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Could Medieval Islamic Oculists Remove Cataracts? The views of a fourteenth-century Egyptian sceptic.

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ABSTRACT: As early as the ninth century CE, Arabic ophthalmological treatises described surgical procedures for treating cataracts. Most commonly the technique described was the ancient technique known to classical antiquity and today called, in English, «couching» (Arabic *qadh*), in which the cataract (the opaque lens) was pushed to one side. However, occasional mention was made of the extraction of a cataract by suction through a hollow needle. This study reviews the evidence for the practice of couching of cataracts as well as for their extraction, concluding with a translation and edition of the very sceptical report on cataract removal written by the eighth/fourteenth-century Egyptian oculist and scholar Ṣadaqa ibn Ibrāhīm al-Shādhilī.

KEYWORDS: cataracts, couching; extraction of cataracts; Hunayn ibn Ishāq; ‘Alī ibn ‘Īsā al-Kaḥḥāl; ‘Ammār ibn ‘Alī al-Mawṣilī; Abū al-Qāsim Kalaf al-Zahrāwī; Khalīfa ibn Abī al-Mahāsīn al-Ḥalabī; Ismā‘īl ibn Ḥusayn al-Jurjānī; Ibn Kammūna; Ṣadaqa ibn Ibrāhīm al-Shādhilī.

Podien eliminar les cataractes, els oculistes medievals araboislàmics? Les opinions d'un escèptic egipci del segle XIV

RESUM: Ja al segle IX, els tractats d'oftalmologia àrabs descrivien procediments quirúrgics per tractar les cataractes. Ben sovint, la tècnica descrita és una tècnica antiga coneguda a l'antiguitat clàssica que avui anomenem «abatiment» (*couching* en anglès, *qadh*, en àrab) amb la qual la cataracta (la lent opaca) s'empenyia a un costat. Ocasionalment s'esmenta l'extracció de la cataracta amb una agulla buida. Aquest estudi examina les evidències sobre la pràctica tant de l'abatiment de les cataractes com de la seva extracció, i conclou amb una traducció i edició d'un informe escèptic sobre l'eliminació de cataractes, escrit per l'oculista i erudit Ṣadaqa ibn Ibrāhīm al-Shādhilī cap al segle VIII/XIV.

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PARAULES CLAU: cataractes, abatiment; extracció de cataractes; Ḥunayn ibn Ishāq; ‘Alī ibn ‘Īsā al-Kaḥḥāl; ‘Ammār ibn ‘Alī al-Mawṣilī; Abū al-Qāsim Kalaf al-Zahrāwī; Khalīfa ibn Abī al-Mahāsīn al-Ḥalabī; Ismā‘īl ibn Ḥusayn al-Jurjānī; Ibn Kammūna; Ṣadaqa ibn Ibrāhīm al-Shādhilī.

A major cause of blindness throughout the Middle East was and is the occurrence of cataracts. Today the condition is known to be due to an opacity of the crystalline lens of the eye, but in medieval literature it was said that an opaque fluid was interposed between the lens and pupil of the eye. The Arabic name for it, *al-mā’ al-nāzil*, «descending fluid», gave rise to the modern term «cataract» through a late eleventh-century Latin translation by Constantine the African.¹ There were various theories regarding the precise site of the cataract, but it was always located someplace between the cornea and the lens, usually between the cornea and the iris, with the condition itself classified as a disorder of the pupil. In most of the Arabic treatises, fish-eating was particularly associated with the formation of cataracts amongst the fish-eating populations of Tinnīs and Damietta in the Nile delta as well as those on the Syrian coast.²

As early as the ninth century CE, the surgical technique of «couching» was advocated for treating cataracts by physicians such Ḥunayn ibn Ishāq (d. 260/873 or 264/877)³ and ‘Alī ibn ‘Īsā al-Kaḥḥāl (first half of fifth/eleventh cent.),⁴ both working in Baghdad, the Cairene oculist ‘Ammār ibn ‘Alī al-Mawṣilī (early fifth/eleventh cent.),⁵ and the influential Andalusian physician Abū al-Qāsim Kalaf al-Zahrāwī (d. after 400/1010), known in Latin as Abulcasis,⁶ and Khalīfa ibn Abī

