astrology. He left behind him the legacy of Ḥunayn's School of Translation, which his son Ishāq Ibn Ḥunayn اسحق بن حنين and nephew Ḥubaysh Al-'Aasam حبيش الأعسم inherited.

In addition to his skills in translation, Ḥunayn was a prominent physician and ophthalmologist, writing several

books listed by Usaybi‘a<sup>1,2,3</sup> as follows:

- 1 *Ten Treatises on the Eye* العشر مقالات في العين
- 2 *The book about the Eye in question and answer format.* كتاب في العين على طريقة المسألة و الجواب
- 3 *Treatise about the structure of the Eye.* مقالة في تركيب العين
4. *Treatise about how to choose Eye Medications.* مقالة في اختيار أدوية العين
- 5 *Treatise about the Surgical Treatment of Eye Diseases.* مقالة في مداواة العين بالحديد
- 6 Summary of Galen’s book on the eye diseases. كتاب جالينوس في جوامع الأمراض الحادثة في العين

The most important known book is the *Ten Treatises on the Eye*, which was later translated three times throughout history, twice into Latin and once into English.

The Latin translators claimed to be the authors of Ḥunayn’s work:

1. *Galini liber de oculis translatus Demetrios*
2. *Liber de oculis: Constantini Africani*

J. Hirschberg<sup>4</sup> discovered that neither Demetrios nor Constantini Africani were the original authors, rather translators of Ḥunayn’s *Ten Treatises on the Eye*.

The translation into English was the work of the brilliant ophthalmologist and historian Professor Max Meyerhof and was published in Cairo, Egypt in 1928 to commemorate the 100<sup>th</sup> anniversary of the establishment of the King Fuad University.<sup>5</sup>

1 Usaybi‘a, vol. 1, (Cairo: 1882), 184-200.

2 Al-Samarrai, vol.1, 376-400

3 N. Hamarne and I. Rajab, 125-133.

4 J. Hirschberg, vol. 2, 46-48.

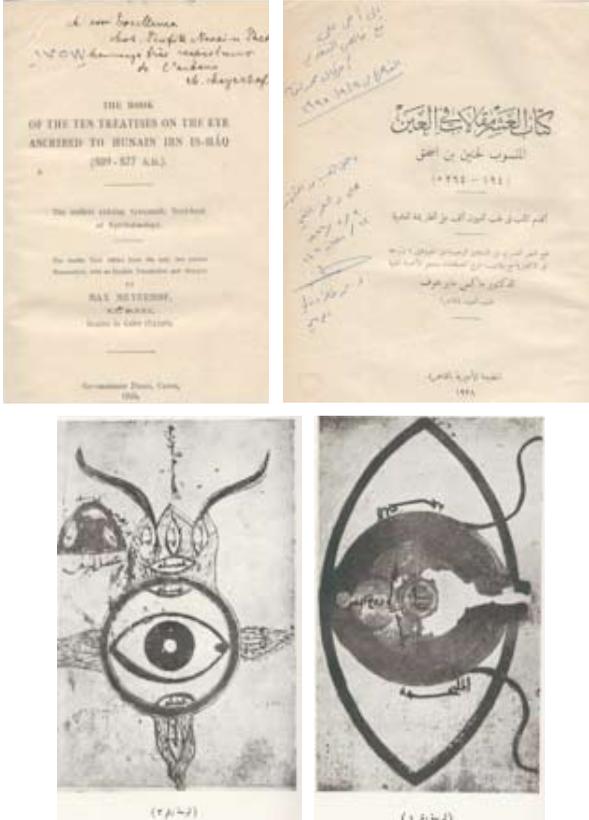
5 Max Meyerhof, M.D. PhD. HC: *The Book of the Ten Treatises about the Eye*, ascribed to Ḥunayn Ibn Ishāq, 809-877 AD, (Cairo: The Government Press, 1928).

The book gained its fame because it is the first book to be written in the very meticulous and precise manner that is now common in the writing of textbooks. In addition, it contained the very first drawing of the eye and its six muscles to which Hunayn added the retractor bulbi muscles, which are found only in certain classes of mammals, and the optic nerve. He also explained and simplified the mechanism of vision as written by Galen, شرح آية الابصار على مذهب جالينوس which stated that light gets reflected from objects to meet the luminous rays of the vision. The emanation of the luminous spirit streams from the brain through the optic nerve, the lens, and the pupil and the intermediary of the two rays is supposed to be the air. Aristotle and Galen developed this theory of vision, which Hunayn adopted. However, Hunayn rejected vehemently two other theories about vision, the first of which Empedocles أمبودقليس developed, claiming that an image-ray leaves the object and meets the eye. Epicurus أبقرس formed the second theory, stating that the visual rays leave the eye, stretch themselves out to the objects, and feel them.

Moreover, the book was so important that most, if not all the Arabian, Persian and Turkish authors followed Hunayn's method of writing textbooks. Meyerhof concluded in his 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 the

European books written much later.<sup>21</sup>

F.Sezgin, however wrote extensively about Ḥunayn and praised him very highly<sup>2</sup>



1 Max Meyerhof, M.D. Ph.D. HC: *The Book of the Ten Treatises on the Eye*, ascribed to Ḥunayn Ibn Ishāq, 809-877 AD, (Cairo: The Government Press, 1928).

2 F. Sezgin, vol.3, 380-398

## 1/4: Thābit Ibn Qurrah Al-Ḥarrānī (211-288 AH = 823-900 AD)

ثابت بن قرة الحراني (٢١١-٢٨٨هـ = ٨٢٣-٩٠٠م)

*The Vision and the Perception*

البصر والبصيرة

Thābit Ibn Qurrah Al-Ḥarrānī<sup>1,2,3,4</sup> was born and raised in Harrān, Mesopotamia in the year 221 AH = 823 AD. He moved to Baghdad during the reign of Caliph Al-Mu‘taḍid **المعتضد بالله** and enjoyed a very high rank in the Caliph’s court, where he learned and mastered several ancient languages, such as Aramaic, Greek, and Syriac in addition to the Arabic language. Thābit Ibn Qurrah was a philosopher, mathematician, astrologist, and physician. He translated many books dealing with philosophy and excelled in this field. He was the top mathematician of his time and a master of astrology, having written a book about solar and lunar eclipses, but died before finishing the book. In the field of medicine, he was incomparable and became the personal physician of Caliph Al-Mu‘taḍid. As an ophthalmologist, he wrote a book entitled *The Vision and the Perception*.

1 Usaybi‘a, 295-300.

2 Samarrai, vol. 1, 428-431.

3 N. Hamarne and I. Rajab, 131.

4 F. Sezgin, vol.3, 403-408

Although it is a small book compared to the books written later, it was quoted by most of the ophthalmologists who followed him, such as Khalīfah, who referenced *The Vision and the Perception* in his book *Al-Kāfī (The Sufficient Knowledge in Ophthalmology)*. Al-Rāzī also referenced Thābit Ibn Qurrah’s work in his massive book *Al-Ḥāwī fi Al-Ṭib (Continens)*. The only known manuscript of this book is in Cairo (Egyptian archives, Taymour No. 100, 385-451).<sup>1</sup>

Thābit Ibn Qurrah’s most important contribution to ophthalmology was his treatment of amblyopia, or lazy eye, الغطش 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,” which is an outstanding breakthrough in the field of ophthalmology. He also added a diagram to explain the diseases of the visual spirit.



<sup>1</sup> Thābit Ibn Qurrah Al-Ḥarrānī, *The Vision and the Perception*, and ‘Ammār Ibn ‘Alī Al-Mawṣilī, *The Chosen of the Eye Diseases and their Management*, edited by Professor M. Rawwas Qal’ajī and Muhammad Zafer Al-Wafai, (Riyadh, Saudi Arabia: Al-Obekan Publishing House, 1411 AH = 1991 AD).

## 1/5: Abu 'Alī Khalaf Al-Ṭūlūnī (D 302 AH = 914 AD)

أبو علي خلف الطولوني ( ٣٠٢ هـ = ٩١٤ م )

كتاب النهاية و الكفاية في تركيب العينين وخلقتهما  
وعلاجهما وأدويتهما

*The Book about the Final Objectives and about the  
Composition of the Two Eyes and their Constitution,  
their Treatment, and their Medications*

Unfortunately, I could not find any manuscript of this book. The author was mentioned by Usaybi'a, "Khalaf Al-Ṭūlūnī is the first Muslim among the authors of Arabian books on ophthalmology."<sup>1</sup> It is to our surprise that Khalīfa referenced Al-Ṭūlūnī in his book *The sufficient in Ophthalmology*,<sup>2</sup> indicating that Al-Ṭūlūnī's book had a good reputation among ophthalmologists.<sup>3,4,5</sup>

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1 Usaybi'a, 544.

2 Khalīfah Ibn Abī Al-Maḥāsin Al-Ḥalabī, Al-Kāfi fī Al-Kuhl, 31.

3 J. Hirschberg, vol. 2, 52.

4 Samarrai, vol. 2, 491.

5 N. Hamarne and I. Rajab, 106, 137, 204, 403.

## 1/6: Abū 'Abdullāh Moḥammad Ibn Sa'īd Al-Tamīmī Al-Maqdesī (D. 980 AD = 369 AH)

أبو عبد الله محمد بن سعيد التميمي المقدسي  
حوالي (٩٨٠ م = ٣٦٩ هـ)

مقالة في ماهية الرمد وأنواعه وأسبابه وعلاجه

Moḥammad Ibn Sa'īd Al-Tamīmī Al-Maqdesī was a famous physician who practiced in his hometown, Jerusalem, around 980 AD, and then moved to Egypt where he lived the rest of his life. He mainly treated diseases of the digestive system, but as far as ophthalmology, he wrote a book entitled, *Treatise about the essence of ophthalmia, its types, causes, and treatment*.<sup>1,2,3,4</sup>

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1 Usaybi'a, 547.

2 Hirschberg, vol. 2, 105.

3 N. Hamarne and I. Rajab, 106, 211, 398.

4 F. Sezgin, vol.3, 504-506

## 1/7: A‘yan Ibn A‘yan Al-Maṣrī (D 385 AH = 995 AD)

أعين بن أعين المصري (ت ٣٨٥ هـ = ٩٩٥ م)

*The Book about the Eye Diseases and their Treatment*

كتاب في أمراض العيون ومداواتها

Unfortunately, this book did not survive time, as I could not find any mention of the author or the book, except by Usaybi‘a, “A‘yan Ibn A‘yan of Egypt, who died in 385 AH, wrote a book about ophthalmology entitled *A Book about the eye diseases and their management*.”<sup>1</sup>

There is an interesting confusion about this author’s last name. Usaybi‘a mentioned two similar names: Zahrūn Ibn A‘yan Al-Baṣrī, زهرون بن أعين البصري from Basra, Iraq, who was the teacher of Masarjawaih and lived in the Marwānī dynasty, and A‘yan Ibn A‘yan Al-Maṣrī, أعين بن أعين المصري from Egypt.<sup>2</sup> J. Hirschberg could not differentiate between the two names with certainty.<sup>3</sup> In his book Noor Al-‘Uyūn, Ṣalāh Al-Dīn quoted Ibn A‘yan Al-Baṣrī’s<sup>4</sup> The examination of ophthalmologists and Samarrai mentioned A‘yan Ibn

<sup>1</sup> Usaybi‘a, 546.

<sup>2</sup> Ibid.

<sup>3</sup> J. Hirschberg, vol. 2, 82.

<sup>4</sup> Ṣalāh Aldin Al-Kaḥḥāl, Al-Ḥamwī.

A‘yan Al-Maṣrī briefly, as well.<sup>1,2,3</sup>

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1 Samarraī, vol. 2, 571.

2 N. Hamarne and I. Rajab, 149, 210, 394.

3 F. Sezgin, vol.3. 496

## 1/8: 'Ammār Ibn 'Alī Al-Mawṣilī (D 400 AH = 1010 AD)

عمار بن علي الموصلی (ت ٤٠٠ هـ = ١٠١٠ م)

*The chosen of the eye diseases and their treatment*  
المنتخب في علم العين وعلاجها<sup>1</sup>

The author, as his name indicates, was born and raised in Mawṣil, الموصل Iraq, where he also studied medicine and excelled in ophthalmology. He traveled extensively, treating patients, as he mentioned in his book. He gained fame after he invented and used the hollow couching needle *المقدح المجوف* to extract the soft cataract (congenital and/or traumatic), which is considered a major breakthrough in the management of cataracts throughout the history of mankind.

Max Meyerhof<sup>2</sup> translated the six different techniques 'Ammār used to treat the cataract surgically, which demonstrated 'Ammār's skills in modifying the procedure as deemed fit for each case. The book gained fame and attention by several scholars, who specialized in the history of ophthalmology. Hirschberg, Lippert, and Mittwoch

1 Edited by M. Rawwas Qal'ajī and M. Zafer Wafai, M.D., (Riyadh, Saudi Arabia: Obekan Publishing House, 1411 AH = 1991 CE).

