

Abu al-Qasim al-Zahrawi

– Written by Emilia Calvo, Spain

Abu al-Qasim al-Zahrawi, known in Europe as Albucasis, is considered one of the most outstanding physicians of the al-Andalus region and one of the greatest surgeons of his time. His patronym (name passed down from his father), al-Zahrawi, indicates that his native city was Madinat al-Zahra, the governmental centre and cultural metropolis established in 936 AD near Cordoba, in southern Spain. We do not know exactly when he was born but it is considered that it was some time after 936 AD. He died around 1010 AD.

We have little information about his life. He lived in the territory of al-Andalus, during the second half of the 10th century AD, when Andalusian medicine was reaching high levels of advancement, surpassing the medical knowledge and practices inherited from the Romans. This was a period when

physicians such as al-Zahrawi participated in scientific sessions where disciplines such as astronomy, mathematics and philosophy were discussed.

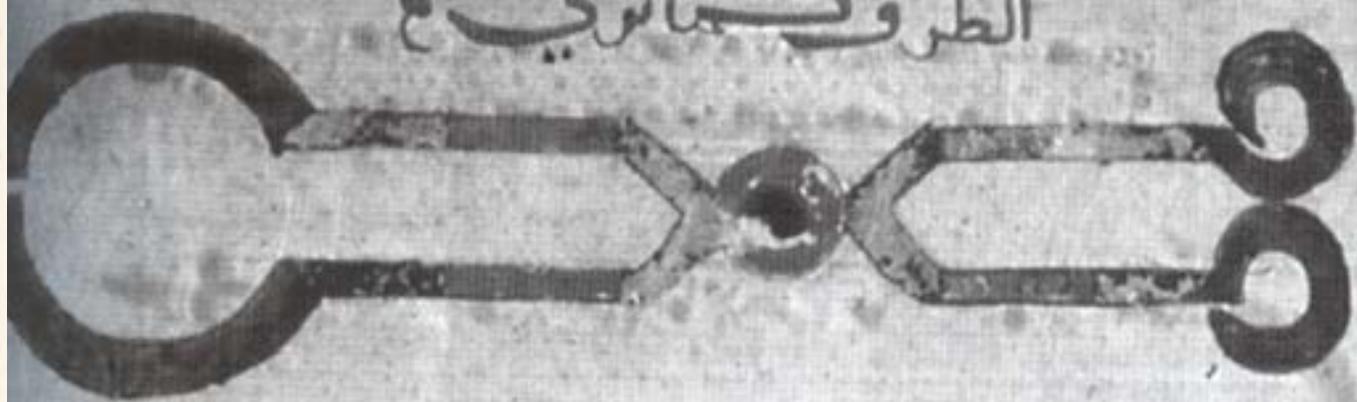
We know of only one work of al-Zahrawi's that has survived: a medical encyclopaedia entitled *Kitab al-tasrif li man 'ajiza min al-ta'lif* roughly translating as "The arrangement of medical knowledge for one who is not able to compile a book for himself". It is an illustrated 1500-page encyclopaedia of medicine and surgery.

This work was the result of almost 50 years of medical practice and experience and arose in the second half of the 10th century AD, almost without precedent. It is one of the greatest works in Andalusian history and can only be compared to the level of the great physicians practising 200 years later in the 12th century AD. Like other

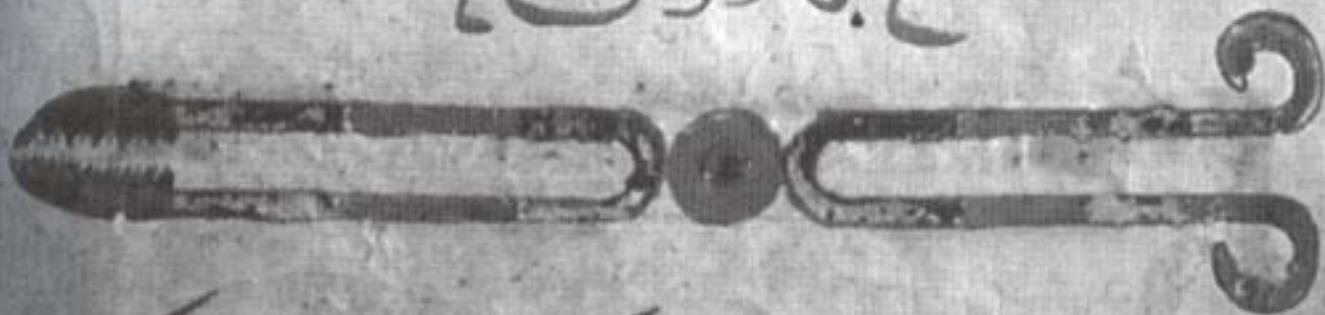
early Arabic medical writers, al-Zahrawi based his work on Greek authorities. In fact, he mentions more than 60 sources, among them Galenus, al-Razi and Ibn al-Jazzar. In some instances, he draws heavily upon Alexandrian physician Paul of Aegina who practised in the 7th century AD.