1. McVaugh (2001), 327–329.

2. For fish-eating and cataracts, see Wood (1936), 181, Meyerhof (1937), and Sezgin (1986), 3:628–629.

3. Meyerhof (1928); Sezgin (1986), 2:1–517.

4. Hirschberg & Lippert (1904); Wood (1936); Sezgin (1986), 1:196–556.

5. Meyerhof (1937); Sezgin (1986), 3:590–712. For a German translation of entire treatise, see Hirschberg, Lippert & Mittwoch (1905), 1–152; Sezgin (1986), 1:558–718. For an English translation, see Wafai (1993), 35–183. For a recent edition of the complete Arabic text, employing six manuscripts, see [pseudo] Thābit ibn Qurra al-Ḥarranī (1991), in the second of the two volumes bound as one. See also HIRSCHBERG (1904) and E. SAVAGE-SMITH «‘Ammār b. ‘Alī al-Mawṣilī», *Encyclopaedia of Islam, Edition Three*.

6. Spink & Lewis (1973).

al-Mahāsin al-Ḥalabī,⁷ whose illustrated treatise on ophthalmology was composed in Syria between 654/1256 and 674/1275. Ophthalmology, though with little interest in surgical intervention, also formed part of the first major medical text written in Persian, the medical encyclopaedia *Dhakhīra-i Khwarazmshahī*, compiled by Ismāʿīl ibn Ḥusayn al-Jurjānī (d. 531/1136) and dedicated to his patron Quṭb al-Dīn Muḥammad ibn Nūshtigīn, the ruler of Khwarazm from 490/1097 to 521/1127.⁸

The technique used was an ancient one, known to classical antiquity and possibly originating much earlier in India. In English the technique is called couching (Arabic *qadh*), and in it the opaque lens (or «crystalline humour», *al-ruṭūba al-jalīda*, as it was then called) was not removed but rather pushed to one side. A small incision with a lancet was made into the temporal side of the sclera (the white of the eye), near the limbus (edge of the cornea) and then, after the lancet was removed, a cataract needle or probe was inserted and used to depress the lens, more or less forcefully, into the vitreous, tearing through the suspensory ligament from behind.⁹ Some oculists advocated only a needle without the preliminary incision with a lancet. See Figure 1.

Concerning this operation, al-Zahrāwī observed in his highly influential chapter on surgery:¹⁰ «But you should know that in the case of the depression of a cataract, the student cannot manage without having seen that operation performed many times; [only] then may he perform it himself». Al-Zahrāwī illustrated five cataract needles (*miqdah*), which he described as bronze with triangular, sharp tips.

ʿAlī ibn ʿIsā al-Kaḥḥāl, a contemporary of al-Zahrāwī, but working in Baghdad rather than al-Andalus, did not illustrate his manual for oculists, but in it he gave further details of the operation: The patient's knees should be bound together and his hands tied to his thighs. An assistant should hold the patient's head and instruct the patient to gaze toward his nose. He also stated that after the cataract needle had been inserted into the eye, but before the depression of the cata-

7. Hirschberg, Lippert & Mittwoch (1905), 155–799; Sezgin (1986) 1:719–760. For an English translation, see Wafai (1993), 187–231. For a recent complete edition, see Khalīfa ibn Abī al-Mahāsin al-Ḥalabī (1990).

8. For the treatise by Ismāʿīl ibn Ḥusayn al-Jurjānī, see Thierry de Crussol (1998), Thierry de Crussol (1998/2), Richter-Bernburg (1999), 157–159, Keshavarz (1986), 149–154 no. 43, and Aʿlam HUŠANG, «Jurjānī, Zayn al-Dīn Esmaʿīl», *Encyclopaedia Iranica*.

9. The cataract was said to be depressed in «the fringes of the uvea» (*khamlīyat al-ʿinabīyah*), called by some the ciliary processes, but in today's terminology, the zone of Zinn (*zonula ciliaris*).