2 'Ammār Ibn 'Alī Al-Mawṣilī, partially translated to Spanish by Max Meyerhof, *Las Operaciones de cataracta de 'Ammār Ibn 'Alī Al-Mawṣilī*, (Laboratorios del Norte de Espana, 1937)

extensively reviewed, surveyed, and evaluated all the known manuscripts of ‘Ammār’s book, specifically the #894 in the library of the Royal Monastery of Saint Lorenzo of Escorial in Spain.<sup>1</sup>

Four more manuscripts were obtained from:

1. The general library of Rabat, Morocco #782.
2. The Cairo Egypt Tub Talaat #618.
3. The British Library of London #10257.
4. Istanbul, Aḥmad III #208.

‘Ammār’s book was translated into Latin as *Tractatus de oculis canamusalli*.

In 2000, Emilie Savage-Smith wrote an exhaustive article entitled “*The practice of surgery in Islamic land: myth or reality*”<sup>2</sup> in which she discussed several surgical procedures mentioned in ancient Arabic medical books. She questioned the validity of those procedures and whether or not they were truly performed. Particular attention was paid to cataract aspiration using the ‘hollow couching needle’ as described in ‘Ammār’s book “*The chosen of the eye diseases and their treatment*”.

On page 318 she wrote “the tenth-century Egyptian oculist ‘Ammār Ibn ‘Alī Al-Mawṣilī claimed to have designed

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1 *The Arabian Ophthalmologists*, compiled by J. Hirschberg, J. Lippert, and E. Mittwoch, translated into English by Frederick C. Blodi, Wilfried J. Rademaker, Gisela Rademaker, and Kenneth F. Wildman, Reviewed and edited by M. Zafer Wafai, M.D., (Riyadh, Saudi Arabia: King Abdul Aziz City for Science and Technology, 1993).

2 Emilie Savage-Smith, “The practice of surgery in Islamic Lands: Myth and reality” 0951-631X, *Social History of Medicine*, Vol.13, No.2, 307-321

a hollow couching needle for the removal of cataract by suction, and he presented case histories in which he claimed to have had much success with this technique”, she continued saying “Rāzī had briefly described the procedure and the hollow instrument, attributing its invention to the Greek physician Antyllus of the second century”, as if she is questioning ‘Ammār’s honesty and integrity in claiming the invention to himself, and furthermore she was doubting his results by saying: “contemporary and later doctors such as Al-Zahrāwī (fl.1000) and Al-Shāzilī (fl.1350-1390) doubted the efficacy of ‘Ammār’s instrument”.

A few remarks are worth mentioning in response to the above view:

‘Ammār was not an Egyptian, from his name, he was from Mawṣil, Iraq but worked in Egypt. The actual statement referred to in Al-Ḥāwī is “Antyllus reported that some people introduced in the couching location a glass tube to aspirate the cataract, but they aspirated the aqueous humor along with it”<sup>1</sup>. There are two problems with this statement. There does not seem to be a source on Antyllus other than this sentence in Al-Ḥāwī. The other is the level of technology at the time of Antyllus to produce a very small diameter glass tube.

Al-Ḥāwī Fī Al-Ṭib, however, was compiled by Al-Rāzī’s students and admirers years after his death, which puts the originality of some of its content under legitimate

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1 Al-Ḥāwī Fī Al-Ṭib, Abu-Bakr Muhammad Ibn Zakarya Al-Rāzī; Reviewed and edited by: Muhammad Muhammad Ismail, Vol. I, Part II, p.319, published by Scientific Books House, Beirut.1421 AH,2000CE

questioning. Furthermore, the fact that Al-Rāzī did not dwell on the authenticity of this invention may be that he was neither a surgeon nor a recognized ophthalmologist. He passed away at least 75 years before ‘Ammār’s book came to be known and famous.

Mentioning Al-Shāzilī’s name with Al-Zahrāwī as doctors is misleading, as Al-Shāzilī was not an ophthalmologist, and he bought the instruments from the market, whereas ‘Ammār claimed that he made the instruments himself.

There is a problem in quoting Yusūf Ibn Al-Labbān since he is not known to the ophthalmological historians.

‘Ammār was very sure of himself, as is clear in the beginning of his book: “For my ability and knowledge of this field surpasses everybody else’s.” He finished most of his chapters with “and I say...,” indicating that his opinion was the final word. Such overconfidence in his knowledge and experience caused some authors to accuse him of arrogance. The following are samples of his statements:

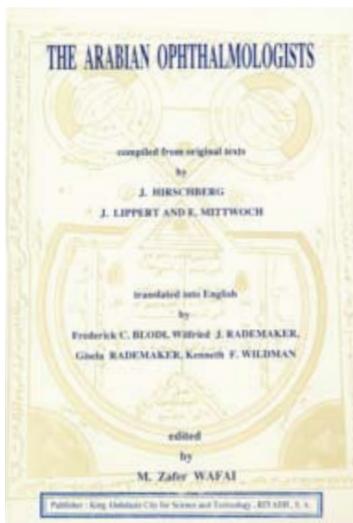
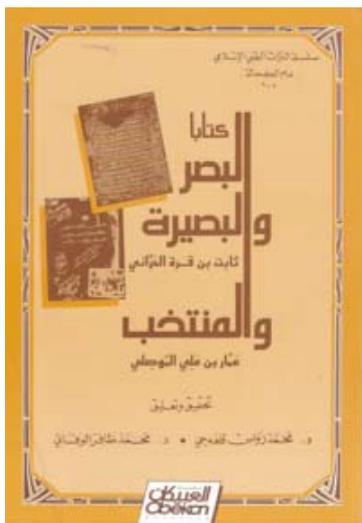
- “I did not write anything in this book that I did not try, and I have treated people all of my life, so be certain that my treatment will work.”
- He recommended, for the first time in history, to scratch the iris to create a blood clot in order to prevent the cataract from re-ascending.
- He was the first to warn surgeons of dislocating the cataract into the anterior chamber, as doing so will touch the corneal endothelium, causing irreversible corneal edema, which is

- nowadays called corneal decompensation.
- He was a pioneer in the advocacy of fragmenting and aspirating the cataract.
  - He was the first to use the word “pupil” to refer to what was previously called the “hole of the iris.”
  - He used the term “airy cataract” **الساد الهوائي** to describe a superiorly dislocated cataract that is stuck at the upper edge of the pupil.
  - Above all, he invented and used skillfully the hollow couching needle, stating, “Nobody ever did it before me.”

‘Ammār described the characteristics of a good surgeon as being one who is “able, experienced, sharp-sighted and steady-handed.” He claimed that experience is what is required from a surgeon: “He who has no experience has no profession.” **ومن لا درية له فلا صنعة له**

‘Ammār was an extremely observant clinician and meticulous in inventing surgical instruments with very detailed measurements, observing that the cataract was very common in Egypt, due to dietary habits of consuming excessive amounts of fish. A major shortcoming of his book is the lack of illustrations, anatomical and surgical instruments, and he did not explain the mechanism or causes of strabismus. He also did not discuss the pathology of vitreous or the retina. However, these minor setbacks do not diminish the value of the book or the contribution of the

author.<sup>1,2,3,4,5</sup>



1 Usaybi'a, 549

2 J. Hirschberg, vol. 2, 59-67.

3 Samarrai, vol. 2, 17-20.

4 N. Hamarne and I. Rajab, 63, 75, 98.

5 F. Sezgin, vol. 3. 528-533

## 1/9: 'Alī Ibn 'Isā Al-Kaḥḥāl (D 400 AH = 1010 AD)

علي بن عيسى الكحال البغدادي (ت ٤٠٠ هـ = ١٠١٠ م)

*Memorandum Book for Ophthalmologists*

تذكرة الكحالين

'Alī Ibn 'Isā Al-Kaḥḥāl spent his life in Baghdad as a brilliant practicing ophthalmologist. He wrote the first academically arranged book in the field of ophthalmology, called *Memorandum Book for Ophthalmologists*,<sup>1</sup> the oldest textbook of ophthalmology that has been preserved in its entirety and in its original language. Hirschberg listed ten manuscripts in different European National libraries.<sup>2</sup>

'Alī Ibn 'Isā preserved the information in the lost works of ancient Grecian authors, such as Oribasius, Aetius, and Paulus. This knowledge would have been lost were it not for 'Alī Ibn 'Isā's book. He added to the Grecian methods and concepts both what he gained from his teachers and experiences in his own practice, contributing new insight beyond what was known to the ancient Greeks. 'Alī Ibn 'Isā is known to European translators as Jesu Hali and his book as *Tractatus de Oculis*.

Then Casey A. Wood published an English translation in the

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1 Usaybi'a, 333.

2 J. Hirschberg, vol. 2, 53-59, 129-153.

United States in 1936,<sup>1</sup> the most recent edition of which was published in 1964.<sup>2</sup> The book exemplifies the ideal textbook of Arabian Ophthalmology. Later, many oculists quoted the book, which survived over 800 years as a reference to all practicing ophthalmologists, even those in Europe, where original manuscripts or incomplete translations were scattered in different libraries. ‘Alī Ibn ‘Isā emphasizes meticulousness and caution in the performance of surgery, which was not present in Grecian books. For the following 800 years, no other book was its equal or surpassed ‘Alī Ibn ‘Isā’s work, for it contained good teaching and the practical aspect of the profession. The first to present new ideas after ‘Alī Ibn ‘Isā’s work was Kepler, who, later in the 18<sup>th</sup> century, presented the theory of the dioptric power of the eye and lenses.

What made *Memorandum Book for Ophthalmologists* so unique and such a major reference for over 800 years was the elegant manner in which it was written. The book consists of four different sections:

1. In the first section, ‘Alī Ibn ‘Isā discusses the anatomy of the eye with comments about physiology. He explains the concept, the use, and the nature of the eye.
2. The second section deals with external eye diseases

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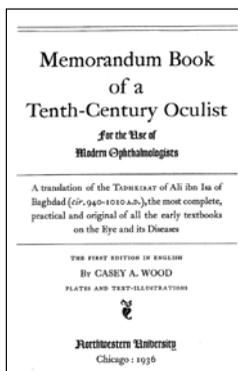
1 Casey A. Wood, *Memorandum Book of the 10th Century Oculist*, (Chicago, USA: Northwestern University Press, 1936).

2 Tathkirat, ‘Alī Ibn ‘Isā Al-Kaḥḥāl, Al-Hakin Ghawth Muhiuddin Al-Qadri Al-Sharafi, (Hyderabad Al-Dukn, India: Department of Osmania Education, 1382 AH = 1964 AD).

and their treatment.

3. In the third section, ‘Alī Ibn ‘Isā discusses diseases of the eye that are not apparent, such as diseases of the visual mechanism, crystalline fluid, vitreous, optic nerve, night blindness, day blindness, and abnormalities of the extra-ocular muscles.
4. At the end of the book, ‘Alī Ibn ‘Isā lists 143 simple medications in alphabetical order, as well as their effect on the eye and 80 additional prescriptions of compounded medication.

Included in the book are 130 eye diseases and thorough descriptions of the signs, symptoms, and phases of some of the diseases and medical—and possibly surgical—management with extensive details, which is why the book is regarded as the Arabian Dogma of Ophthalmology.<sup>1,2,3</sup>



1 Samarrai, vol. 1, 519-522.

2 N. Hamarneh and I. Rajab, 145-147.

3 F. Sezgin, vol.3, 540-544

## 1/10: Aḥmad Ibn 'Abdul-Raḥmān Ibn Mandawayh Al-Aṣḥāhānī (D. 410 AH = 1019 AD)

أحمد بن عبد الرحمن بن مندويه الأصفهاني  
(ت ٤١٠هـ = ١٠١٩م)

This author is not known to historians except Usaybi'a,<sup>1</sup> who wrote about him briefly. Usaybi'a mentioned that Al-Aṣḥāhānī wrote two books about ophthalmology: *Treatise about the structure of the eye's coats* رسالة في تركيب طبقات العين and *Treatise about the treatment of Mydriasis*. رسالة في علاج انتشار العين Samarrai,<sup>2</sup> however, wrote a more detailed biography of Al-Aṣḥāhānī, listing thirty three books and treatises in almost all aspects of medicine, among them are the two books about the eyes mentioned by Usaybi'a. Al-Aṣḥāhānī was the first to write about pediatric ophthalmology in his book *Treatise about the Illness in Children* رسالة في أوجاع الأطفال. Therefore, he is considered a founder of pediatric ophthalmology.<sup>3,4</sup>

1 Usaybi'a, 459-461

2 Samarrai, vol. 2, 464-466.

3 N. Hamarne and I. Rajab, 108, 210.

4 F. Sezgin, vol. 3, 525-528

## 1/11: 'Alī Ibn Ibrāhīm Ibn Bakhtyashū' Al-Kafarṭabī (D. 460 AH = 1067 AD)

علي بن ابراهيم بن بختيشوع الكفرطابي  
(ت ٤٦٠ هـ = ١٠٦٧ م)

*Anatomy of the eye, its shape, and treatment of its diseases*

تشریح العین وأشکالها ومداواة أعالها

'Alī Ibn Ibrāhīm is a virtually unknown author and/or practicing physician, as Usaybi'a did not even mention him. The author was born and raised in Kafarṭab, كفرطاب which is a small town between Aleppo and Ma'arat Al-Nu'mān معرة النعمان in northern Syria. He traveled to Egypt, where he practiced ophthalmology and died in Cairo around 460 AH = 1067 AD. His father was also an ophthalmologist and 'Alī Ibn Ibrāhīm copied several compounded medications from his father's handwritten prescriptions. He was a descendent of a Christian family that produced many scholars throughout the 'Abbāsīd Dynasty, beginning with Georges Ibn Bakhtyashū', a brilliant practicing physician from Jundisabour. Caliph Al-Manṣūr hired Ibn Bakhtyashū' to be his personal physician around 155 AH = 776 AD. 'Alī Ibn Ibrāhīm's father converted to Islam, as his name indicates, which could be reason for Ibrāhīm's frequent traveling in the middle of northern Syria. It is possible

that he was considered an outcast by his wealthy Christian family, which may also be the reason historians overlooked him.<sup>1,2,3</sup>

Max Meyerhof brought ‘Alī Ibn Ibrāhīm’s book to the scientific community’s attention in his introduction to his book *Ten Treatises on the eye*.<sup>4</sup> Max Meyerhof brought from Leningrad in 1930 a copy of the book, which is now located in the National Archive in Cairo (#1490 Ṭībb). Despite the implications of the title *Anatomy of the eye, its shape, and treatment of its diseases*, no more than a few pages describe the eye and its seven coats, three humidities, nine muscles, and four nerves. The book lacks any illustrations or drawings but deals with adnexa (eyelids, lacrimal sac, etc.). The only sentence in the book considered particularly progressive is, “The eye is an instrument of vision and not a seeing organ by itself,” العین آلة للابصار وليست مبصرة بذاتها which differs from the ideology of vision prior to the author’s time.

