Two Instruments
for Measuring the Quantity
of Blood after Bloodletting

In the third «category» of his *Kitâb al-Gâmi‘*, Ibn ar-Razzâz al-Ġazari describes various instruments which function according to the principle that floating bodies transmit motion by rising up when a liquid enters a vessel and by causing a counterweight to sink down at the same time. The instrument described and illustrated here serves to measure the quantity of blood during bloodletting.¹ Al-Ġazari’s detailed description was already made accessible by Eilhard Wiedemann² through a German translation in 1918. An English translation was provided by Donald Hill³ when he translated the whole book (1974).

³ *The Book of Knowledge of Ingenious Mechanical Devices*, pp. 137–139.
CAUTERISATION

Cauter
in the form of a fingernail
(mikwāt mismārīya)

From the Kitāb at-Taṣrīf of az-Zahrāwī¹
(4th/10th cent.).

Our model:
Brass and stainless steel.
Length: 118 mm.
(Inventory No. H 1.01)

Another
Cauter
in the form of a fingernail
(mikwāt mismārīya)

From the Kitāb at-Taṣrīf of az-Zahrāwī²
(4th/10th cent.).

Our model:
Brass and stainless steel.
Length: 129 mm.
(Inventory No. H 1.02).


² Az-Zahrāwī, op. cit., vol. 2, p. 470; La chirurgie d’Abulcasis, p. 15, fig. no. 4; Albucasis. On Surgery and Instruments, p. 97.
Cauters

Instrument for cauterisation
in the case of «cold liver»
(mikwāt fī kaiy al-kabid al-bārida)

from the Kitāb at-Taṣrif by az-Zahrāwī.
Our model is based on the text and on the illustrations in one of the Paris manuscripts\(^1\) (v. fig. below) and in the manuscript Oxford, Bodleiana, Marsh\(^4\).
The manuscripts also show the form of the track of the burn, from which it is apparent that the instrument ended in a flat tip, shaped like a lancet.

From: az-Zahrāwī, Taṣrif.

\(^1\) La chirurgie d’Abulcasis, op. cit., pp. 32-33, fig. no. 19.
\(^4\) Albucasis. On Surgery and Instruments, op. cit., p. 87.
Cauter
for the treatment of the feet
and the thighs
(mikwāt ʿfi kaʿy al-qadāmain
wa-s-sāqain)

Our two models (a, b) reproduce the illustrations in
the manuscripts from Paris5 Istanbul6 and Oxford7
of the Taṣrif by az-Zahrāwī (4th/10th cent.).

Our models:
a) Brass and stainless steel.
Length: 121 mm.
(Inventory No. H 1.06-1)

b) Brass and stainless steel.
Length: 103 mm.
(Inventory No. H 1.06-2)

5 L. Leclerc, La chirurgie d’Abulcasis, pp. 36–37, fig. no. 21;
E. Gurlt, Geschichte der Chirurgie, pl. IV, no. 21.
7 Albucasis. On Surgery and Instruments, p. 97.
TREATMENTS OF THE HEAD AND THE FACE

<olive> Cauter

(mikwât zaitûniya)

for a single cauterisation of the head
(fî kaiy ar-ra's kaiyan wâhidan)

from the Kitâb at-Tâṣrîf by az-Zahrâwi1 (4th/10th cent.). Probably Leclerc (v. fig. below) allowed himself to be misled by the name of this important instrument and regarded the handle in the manuscripts available to him as the tip of the cauter. At the time of az-Zahrâwi, the real cauter (v. fig. on the right) probably had no likeness (any more) with an olive seed, which might have been decisive for the naming of the instrument that is known from Antiquity.

Leclerc, La Chirurgie d’Abulcasis, fig. 1 & 2; after Gurlt, Geschichte der Chirurgie.

Another

Instrument for cauterisation

on the head, at the temples and on the back of the skull

Constructed after an illustration from the Kitâb at-Tâṣrîf by az-Zahrâwi as copied by L. Leclerc².

Our model:
Brass and stainless steel.
Length: 127 mm.
(Inventory No. H 1.03)

Kitâb at-Tâṣrîf, facsimile ed., vol. 2,
From: Kitâb at-Tâṣrîf, MS Istanbul, Ahmet III 1990 (8th/14th cent.), fol. 7b.


1 Az-Zahrâwi, op. cit., vol. 2, p. 463; La chirurgie d’Abulcasis, p. 12, fig. no. 1; cf. Albucasis. On Surgery and Instruments, p. 17.
**Cauter**
to be used in the case of paralysis of the face
(*mikwāt al-laqwa*)

Our model is based on a sketch drawn by L. Leclerc after an illustration in one of the Paris manuscripts of the *Kitāb at-Taṣrīf* by az-Zahrāwī (4th/10th cent.).

Our model:
Brass and stainless steel.
Length: 120 mm.
(Inventory No. H 1.08)

---

Another

**Cauter**
to be used in the case of paralysis of the face
(*mikwāt al-laqwa*)

Our model reproduces an alternative sketch drawn by L. Leclerc after an illustration from one of the Paris manuscripts of the *Kitāb at-Taṣrīf* by az-Zahrāwī (4th/10th cent.).

Our model:
Brass and stainless steel.
Length: 120 mm.
(Inventory No. H 1.09)

---

*La chirurgie d’Abulcasis*, op. cit., pp. 17-18, fig. 6 bis; cf. MS Istanbul, Veliiyeddin 2491, fol. 109a–b.
*La chirurgie d’Abulcasis*, op. cit., p. 17–18, fig. 6.
Small
Cauter in the shape of a scalpel for the treatment of fissures on the lips

(mikwāt ṣaghira sikkiniya li-kaiy šiqāq aš-šafā)

Our model was made after the illustration in a Paris manuscript of the Taṣrīf by az-Zahrāwī (4th/10th cent.) and its copy drawn by L. Leclerc.

Our model:
Brass and stainless steel.
Length: 120 mm.
(Inventory No. H 1.10)

La chirurgie d’Ablulcasís, p. 27, fig. 13; E. Gurli, Geschichte der Chirurgie, pl. IV, no. 13; cf. Albucasis. On Surgery and Instruments, p. 61.
TREATMENT OF THE EYES

Cauter
for the treatment of fistulas
in the tear gland

(fī ka‘y an-nāṣūr alladī
fī ma‘aq al-‘ain)

Our model was prepared according to the sketch
drawn by L. Leclerc' after the illustrations in the
Paris manuscripts of the Taṣrif by az-Zahrāwī
(4th/10th cent.).

Our model:
Brass and stainless steel.
Length: 135 mm.
(Inventory No. H 2.01)

A second version of the same instrument was
prepared after the illustration in manuscript
Veliyeddin¹ (Istanbul).

Our model:
Brass and stainless steel.
Length: 132 mm.
(Inventory No. H 2.02)

¹ La chirurgie d’Abulcasis, op. cit., pp. 25–26, fig. no. 11.
² At-Taṣrif, MS Veliyeddin no. 2491, fol. 112a, cf. Albucasis.
On Surgery and Instruments, p. 57.

az-Zahrāwī, Taṣrif,
MS Veliyeddin 
no. 2491, fol. 112a.
az-Zahrāwī, Taṣrif,
MS Paris Bibl. nat.,
ar. 2953, fol. 10b.
Cauter for the tear gland fistula
(mikwāt al-ğarab)

«This is used to cauterise the tear gland fistula after its rupture» (Halifa al-Halabi).
Our model was made after the illustration in the al-Kāfi fī l-kuhl by Ḥalifa b. Abi l-Maḥāsin al-Ḥalabi (written before 674/1275) and after the sketch by J. Hirschberg.5

Our model:
Brass and stainless steel.
Length: 113 mm.
(Inventory No. H 2.04)

Drawing by
Hirschberg, p. 167,
No. 21.

Cleaner
for the tear gland fistula
(miḥṣaf al-ğarab)

«This is used to clean the entire corner of the eye – for those who do not like cauterisation near the fistula» (Ḥalifa). (Ḥalifa).
Our model was made after the illustration in the Paris6 manuscript of the Kitāb al-Kāfi fī l-kuhl by Ḥalifa al-Ḥalabi7.