With his work, al-Zahrawi aimed to help train students and to provide a reference manual for the practising physician. His work allows the reader to be self-sufficient and alleviates the need to consult the manuals produced in the East, which al-Zahrawi describes as "inexplicable works of the ancients", referring to the difficulties encountered in understanding the Arabic translations of Greek medical texts. However, this comment does not mean that he did not know the contributions of Arabic classical oriental medicine – quite the

وهذه صورة المشاح الذي يشح
به رأس الخيز يشبه المتصر له أسنان في
الطرف كما ترى



وقد تصنع مستطيله كالكلاب عكس
هذه الصورة كما ترى أسنانها كاسنان المشاح
تقطع بها وترض



اعلم ان هذه الآلات كلما كثرت انواعها وكثرت معدة
عند الصانع كانت اسرع لعمله وارفع عند الناس لقدره ولا تستحقر



contrary. The *Tasrif* is not only a collection of quotations from the medical literature known to the author but also the work of a physician and surgeon with extensive experience, which is evident on almost every page of his work.

The *Tasrif* is divided into 30 books. The author first reviews clinical and general medicine (Books 1 and 2), studying human nature and temperament, anatomy, pathology, classification of diseases, symptoms and treatment. It is surprising to note the care with which al-Zahrawi develops anatomy, a discipline that is essential knowledge for any surgeon. His study of pathology is also remarkable.

He analysed 325 diseases, paying close attention to al-Razi, from whom he learnt the treatise on the differential diagnosis of smallpox and measles. His study on fevers closely follows that of an earlier physician, Ishaq b. Sulayman al-Isra'ili, who published one of the earliest known descriptions of haemophilia. Books 26 and 27 deal with hygiene and diet but al-Zahrawi seems to be more interested by the study of pharmacology, a topic dealt with in chapters 3 to 25 and 28 to 29. Worth mentioning is chapter 19 which details the first-known independent treatment of cosmetics in al-Andalus.

The concept of pharmacology that al-Zahrawi presents is primarily the work of a doctor rather than a naturalist. He is concerned with the technique of preparation of drugs from substances of vegetable, mineral or animal origin, a topic dealt with in chapter 28. This is one of the

most well-known chapters of the book as it was translated into Latin as *Liber Servitoris* in the late 13th century AD by Abraham Judaeus of Tortosa and Simon of Genoa, and printed in Venice in 1417 AD. On this topic, al-Zahrawi seems to be much influenced by Greek physician, pharmacologist and botanist Dioscorides but still adds many details not found in the Greek work, especially as far as drugs used in al-Andalus are concerned.

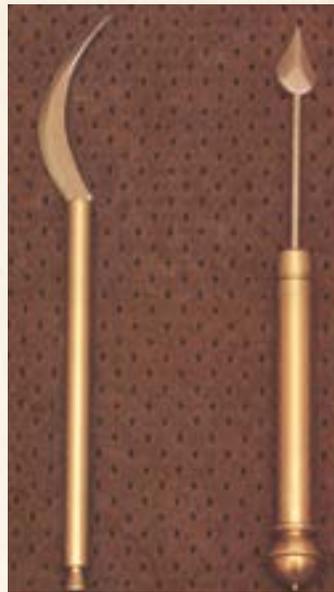
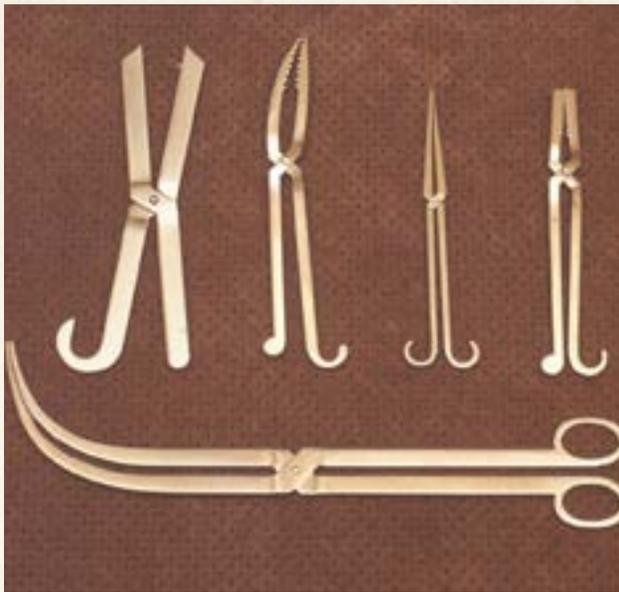
Books 25 and 28 describe laboratory techniques in detail, which gives an interesting insight into the history of chemistry. The remote origin of some of these techniques can be traced to ancient Mesopotamia. Al-Zahrawi also follows the techniques used by craftsmen and perfumers of Iraq and Egypt, thus widening the geographic reach of the narrow academic circle of the time.