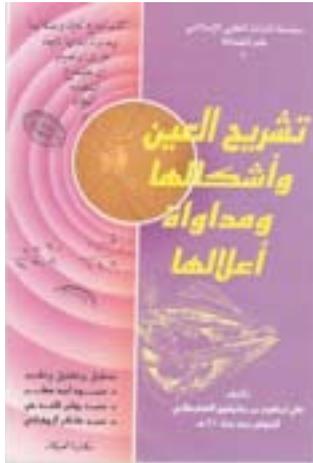
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1 ‘Alī Ibn Ibrāhīm Ibn Bakhtyashū’ Al-Kafarṭabī, *The anatomy of the eye, its shape, and its treatment*, edited by Dr. Mahmoud Aḥmad Saqr, Professor M. Rawwas Qal’ajī, and M. Zafer Wafai, MD. (Riyadh, Saudi Arabia: Obekan Publishing House, 1411 AH = 1991 AD).

2 Samarrai, vol. 2, 512.

3 N. Hamarne and I. Rajab, 153, 212, 213.

4 Ḥunayn Ibn Ishāq Al-‘Abādī, *Ten Treatises on the eye*, (194-264 AH), edited by Max Meyerhof, (Cairo: Amiri Press, 1928), XIV.



## 1/12: Abū Sa'īd Ibn Manṣūr Ibn Nā'esah (D. 458 AH = 1067 AD)

زاهد العلماء أبو سعيد منصور بن ناعسة

(٤٥٨ هـ = ١٠٦٧ م)

*The Eye Diseases and their Treatment*

امراض العيون و علاجاتها

No known libraries around the world that contain Islamic manuscripts include a manuscript of this book.<sup>1,2,3</sup>

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1 Usaybi'a, 341.

2 Samarrai, vol. 2, 496.

3 N. Hamarne and I. Rajab, 156, 214.

## 1/13: Abū Al-Faraj 'Abdullāh Ibn Al-Ṭayyeb (D. 468 AH = 1075 AD)

أبو الفرج عبد الله بن الطيب (ت ٤٦٨ هـ = ١٠٧٥ م)

*Comments about the Eye* تعاليق في العين

None of the known libraries containing books on Islamic medicine hold a manuscript of this book.<sup>1,2,3</sup>

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1 Usaybi'a, 323-325.

2 Samarrai, vol. 1, 501-504.

3 N. Hamarne and I. Rajab, 390, 392.

## 1/14: Abū Al-Muṭarref 'Abdul Raḥmān Ibn Moḥammad Ibn Wāfid Al-Lakhamy (998-1075 AD = 388-468 AH)

أبو المطرف عبد الرحمن بن محمد بن وافد اللخمي  
(٣٨٨-٤٦٨ هـ = ٩٩٨-١٠٧٥ م)

*Close Observation in the Diseases of the Visual System*

تدقيق النظر في علل حاسة البصر

Abū Al-Muṭarref, known to Latin translators as Abengefit, was born, lived and died in Toledo, Spain. He came from a very prominent family and gained the respect and trust of the Amīr Ibn dhi Al-Nūn, الأمير ابن ذي النون, so much so that he held the post of two ministries as a dual minister. ذو الوزارتين

During his time, he was a prominent physician and wrote several books on general medical topics, including his famous book on simple medications and a book on ophthalmology called *Close Observations about the Diseases of the Visual System*.<sup>1,2,3,4</sup> Unfortunately, the book was not preserved, but the author's name was mentioned in Khalīfa's list.<sup>5</sup>

1 Usaybi'a, 496.

2 Samarrai, vol. 2, 467-468

3 Hirschberg, vol. 2, 73-74.

4 N. Hamarne and I. Rajab, 67, 101, 152, 211, 212.

5 Khalīfa, 31-32.

## 1/15: Zarrin-Dast/Abū Ruḥ Moḥammad Ibn Maṣṣūr Ibn ‘Abdullāh Ibn Maṣṣūr Al- Yamānī (D. 480 AH = 1087 AD)

أبو روح محمد بن منصور بن عبد الله بن  
منصور اليماني (زارين داست)  
(ت ٤٨٠ هـ = ١٠٨٧ م)

### *The Light of the Eyes* نور العيون

Zarrin-Dast (the golden hand) was a Muslim from Persia, who wrote his book *The Light of the Eyes* to revive the Persian culture after the Arabic language dominated the scientific scene due to the Muslim conquer of Persia around 636 AD, which could be the reason why early Arabic biographers did not mention him. According to Hirschberg,<sup>1</sup> the book was discovered in the Bodleyan Library under No. 1575 and was written in the form of questions and answers. Zarrin-Dast did not give any credit to the books or authors he quoted frequently, and the 30 eye operations he mentioned in his book were almost exactly as mentioned in the *Memorandum* by ‘Alī Ibn ‘Isā.<sup>1,2</sup>

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1 J. Hirschberg, vol. 2, 67-68.

2 N. Hamarne and I. Rajab, 156.

## 1/16: Abū Al-Faḍā'el Ibn Al-Nāqed (D. 577 AH = 1181 AD)

أبو الفضائل بن الناقد (ت ٥٧٧ هـ = ١١٨١ م)

*The Experienced in Ophthalmology*

المجربات في العين

No manuscript of this book was found.<sup>1,2,3</sup>

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1 Usaybi'a, 580.

2 Samarrai, vol. 2, 471.

3 N. Hamarne and I. Rajab, 163, 219.

## 1/17: Moḥammad Ibn Qassūm Ibn Aslam Al-Ghāfiqī (D. 595 AH = 1197 AD)

محمد بن قسوم بن أسلم الغافقي  
(ت ٥٩٥ هـ = ١١٩٧ م)

*The Guide to Ophthalmology*

المرشد في الكحل

Al-Ghāfiqī was born and raised in Ghāfiq, or what is now known as De Quijo, a suburb of Pedroche near Cordoba in Spain. Max Meyerhof translated part of *The Guide to Ophthalmology* into French,<sup>1</sup> which I managed to compare with the Arabic text.

Ḥasan ‘Alī Ḥasan formatted a dissertation for a degree in medicine through the University of Madrid in 1977, and he later edited and published the entire book.<sup>2</sup> Hirschberg, Lippert, and Mittwoch studied a manuscript in the Escorial Library No. 835, but did not publish anything about it.<sup>3</sup> In addition to this manuscript, we located and obtained a

1 Max Meyerhof, *Le Guide D’Oculistique de Moḥammad Ibn Qassūm Ibn Aslam Al-Ghāfiqī*, (Laboratoires De Nord De L’Espagne, 1933).

2 Tesis Doctorar Rusumen, *La Ophthalmologia De Al-Ghāfiqī*, SIGLIO XII, por Ḥasan ‘Alī Ḥasan.

3 Hirschberg, *Die Arabischen Lehrbücher Der Augenheilkunde* Unter Mitwirkung Von J. Lippert Und E. Mittwoch bearbeitet Von J. Hirschberg (Anhang Zu Den Abhandlungen D. Kgl. Breussischen Akademie Der Wissenschaften) In Al-Ghāfiqī, *The Guide to Ophthalmology*, 24.

microfilm from the National Library in Cairo No. 3319, copied in 1937 from another manuscript No. 1808, which is a copy of the Escorial No. 835.

While editing the book, Professor M. Rawwas Qal‘ajī and I noted that the book appeared to be more of a general medical book than one specialized in ophthalmology. The author discusses extensively the anatomy and physiology of the eyes and stresses the effect of the psychological condition of a patient on his/her eyes. The author listed 23 Arabian physicians and their books as references in his book.

Furthermore, Al-Ghāfiqī listed over 500 simple medications known in his region and 59 compounded prescriptions that he personally used to treat his patients, which indicates his great experience in the field of ophthalmology. Although he wrote a full chapter about wine and alcohol, Al-Ghāfiqī never used any medication with ingredients that were forbidden in Islam (i.e. pork and alcohol).

The author illustrated 13 surgical instruments, which he made, supporting the claim that he was an ophthalmologist, rather than a general practitioner. In addition, he drew several illustrations to explain the refractive error of the eye in his chapter called “Diseases of the visual spirit.”<sup>1</sup>

### الروح الباصر

Overall, Al-Ghāfiqī’s *The Guide to Ophthalmology* was an outstanding contribution to ophthalmology and a reference

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1 Moḥammad Ibn Qassūm Ibn Aslam Al-Ghāfiqī, *The Guide to Ophthalmology*, edited by Prof. M. Rawwas Qal‘ajī, PhD. and M. Zafer Wafai, MD. (Riyadh, Saudi Arabia: KACST, 1410 AH = 1990 AD).

for future generations.<sup>1,2,3</sup>



1 J. Hirschberg, vol. 2, 77-79.

2 Samarrai, vol. 2, 518-519.

3 N. Hamarne and I. Rajab, 158-160, 216-217

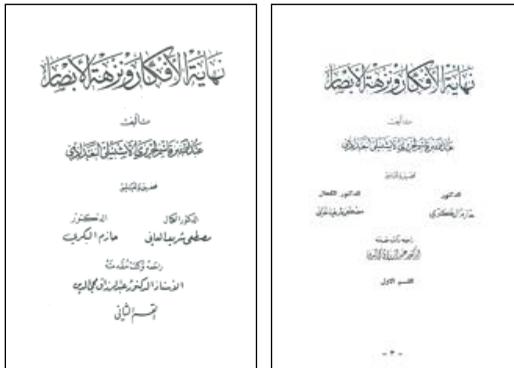
## 1/18: 'Abdullāh Ibn Qāsim Al-Ḥarīrī Al-Ishbīlī Al-Baghdādī (D. 646 AH = 1248 AD)

عبد الله بن قاسم الحريري الأشبيلي البغدادي  
(ت ٦٤٦ هـ = ١٢٤٨ م)

*The End of Thoughts and the promenade of Vision.*

نهاية الأفكار ونزهة الأبصار

Al-Baghdādī and his book did not gain much fame, but Drs. Ḥāzēm Al-Bakrī and Mustafā Sharīf Al-‘Aanī discovered and edited *The End of Thoughts and the promenade of Vision*. The Ministry of Cultural Affairs and Information published this edition in Baghdad, Iraq in 1979.<sup>1,2</sup>



1 Samarrai, vol. 2, 510.

2 N. Hamarne and I. Rajab, 162-164.

## 1/19: Abū Al-'Abbās Aḥmad Ibn 'Uthmān Ibn Hibatullāh Al-Qaysī (D. 657 AH = 1259 AD)

أبو العباس أحمد بن عثمان بن هبة الله القيسي  
(ت ٦٥٧ هـ = ١٢٥٩ م)

*The Final Thoughts about the Treatment of the Eye  
Diseases*

نتيجة الفكر في علاج أمراض البصر

Al-Qaysī<sup>1,2</sup> was born and raised in Damascus, Syria and moved to Egypt with Mālik Al-'Aziz **مالك العزيز**, where he was appointed Head of Physicians. He stated that he wrote his book upon the order of Sultan Ṣaliḥ Najm **السلطان صالح نجم** (1240-1249 AD). Several manuscripts exist in different national libraries, as listed by Dietr Bischof, who translated Al-Qaysī's book into German and made an impressive statement in his introduction:

“We owe our knowledge in ophthalmology to what we inherited from the Arabian Ophthalmologists, we still discover books and treatises, but unfortunately, most of them still need to be discovered, copied, edited, and indexed. The pioneers in this field are

1 Usaybi'a, 585.

2 Samarrai, vol. 2, 520.

the great German ophthalmologist, J. Hirschberg, and Max Meyerhof, who died in 1945. Nothing was published in the field of Arabian Ophthalmology worth mentioning after his death.”<sup>1</sup>

In his book *Light of the Eyes*, Ṣalāh Al-Dīn said “Al-Qaysī’s book was a collection, or summary, of all the knowledge gathered prior to his time. He commented that his book was well written, organized, and that Al-Qaysī was very thorough in his description of the diseases and their medications and applications”. In spite of the fact that it did not add anything new to the field, Al-Qaysī attempted to describe glaucoma and diseases of the aqueous humor, but was hesitant to oppose the old theory about the cataract, stating that it was a disease of the crystalline lens, and one can assume that he himself performed cataract couching.<sup>1</sup>

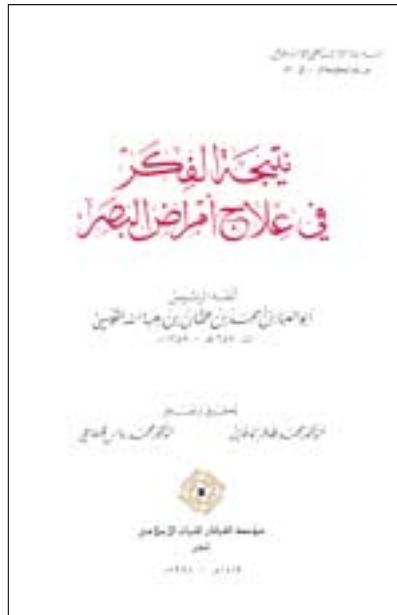
Hirschberg concluded that “If among all ophthalmic books in Arabic, this one alone would have survived, it would have been quite sufficient, as it excelled all similar books in medieval Europe. Although in comparison to other Arabian books, this book may be considered mediocre, the author speaks of ‘rare cases and wonderful experience,’ but we detected very little of this in the text.”<sup>2,3</sup>

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1 Abu Al-‘Abbās Aḥmad Ibn Uthmān Ibn Hibatullāh Al-Qaysī, *The final thoughts about the treatment of the visual diseases*, edited by M. Zafer Wafai, MD, and Prof. M. Rawwas Qal‘ajī, PhD. (Wimbledon, London: Al-Furqan Islamic Heritage Foundation, 1419 AH = 1998 AD).

2 J. Hirschberg, vol. 2, 88-90.

3 N. Hamarne and I. Rajab, 222.



## 1/20: Khalīfah Ibn Abī Al-Maḥāsīn Al-Ḥalabī (D. 656 AH = 1256 AD)

خليفة بن أبي المحاسن الحلبي (ت ٦٥٦هـ = ١٢٥٦م)

*The Sufficient Knowledge in Ophthalmology*

الكافي في الكحل

Khalīfah lived and practiced ophthalmology in his hometown of Aleppo in Northern Syria around 654 AH = 1252 AD. He wrote his book in the middle of the 13<sup>th</sup> century. Therefore, it was considered a comprehensive review of most, if not all, books written prior to his time.<sup>1,2,3</sup>

Medical historians and biographers ignored Khalīfah's book for a long time until Dr. Leclerc<sup>4</sup> mentioned it for the first time. Dr. Leclerc wrote a brief review of the book in 1876, based on the only copy known to him, which was available at the Bibliothèque Nationale in Paris under No. 1043d Arabe, now listed under Arabe 2999. Brockelmann's history of Arabic literature in 1902 soon followed Leclerc's review, mentioning another copy of this book in Istanbul Yeni Jami,

1 Khalīfah Ibn Abi Al-Maḥāsīn Al-Ḥalabī, *Al-Kāfi fi Al-Kuhl*, edited by M. Zafer Wafai, MD, and M. Rawwas Qal'ajī, PhD, (Rabat, Morocco: ISESCO, 1410 AH = 1990 AD).

2 Samarrai, vol. 2, 491.

3 N. Hamarneh and I. Rajab, 164-166.

4 Lucien Leclerc, *Histoire de la Médecine Arabe*, vol. 2, (Paris: Ernest Laroux, 1876), 145-147.

The New Mosque, No. 924.<sup>1</sup> In 1905, J. Hirschberg, J. Lippert, and E. Mittwoch wrote an exhaustive review of this book in *The Arabian Ophthalmologists*, based on only two manuscripts: Paris 2999 and Istanbul 924.

To summarize Khalīfah's work, the following are highlights of *The Sufficient Knowledge in Ophthalmology*:

1. The book contains quotations from 73 books, written by 41 physicians, and referenced all authors and books.
2. It is the first book to contain a very elegant and detailed illustration of the eyes, the optic chiasm, the cerebral ventricles, the peri cranium, the dura mater, the pia mater, the olfactory nerves, and the petrosal bone. In this drawing, the conjunctiva seemed to originate from the peri cranium, and the sclera from the dura mater. He drew the optic nerves as hollow, parallel lines, stemming from the back of the sclera to meet the optic chiasm and continue their course posteriorly through the brain tissue until finally reaching the occipital lobe. **البطين المؤخر.**

As far as the eyeball itself is concerned, he drew the lens in the middle of the globe, as Galen believed to be the proper positioning of the lens. The lens, however, looks far too large in comparison to the size of the globe itself, which made the vitreous too small relative to the size of the globe. Moreover, he drew the pupil in the middle of the iris, in front of the aqueous

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<sup>1</sup> G. Brockelmann, *Geschichte Der Arabischen Literatur*, (Berlin, Germany: 1902).

humor, and for the first time, the zonule **الرباط المعلق** were clearly illustrated in a medical book. The cornea looks as if it consists of one layer, and it is smaller than it should be, about one sixth of the globe's surface. Two parallel lines extend from the back of the lens to the sclera and optic nerve, almost about to describe Cloquet's canal **قناة (كلوكة)**. All of the ocular coats (cornea, sclera, choroid, zonule, and the retina) and three humidities (vitreous, crystalline lens, and aqueous) are clearly illustrated and labeled.

Although Khalīfah drew a small circle in the middle of the triangle behind the chiasm, he did not mention or give the pituitary gland a name. The drawing is so elegant, and all of the yellowish colors are made of gold.

If Arabs and Muslims only knew the value of this drawing, they would have reproduced it in larger sizes and posted it in every medical school and department of ophthalmology throughout the Arabic and Muslim land. The American Academy of Ophthalmology used a modified version of Khalīfah's drawing as the emblem for the 1987 annual meeting without giving credit to Khalīfah. The drawing remained a reference to all the books dealing with the anatomy of the eye until Dr. W. Sömmering drew a cross section of the

eye in 1827.<sup>1</sup>

3. Khalīfah's book is the first to draw the surgical instruments in organized tables with each instrument in a labeled small box with its usage described below it. The Paris manuscripts contain 36 instruments in two pages, whereas the Istanbul manuscript has the same 36 instruments in two and a quarter pages.
4. His work was the first to arrange the eye diseases into tables for the eyelid diseases, the different eye diseases, and the mechanism of vision.
5. Khalīfah was the first to write a chapter about the volumes and measurements for medications used during his time.
6. He wrote a special chapter describing blood letting, or venesection **الفصد** and its technique in meticulous detail, surpassing what Ibn Sīnā had written about the topic in his major book *Al-Qanūn*.
7. Khalīfah was the first known surgeon to use a magnet to remove a broken piece of the couching needle from the eye, indicating how skillful and confident Khalīfah was as a surgeon.

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1 J. Hirshberg, J. Lippert, E. Mittwoch, *Die Arabischen Augenartzté*, Leipzig Verlag, Von Veit and Comp., 1905.

Translaetd to english by: Frederick G. Blodi, Wilfried J. Rademaker, Gisela Rademaker and Kenneth F. Wildman.

Edited by: M. Zafer Wafai

Published by: King Abdulaziz city for science and technology, Riyadh, Saudi Arabia. 1993, page 198





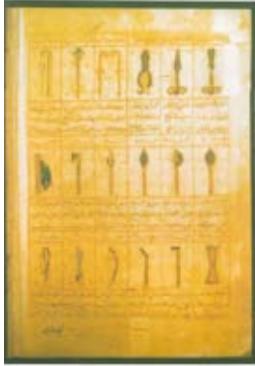
The cover page of the Istanbul manuscript



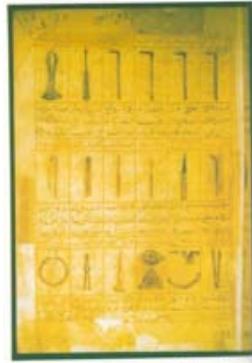
The last page of the Istanbul manuscript



The Book of Salferon Knowledge in Ophthalmology



The Surgical Instruments as appeared in Paris Manuscript.



The Surgical Instruments as appeared in Paris Manuscript.



## 1/21: Ibn Al-Nafīs: 'Alī Ibn Abī Al-Ḥazm Al-Qarashī (607-687 AH = 1210-1288 AD)

علي بن ابي الحزم القرشي (ابن النفيس)

٦٠٧-٦٨٧هـ = ١٢١٠-١٢٨٨م

*Al-Muhadhab Fī Al-Kuḥl Al-Mujarrab*

المهذب في الكحل المجرب

Ibn Al-Nafīs was, and still is, one of the most knowledgeable, intelligent, and innovative scholar in the history of Islamic medicine. He was born near Damascus, Syria, where he studied medicine under Ibn Al-Dākhwar **ابن الدخوار** in Al-Nūrī Hospital, **البيمارستان النوري** the only known hospital of its time. Then, he moved to Cairo, Egypt, and headed Al-Nāsirī **البيمارستان الناصري** and Al-Mansūrī Hospitals **البيمارستان المنصوري** until his death. He excelled in more than one field and wrote in just about every one of them, explaining the Holy Quran, the Prophet's (PBUH) sayings called the Hadeeth, philosophy, Islamic Fiqh, and above all, medicine and anatomy. He became well known for opposing all scholars prior to his time, rejecting the well-established fact that there were holes between the right and the left ventricles of the heart to purify the thick blood and mix it with the light spirit. In *Explanation of the Anatomy in Al-Qanūn* by Ibn Sīnā, (**شرح تشريح القانون لابن سينا**) he states,

“This is wrong. There are no holes in the heart, the thick blood arises to the lungs, where it mixes with air and gets purified and then returns to the left ventricle to go through the circulation.”<sup>1</sup> He made all of his observations four hundred years before Michael Servet and William Harvey “discovered” the lesser blood circulation in 1622.

It is strange that most biographers of his time ignored Ibn Al-Nafīs, despite the fame he had gained in different fields of knowledge. Little is known about him as an ophthalmologist, although his book *Al-Muhadhab* was widespread and frequently quoted by many ophthalmologists succeeding him.

Five microfilms of *Al-Muhadhab* that exist include the following:

1. The Vatican Library No. 307 Arabo.
2. Al-Zaheriyah Library in Damascus, No. 8435.
3. The National Library in Cairo, Ṭib Tal‘at No. 593.
4. The National Library in Cairo, Ṭib Taymūr No. 405.
5. Sulaymaniyeh Library: Haji Mahmoud 5515. Istanbul, Turkey.

Prof. N. Hamarneh mentioned two other copies of this book in Berlin and Sbath Library in Aleppo, Syria, without any name or catalog number given.

While editing this book, a treasure of Ibn Al-Nafīs’ original contributions to ophthalmology became evident:

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<sup>1</sup> Ibn Abi Al-Ḥazm Al-Qarashī, *Explanation of the Anatomy in Al-Qanūn by Ibn Sīnā*, Edited by Prof. Paul Ghalionji and Prof. Salman Qatayeh, The Egyptian General Organization for Books, Cairo, Egypt, 1988.

Ibn Al-Nafis was the first to:

1. Explain the third dimension phenomenon.
2. Modify the couching needles.
3. Explain, with great accuracy, the differential diagnosis between the corneal laceration and the corneal abrasion.
4. Relate the hypopion to irido-cyclitis.
5. Recommend the aspiration of the hypopion from the eye.
6. State that the cataract is located behind the iris.
7. Recommend lowering the intraocular pressure by extracting the aqueous humor to facilitate the repositioning of the prolapsed iris surgically.
8. Describe the aniseikonia in patients with a dilated pupil of only one eye.
9. Describe pupillary dilation and inability to constrict during the acute glaucoma attack.
10. Describe the corneal flattening due to intraocular hypotension, as seen with severe dehydration.
11. Advise purging and vomiting to treat elevated intraocular pressure attack.
12. Describe the monocular diplopia due to lenticular subluxation.
13. Describe the incipient cataract induced myopia.
14. Describe the lens opacities secondary to acute glaucoma attacks, glaucomflecken.
15. Insist on the importance of light perception before performing cataract surgery to ensure success of the procedure.
16. Describe the consensual pupillary reaction to

differentiate between pre and post chiasmal optic nerve injury.