Our model:
Stainless steel and wood.
Length: 122 mm.
(Inventory No. H 2.05)

3 MS Süleymaniye Kütüphanesi (İstanbul), collection Yeni Cami no. 924, fol. 95b.
4 v. C. Brockelmann, Geschichte der arabischen Litteratur, suppl. vol. 1, p. 899.

6 Bibliothèque nationale, ar. 2999, fol. 43a.
7 v. ṬAmmār b. ‘Alī ..., p. 167, fig. no. 23, v. also p. 169.
Cataract needle

\textit{(miqdaḥ)}

Constructed after the illustration in the \textit{Taṣrīf} by az-Zahrāwī (4th/10th cent.)\textsuperscript{8}.

Our model:
Brass and stainless steel.
Length: 122 mm.
(Inventory No. H 2.13)

Cataract needle

\textit{(barīd)}

Our model reproduces the sketch drawn by L. Leclerc\textsuperscript{9} after an illustration in the Paris manuscripts of az-Zahrāwī’s book (4th/10th cent.).

Our model:
Brass and stainless steel.
Length: 130 mm.
(Inventory No. H 2.12)

\textsuperscript{8} \textit{At-Taṣrīf}, facsimile ed., vol. 2, p. 488; Leclerc, \textit{La chirurgie d’Abulcasis}, p. 92–93, fig. no. 51 et 52.

\textsuperscript{9} \textit{La chirurgie d’Abulcasis}, p. 92, fig. no. 50; cf. ‘Ammār b. ‘Alī…, p. 173.
Spear
(हर्बा)

“This one cleaves the sebaceous cyst and reaches under it and cuts it off. It is made dispensable by the myrtle leaf (असा, see below),” says Ḥālīfa in his al-Kāfī (written before 674/1275). Our model was made after the illustration in Ḥālīfa’s al-Kāfī.

Our model:
Brass and stainless steel.
Length: 121 mm.
(Inventory No. H 2.17)

Rose leaf
(वर्दा)

“For cutting off the mulberry (tumour) of the lid, also used for cutting off the sebaceous cyst and for some other operations” (Ḥālīfa).
Our model was prepared after the illustrations in the two manuscripts of the Kitāb al-Kāfī by Ḥālīfa (written before 674/1275) and the sketch by J. Hirschberg.11

Our model:
Brass and stainless steel.
Length: 111 mm.
(Inventory No. H 2.18)

10 MS Paris Bibliothèque nationale, ar. 2999, fol. 42b; Istanbul, Suleymaniye, collection Yeni Cami 924, fol. 95b; ‘Anmār b. ‘Ali, op. cit., p. 166, fig. no. 9, là-dessus p. 166.
Crescent−shaped Cauter

(*mikwāt hilāliya*)

It is used when the eyelids become limp. Our model reproduces the illustration in the Istanbul manuscript (Beşirağa) of az-Zahrāwī’s book\(^2\) (4th/10th cent.), chapter 15.

Scissors (*miqaṣṣ*)

for the eyelids

A pair of scissors «with broad blades. Their length is set according to how much is cut off from the eyelid» (Ḫalifa).

Our model is based on the illustration in the Kitāb al-Kāfī by Ḫalifa al-Ḫalabi (written before 674/1275) in the manuscript Yeni Cami\(^3\) and the sketch by J. Hirschberg\(^4\).

Notre modèle:


\(^3\) Istanbul, Süleymaniye, collection Yeni Cami 924, fol. 95a.

\(^4\) *Ammār b. ‘Alī*, op. cit., p. 165, 166, fig. no. 1.
Myrtle leaf  
(*asa*)

«This is used to lift and skin the pterygium, while scissors are used for cutting it off. Adhesions of the eyelids can also be cleaved with it.» (Ḥalīfa).

Our model was constructed after the illustrations in the manuscripts of the *Kitāb al-Kāfī* by Ḥalīfa al-Ḥalabī (written before 674/1275) and the sketch by J. Hirschberg.

Our model:
Brass and stainless steel.
Length: 110 mm.
(Inventory No. H 2.10)

Scalpel
for cutting off the pterygium
and for removing adhesions in the inner corner of the eye
(*mibda' li-qat' az-za'fra wa-nutūw laḥm al-āmāq*)

Our model reproduces the sketch drawn by L. Leclerc after the Paris manuscripts of az-Zahrāwī’s (4th/10th cent.) book. The three additional illustrations shown here are from manuscripts Beşiragā in Istanbul, besides Marsh and Huntington in Oxford.

Our model:
Brass and stainless steel.
Length: 141 mm.
(Inventory No. H 2.06)

---

15 MS Paris Bibliothèque nationale, ar. 2999, fol. 42b; MS Istanbul, Süleymaniye, collection Yeni Cami 924, fol. 95b; ʿAmmār b. ʿAli, op. cit., p. 166, fig. no. 10, v. also p. 168.
16 *La chirurgie d’Abulcasis*, op. cit., pp. 82-83, fig. no. 43.
Scissors (kāz)

One of the scissors used in ophthalmology; «for gathering (cutting off) the pterygium of the cornea circumference,» according to Ḥalīfa (before 674/1275). It is said to be thinner than the miqāṣṣ and thicker than the scissors called miqraud (see below).

Our model was made after the illustration in the manuscripts of the Kitāb al-Kāfī and the sketch by Hirschberg.19

![Image](image1)

MS Yeni Cami 924, fol. 95a

Our model:
Stainless steel, riveted.
Length: 110 mm.
(Inventory No. H 2.14)

Scissors (miqraud)

Another pair of scissors used in ophthalmology. It is «thinner than the miqāṣṣ» and «is used for cutting off the membrane (sabal) of the conjunctiva.»

Our model was prepared after the illustration in the manuscripts of the Kitāb al-Kāfī by Ḥalīfa al-Halabi (before 674/1275) and the sketch by J. Hirschberg.20

![Image](image2)

MS Yeni Cami 924, fol. 95a.

Our model:
Stainless steel, riveted.
Length: 132 mm.
(Inventory No. H 2.15)

---

19 MS Paris Bibliothèque nationale, ar. 2999, fol. 42b; MS Istanbul, Süleymaniye, collection Yeni Cami 924, fol. 95a; 'Ammār b. 'Alī, op. cit., p. 165, 166, fig. no. 3.
20 MS Paris Bibliothèque nationale, ar. 2999, fol. 42b; MS Yeni Cami 924, fol. 95a; 'Ammār b. 'Alī, op. cit., p. 165, 166, fig. no. 2.
Lancet

(*mibda’*)

The lancet «with a round top» (*mudawwar ar-ra’s*) is used, according to Halifa, «for eradication of a blister (*šīrmaq*). The chalazion and the like are also cleaved with it.»

Our model was prepared after the illustration in the manuscripts of the *Kitāb al-Kāfi* by Halifa al-Halabi (before 674/1275) and the sketch by J. Hirschberg.

`Halifa, al-Kāfi,` MS Yeni Cami no. 924, fol. 95b.

Our model:
Brass and stainless steel.
Length: 119 mm.
(Inventory No. H 2.21)

Scraper

(*miğrad*)

«For scratching scabies and for removing conjunctival concretions. For that the ‘half rose’ can be used,» which is an instrument with a tip resembling half a «rose leaf» (above).

Our model was prepared after the illustrations in the two manuscripts of the *Kitāb al-Kāfi* by Halifa al-Halabi (before 674/1275) and the sketch by J. Hirschberg.

`Halifa, al-Kāfi,` MS Yeni Cami no. 924, fol. 95b.

Our model:
Brass and stainless steel.
Length: 119 mm.
(Inventory No. H 2.21)

---

21 MS Paris Bibl. nationale, ar. 2999, fol. 42b; MS Istanbul, Süleymaniye, collection Yeni Cami 924, fol. 95b; ‘Ammār b. ‘Alī, op. cit., p. 166, fig. no. 15, v. also p. 168.
22 MS Paris Bibl. nationale, ar. 2999, fol. 42b; MS Istanbul, Süleymaniye, collection Yeni Cami 924, fol. 95b.
**Axe (tabar)**

A knife for bloodletting in the case of eye diseases, in particular «for opening the vein in the forehead (li-fṣad al-ġabha): it is placed lengthwise on the vein (yudda’u 'ala l'-īrq tūlan) and the severing is done with the middle finger of the right hand (wa-yutqabu bi-l-wustā min al-yad al-yumnā).»