10. Spink & Lewis (1973), 256–257.

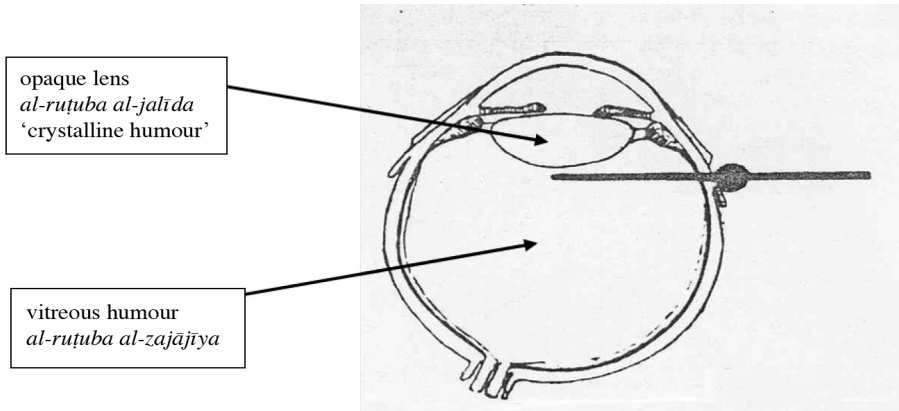


FIGURE 1. Traditional posterior positioning of needle for couching of cataract.

ract, the oculist should address the patient with kind words to quiet his fears and encourage him not to worry because all would be well. He also added the curious statement:¹¹

The eye that is being operated on should, at this stage, be covered with a layer of fresh cotton-wool on which you should audibly blow warm breaths of air and make sounds like drinking, as if to relieve the unrest of the eye.

Following the operation, the eye was to be washed with salt-water and then bandaged with cotton-wool soaked in oil of roses and egg-white. There was great concern that the cataract, once depressed, would then re-ascend, for which reason the patient was instructed to lie on their back for seven days following the operation. On the third day the bandages were to be removed to test the vision, with some advocating forty additional days of rest and daily dressings.

Both al-Zahrāwī and 'Alī ibn 'Īsā advocated the use of a solid triangular needle, but others said there were two types of needles, one round and the other with a triangular point.

It is evident that in some locales certain people did nothing but couch cataracts. In many instances, they were probably itinerant and not highly trained in other medical matters, and perhaps self-taught. For example, the physician Quṭb

11. See Wood (1936), 185.

al-Dīn al-Shīrāzī (d. 710/1311) in his commentary written in Shiraz in 682/1283 on Ibn Sīnā's *Qānūn fī l-ṭibb* said:¹²

I practised manual techniques appertaining to medicine and ophthalmology, such as bloodletting, suturing and fastening, everting [the eyelid] and removal of pterygium and pannus,¹³ and other things, all except the couching operation which was not befitting that I should perform.

In many societies throughout the world, the practice of couching continued into the twentieth century, and it may well still be practised in some remote areas. A study of over 700 cases of couching in India during the first decade of the twentieth century found that 38.2% had some vision restored and 10.6% had at least a third of their vision restored, while the remainder were permanently blind.¹⁴ What we today would call infection and glaucoma were probably the major causes for failure.

Couching continued to be practised in Europe until the technique of removal (extraction through an incision of the lower cornea) was developed by Jacques Daviel in the eighteenth century.¹⁵ In fact, couching continued for some time after that, for there were European oculists who maintained that couching was a better approach than the newly developed extraction methods. Before Daviel perfected his method of extraction, he performed many couchings, initially using a simple needle technique — that is, without the prior incision of a lancet — and with this method he found that five or six out of ten might be considered successful. He then switched to using a lancet followed by a needle (the method used by most medieval Islamic oculists) and found that the success rate increased to 61 out of 75.¹⁶

12. Iskandar (1967), 43; the translation is that of Iskandar, slightly amended.

13. Pterygium (*ṣafara* in Arabic) is a triangular-shaped encroachment of the bulbar conjunctiva onto the cornea, excised by Islamic oculists and earlier Greek physicians. Pannus (*sabal* in Arabic), a vascularization that invades the cornea, was often a complication of trachoma, and also often treated surgically. For both conditions in the Arabic medical literature, see Savage-Smith (1980).

14. Elliot (1917) and Feigenbaum (1960), 319–321.

15. It seems that there is no reliable evidence for cataracts being diagnosed and treated surgically in medieval Latin Europe before the thirteenth century, despite the antique origin of the technique; see McVaugh (2001), esp. p. 326.

16. From a letter from Daviel dated Sept 1748 to M. de Joyeuse, quoted at length by Feigenbaum (1960), 323.

However, techniques for couching of cataracts in recent centuries differed from those in medieval Islamic manuals. Medieval oculists used a posterior approach, inserting the needle behind the limbus (edge of the cornea), to depress the lens into the vitreous (see Fig. 1), while more recent couchers, from at least the beginning of the eighteenth century, used an anterior approach, inserting the needle through the cornea and iris (see Fig. 2).