17. Advocate fragmenting, expressing, and irrigating the cataract, avoiding the loss of the vitreous humor.
  18. Describe the bullous corneal edema secondary to trauma to the corneal endothelium during cataract surgery.
  19. Warn that chronic hypotony due to wound leak may result in phthisis bulbi, shrinking of the eye.
  20. Refuse to perform bilateral cataract surgery in the same sitting fearing the possibility of contamination.
  21. Warn that irritating cancerous lesions can spread the cancer locally or systemically.
  22. State clearly and firmly that congenital strabismus should be treated as early as possible and describe five different types of strabismus, namely: congenital, acquired, spastic, paralytic, and strabismus fixus.
  23. Describe and explain the after-image phenomenon.
  24. Describe, in detail, the subconscious and the human ability to save information and use it in the subconscious.
  25. Classify the eye and give it 25 different names based on the size, color and shape.
  26. Describe the visual cone with a drawing to illustrate it.
- In addition, Ibn Al-Nafis made a table, identifying the different eye conditions, set very rigid conditions required for the couching of the cataract, and advocated the use of the feather to mark the penetrating location of the couching needle.

Shortcomings of Ibn Al-Nafis's book include the lack of illustrations of the surgical instruments, the lack of



## 1/22: Ṣalāh Al-Dīn Al-Kaḥḥāl Al-Ḥamwī (D. 696 AH = 1296 AD)

صالح الدين الكحال الحموي (ت ٦٩٦هـ = ١٢٩٦م)

*The Light of the Eyes and the Collector of the Arts*  
نور العيون وجامع الفنون

Ṣalāh Al-Dīn was born in Ḥama, in central Syria, where he practiced ophthalmology. He must have studied ophthalmology under his father, whom he quoted repeatedly when mentioning some eye medications and ointments. In addition, he quoted a teacher named Al-Ḥakīm Nu‘mān. **الحكيم نعمان** He did not only list eye medications from his predecessors, but he also added several ones from his own invention and praised their effectiveness.

Ṣalāh Al-dīn condensed most of what had been written prior to his time, quoting 94 physicians and scientists, and copying from 31 books, beginning with Galen and Euclides and ending with Al-Ḥasan Ibn Al-Haytham’s *Al-Manāẓir*.

J. Hirschberg praised *The Light of the Eyes and the Collector of the Arts* in his encyclopedia *The History of Ophthalmology*,<sup>1</sup> and in his collaboration with J. Lippert and

1 J. Hirschberg, *The History of Ophthalmology*, translated by Frederick C. Blodi, MD, (West Germany: J. P. Wayenborgh Verlag, 1985).

E. Mittwoch, *The Arabian Ophthalmologists*,<sup>1</sup> he explained with great detail the theory of vision with drawings to illustrate the three theories.

1. The mathematician's theory
2. The external and surrounding air
3. The naturalist theory

*The Light of the Eyes and the Collector of the Arts* is so important because it:

1. Summarizes most of what was written prior to the author's time.
2. References all original authors.
3. Is extremely organized, as it is divided into chapters and subchapters.
4. Is the first book to include a colored picture of a cross section of the eye.
5. Is the first book to draw seven diagrams to explain the theory of vision and two diagrams to explain strabismus.
6. Contains a drawing of 18 surgical instruments scattered throughout the chapter on surgery.
7. Depends heavily on 'Alī Ibn 'Isā's Book *Memorandum تذكرة الكحالين* and on the second volume of Al-Ḥāwī *الحواي* by Al-Rāzī.<sup>2,3,4</sup>

1 J. Hirschberg, J. Lippert, and E. Mittwoch, *The Arabian Ophthalmologists*, 235-302.

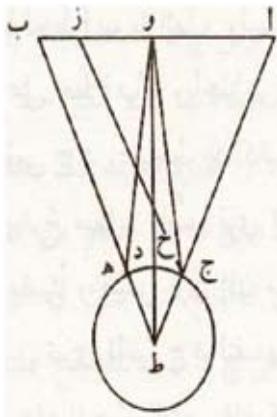
2 Ṣalāh Al-Dīn Al-Kaḥḥāl Al-Ḥamwī, *The Light of the Eyes and the Collector of the Arts*, (Riyadh, Saudi Arabia: King Faisal Center for Research and Islamic Studies), 1407 AH = 1987 AD).

3 Samarrai, vol. 2, 507-508

4 N. Hamarne and I. Rajab, 168-169.

Four manuscripts of the book can be found in the following locations:

- 1. The National Library of Paris #1042 Arab.
- 2. The Gotha Library #1994.
- 3. Alexandria Library in Egypt #1098.
- 4. Istanbul Hamediyah #1038.



## 1/23: Ibn Al-Akfānī, Abū ‘Abdullāh Moḥammad Ibn Ibrāhīm Ibn Sā’ed Al- Anṣārī Al-Sinjārī (D. 749 AH = 1348 AD)

( ابن الأكفاني ) أبو عبد الله محمد بن ابراهيم  
بن ساعد الأنصاري السنجاري  
( ت ٦٤٩ هـ = ١٣٤٨ م )

### *Uncovering Disorders of the Eye*

#### كشف العين في أحوال العين

Ibn Al-Akfānī was a famous scholar in more than one field of science. He excelled in physics, mathematics, Islamic Fiqh, medicine, and philosophy. He was extremely intelligent, sharp, and well versed in the writings of his predecessors. Ibn Al-Akfānī lived and practiced medicine in Cairo, where he was the head physician of Al-Manṣūrī Hospital. Unfortunately, little is known about him, perhaps because he lived after the time of the great biographer Ibn Abī Usaybi‘a. His student and close companion Abu Al-Safā’ Al-Ṣafādī أبو الصفاء الصفدي did, however, write about him.

In the field of ophthalmology, Ibn Al-Akfānī wrote *Uncovering Disorders of the Eye*, about which J. Hirschberg wrote an extensive review in *The History of*

### *Ophthalmology*.<sup>1</sup>

Ibn Al-Akfānī's book cannot be considered as academic and comprehensive as the books written prior to his time, but it contains a few interesting and accurate observations.<sup>2</sup>

Ibn Al-Akfānī was the first to:

1. Describe accurately anthrax or charbon and called it the “Persian fire” or “Persian fever”, **النار الفارسية** as severe pustules affecting the eyelid.
2. Describe a knot (**العقدة**) among the eyelid lesions.
3. State that the pterygium consists of two layers, the epithelium and the endothelium.
4. State that giant papilla, or chemosis, (**الوردينج**) is one of the retinal diseases, which is an erroneous assumption, as it is an eyelid lesion.
5. Describe the ocular migraine as a separate entity, the clinical description and symptoms of which are valid today.
6. Classify the optic nerve diseases and lesions to prechiasmal, within the chiasm and posterior to the chiasm, which are still valid classifications.
7. Describe day blindness. It is clear, however, that what he was actually describing was the congenital blindness caused either by a congenital bilateral optic atrophy or by congenital corneal opacity.

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1 J. Hirschberg, *The History of Ophthalmology*, 90-93.

2 Abi Abdullāh Moḥammad Ibn Ibrāhīm Ibn Sā'ed Al-Anṣārī Al-Sinjārī, *Kashf Al-Rayn Fi Ahwal Al-Ayn*, edited by M. Zafer Wafai, MD, and Prof. M. Rawwas Qal'ajī, PhD, (Riyadh, Saudi Arabia: King Faisal Center for Research and Islamic Studies, 1414 AH = 1993 AD).

Ibn Al-Akfānī also mentioned the hollow couching needle, indicating that he was aware of the instrument and possibly used it. It was obvious that Ibn Al-Akfānī was very sure of himself and confident in his knowledge. His book, unfortunately, lacks illustrations of surgical instruments as well as tables to classify diseases. In addition, it is evident from his works that Ibn Al-Akfānī was a believer in spiritual or magical powers of healing as mentioned by his student Al-Şafadī.<sup>1,2</sup>



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1 Samarrai, vol. 2, 442-443.

2 N. Hamarne and I. Rajab, 170-171.

## 1/24: Ṣadaqah Ibn Ibrāhīm Al-Maṣrī Al-Ḥanafī Al-Shādhilī (D. 751 AH = 1350 AD)

صدقة بن ابراهيم المصري الحنفي الشاذلي  
(ت ٧٥١ هـ = ١٣٥٠ م)

*The Ophthalmologic Support for Diseases of the  
Visual Organ*

العمدة الكحلية في الأمراض البصرية

Little is known about this author and his book, as he was alive toward the second half of the 14th century. J. Hirschberg wrote a detailed chapter about the book in his encyclopedia *The History of Ophthalmology* and praised the author very highly as “the most knowledgeable of the writings of his predecessors.”<sup>1</sup> Although the author lived during the decline of the Arabic and Islamic civilizations, his books show just as much independent thought as those written prior to his time.

J. Hirschberg highlighted a few important points about Ṣadaqah Ibn Ibrāhīm, including the fact that he was the first to write a paragraph about the comparative anatomy and physiology of the eye, a subject about which was

1 J. Hirschberg, *The History of Ophthalmology*, vol. 2., 93-99, and 163.

nothing written until 1876.<sup>1</sup> He was also the first to use the term “ophthalmia” in Egypt, describing the Egyptian eye diseases, or what is now known as trachoma.<sup>2</sup>

According to J. Hirschberg, two manuscripts, one in the Royal Library in Munich #834 and one in Leningrad, Rosen #175, exist.<sup>3</sup>

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1 Grafe-Salmisch, Handbook, 1st Edition, 1876, Encyclopedie francaise D’ophthalmologie in Hirschberg, vol. 2, 163.

2 N. Hamarne and I. Rajab, 173.

3 Hirschberg, 93.

**1/25: Al-Şafadī, 'Alī Ibn 'Abdul Karīm Ibn  
Ṭurkhan Al-Ḥamwī Al-Şafadī  
(D. 720 AH = 1320 AD)**

**(الصفدي) علي بن عبد الكريم بن طورخان  
الحموي الصفدي (ت ٧٢٠هـ = ١٣٢٠م)**

*The Law in the Eye Diseases*

القانون في أمراض العيون

Nothing is known about this author or his book except for the fact that Samarrai mentioned him.<sup>1</sup>

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<sup>1</sup> Samarrai, vol. 2, 512.

# Part two

## 2/1: 'Alī Ibn Sahl Raban Al-Ṭabarī (D. 247 AH = 861 AD)

علي بن سهل ربن الطبري (ت ٢٤٧ هـ = ٨٦١ م)

*The Paradise of Wisdom* فردوس الحكمة

This author was born in Ṭabarīstan on the southern shore of the Caspian Sea, northern Persia. His father, Raban Al-Ṭabarī, was a prominent Jewish physician. 'Alī Ibn Sahl Raban Al-Ṭabarī later converted to Islam and became so famous that he became the teacher of the prominent Arabian physician Al-Rāzī. He also served in the court of Caliph Al-Mu'taṣim **المعتصم** (833-842 AD) and his successor Al-Mutawakkil **المتوكل** (847-861 AD).<sup>1</sup> The book, *Paradise of Wisdom*, was a voluminous book on general medicine, consisting of 30 volumes with 360 chapters. Al-Rāzī quoted him extensively in the second volume of his encyclopedia *Al-Hāwī fī Al-Ṭīb*, or *Continens*.

The director of the Arabic Division of Luknau University in India, Moḥammad Zayd Al-Ṣiddīqī, edited *The Paradise of Wisdom*. The Aftab Printing shop in Berlin printed this

<sup>1</sup> J. Hirschberg, vol. 2, 104

edition in 1928.<sup>1</sup> Ṣiddīqī reviewed five manuscripts: three of them were in Europe and two were in India in a private collection. Both Ibn Moḥammad Al-Ṭabarī and ‘Alī Ibn Sahl Raban Al-Ṭabarī wrote about ophthalmology, Prof. M. Rawwas Qal‘ajī and myself compiled, edited and published their writings into one volume to settle the confusion that existed throughout the history of medicine once and for all.<sup>2,3,4,5,6</sup>



1 Moḥammad Zayd Al-Ṣiddīqī, (Berlin: Aftab Printing, 1928).

2 Aḥmad Ibn Moḥammad Al-Ṭabarī, *Hippocratic Treatments*, and ‘Alī Ibn Sahl Raban Al-Ṭabarī, *The Paradise of Wisdom*, Prof. M. Rawwas Qal‘ajī and M. Zafer Wafai, MD., (Wimbledon, London: Al-Furqan Islamic Heritage Foundation).