Our model was prepared according to the sketch by J. Hirschberg, which he drew after the Paris manuscript of the Kitāb al-Kāfī by Ḥalīfa (before 674/1275).

Our model:
- Brass and stainless steel.
- Length: 119 mm.
  (Inventory No. H 2.22)

---

**Cauter for the vertex of the head (mikwāt al-yāfūḥ)**

A branding iron used for the treatment of eye diseases. According to Ḥalīfa «the head seam and the two veins on the two sides of the head are cauterised with this.»

Our model is based on the illustration in the two manuscripts of the Kitāb al-Kāfī by Ḥalīfa al-Ḥalabi (before 674/1275) and the sketch by J. Hirschberg.

Our model:
- Brass and stainless steel.
- Length: 120 mm.
  (Inventory No. H 2.23)
Cauter

(mikwāt)

for cauterising the roots of the hair on the eyelid, when eyelashes grow into the eye (fi kaiy ġafīn al-‘ain ida naqalabat aš‘ārūhā īlā dāḥīl al-‘ain).

Our model was constructed according to the sketch by L. Leclerc, which he drew after the illustrations in the Paris manuscripts of the Kitāb at-Taṣrīf by az-Zahrāwī (4th/10th cent.). It differs slightly from the illustration in the facsimile of the Istanbul manuscript (Beşiragha). For an instrument with the same function, see the following.

Our model:
Brass and stainless steel.
Length: 113 mm.
(Inventory No. H 2.03)

Cauter

(mikwāt)

«For cauterising the locations of superfluous eyelashes after the same have been pulled out (li-kaiy mawādi‘ aš-ša’r az-zā‘id ba’d natifihi).»

Our model was developed from the illustrations of the manuscripts in Paris and Istanbul of the Kitāb al-Kāfī by Ḥalīfa al-Halabī (before 674/1275) and the sketch by J. Hirschberg.

Our model:
Brass and stainless steel.
Length: 119 mm.
(Inventory No. H 2.24)

28 La chirurgie d’Abulcasis, p. 23*24 and fig. no. 10.
29 At-Taṣrīf, facsimile ed. vol. 2, p. 467.
30 Bibliothèque nationale, ar. 2999, fol. 43a.
31 Süleymaniye-Bibl., collection Yeni Cami 924, fol. 95b.
Sickle (min̲g̲al)

«For separating adhesions between the two lids. It is also used in the case of hare-eye (šitra)» (Ḥalīfā).

Our model was developed from the illustration in the 33 by Ḥalīfā al-Ḥalabī (before 674/1275) and the sketch by J. Hirschberg 34.

Raven’s Beak

(Arabic šaft, Persian ġaft, «courbé»)

«For removing whatever sticks to the eye or the inner side of the lid» (Ḥalīfā).

Our model was developed from the illustration in the Kitāb al-Kāfī 35 by Ḥalīfā al-Ḥalabī (before 674/1275) and the sketch by J. Hirschberg 36.
Awn-tongs
(kalbatān nusūlīya)

«It is used when an awn or a similar object falls into the eye» (Ḥalīfa).
Our model was developed from the illustration in the two manuscripts of the Kitāb al-Kāfī37 by Ḥalīfa al-Ḥalabī (before 674/1275) and the sketch by J. Hirschberg38.

Our model:
Stainless steel, riveted.
Length: 122 mm.
(Inventory No. H 2.20)

Gatherer (milqāṭ)

«This is used to gather (pluck) superfluous hair. It also pulls out any ‘foreign body’ that has fallen into the eye» (Ḥalīfa).
Our model was developed from the illustration in the Paris manuscript39 of the Kitāb al-Kāfī by Ḥalīfa al-Ḥalabī (before 674/1275), which deviates in the depiction of the handle mechanism from that in the Istanbul manuscript.40 J. Hirschberg41 follows the Paris manuscript in his sketch.

Our model:
Stainless steel, polished.
Length: 121 mm.
(Inventory No. H 2.16)

37 MS Paris Bibliothèque nationale, ar. 2999, fol. 43a; MS Istanbul, Süleymaniye, collection Yeni Cami 924, fol. 96a.
39 Bibliothèque nationale, ar. 2999, fol. 42b.
40 Süleymaniye Kütüphanesi, coll. Yeni Cami 924, fol. 95b.
41 Ṭāmr b. ‘Ali, op. cit., p. 166, fig. no. 18, v. also p. 168.
TREATMENT OF THE EARS, NOSE, AND RESPIRATORY PASSAGES

Cauter called ‘point’
(al-mikwât allatî tusammâ an-nuqṭa)

It serves the treatment of earache by cauterising various points on the auricle. This instrument is depicted in two versions, one pointed and the other blunt. We have designed the pointed form after the illustrations in manuscript Huntington (Oxford) and one of the Paris manuscripts of az-Zahrâwi’s (4th/10th cent.) book.

Our model:
Brass and stainless steel.
Length: 108 mm.
(Inventory No. H 4.07 and H 4.01)

Cauter called ‘point’
(al-mikwât allatî tusammâ an-nuqṭa)

It serves the treatment of earache.
The second, blunt version of this instrument was fashioned after the illustration in manuscript Marsh (Oxford), one of the Paris manuscripts of az-Zahrâwi’s (4th/10th cent.) book.

Our models:
Brass and stainless steel.
Length: 119 mm each.
(Inventory No. H 4.07 and H 4.01)

1 Albucasis. On Surgery and Instruments, p. 29.
2 La chirurgie d’Abulcasis, pp. 16–17, fig. 5.
3 Albucasis. On Surgery and Instruments, p. 29.
A fine Scalpel

*(midha‘ raqīq)*

It serves «to disintegrate corns or seeds that have fallen into the ear (*qaṭr al-ḥubūb as-saṣiqa fi l-uḍn*) and have swollen up due to the moisture inside the ear (*qad tarattabat bi-buḥr al-uḍn*)» (az-Zahrāwī). Our model is constructed after the illustrations in the Paris manuscripts of the *Kitāb at-Taṣrīf* by az-Zahrāwī (4th/10th cent.) in the reproduction by L. Leclerc, which correspond with the illustrations in one of the two Oxford manuscripts and in MS Veliyeddin at Istanbul.

**Our model:**
Brass and stainless steel.
Length: 121 mm.
(Inventory No. H 4.09)


Tweezers (*gifṭ*)

**Our model (a):**
Copper.
Length: 118 mm.
(Inventory No. H 4.02a)

**Our model (b):**
Brass.
Length: 130 mm.
(Inventory No. H 4.02b)

for removing foreign bodies from the auditory canal. Our model was constructed after the illustrations in the two Oxford manuscripts of the *Taṣrīf* by az-Zahrāwī (4th/10th cent.) and after the illustration in MS Veliyeddin in Istanbul.

*La chirurgie d’Abulcasis*, p. 69, fig. no. 36; E. Gurlt, *Geschichte der Chirurgie*, vol. 1, p. 649, no. 33.


* No. 2491, fol. 128a.


* No. 2491, fol. 128a.
Cauter (mikwāt)

to be used in the case of nasal putrefaction (natn al-anf). Our model reproduces the illustration of one of the Paris manuscripts of az-Zahrāwī’s (4th/10th cent.) book (see above). The depiction of how to use it in the Turkish version by Şerefeddin (see below) corresponds to the instruction given in the text; according to that, the nose itself is not cauterised, but cauterisation is done twice between the eyebrows and the hairline with an instrument «shaped like a nail» or «shaped like a pin».

\[\text{Illustration from the Turkish version of the Tāṣrīf de Şerefeddin, MS Istanbul, Millet, Ali Emiri no. 79, fol. 24b.}\]
〈Scissor-like Instrument〉
(aša tušbihu l-miqass)

«for removing tonsils and other tumours of the
pharynx.»
(li-qat ′ waram al-lauzatain wa-mā
yanbutu fi l-ḥalq min sāʿir al-aurām).

Our model:
Stainless steel, riveted.
Length: 168 mm.
(Inventory No. H 4.05)

Our model is based on the sketch drawn by L.
Leclerc after the Paris manuscripts of the Tašrif
by az-Zahrāwī (4th/10th cent.) and on the illustra-
tion in the manuscript Beşiğa.