Despite the importance of the medical and pharmacological parts of the *Tasrif*, the fame of this work comes from book 30 which is a treatise on surgery, based on the work of Paul of Aegina and al-Zahrawi's own experience. In the foreword to this chapter, he regrets the low scientific level of surgery reached in his time and gives several examples in which the patient died due to the surgeon's incompetence. Prudence has to be applied in this professional activity and al-Zahrawi presents clear criteria to determine when surgery is feasible and when it is useless and dangerous. For example, he advises to refrain from intervening in cases of hydrocephalitis, even though he describes the surgical technique used. He says that all children who suffer from this disease die without remedy and that he has always refused to intervene in these cases.

Book 30 is divided into three parts. The first deals with the cauterisation applied to 50 types of disease. While it was sometimes used improperly, in many cases it probably gave good results, such as for the removal of tumours or in cases of arterial bleeding. This part also contains the first known description of haemophilia and one of the first descriptions of leprosy.

The second part of Book 30 deals with surgeries performed with a knife. It is divided into 99 chapters. Here, al-Zahrawi gives a detailed account of surgical interventions he knows and practices, and provides some 'case studies'. Some involve removing tumours or growths, while others involve treating men struck by arrows.

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Images shown: Surgical saws used to saw bones; surgical hooks; forceps for diverse applications; two instruments for cataract surgery: scalpel and needle.

Modern reconstructions property of the Institut für Geschichte der Arabisch-Islamischen Wissenschaften (Frankfurt).

In some cases, al-Zahrawi extracted the arrowhead, but in others no extraction was attempted and the wound healed with the arrowhead in place.

Al-Zahrawi also discusses in detail the issue of suturing techniques, referring to the use of giant ants for abdominal sutures. The ant is used to bite on the lips of the wound and its head is then cut off. Using wool, silk, flax and horse hair as suture material, al-Zahrawi seems to be the first surgeon to document the use of animal guts, i.e. catgut, which is still universally used today.

In his clinical accounts, al-Zahrawi appears to be a physician well-versed in Greco-Roman medical writings (through Arabic translations). He was able to apply techniques in an emergency, although he also stated that some operations were unknown in his time.

Since al-Zahrawi was both a good surgeon and interested in the topic of cosmetics, he could not be indifferent to plastic surgery. He described interesting techniques to reduce the size of enlarged male breasts and to correct excessively large breasts in women. In this section, he describes the extraction of varicose veins, surgical solutions for suspected cases of hermaphroditism and clearly shows the technique to apply in circumcision (substituting the knife for scissors) and even for castration, although he is not very fond of it.

Al-Zahrawi warns against attempting amputation when gangrene has spread above the elbow or the knee, but also

reports that he examined a man who had amputated his own foot after gangrene had attacked it. Moreover, he requested al-Zahrawi to amputate his hand when the disease appeared in that organ. Al-Zahrawi, however, refused to perform the operation, fearing the man would die at the amputation of his hand. Interestingly, he later heard that the patient had himself

“ He reports that he examined a man who had amputated his own foot after gangrene had attacked it

cut off his entire hand and had recovered.

The third part of the book deals with fractures, sprains and dislocations. In it, the author describes in detail the techniques used in the treatment of fractures of various body parts, based on the general principle of starting to reduce the fracture and then proceed to restrain it. A fracture of the pelvis is mentioned and, in the case of shoulder dislocation, al-Zahrawi describes the use of a kind of plaster mixed with egg.

One of the greatest qualities of Book 30

and an important innovation in the history of surgical literature is the abundance of surgical instruments that appear in the manuscripts. They acquire a special significance, given the limited knowledge that can be gleaned from the real instruments recovered in archaeological sites. The instruments described and drawn in this book include scalpels, scissors, hooks, forceps, syringes, saws, needles, spoons and wooden instruments to reduce fractures and dislocations.

The chapter on surgical techniques was well-known in Latin Europe from the translation made by Gerard of Cremona (1114-1187 AD) in the 12th century AD. It comprised some 200 pages in the 1531 Strasburg printing of the Latin translation (it went into at least 10 Latin editions between 1497 and 1544 AD). The most prominent surgeons of the Latin Middle Ages, such as William of Saliceto (d. 1277) and Guy de Chauliac (d. 1368), used it extensively. After that, it was used as a standard reference on the subject in all universities of Europe for over five hundred years. The contributions of al-Zahrawi in this field are indeed remarkable.

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