3 Samarrai, vol. 1, 407-414.

4 N. Hamarne and I. Rajab, 125.

5 Usaybi‘a, 414

6 F. Sezgin, vol.3, 361-367

## 2/2: Abū Bakr Moḥammad Ibn Zakariyā Al-Rāzī (247 - 320 AH = 850 - 923 AD)

(الرازي) أبو بكر محمد بن زكريا الرازي

(٢٤٧-٣٢٠ هـ = ٨٥٠-٩٢٣ م)

Al-Rāzī was and still is one of the most respected and admired physicians of all times. Al-Rāzī, Aristotle and Galen are considered the three forefathers of high medical knowledge, ethics, and practice. Al-Samarrai<sup>1</sup> counted 113 books written by Al-Rāzī, the most famous of which being *Al-Hāwī*, *الحاوي في الطب* or *Continens*, and *Al-Mansūrī*, *المنصوري* which were the fundamental sources of knowledge in Europe until the late 17<sup>th</sup> century. The second volume of *Al-Hāwī* deals with ophthalmology, but is unfortunately very disorganized, with valuable knowledge scattered and without reasonable classification of the treatise. Hirschberg commented, “It reads like an accumulation of file cards, which has been collected to form an encyclopedia of practical medicine.”<sup>2</sup> These pitfalls do not reduce the value of the book, as it contains numerous quotations of Greek and Arabian authors.

Usaybi<sup>3</sup> mentioned treatises about the eye as follows:

1 Al-Samarrai, vol. 1, 437-464.

2 Hirschberg, vol. 2, 110-116.

3 Usaybi<sup>3</sup>, 414-427.

1. Treatise about the advantage of the eye over the other senses. رسالة في فضل العين على سائر الحواس
2. A book about the mechanism of vision. كتاب في كيفية الابصار
3. Treatise about the morphology of the eye. رسالة في هيئة العين
4. Treatise about the surgical management of the eye diseases رسالة في علاج العين بالحديد
5. A book about the eye drugs and its treatments. كتاب في أدوية العين و علاجاتها
6. Treatise about why the pupil constricts in light and dilates in darkness. مقالة في العلة التي من أجلها تضيق النواظر في النور وتوسع في الظلمة
7. A book of medical poetry. كتاب المشجرة

His most famous book, *Continens*, الحاوي في الطب is comprised of 20 massive volumes, dealing with all aspects of known diseases and their management. The second volume deals with the eye and has been praised by almost all the physicians who followed Al-Rāzī. In this second volume about ophthalmology, one can recognize the contribution of Al-Rāzī to ophthalmology:<sup>1,2</sup>

1. He refuted Galen's theory of vision that "a ray exits the eye to touch the object or objects in front of it and then returns to the eye where the vision takes place." Al-Rāzī denounced this theory and put forward his own explanation of vision that rays are emitted by the

<sup>1</sup>Osmania Department of Education, Hyderabad Al-Dakan-India, (1960).

<sup>2</sup>N. Hamarne and I. Rajab, 65, 135-137.

- object or objects and enter the eye.
2. Another milestone in this book is the treatment of pubic lice and lice of the eyelashes by applying mercury ointment.
  3. The cataract lies in the hole of the iris between it and the crystalline lens.
  4. A visual disturbance originating from the brain will be accompanied by headaches and tinnitus, if it is due to disease of the optic nerve. The pupil of this side will be dilated and the pupil of the other eye will be constricted.
  5. The pupil has to be carefully evaluated before attempting to couch the cataract.
  6. F. Sezgin praised Al-Rāzī and wrote 42 pages about him in his outstanding encyclopedia about the history of Arabic literature<sup>1</sup>

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<sup>1</sup> F. Sezgin, vol. 3 425-467

## 2/3: Yūḥanna Ibn Sarabyūn (D. 322 AH = 935 AD)

يوحنا بن سرابيون (ت ٣٢٢ هـ = ٩٣٥ م)

### *Practica* الكناش الكبير

Ibn Sarabyūn<sup>1</sup> was a prominent physician, born in Damascus, Syria, where he also practiced medicine. Although he was not as famous as Al-Rāzī, his book *Practica*, الكناش الكبير, which was written in Syriac language and later translated into Arabic, was quoted repeatedly and extensively even by Al-Rāzī. The eleven chapters of his book that deal with ophthalmology are excellent and comprehensive. Gerard De Cremona translated the book into Latin and then Andreas Alpagu did the same.<sup>2,3,4,5</sup>

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1 J. Hirschberg, 116.

2 Usaybi'a, 158.

3 Andreas Alpagu, Serapionis Practica Quam Al-Pago. (Leon, 1925), in Hirschberg, 116.

4 Samarrai, vol.2, 544-545.

5 N. Hamarne and I. Rajab, 66, 100, 147.

## 2/4: Abū Al-Ḥasan Aḥmad Ibn Moḥammad Al-Ṭabarī (D. after 366 AH = 976 AD)

(الطبري) أبو الحسن أحمد بن محمد  
(ت بعد ٣٦٦ هـ = ٩٧٦ م)

### *The Hippocratic Treatments*

#### المعالجات البقراطية

Little is known about this genius physician, though his most important work has been preserved in the original Arabic language in many European libraries. He was born and raised in Ṭabarīstan in Northern Mesopotamia, where he died after 366 AH = 976 AD. Usaybi‘a<sup>1</sup> mentioned his name, briefly stating that he was a respected scholar in medicine. He served as a private physician to Prince Rukn Al-Dwla Al-Bowayhī (321-366) **رکن الدولة البويهی** (AH = 933-976 AD). He wrote one of the most respected and useful books in medicine called *The Hippocratic Treatments*, **المعالجات البقراطية** in which he explored and discussed diseases and their treatments. Al-Samarrai<sup>2</sup> wrote a more extensive review about him and his book. Hirschberg wrote the most thorough review of this book and stated, “Although the author was not very famous or well known, his book is

<sup>1</sup> Usaybi‘a, 427.

<sup>2</sup> Al-Samarrai, vol. 1, 531-535.

an encyclopedia in medicine of the second half of the 10th century.”<sup>1</sup> The author’s successors quoted extensively the fourth treatise of the book that dealt with the eye diseases and their management, perhaps because the Arabic manuscripts were preserved, while no Latin translation was found.

The fourth treatise of this book dealt with the eye diseases and their management, making up 54 chapters. The following are some original contributions:

1. Remaining in dark places for long periods of time, for example within a prison, could lead to total blindness.
2. He was the first to state, “The cataract is a thick humidity that affects the crystalline lens and makes it opaque.” He was, therefore, 800 years ahead of Hermann Borhaff (1668-1738 AD), who is accredited for being the first to state that the cataract is the disease of the lens.<sup>2</sup>
3. A description of signs and symptoms of ocular migraine.
4. He was the first to state, “There is a true congenital type of squint which is not curable because it represents an organic disease, which originates in the womb and is hereditary.”<sup>3</sup> He advocated wrapping the child’s head with a thick, black cloth with two openings in front of

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1 J. Hirschberg, vol. 2, 27, 52, 116-123.

2 Ibid.

3 Aḥmad Ibn Moḥammad Al-Ṭabarī, *Hippocratic Treatments*, and ‘Alī Ibn Sahl Raban Al-Ṭabarī, *The Paradise of Wisdom*, Prof. M. Rawwas Qal‘ajī and M. Zafer Wafai, MD., (Wimbledon, London: Al-Furqan Islamic Heritage Foundation).

- the eyes to realign and straighten them.
5. He is the first to relate eye diseases to contact with animals and described the entrance of gnat-like flies in the eye.
  6. Al-Ṭabarī was the first to describe what is now known as “snow blindness” as “extensive exposure of the eye to reflected sunlight.”
  7. He pioneered the description of the biconvex lens, calling it the “burning pebble”.
  8. He was the first to describe the solar eclipse and related it to the passing of the moon between the sun and the earth. Moreover, he warned against looking at the eclipsed sun to avoid permanent blindness.
  9. He described in great detail the ability of the patient to see his own ocular circulation after rubbing the eyes and pressing on them ( what is now referred to as the entoptic phenomena).
  10. He attempted to describe the “black water” which is now known as glaucoma and stated, “No treatment can be successful.”<sup>1,2</sup>

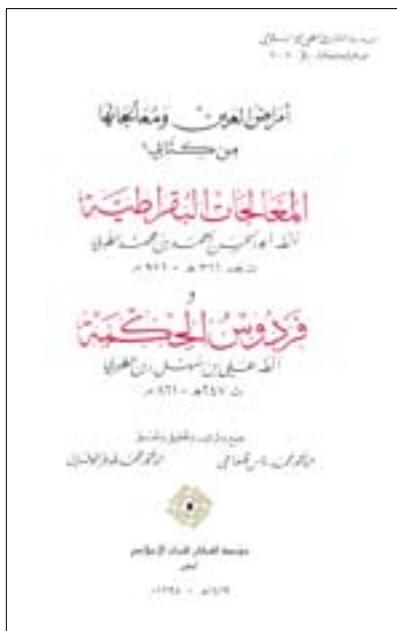
J. Hirschberg cited several manuscripts of this book:

1. Bodleyan Library in Oxford, #567, 641, 644.
2. Indian Office in London #773.
3. Munich #810.

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1 N. Hamarne and I. Rajab, 139, 206.

2 F. Sezgin, vol.3, 489-492



## 2/5: 'Alī Ibn Al-'Abbās Al-Ahwāzī<sup>1</sup> (D. 383 AH = 994 AD)

علي بن العباس الأهوازي (ت ٣٨٣ هـ = ٩٩٤ م)

*The Royal Book (The Complete Industry of Medicine)*

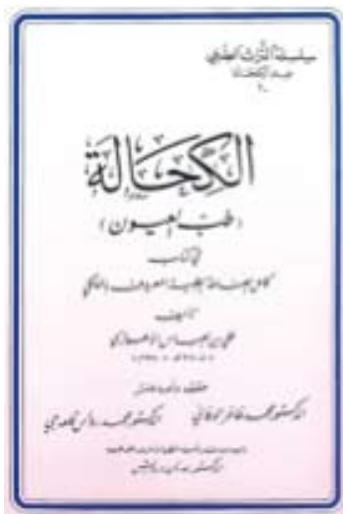
الكتاب الملكي (كتاب كامل الصناعة الطبية)

'Alī Ibn Al-'Abbās Al-Ahwāzī lived and practiced medicine in Baghdad, where he was a very prominent, comprehensive, and precise physician. He dedicated a book called *The Royal Book* to his mentor Caliph 'Aḍud Al-Dawla (عزدد الدولة) and was so trustworthy that he was the private physician of the ruler. Shorter than *Al-Hāwī*, (الحاوي في الطب) or *Continens*, and longer than *Al-Manṣūrī*, (المنصوري) *The Royal Book* (Latin translation *Liber Regius*) was well known to practicing physicians for its completeness, orderly presentation, and precision. It was considered to be the first real handbook of medicine in the world, until Ibn Sīnā's (D. 1037 AD) *Al-Qanūn* (القانون) replaced it. *The Royal Book* remained a great reference until the late 13<sup>th</sup> century, when Ṣalāh Al-Dīn quoted him repeatedly.

Several Latin translations of this book were scattered in European libraries. Stephanus Antiochenus (اسطفان الانطاكي) was the first to translate it into Latin around 1127

<sup>1</sup> Hirschberg, vol 2, 18, 27, 123-124

AD.<sup>1</sup> A voluminous chapter in the book deals with ocular diseases and their management in anatomical sequences was reviewed and edited by myself in collaboration with Prof. Rawwas Qal'ajī and published by the Ministry of Cultural Affairs in Syria.<sup>2,3,4,5,6</sup>



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1 Ibid., 124.

2 'Alī Ibn Al-‘Abbās Al-Ahwāzī, *The Royal Book*, edited by M. Zafer Wafai, MD, and Prof. M. Rawwas Qal'ajī, PhD, (Damascus: The ministry of cultural affairs, 1997).

3 N. Hamarne and I. Rajab, 139-140.

4 Al-Samarrai, vol. 1, 478-480.

5 Usaybi'a, 319-320.

6 F. Sezgin, vol.3,510-517

## 2/6 Abū Al-Qāsim Khalaf Ibn 'Abbās Al-Zahrāwī (D. 400 AH = 1013 AD)

(الزهرراوي) أبو القاسم خلف بن عباس الزهرراوي  
(ت ٤٠٠ هـ = ١٠١٣ م)

*The Explanation for He Who Is Unable to Write  
Books*

التصريف لمن عجز عن التأليف

Al-Zahrāwī spent his entire life in Cordoba as a famous physician and a great surgeon. He invented and manufactured all of the surgical instruments that he used in practice. He was the first to:

1. Design and use a table for the reduction of fractured bones and dislocated joints.
2. Invent and use the vaginal speculum.
3. Invent and use tonsillectomy snares.
4. Remove a bladder stone by fragmentation, without surgery.
5. Invent, make, and use the 18 ophthalmic surgical instruments that he drew in his book.
6. Describe hemophilia. (النناور)
7. Describe the cleft palate. (شفة الأرنب)
8. Use silk to tie bleeding vessels.
9. Use a horse's tail hair to suture wounds.
10. Invent and use fetus forceps. (ملقط الجنين)

11. Describe ectopic pregnancy. (الحمل الهاجر)
12. Make and use saws and implement cauterly الكي during bone surgery.

Al-Zahrāwī wrote a huge encyclopedia about medicine, consisting of 30 treatises, that last of which was the most famous treatise about surgery. This treatise was divided into three parts: the first dealt with cauterization, the second with dissection, and bloody procedures in general, and the third with the setting of bones. In the second part, he listed 16 chapters, describing 25 eye operations in great detail and with precision.