Scalpel (mibdaʿ)
for removing tonsils (tonsillectomy)

To be used as an alternative to the previous instru-
ment.

Our model is based on the description of the Tašrif
by az-Zahrāwī (4th/10th cent.), on the sketch by
Leclerc, as well as the depiction in the facsimile
edition of the manuscript Beşiğa (İstanbul).

12 La chirurgie d’Abulcasis, p. 106, fig. no. 67.
and Instruments, p. 303.
14 La chirurgie d’Abulcasis, p. 106, fig. no. 68; v. also
Albucasis. On Surgery and Instruments, p. 303.
«Instrument shaped like a hook
(āla tušbihu l-kalālib)

A pair of tongs «for the extraction of foreign bodies from the pharyngeal cavity» (fi ḥraṣ al-‘alaq an-nāṣib fil-halaq).

Of our two models, (a) was made according to the sketch drawn by L. Leclerc after the diagram of the Paris manuscripts of the Taṣrīf by az-Zahrāwī (4th/10th century), and after the illustration in the MS Huntington at Oxford.

Model (b) was developed after the variant depictions in the Istanbul manuscripts at Beşirağa and Veliyeddin as well as Marsh in Oxford.

K. Sudhoff established as early as in 1918 that the illustrations of this pair of tongs differ considerably also in the manuscripts of the Latin translation of az-Zahrāwī’s book.

Our model (a):
Stainless steel, riveted.
Length: 320 mm.
(Inventory No. H 4.13)

16 La chirurgie d’Abulcasis, pp. 112–113, fig. no. 72.
17 Albucasis. On Surgery and Instruments, p. 319.
19 No. 2491, fol. 145a.
Our model (b):
Stainless steel, riveted.
Length: 273 mm.
(Inventory No. H 4.14)
Cauter

(*mikwāt*)

For use «in the case of diseases of the lungs and coughing» (*fi kaiy marad ar-ri'a wa-s-su'āl*) from the *Kitāb at-Tasrif* by az-Zahrāwī. The instrument with three pin-shaped projections at one end replaces the cauter called «point» (see above) when numerous, closely spaced applications are required.

Our model was developed according to the sketch drawn by L. Leclerc after a manuscript of the *Tasrif* preserved in Paris. The illustrations reproduced here after our facsimile edition seem to be incorrect. The instrument is completely omitted in manuscripts Paris Bibl. nat. ar. 2953 and Veliyeddin No. 2491.

La chirurgie d’Abulcasis, fig. 17a.


Albucasis. *On Surgery and Instruments*, p. 319 (MS Marsh, on the left, and MS Hunt., on the right).

Our model:
Brass and stainless steel.
Length: 120 mm.
(Inventory No. H 4.06)

22 *La chirurgie d’Abulcasis*, pp. 30–31, fig. no. 17.

DENTAL TREATMENT

14 Raspatories
for the Removal of Tartar

Our models:
Brass and stainless steel.
Length ca. 110 mm each.
(H 9.01 to H 9.14)

Among the dental instruments which az-Zahrāwī (4th/10th cent.) discusses and illustrates in sections 29 to 32 of the first chapter of his 30th treatise on medical treatment, the fourteen small instruments for removing tartar form a compact group. They appear, in various forms that differ considerably from one another, in Arabic and Latin manuscripts and in incunabula of the translation of the chapter on «surgery» (al-ʼamal bi-l-yad, «treatment») of az-Zahrāwī’s book. The most striking feature is that in the European Zahrāwī-tradition the dental instruments often display an option for using them from both ends.¹

Our models were made according to the drawings by L. Leclerc² after the illustrations in the manuscripts in az-Zahrāwī’s book preserved in Paris as well as after the illustrations in the manuscript Beşirāğa (Istanbul)³ and the two manuscripts at Oxford.⁴ In addition, the illustrations which K. Sudhoff⁵ compiled from Latin manuscripts and incunabula were also consulted.


² La chirurgie d’Abulcasis, 97–98, fig. no. 54 (14 figs.).
⁵ Beiträge zur Geschichte der Chirurgie im Mittelalter, 2nd part, pp. 68–70 (repr. pp. 218–220).
In the «Groß Chirurgei» by Walter Ryff (1559), this group of 14 instruments is shown as follows:\footnote{Groß Chirurgei / oder Vollkommene Wundarznei, Franckfurt am Meyn, 1559, fol. 38.}: 

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{instruments}
\caption{Instruments depicted in the «Groß Chirurgei» by Walter Ryff (1559).}
\end{figure}

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{instruments2}
\caption{Instruments depicted in the «Groß Chirurgei» by Walter Ryff (1559).}
\end{figure}
**Instrument**

〈like a small chisel〉

(āla tušbihu ʿatala ṣağira)

For levering out broken teeth that cannot be extracted with a pair of tongs. Our model was prepared according to the sketch drawn by L. Leclerc after the illustrations in the manuscripts preserved in Paris of az-Zahrāwi’s book, as well as after the illustrations in the manuscript Beşirağa and in the Oxford manuscripts Huntington and Marsh.

**Instrument**

for levering out broken teeth

Serves the same purpose as the preceding instrument. Our model was prepared according to the sketch drawn by L. Leclerc after the illustrations of the manuscripts of the Kitāb at-Taṣrif by az-Zahrāwi (4th/10th cent.) which are preserved in Paris as well as after the illustrations of the Istanbul manuscript Beşirağa and the Oxford manuscripts Huntington and Marsh.

---

1 La chirurgie d’Abulcasis, 101, fig. no. 57.
3 No. 156.
5 La chirurgie d’Abucasis, p. 101, fig. no. 58.
6 Albucasis. On Surgery and Instruments, p. 281 (MS Hunt.).
7 Albucasis. On Surgery and Instruments, p. 283 (MS Marsh.).
9 No. 156.
Likewise for levering out broken teeth that cannot be extracted with tongs any more. Our model was prepared according to the sketch drawn by L. Leclerc\textsuperscript{18} after the illustration in a Paris manuscript of the Kitāb at-Tasrif by az-Zahrāwī (4th/10th cent.), and after the illustration in the manuscript Huntington\textsuperscript{16} in Oxford. This shape is confirmed by the Latin Zahrāwī-tradition.\textsuperscript{17} The instrument is depicted neither in the Istanbul manuscripts Veliyeddin and Beşīrağa nor in the Oxford copy Marsh.

Serves the same purpose as the preceding instruments, for exposing and levering out broken teeth. Our model was prepared according to the sketch drawn by L. Leclerc\textsuperscript{18} after the illustrations in the manuscripts of the Kitāb at-Tasrif by az-Zahrāwī (4th/10th cent.) preserved in Paris as well as the illustrations in the Istanbul manuscript Beşīrağa\textsuperscript{19} and the Oxford manuscripts Marsh\textsuperscript{20} and Huntington,\textsuperscript{21} taking into account the Latin Zahrāwī-tradition\textsuperscript{22}.

\textsuperscript{15} La chirurgie d’Abulcasis, p. 101, fig. no. 60.
\textsuperscript{17} Ch. Niel, La chirurgie dentaire d’Abulcasis, p. 178. (repr., p. 154); K. Sudhoff, Beiträge zur Geschichte der Chirurgie im Mittelalter, 2nd part, p. 72 (repr., op. cit., p. 222).
\textsuperscript{18} La chirurgie d’Abulcasis, p. 101, fig. no. 61.
\textsuperscript{20} No. 54.
\textsuperscript{22} V. Guerini, A history of dentistry, p. 134; Ch. Niel, La chirurgie dentaire d’Abulcasis, p. 178 (repr., op. cit., p. 154); K. Sudhoff, Beiträge zur Geschichte der Chirurgie im Mittelalter, 2nd part, p. 72 (repr., op. cit., p. 222).
Model (a):
Stainless steel, riveted.
Length: 121 mm.
(Inventory No. H 9.21))

Model (b):
Stainless steel, riveted.
Length: 144 mm.
(Inventory No. H 9.19)

Model (c):
Stainless steel, pivoted.
Length 144 mm.
(Inventory No. H 9.20)

Tongs
(kalālīb)

For the extraction of teeth and the removal of tooth fragments.
Our models (a, b, c) were prepared according to the sketches drawn by L. Leclerc\textsuperscript{23} after the illustrations in the Paris manuscripts of az-Zahrāwī’s \textit{Tasrif}, also taking into account the illustrations in the Istanbul manuscript Beşira\textsuperscript{24} and the Oxford manuscripts\textsuperscript{25} as well as the Latin Zahrāwī-tradition\textsuperscript{26}.

\textsuperscript{23} La chirurgie d’Abulcasis, p. 100, fig. nos. 55 and 56.
\textsuperscript{24} No. 502, v. facsimile ed., op. cit. vol. 2, p. 491.
\textsuperscript{25} Huntington 156 and Marsh 54, v. \textit{Albucasis. On Surgery and Instruments}, p. 281.
\textsuperscript{26} V. Guerini, \textit{A history of dentistry}, p. 133; K. Sudhoff, \textit{Beiträge zur Geschichte der Chirurgie im Mittelalter}, 2nd part, p. 70 (repr., op. cit., p. 220).
**Tongs or Tweezers**

(ġift)

For the extraction of the roots of teeth and for the removal of jawbone fragments.

Our model was prepared according to the sketches drawn by L. Leclerc\(^\text{27}\) after the illustrations of the Paris manuscripts of az-Zahrāwī’s (4th/10th cent.) *Tasrif*, taking into account the illustrations in the Istanbul manuscript Beşirāğa\(^\text{28}\) and the two Oxford manuscripts Huntington and Marsh\(^\text{29}\).

---

\(^{27}\) *La chirurgie d’Abulcasis*, p. 101, fig. no. 62.


\(^{29}\) No. 156 and no. 54, v. *Albucasis. On Surgery and Instruments*, p. 287.
TREATMENT OF NERVOUS DISORDERS

Cauter with ring-shaped branding area

for the treatment of the lower area of the back «in the case of children with painful diseases of the spinal column.»

Our model is based on the drawing made by L. Leclerc after the illustrations in the Paris manuscripts of the Taṣrīf by az-Zahrāwī (4th/10th cent.), and after the illustrations in the manuscript Veliyeddin and those in the two copies at Oxford.

Our model:
Brass and stainless steel.
Length: 117 mm.
(Inventory No. H 7.01)

az-Zahrāwī, Taṣrīf, MS Veliyeddin no. 2491, fol. 115a.

Cauter for use in lumbar sciatica

(ālā li-kaiy huqq al-wark)

The round head of this instrument that is used in the case of pain in the lumbar region (sciatica) has a diameter of roughly half a span. Our model reproduces the illustration of the Istanbul manuscript Beşirâğa of az-Zahrāwī’s (4th/10th cent.) Kitāb at-Taṣrīf. The illustrations of the Paris manuscripts as copied by L. Leclerc were also consulted.

Our model:
Brass and stainless steel.
Length: 117 mm.
(Inventory No. H 7.02)

az-Zahrāwī, Taṣrīf, MS Paris Bibl. nat., ar. 2953, fol. 16b.


1 K. Sudhoff, Beiträge zur Geschichte ..., 2nd part, p. 22 and pl. II, fig. 13 (repr., op. cit., p. 172, 226).
2 La chirurgie d’Abulcasis, p. 46, fig. no. 25.
3 Albucasis. On Surgery and Instruments, p. 129.

5 La chirurgie d’Abulcasis, p. 43, fig. no. 23; E. Gurlt, Geschichte der Chirurgie, pl. IV, no. 23; v. also Albucasis. On Surgery ..., p. 119; K. Sudhoff, Beiträge ..., 2nd part., p. 22 and pl. II, fig. 14 (repr., op. cit., p. 172, 226).
Cauter
for the treatment of epilepsy
(mikwāt fī kaiy ḥaṣ-ṣar‘)

Our model was constructed after the illustrations in the Paris manuscripts of the Kitāb at-Taṣrīf by az-Zahrāwī (4th/10th cent.) as sketched by L. Leclerc⁶ and after the illustration of the manuscript Veliyeddin.⁷ In the facsimile edition of az-Zahrāwī’s book the illustration is missing. The illustration in the manuscript Huntington,⁸ at variance with the other manuscripts, shows an instrument bent at an angle which is meant for a similar purpose. According to az-Zahrāwī, the common ‘olive-cauter’ (mikwāt za’itūniya, see above, p. 39) is used for cauterisation of adult patients; the smaller instrument, shown here, is meant for boys.

Our model:
Brass and stainless steel.
Length: 116 mm.
(Inventory No. H 7.05)

az-Zahrāwī, Taṣrīf, MS Paris Bibl. nat., ar. 2953, fol. 38a.

az-Zahrāwī, Taṣrīf, MS Veliyeddin no. 2491, fol. 110a.

⁶ La chirurgie d’Abulcasis, op. cit., p. 19–20, fig. 7.
⁷ No. 2491, fol. 110a.
TREATMENT OF THE URINARY TRACT

Catheter
(qātātīr)

«for relief when urine is retained in the bladder» (fī ʿilāq al-baul al-muhtabas fī l-mātānā). It is a very fine, smooth, silver tube of about one and a half spans in length which terminates in a beaker-like projection. With the help of a piece of cotton or wool which is inserted like a plug at the end of the tube and which is held by a thread laid out in double, the physician can let the accumulated urine flow off from the bladder. After applying some lubricating substance to it, he inserts the instrument into the male urinary tract and moves it, while pushing it forward, first with a downward movement and then upwards until the bladder is reached. Then he pulls the wool or cotton plug out through the narrow silver tube in order to let the urine, which has become free, flow off. The procedure is repeated until the bladder is emptied.

Our model is based on the illustrations in the manuscripts of the Tasrif by az-Zahrawi (4th/10th cent.) in Istanbul and Oxford and on the drawing made by L. Leclerc after the manuscripts preserved in Paris.

Reproduced here are the illustrations of two extant catheters made by the successors of this tradition: the first (a) by Cornelius Solingen (1706) and the second (b) by Whicker & Blaise (London, circa 1856).12

Our models:
Silver, length 23 (illustration) and 34 cm.
(Inventory No. H 5.01)

La chirurgie d’Abulcasis, fig. 69.

Albucasis. On Surgery and Instruments, p. 407 (MS Marsh).

az-Zahrawi, Tasrif,
MS Veliyeddin no. 2491, fol. 107b.

Elisabeth Bennion,
Antique medical instruments, pp. 77, 80.


Stamp Syringe
(*zarrāqa* or *miḥqan*)

for instillation (*ḥaqn*) of the bladder. This apparatus is used for instilling medicines in liquid form through the urethra into the bladder. This is done for the treatment of ulcers, blood clots or pus in the bladder. The syringe is made of silver or ivory. The diameter of the cannula corresponds to the width of the urethra. As in the case of a modern syringe, a piston is passed through the broader part at the back, which is «used for drawing liquids as well as for giving injections» (Sudhoff). Towards the end of the cannula there are three holes on opposite sides, two on one side and one on the opposite side. Through these holes the liquid reaches the bladder while the injection is done.

Our model was constructed after the description in the *Ta◊r¬f* by az-Zahrāwî (4th/10th cent.) and after the illustrations in the manuscripts at Oxford and Istanbul, and also after the drawing made by L. Leclerc after the illustrations in the Paris manuscripts.

*Our model:*
- Brass, synthetic material
- Length: 133 mm
- Inventory No. H 5.06

Fig. on the right: The form of the apparatus described by az-Zahrāwî continued through the centuries in different sizes and with differing functions and survives in the modern injection syringe. Some specimens of the 17th century made of silver, ivory, brass or wood can be found in the Germanisches Nationalmuseum at Nuremberg.

---

13 Bodleian Library, Marsh 54 and Huntington 156, v.
for bladder irrigation. In continuation of the preceding instrument for instillation of the bladder, az-Zahrâwî describes another type where the function of the piston is performed by a balloon-like hose. A ram-bladder, filled with the liquid medication, is tied to the cannula which is provided at the end with a groove for the piece of cord with which the bladder is fastened. If no ram-bladder is at hand, az-Zahrâwî recommends that a round piece be cut out of parchment (qi‘at raqq), that holes be made closely to each other near the edge and a strong piece of cord be drawn through the holes and, while pulling the cord together, the parchment be given the form of a moneybag (read surra instead of sufra). Then this bag, filled with the liquid medication, is tied to the cannula.