His book was well known and widespread around Europe. Guy De Chauliac (D. 1363) quoted him extensively, Gerard de Cremona translated it into Latin, and J. Jenning published a combined Arabic and Latin translation in Oxford in 1778. L. Leclerc translated the book into French in Paris in 1861,<sup>1</sup> and Spinks and Lewis were the last to translate the 30th treatise.<sup>2,3,4,5,6</sup>

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1 Hirschberg, vol 2, 28, 125-127

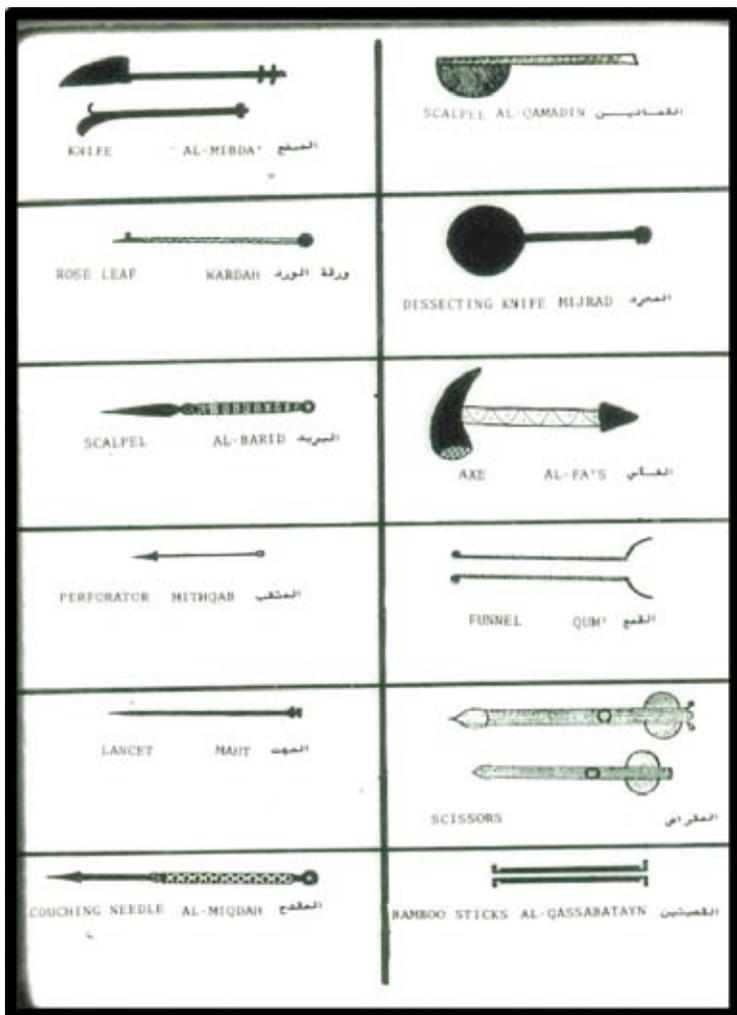
2 M. S. Spinks and G. L. Lewis, Al-Bucasis, (University of California Press, 1973).

3 Usaybi'a, 501.

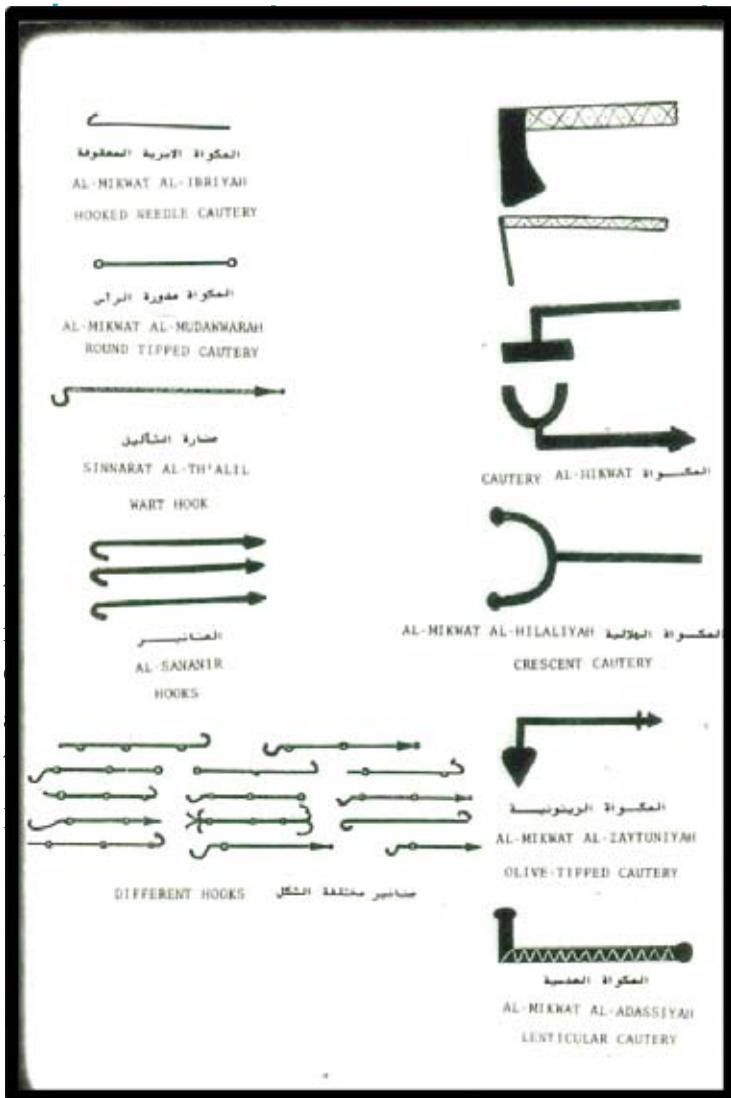
4 Samarrai, vol.2, 161-168.

5 N. Hamarne and I. Rajab, 142-144, 207.

6 F. Sezgin, vol.3,516-520



Surgical instruments as drawn by Al- Zahrāwī



Surgical instruments from Al-Zahrāwī's book, *The Principles, the head*, Ibn Sīnā, *Al-Qanūn Fī Al-Ṭib*, (Beirut, Lebanon) not dated

reduce fever.

4. Advocate tasting the urine of a patient to establish or rule out diabetes mellitus.

Although Ibn-Sīnā was not an ophthalmologist, he wrote an extensive and complete treatise on ophthalmology. *The Dogma* was a textbook about the entirety of medicine, including surgery. His book differs from the ancient Grecian books, which were collections, excerpts, and summaries. On the other hand *The Dogma* was a complete unit that remained the principle textbook of medicine for over 500 years. *The Dogma* was printed in Arabic in Rome in 1593 and later, in Bulaq, Egypt in 1877. Gerard of Cremona translated *The Dogma* into Latin and Andreas Alpago of Belluno published another Latin translation in 1547.<sup>1</sup>

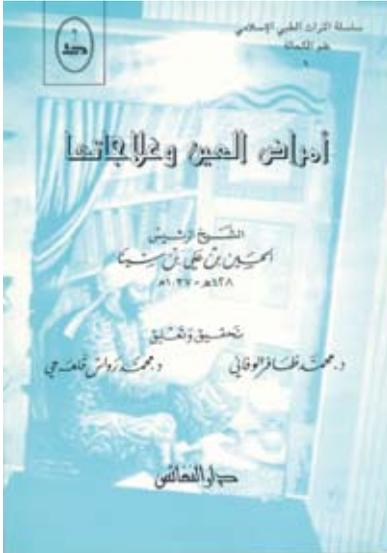
Ibn-Sīnā's chapter on eye diseases was a reference to just about every ophthalmologist to follow him. J. Hirschberg and J. Lippert translated all of *The Dogma* into German in 1902,<sup>2</sup> making *Al-Qanūn* accessible to a large medical community. I, in collaboration with Prof. M. Rawwas Qal'ajī extracted, organized and edited the passages related

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1 Hirschberg, 124-125.

2 J. Hirschberg and J. Lippert, *Augen Heilkunde Im Islam*, vol. I, Die Augen Heilkunde Des Ibn Sīnā, (Leipzig, Verlag Von Veit and Comp, 1902).

to ophthalmology and these were published in 1995<sup>1,2,3,4</sup>



1 M. Zafer Wafai, MD and Prof. M. Rawwas Qal'aji, PhD, *The Eye Diseases and their Management, Al-Qanun* by Ibn Sina. (Beirut, Lebanon: S Dar Al-Nafaes, 1415 AH = 1995 AD).

2 Al-Samarrai, vol. 1, 483-500.

3 N. Hamarneh and I. Rajab, 145-146.

4 Usaybi'a, 437-459.

## 2/8: Al-Ḥasan Ibn Al-Haytham (D. 350-431 AH = 965-1039 AD)

الحسن بن الهيثم (٣٥٠-٤٣١ هـ = ٩٦٥-١٠٣٩ م)

### Al-Manāzīr المناظر

Ibn Al-Haytham was born in Basrah, Iraq. The Caliph Al-Ḥākem **الحاكم بأمر الله الفاطمي** (996 – 1021 AD) summoned Ibn Al-Haytham to Egypt, asking him to regulate the annual flood of the Nile River to increase the fertility of the land. Because he did not succeed in completing this task, Ibn Al-Haytham was forced out of the Caliph's inner circle and into isolation and hiding. This isolation provided him with time to concentrate on his interest in the theory of light, as well as in other scientific endeavors. During his isolation, he earned his living by copying several books and selling them for almost 150 dinars a year. Among the books he copied was *The Elements by Euclid* (الاسطقسات لاقليدس) and *Almagest by Ptolemy* (الرياضيات و المجسطي لبطليموس). Ibn Al-Haytham passed away in Cairo around 1038 or 1039 AD.

Before his death, Ibn Al-Haytham wrote the most brilliant, outstanding, and original book about optics and the theory of vision called Al-Manāzīr. The original manuscript was temporarily lost and only Latin translations of several parts remained scattered. Risener published these Latin translations in 1572 with the title *Opticae Thesaurus Al-*

*Hazeni, Libri VII*,<sup>1</sup> which contained three chapters of *Al-Manāẓir*. The first chapter dealt with the concept of vision and anatomy of the eye, with its three coats and three fluids according to the anatomy books of that time. However, it differs from other books by drawing a fantastic illustration of a cross section of the eye. The second chapter dealt with the theory of reflection, and the third with the theory of the refraction of light. Ibn Al-Haytham was one of the original geniuses of his time, as his contributions included the following:

1. He vehemently argued against the theory that vision was due to the rays emitted from the eye, rejecting Galen's theory. Al-Rāzī had argued Galen's same theory 100 years before Ibn Al-Haytham's time in his monograph *About the Nature of Vision*. (طبيعة الابصار)
2. He was the first to discuss how the eye distinguished objects, including the factors required of the object and the media between the eye and the object for vision to be possible. Factors included brightness, color, distance, location, substance, and shape.
3. He was the first to mention optical illusions.
4. Ibn Al-Haytham expanded upon Ptolemy's discussion of single and double vision.
5. He explained the theory of reflection and the several different types of reflection of light.
6. He listed five different types of mirrors (plain, circle,

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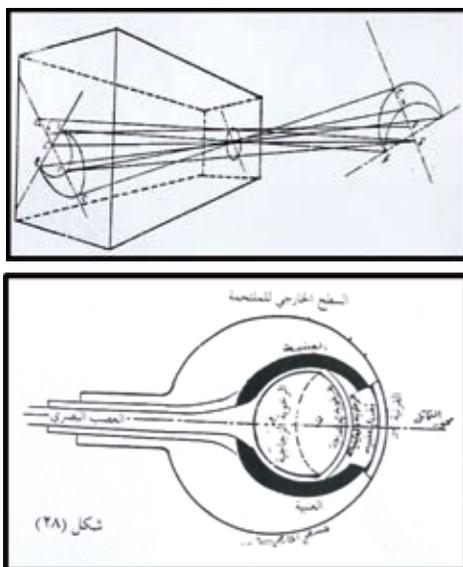
1 J. Hirschberg, 167-173.

- conical, convex and concave).
7. In his book, he answered one of the most famous questions of his time, which was known as *Al-Hazen's Problem*: If the location of the objects and the mirror is known, how can the location of the reflected point from a spherical mirror be calculated?
  8. He experimented with the location and distortion of reflected images.
  9. He was the first to calculate the location of the focal point and longitudinal distortion of a concave mirror.
  10. He is known to be the inventor of *camera obscura*, which was later called the pinhole camera.
  11. Ibn Al-Haytham wrote about the theory of reflection of light, and for the first time in history, he stated, "The larger segment of a sphere can be used to magnify objects." However, he did not conduct serious experimentation with magnifying lenses.