Model (a) was made after the description of the Arabic text\(^\text{16}\) of the Taṣrîf by az-Zahrâwî (4th/10th cent.); model (b) after the illustrations known to us in its Latin translation.\(^\text{17}\)

---


Scissors

(miqaṣṣ)

for the circumcision of boys. Our model was prepared after the illustration in one of the Paris manuscripts of the Taṣrīf by az-Zahrāwī (4th/10th cent.) and after the drawing by L. Leclerc. For comparison, the illustrations from the manuscripts Istanbul (Beṣirağa and Veliyeddin) as well as Oxford (Hunt. and Marsh) are shown here.

az-Zahrāwī, Taṣrīf, MS Veliyeddin no. 2491, fol. 107.

Our model:
Stainless steel.
Length: 168 mm.
(Inventory No. H 5.07)


Albucasis. On Surgery and Instruments, p. 401 (MS Hunt.).

Albucasis. On Surgery and Instruments, p. 401 (MS Marsh).

18 Bibliothèque nationale, ar. 2953, fol. 54a.
19 La chirurgie d’Abulcasis, pp. 143–146, fig. no. 94.
21 No. 2491, fol. 107.
GYNAECOLOGICAL INSTRUMENTS

In connection with the extraction of the fetus, az-Zahrāwī (4th/10th cent.) briefly describes three instruments in his Taṣrīf. We are indebted to K. Sudhoff for a helpful interpretation of the illustrations belonging to this subject, which are difficult to understand and in parts unclear in the manuscripts and incunabula of the Latin and French translations.

The first of the instruments mentioned and depicted by az-Zahrāwī under the heading ʿSuwar al-ālāt allatī yuṭāqū ilāhā fī iḥrāq al-ḡanīn («Depiction of the implements needed for the extraction of the fetus») is called laulab yuṭaΩu bihī fam ar-rahim («device in the form of a screw for opening the neck of the cervix»). In modern technical literature, this apparatus is known as a «two-leaved speculum uteri».

The second instrument is called «tongs-shaped» (ʿalāk ṣaΩ al-ḥālāΩ) by az-Zahrāwī. According to him, the third is another screw-like device «mentioned by the ancients» (laulab ʾaΩar ḍakārāthu ʿl-awāʾil). About the material of which the first two instruments were made, az-Zahrāwī states that it was ebony (ābalūs) or box-tree wood (ḥaΩab al-baqṣ), but he does not make any comment on the material of the instruments of «the ancients.» We know from archaeological finds from Pompeii that this was made of metal in Antiquity.

Various gynaecological instruments from Taṣrīf d’az-Zahrāwī, MS Paris Bibl. nat., ar. 2953, fol. 68.

az-Zahrāwī, Taṣrīf, MS Veliyeddin no. 2491, fol. 172a.

4 A. Schahien, Die gehärtshiflich–gynäkologischen Kapitel aus der Chirurgie des Abulkasim, p. 31 (repr., op. cit., p. 351).

I. The Two-leaves Speculum

About the illustration az-Zahrāwī says: «This is [like] the drawing of a press with which books are prepared. It consists of two screws at the end of two pieces of wood. But the two screws must be finer than the screws of the press and must be of ivory or box-tree wood, and the width of each of the two pieces of wood must be about two fingers, its thickness about one finger and their length must be one and a half spans, and at the middle of [each of] the two wooden pieces there should be two insets of the same type of wood, fixed firmly to them. Their length should be half a span or a little more, their width about two fingers or a little more. These are the two pieces of wood which are inserted into the cervix so that it is opened by them when you turn the two screws.»

Our model was prepared according to the sketch drawn by L. Leclerc after the illustrations in the Paris manuscripts of az-Zahrāwī’s book, and after the illustrations in the manuscripts Beşiraga at Istanbul and Huntington at Oxford. Moreover, we consulted the illustration in the Istanbul manuscript Velıyeddin which is not reproduced here. In this illustration the grooves of the screw-spindle are not depicted, but the broad, spoon-like shape of the gliding strips of wood are clearly discernable, which serve for widening the genital tract.

\[\text{Our model:} \]
\[\text{Oak (for want of true box-tree wood) and brass, } 30 \times 30 \text{ cm. (Inventory No. 6.04)}\]

A variant with four threads is depicted in the Turkish adaptation by Şerefeddin (1465) (see below; left: reconstruction sketch).

\[\text{Şerefeddin, MS Istanbul, Millet, Ali Emiri no. 79, fol. 113a.}\]
2. The second instrument used in connection with the extraction of the fetus as described by az-Zahrāwī is called «Scissor-Speculum»

by K. Sudhoff, who describes it in the following words after the Latin translation: «It is a wooden instrument, shaped like a pair of tongs, which has appendages (additamenta), as long as one’s hand and as broad as two fingers, that is to say quite large spoon-shaped branches of the speculum. These spoons (additamenta), in a closed state, are to be pushed into the vagina of the woman who is sitting on the bed with her legs hanging down. Then one should take hold of the other end of the scissor-speculum and open it with the hand, as one does while opening a pair of scissors; indeed open it as far as necessary to open the vulva and the vagina in order to see the portio. The physician and the midwife probably used to content themselves even with a thorough opening of the introitus vaginae. Particularly since even this is unnecessary, as a rule, when gynaecological operations are carried out.»

Our model was made after the description in the text of the Taṣrif by az-Zahrāwī and after the figure in manuscript Marsh (Oxford).

Our model:
Stainless steel, riveted.
Length: 194 mm.
(Inventory No. H 6.01)

Albucasis. On Surgery and Instruments, p. 487 (MS Marsh).

Cod. lat. Monacensis 161 (XIII s.) fol. 18a.
D’après Sudhoff, Beiträge zur Geschichte der Chirurgie im Mittelalter, 2nd part, p. 51.

11 Beiträge zur Geschichte der Chirurgie im Mittelalter, 2nd part, p. 51 (repr., op. cit., p. 201); v. also A. Schahien, op. cit., p. 32 (repr., op. cit., p. 352).
12 v. facsimile ed., vol. 2, p. 515; v. also Leclerc, La chirurgie d’Albucasis, pp. 183–184, fig. no. 103.
3. The third instrument which az-Zahrāwi mentions in connection with the extraction of the fetus and calls the

**Instrument of the Ancients**

*(ālāt al-awā’il)*

without, however, describing it. Even the illustrations in the available manuscripts do not offer a clear idea about this apparatus. K. Sudhoff made every effort and succeeded in finding an explanation for the illustrations preserved in manuscripts and incunabula. He found that the drawing which is difficult to interpret even in some of the Arabic manuscripts and which in the Latin copies resembles a street-lantern, must originally have represented «a spoon-speculum with a screw arrangement for unscrewing its spoon-branches as they are preserved from Pompeii as speculum trivalve.»

Only in the manuscript Marsh 54, which he knew through the Latin translation by Channing, did he find «a screw arrangement of a similar nature where one could, if so inclined, really find what is essential.» Among the Arabic manuscripts of the

---

16 Ibid., p. 52 (repr., p. 202).
17 *Albucasis de Chirurgia Arabice et Latine* Cura Johannes Channing, 2 vols, London 1778.
30th chapter of az-Zahrāwi’s *Taṣrif* which are accessible to me at present, I believe that the illustration of the Istanbul manuscript Veliyeddin comes the closest to reality:

\[\text{az-Zahrāwi, *Taṣrif*, MS Veliyeddin no. 2491, fol. 171b.}\]

An example of the later «lantern» pictures where the «lantern» had obviously been installed erroneously from an independent illustration (of another speculum?):

With this it is possible to reconstruct the instrument as follows:

The two arcs E and F have the function of securing the screw with which the lower and movable of the two spoon-branches is screwed upwards and downwards. This branch must have acquired its ability to slide up or down through a slot in the beam AB or through a ring surrounding the beam. After these deliberations it should not be difficult to realise the connection between the distorted illustrations in a few Arabic and in almost all Latin manuscripts, on the one hand, and the original illustration, on the other.

\[\text{Fig. from the *Taṣrif*’s Hebrew translation by Shemtov b. Isaac of Tortosa (1258), copy from the early 15th century.}\]

\[^{18}\text{K. Sudhoff, op. cit., p. 52 (repr., p. 202).}\]
\[^{19}\text{MS Paris Bibl. nat., heb. 1163, fol. 222a.}\]
Cephalotribe

(mišdāḥ)

An instrument resembling obstetric forceps «for crushing the head of a fetus» (yuṣdaḥ biḥi raʾs al-ḡaṇīn) in case of miscarriages. Our model is based on the sketch by L. Leclerc\(^{20}\) which he drew after the illustrations in the Paris manuscripts of the Taṣrif by az-Zahrāwī (4th/10th cent.) and on the illustration in the Istanbul manuscript Beṣirağa\(^{21}\) (see above). By way of comparison, the illustration of the Oxford manuscript Huntington\(^ {22}\) is reproduced here.

\(^{20}\) *La chirurgie d’Abulcasis*, p. 184, fig. no. 106.


Cephalotribe
(miṣdāḥ)

Another pair of tongs with the same function, which az-Zahrāwī describes in the following manner: «It is similar to a pair of scissors. As you see, it has teeth at the end, and sometimes it is made long like tongs. In this illustration it has, as you see, teeth like the teeth of a saw. With this you cut and crush (the head).»

Our models (a, b) are based on the Istanbul manuscript Beşirğa of the Taṣrīf by az-Zahrāwī (4th/10th cent.) and on a sketch drawn by L. Leclerc after one of the Paris manuscripts of that book. For comparison, the illustration from the Paris manuscript ar. 2953 is reproduced here.

---

25 La chirurgie d’Abulcasis, op. cit., p. 183, fig. no. 107.
26 Bibliothèque nationale, ar. 2953, fol. 67b.

Model (a):
Stainless steel, riveted.
Length: 254 mm.
(Inventory No. H 6.03)

Model (b):
Stainless steel, riveted.
Length: 198 mm.
(Inventory No. H 6.06)

az-Zahrāwī, Taṣrīf,
MS Paris Bibl. nat., ar. 2953, fol. 67b.
Hook with two horns
(šinnāra ḍāt aš-šaukatain)

An instrument for the extirpation of dead foetuses from the uterus.
Our model is based on the illustrations, one from each, of the Paris, Istanbul and Oxford manuscripts and the drawing by L. Leclerc.

Our model:
Brass and stainless steel.
Length: 196 mm.
(Inventory No. H 6.07)

az-Zahrāwī, Tāṣrīf, MS Paris Bibl., nat., ar. 2953, fol. 68a.

Albucasis.
On Surgery and Instruments, p. 495 (MS Marsh).

az-Zahrāwī, Tāṣrīf, MS Veliyeddin no.2491, fol. 172b.

27 Bibliothèque nationale, ar. 2953, fol. 68a.

30 La chirurgie d’Abulcasim, p. 184, fig. no. 110; v. also K. Sudhoff, Beiträge zur Geschichte der Chirurgie im Mittelalter, 2nd part, pp. 54–55 (repr., op. cit., p. 204–205); A. Schahien, Die geburtshilflich-gynäkologischen Kapitel aus der Chirurgie des Abulkasim, p. 34 (repr., op. cit., p. 354).
ORTHOPAEDICS

Cauter
with <two spits>
(mikwāt ḍāt as-saffūdān)

for branding the armpit (li-ka'iya al-ibṭ) in case of luxations (dislocations).

Our model reproduces one of the illustrations in the Istanbul manuscript Beşiragā' of the Kitāb at-Tasrif by az-Zahrāwī (4th/10th cent.) and corresponds with the sketch drawn by L. Leclerc after the manuscripts of the book preserved in Paris.

Like wise for branding the armpit (li-ka'iya al-ibṭ) in case of luxations (dislocations).

Our model corresponds with the drawing made by L. Leclerc after the manuscripts of the Kitāb at-Tasrif by az-Zahrāwī (4th/10th cent.) preserved in Paris and takes into account the illustrations in the Latin translations of the book. The illustrations reproduced here are taken from the Arabic copies of the work in the collections Beşiragā' (a) and Veliyeddin (b) at Istanbul as well as from the copy of the Bodleian at Oxford (c).

2 La chirurgie d’Abulcasis, p. 31, fig. no. 17'.
3 La chirurgie d’Abulcasis, p. 31–32, fig. no. 17''.
5 No. 2491, fol. 114b.
Orthopaedic bench
(for the treatment of luxations (dislocations) of the dorsal vertebrae)
(fī ‘ilāq fakk ḥaraz az-ẓahr)

Our model was constructed according to the drawing made by L. Leclerc after the illustrations in the Paris manuscripts of the Tārsīf and after the description in az-Zahrāwī’s book.

The illustration included in the Tārsīf by az-Zahrāwī (4th/10th cent.) is the last one in the book.

Our model: Wood, carved figure.
(Inventory No. H 3.05)

Miniature with orthopaedic bench from the Latin translation of the Tārsīf (MS 14th cent.) in the Austrian National Library.

1 La chirurgie d’Abulcasis, pp. 131–133, fig. no. 151.
3 Codex S.N. 2641, facsimile ed., Graz 1979, fol. 76b.

Miniature with orthopaedic bench from the Turkish version of the text by az-Zahrāwī through Šerefeddin (MS Paris).

10 P. Huard, M. D. Grmek, Le premier manuscrit chirurgical turc rédigé par Charaf ed-Din (1465) et illustré de 140 miniatures. Présentation française. Paris 1960, fig. 127.
GENERAL SURGERY

Scarificator
(miṣraṭ)

for cutting off and removing cysts, sebaceous cysts and tumours (yuṣraṭ bihi as-sila' wa-l-aurator). az-Zahrāwī (4th/10th cent.) knows three different sizes (v. fig. on the right).

Our model representing the largest of the three forms according to the Kitāb at-Taṣrif, was made on the basis of the sketch drawn by L. Leclerc after the illustrations in the Parisian manuscripts. For comparison, the illustration from one of the Oxford manuscripts is added here (on the left).

Albucasis.
On Surgery and Instruments,
p. 355 (MS Marsh).

Scalpel
(mibda‘)

for the extraction of arteries at the temples (fi sall aš-širiyānīn alladain fi l-aṣdāq).

Our model is based on the drawing made by L. Leclerc after the illustrations in the Paris manuscripts of the Taṣrif by az-Zahrāwī (4th/10th cent.). For comparison, the depictions from the Istanbul manuscripts Beṣiraga and Ahmet III are added here.

1 La chirurgie d’Abulcasis, p. 126, fig. no. 83; cf. K. Sudhoff, Beiträge..., 2nd part, p. 35 (repr., op. cit. p. 185).
Our model (single hook):
Brass and stainless steel.
Length: 106 mm.
(Inventory No. H 3.08)

Our model (double hook):
Brass and stainless steel.
Length: 133 mm.
(Inventory No. H 309)

Our model (triple hook):
Brass and stainless steel.
Length: 153 mm.
(Inventory No. H 3.10)

Hook
(şinnāra)

for lifting vessels. Az-Zahrāwi (4th/10th cent.)
describes in his Taṣrīf three types of hooks: a
simple one with a single prong, one with two
prongs and one with three prongs. Of each
type, he mentions three sizes: small, medium
and large (şinnāra şaqira, şinnāra «wasat»,
şinnāra kabīra). Our models represent the
«large» size in each case. They are based
on the drawings made by L. Leclerc\(^5\) after
the manuscripts of the Taṣrīf by az-Zahrāwi
(4th/10th cent.) available in his time at Paris
and on the illustrations in other manuscripts in
Istanbul\(^6\) and Oxford\(^7\).