Regrettably, most Arabian oculists and authors ignored Ibn Al-Haytham's book *Al-Manāẓir* and all his genius work on optics. On the other hand, *Nour Al-'Uyūn* by Ṣalāh Al-Dīn and *Al-Kāfī* by Khalīfah did mention Ibn Al-Haytham briefly. Ibn Al-Haytham's reclusive style of life was probably the reason he was overlooked. Joseph Ibn-Yahuda Ibn Aknin, who died in Aleppo, Syria in 1226 AD, ranked *Al-Manāẓir* above books by Euclid and Ptolemy.

Thuringopolonus Vitello translated *Al-Manāẓir* into Latin in the 13<sup>th</sup> century and called it *Opticae Al-Hazeni*, which

remained as famous as Euclid's book. The most recent edition of this ingenious work was done by Prof. A.H Sabra and was published in 1983. The world had to wait 600 years until the German Johannes Kepler published optical investigations and experiments similar to those of Ibn Al-Haytham, in 1604.<sup>1,2,3,4</sup>



1 Al-Ḥasan Ibn Al-Haytham, *Al-Manāzīr*, edited by Professor Abdul Hamid Sabra, (Kuwait: The National Council for Culture, Arts, and Literature, 1983).

2 Usaybi'a, 554-560.

3 Samarrai, vol. 2, 25-28.

4 N. Hamarneh and I. Rajab, 156, 214

## The Medical Code of Ethics of Arabian Ophthalmologists

The medical code of ethics of Arabian ophthalmologists, in general, is based upon the Grecian principles founded by Hippocrates, which Ḥunayn translated into Arabic. In a well-known story, the Caliph Al-Mutawakkel asked Ḥunayn to prescribe a lethal poison for one of his enemies. Ḥunayn refused the order, despite the consequences, declaring adherence to the medical code of ethics. Ḥunayn's ethical behavior made him a trusted and private physician to the Caliph.

All Muslim physicians took a modified version of the Hippocratic oath, stating, "I shall never give a lethal poison." An additional sentence was added for ophthalmologists, "... or an ointment, which could diminish or abolish vision."

In his book *Al-Murshid*, Al-Ghāfiqī stated that all physicians should act in accordance with the following:

1. Respect one's teachers as one respects his father, and treat the teacher's children as one's own.
2. Care for his patient with the best available treatment, diet, and medication.
3. Not to care about financial gain and accumulating wealth, but to ask for divine compensation and expect reward from Almighty Allah.
4. To fear God, be clean, honest, religious, and never make derogatory remarks. One should behave in

an exemplary manner and avoid immoral activity, like looking at a patient's female relatives with bad intentions.

5. Not to disclose a patient's secrets, even to one's family.
6. To be charitable and benevolent, especially toward poor patients, by not charging them for services, and giving them medications and food from one's own money.
7. To visit patients in the morning and evening if needed.

Ṣalāh Al-Dīn Al-Kaḥḥāl wrote the following in his book *Noor Al-'Uyūn* as advice to his son:

1. The physician should become an intermediary between God and the patient by restoring health.
2. Wear the garment of purity and chastity, and above all, fear God.
3. Work hard to excel in your field of practice.
4. Do not follow useless and vain desires of the body.
5. Associate oneself with other scholars.
6. Dedicate oneself to the well being of patients by always thinking of their treatment and ways and means to preserve and re-establish their health.
7. If the patient is poor, give him and his family from one's own money and do so with joy, rather than humiliating the patient and the patient's family.
8. Beware of lethal or harmful medications.

Al-Shādhilī wrote the following statement in his book *The Ophthalmic Support for Diseases of the Visual Organ*:

*Wasiyah* (advice):

Every physician, ophthalmologist or otherwise, every sane and noble practitioner, should know and be obedient to the divine laws and the laws of the Prophet (PBUH): to be honorable, chaste, truthful, pure-hearted, charitable toward all creatures, and generous. His eyes should avoid what is not permitted to him, such as maids and/or female relatives of the patient. He should never drink alcohol and should keep all secrets of his patients.

Just about every Arabian physician emphasized the importance of the dress code of the practitioner by being clean, smelling good, and washing ones hands before and after examining the patient. The physician should present himself to everyone with kindness, change his clothes as frequently as necessary, and be a role model to his patients to alleviate their apprehension. A physician should never predict the final outcome of his treatment, for all is in the hands of Allah, who will decide who lives and who will eventually die.

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 -The Royal book. الكتاب الملكي (الصناعة الطبية كامل)
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**Arabian Ophthalmologists**

# References

## 1. Julius Hirschberg

The History of Ophthalmology - Volume II, The Middle Ages

Translated into English by:

Prof. Frederick C. Blodi

published by: J. P. Wayenborgh Verlag post fach 200646,  
D5300

Bonn 2-Germany 1985.

## 2. Julius Hirschberg, J. Lippert and E. Mittwoch.

The Arabian Ophthalmologists.

translated into English by:

Prof. Frederick C. Blodi, Wilfried J. Rademaker, Gisela Rademaker and Kenneth F. Wildman

Reviewed and edited by: M. Zafer Wafai, M.D.

published by: King Abdul Aziz City for Science and Technology (KACST) Riyadh, Saudi Arabia 1413 AH = 1993 AD.

## 3. Ibn Abī Usaybi‘ah

‘Uyūn Al-Anbā’ Fī Ṭabaqat Al-Aṭṭibba’

edited by: Nizar Rida

published by: Al-Hayat, Beirut Lebanon in 1965.

4. Al-Samarrā'i, M.D. Kamal  
Abstract of the History of Arabian Medicine, 2 volumes  
published by: Dar Al-Nidal , Baghdad, Iraq in 1985.
5. Ḥamarne, N. MD and Rajab, I.  
The Arabic Islamic Period in the History of Ophthalmology,  
Introduction  
published by: The Ministry of Education, Damascus,  
Syria, 2013.
6. Ibn Sīnā, Abū 'Alī Al-Ḥusayn Ibn 'Alī (Died 428 AH =  
1037 AD)  
Al-Qanūn Fī Al-Ṭīb  
published by: Dar Sader, Beirut Lebanon.
7. Ibn Sīnā, Abū 'Alī Al-Ḥusayn Ibn 'Alī (Died 428 AH =  
1037 AD)  
Al-Qanūn Fī Al-Ṭīb  
Edited by: Edward Al-Qish  
published by: Izzeddin Foundation, Beirut Lebanon in  
1987.
8. 'Alī Ibn 'Isā Al-Kaḥḥāl Al-Baghdādī (Died 400 AH =  
1010 AD)  
Memorandum Book of a 10th century oculist  
translated by: Casey A. Wood  
published by: North Western University Press, Chicago,  
U.S.A. 1936.

9. 'Alī Ibn 'Isā Al-Kaḥḥāl Al-Baghdādī (Died 400 AH = 1010 AD)

Tathkirat Al-Kaḥḥalīn

Edited by: Al-Ḥakīm Ghawth Muḥiuddīn Al-Qadīrī Al-Sharaḥī

Published by: Office of Osmania Education

Haydarabad, India 1964.

10. 'Alī Ibn Al-'Abbās Al-Ahwāzī (Died 384 AH = 994 AD)

The Eye diseases and their management from: Kamel Al-Sīna'ah Al-Ṭibbyah

Editor: Prof. M. Rawwas Qal'ajī Ph.D. and M. Zafer Wafai, M.D.

Published by: The Ministry of Cultural Affairs, Damascus, Syria, 1997.

11. Al-Ṭabarī, 'Alī Ibn Sahl Raban (Died 247 AH = 861 AD).

The Eye diseases and their management from (The Wisdom Paradise).

Collected and edited by Prof. M. Rawwas Qal'ajī Ph.D. and M. Zafer Wafai, M.D.

Published by: Al-Furqan Islamic Heritage Foundation  
Eagle house

High Street, Wimbledon, London, SW 19 5EF, 1409 AH = 1998 AD.

12. Al-Ṭabarī Aḥmad Ibn Moḥammed (Died 366 AH = 976 AD)  
The Eye diseases and Their Management (from the hippocratic treatments) Collected and Edited by: Prof. M. Rawwas Qal‘ajī Ph.D. and M. Zafer Wafai, M.D.  
Published by: Al-Furqan Islamic Heritage Foundation  
Eagle house  
High Street, Wimbledon, London, SW 19 5EF 1490 AH = 1998 AD.
13. Ibn Sīnā, Abu ‘Alī Al-Ḥusayn Ibn ‘Alī  
The Eye Diseases and Their Management from (Al-Qanūn Fī Al-Ṭīb)  
Collected and edited by: M. Zafer Wafai, M.D. and M. Rawwas Qal‘ajī, Ph.D. Published by: Dar Al-Nafaes, Beirut, Lebanon 1995.
14. Thābit Ibn Qurrah Al-Ḥarrānī (Died 288 AH = 901 AD)  
Vision and Perception  
Edited by: M. Rawwas Qal‘ajī, Ph.D. and M. Zafer Wafai, M.D.  
Published by: Al-Obekan Publishing House,  
Riyadh, Saudi Arabia in 1991.

15. Al-Kafarṭābī, Ibrāhīm Ibn ‘Alī Ibn Bakhtyashū‘ (Died 460 AH = 1070 AD)

Anatomy of the Eye, Its shape and treatment of its diseases

Edited by: Aḥmad Ṣaqr, M.D., Prof. M. Rawwas Qal‘ajī, Ph.D. and M. Zafer Wafai, M.D.

Published by: Al-Obekan Publishing House,  
Riyadh, Saudi Arabia in 1992.

16. Al-Rāzī, Moḥammad Ibn Zakaryā (Died 313 AH = 925 AD)

Al-Ḥāwī Fī Al-Ṭīb

Edited and published by: Office of Osmania Education,  
Hyderabad, India 1976.

17. Ḥunayn Ibn Ishāq Al-‘Abādī (Died 264 AH = 875 AD)

Ten Treatises on the Eye

Edited and translated into English by Max Meyerhof,  
M.D.

Published by: Al-Amiriyah Press, Cairo, Egypt in  
1928,

18. Khalīfah Ibn Abī Al-Maḥāsīn Al-Ḥalabī (Died 656 AH = 1256 AD)  
Al-Kāfī Fī Al-Kuḥl,  
Edited by: M. Zafer Wafai, M.D. and Prof. M. Rawwas Qal‘ajī, Ph.D.  
Published by: the Islamic Educational, Scientific and Cultural Organization (ISESCO)  
Rabat, Morocco, 1990.
19. Ibn Al-Akfānī: Moḥammad Ibn Ibrāhīm Ibn Ṣa‘ed (Died 749 AH = 1348 AD)  
Kashf Al-Rayn Fī Aḥwāl Al-‘Ayn  
Edited by: M. Zafer Wafai, M.D. and Prof. M. Rawwas Qal‘ajī, Ph.D.  
Published by the King Faisal Center for Research and Islamic Studies,  
Riyadh, Saudi Arabia in 1993.
20. Al-Ghāfiqī: Moḥammad Ibn Qassūm Ibn Aslam (Died 595 AH = 1197 AD)  
Al-Murshid Fī Al-Kuḥl  
Edited by: Prof. M. Rawwas Qal‘ajī, Ph.D. and M. Zafer Wafai, M.D.  
Published by: the King Abdul Aziz City for Science and Technology (KACST)  
Riyadh, Saudi Arabia in 1990.

21. ‘Ammār Ibn ‘Alī Al-Mawṣilī (Died 400 AH = 1010 AD)  
Al-Muntakhab Min ‘Ilm Al-‘Ayn  
Edited by: Prof. M. Rawwas Qal‘ajī, Ph.D. and M. Zafer Wafai, M.D.  
Published by: the Al-Obekan Publishing House,  
Riyadh, Saudi Arabia in 1991.
22. Ibn Al-Nafīs, ‘Alā’ Al-Dīn Ibn Abī Al-Ḥazm Al-Qarashī (Died 687 AH = 1288 AD)  
Al-Muhadhab Fī Al-Kuḥl Al-Mujarrab  
Edited by: M. Zafer Wafai, M.D. and M. Prof. M. Rawwas Qal‘ajī, Ph.D.  
Published by: the Islamic Education, Scientific and Cultural Organization (ISESCO)  
Rabat, Morocco, 1988.
23. Ṣalāh Al-Dīn Al-Kaḥḥāl Al-Ḥamwī (Died 646 AH = 1296 AD)  
Noor Al-‘Uyūn Wa Jami‘ ‘Al-Funūn  
Edited by: M. Zafer Wafai, M.D. and M. Prof. M. Rawwas Qal‘ajī, Ph.D. Published by: The King Faisal Center for Research and Islamic Studies,  
Riyadh, Saudi Arabia 1407 AH = 1987 AD.

24. Fuat Sezgin: The history of Arabic Literature, Vol. III.  
Translated into Arabic by: Abdullāh Ibn Abdullāh Al-Hijazi  
Published by: The King Saud University, Riyadh, Saudi Arabia, 2009AD=1430AH.
  
25. Emile Savage-Smith, “The practice of surgery in Islamic Lands: Myth and reality”  
0951-631X, Social History of Medicine, Vol.13, No.2,  
307-321

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