\(^5\) La chirurgie d’Abulcasis, p. 126, fig. no. 78, 80, 81.
\(^6\) Süleymaniye Kütüphanesi, collection Beşirâğa 502,
\(^7\) Bodleian Library, Huntington 156 and Marsh 54, v. Albu-
casis. On Surgery..., pp. 351–355; v. also K. Sudhoff, Bei-
Covered Scalpel

〈secret chamber〉 (*miḥda‘) *

According to the description by az-Zahrāwī⁶ (4th/10th cent.) and his illustrations in the *Kitāb at-Tasrif*, this instrument consists of a blade hidden inside an ellipsoid shell. It can be pushed out of the shell up to the desired length and pulled back again into the shell so that the patient does not notice it. Our model was constructed after the description by az-Zahrāwī, following the illustrations in the Istanbul manuscript Veliyeddin⁹ and the Oxford manuscript Marsh¹⁰, and after the sketch drawn by L. Leclerc¹¹ after the illustrations in the manuscripts of the *Tasrif* available in his time at Paris. This instrument was also in use in three sizes (v. fig. below, on the left).

Our model:
Copper, brass and steel,
length: 125 mm.
(Inventory No. H 3.11)

---

⁷ Veliyeddin 2491, fol. 151a.
⁹ MS Paris Bibl. nat., ar. 2953, fol. 68a.
TRAUMA SURGERY

a)

〈Peeler〉
or 〈Scraper〉 (Raspatorium)  
(miğrad)

for the incision of bones (li-qat al-‘izām). Our model was prepared according to the sketch drawn by L. Leclerc after the illustrations in the Paris manuscripts of the Taṣrif by az-Zahrāwī (4th/10th cent.). The illustration added here goes back to one of the Oxford manuscripts. \(^1\)

Our model:  
Brass and stainless steel. Length: 174 mm.  
(Inventory No. H 3.12)

Albucasis. On Surgery and Instruments, p. 573 (MS Marsh).

Our model:  
Brass and stainless steel. Length: 174 mm.  
(Inventory No. H 3.13)

b)

〈Raspatory〉  
(miğrad)

»bent at an angle at the end« (mu‘aqqaf at-taraf). Our model was prepared according to the sketch drawn by L. Leclerc after the illustrations in the Paris manuscripts of the Taṣrif by az-Zahrāwī (4th/10th cent.). The illustration reproduced here is taken from such a source. \(^4\) The rounded shape of the blade probably did not affect its function.

Fig. from the Latin MS, Munich, cod. lat. 161, after K. Sudhoff, Beiträge ..., 2nd part, plate XVII, 8-9.

\(^1\) La chirurgie d'Abulcasis, p. 219, fig. no. 130.  
\(^3\) La chirurgie d'Abulcasis, p. 219, fig. no. 125.  
c) **Raspatory**

\[\text{\textit{mi\textasciitilde{g}rad}}\]

«with indentation» (\textit{fihi ta\textasciitilde{g}wif}), i.e. with a concave blade.

Our model is based on the sketch drawn by L. Leclerc\(^5\) after the illustrations in the Paris manuscripts of the \textit{Ta\textasciitilde{r}if} by az-Zahr\"awi (4th/10th cent.). The illustrations reproduced here are from the copies Huntington (a) and Marsh (b) in Oxford\(^7\).

\[\text{Our model:}
\begin{align*}
\text{Brass and stainless steel.} \\
\text{Length: 150 mm.} \\
\text{(Inventory No. H 3.14)}
\end{align*}
\]

\(\text{(a)}\) \hspace{1cm} \text{(b)}

\[d) \text{ **Broad Raspatory**}

\[\text{\textit{mi\textasciitilde{g}rad ʿar\textasciitilde{d}}}\]

Our model is based on the sketch drawn by L. Leclerc\(^8\) after the illustrations in the Paris manuscripts of the \textit{Ta\textasciitilde{r}if} by az-Zahr\"awi (4th/10th cent.). The illustrations reproduced here\(^9\) come from the manuscripts Veliyeddin\(^10\) (a) at Istanbul and Marsh\(^11\) (b) at Oxford.

\[\text{Our model:}
\begin{align*}
\text{Brass and stainless steel.} \\
\text{Length: 182 mm.} \\
\text{(Inventory No. H 3.15)}
\end{align*}
\]

\(\text{(a)}\) \hspace{1cm} \text{(b)}

\(^1\) La chirurgie d’Abulcasis, p. 219, fig. no. 124.


\(^4\) La chirurgie d’Abulcasis, p. 219, fig. no. 126.

\(^5\) No. 2491, fol. 185b; cf. facsimile ed., vol. 2, p. 528.

\(^6\) Marsh 54, v. Albuca\textasciitilde{s}is. On Surgery and Instruments, p. 571; v. also E. Gurlt, Geschichte der Chirurgie, vol. 1, p. 642 and plate V, no. 86.
c) **Compact Hacksaw**

*(minšār muḥkam)*

Our model is based on the sketch drawn by L. Leclerc after the illustrations in the Paris manuscripts of the *Taṣrīf* by az-Zahrāwī (4th/10th cent.) and following the illustration in the Istanbul manuscript Veliyeddin. According to az-Zahrāwī, the bow and the blade are of «iron» (*ḥaḍīḍ*), the handle of box-tree wood (*baqs*), «turned and fastened well».

Our model:
Brass and stainless steel.
Length: 245 mm.
(Inventory No. H 3.16)

az-Zahrāwī, *Taṣrīf*, MS Veliyeddin no. 2491, fol. 185b.

---

f) **Padsaw**

*(minšār)*

Notre modèle:
Laiton et acier inoxydable.
Longueur: 145 mm.
(Inventaire no. H 3.17)

Our model is based on the sketch drawn by L. Leclerc after the illustrations in the Paris manuscripts of the *Taṣrīf* by az-Zahrāwī (4th/10th cent.). It corresponds to the drawing in the Oxford manuscript Marsh.

---

11 *La chirurgie d’Abulcasis*, p. 219, fig. no. 128.
13 *La chirurgie d’Abulcasis*, p. 218, fig. no. 119.
Our model is based on the sketch drawn by L. Leclerc\textsuperscript{15} after the illustrations in the Paris manuscripts of the \textit{Taṣrīf} by az-Zahrāwī (4th/10th cent.). Additionally, the illustrations from the manuscript Veliyeddin\textsuperscript{16} at Istanbul and from one of the Paris manuscripts are reproduced here.\textsuperscript{17}

\textit{Large hacksaw} (\textit{minšār kabīr})

Our model:
Brass and stainless steel.
Length: 255 mm.
(Inventory No. H 3.18)

\textit{La chirurgie d’Abulcasis}, p. 218, fig. no. 122; v. also E. Gurlt, \textit{Geschichte der Chirurgie}, vol. 1, p. 642 and plate V, no. 80.
\textsuperscript{16} No. 2491, fol. 145b.
\textsuperscript{17} Bibl. nat., ar. 2953, fol. 79b.
In view of the fact that the following surgical instruments are depicted variously in different manuscripts, it seemed advisable to collect the relevant pages of the manuscripts here and to indicate with the letters of the alphabet those instruments which we reconstructed.


From the Turkish version of az-Zahrāwī’s text by Şerefeddin (9th/15th cent.). MS Paris suppl. turc 693, fol. 138a.

az-Zahrāwī, *Tasrif*,
MS Berlin, Staatsbibl., MS or. 91, f. 154a.

az-Zahrāwī, *Tasrif*,
MS Veliyeddin no. 2491, fol. 185-186a.
VARIOUS INSTRUMENTS

from al-Fusṭāt (Egypt)

c.a. 3rd/9th cent.? (Originals in the Islamic Museum, Cairo)

The few publications\(^1\) to have appeared so far on these uncertain archaeological finds do not, unfortunately, offer the detailed comparison needed for their identification with instruments known from literature; in some cases, the function is obvious, e.g. tweezers (fig. 1, on the right); others are unusual but can be identified quite correctly with the help of the descriptions and illustrations in the *Kitāb at-Taṣrīf*; e.g. fig. 1, 2 from the left is probably a multiple cauter (see above, pp. 60, 81) which would be useful for eyelids; a few more common cauters of the kind described in az-Zahrāwī’s book (see above, p. 36 ff.) are collected in fig. 5; fig. 4 shows two classical forms of the scalpel.

---

\(^1\) Sami K. Hamarneh, *Excavated Surgical Instruments from old Cairo, Egypt*, in: Annali Dell’Istituto e Museo di Storia della Scienza di Firenze, 2/1977/1–14, 6 fig.
VARIOUS INSTRUMENTS

2

3