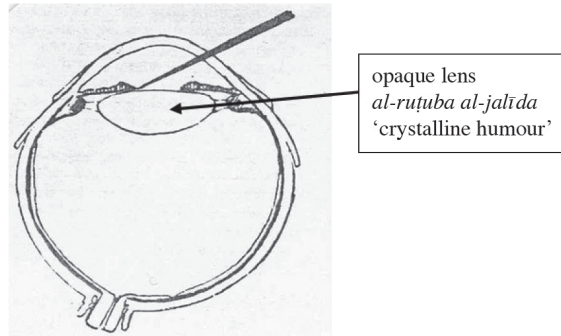


FIGURE 2. The anterior approach, inserting needle through the cornea and iris.

Since untreated cataracts inevitably result in blindness, and the medieval world afforded few means of livelihood for a blind person,¹⁷ it is perhaps not surprising that couching found widespread acceptance despite its less than encouraging success rate and evident pain. On the other hand, medieval biographers relate that when Abū Bakr Muḥammad ibn Zakarīyā' al-Rāzī grew blind with cataracts, he declined to have them couched. It is reported that, not long before he died in ca. 313/925, he told an oculist who had come to operate on his eyes:¹⁸

I acknowledge that you are the most learned of oculists. You know, however, that this operation is not without pain, which the soul loathes, and long-drawn-out discomfort, which men find wearying. And perhaps [my] life may be cut short and the time of death be near; in which case it is repugnant to someone like myself at the end of his days to choose pain and discomfort over repose. So depart, with thanks for what you intended to do.

17. For the difficulties encountered by the one-eyed and the blind in medieval Islamic society, see Richardson (2012) and, for the later Ottoman period, Scalenghe (2014).

18. Kraus (1936), 5–6; see also Savage-Smith (2002).

In another version of the event, it was said:¹⁹

He [al-Rāzī] became blind towards the end of his life due to fluid entering the eye. When he was advised to have his eyes couched, he said, «No, I have seen enough of the world and am weary of it», and refused to undergo the operation.

Thus, if al-Rāzī's attitude towards couching is representative, most people probably avoided the operation if at all possible.

It is often unclear whether the procedural instructions in medieval Arabic manuals reflect actual practice or whether they are a repetition of an earlier written account or even simply a «thought experiment» in which the writer guesses at what he might do were the occasion ever to arise. Case histories are crucial evidence for determining the nature and frequency of surgical interventions, as well as medical practice in general. Yet, while al-Zahrāwī provided eighteen «case histories» in his chapter on surgery, none involved eye surgery.²⁰

Ophthalmic surgery is also noticeably lacking from the over 900 case histories recorded by al-Rāzī's students and posthumously circulated under the title *Kitāb al-Tajārib*, although in this group of case histories al-Rāzī did treat incipient cataracts with collyriums and purgatives.²¹ Nor are cataracts to be found amongst the thirty-three clinical observations that al-Rāzī included, following a discussion of clinical cases recorded by Hippocrates, in his collection of working notes later assembled posthumously by his pupils under the title *Comprehensive Book on Medicine (Kitāb al-Ḥāwī fī al-ṭibb)*.²² Although al-Rāzī was renowned as a clinician, we have only one reference to him even mentioning couching in connection with a particular patient, and in that instance (which is recorded also in the *Ḥāwī* but in the section of notes on cataracts taken from many earlier writings) al-Rāzī says simply:²³

19. Ibn Abī Uṣaybi'a (2020), sect. 11.5.19.

20. Spink & Lewis (1973), 304, 330, 374, 480, 558, 578–80.

21. Álvarez Millán (2000), esp. 300–305.

22. Meyerhof (1935), based on Oxford, Bodleian, MS Marsh 156, fols. 239b–245b. See also al-Rāzī, *al-Ḥāwī* (Hyderabad ed.), 16:189–208 and al-Rāzī, *al-Ḥāwī* (Beirut 2000) *juz'* 16, 94–102, where the same section of the *Ḥāwī* is edited using different manuscripts. For other case histories from this section of the *Ḥāwī*, see Savage-Smith (2011), Entry 43A.

23. al-Rāzī, *al-Ḥāwī* (Beirut 2000) *juz'* 2, *bāb* 5, 129, 2nd entry, and al-Rāzī, *al-Ḥāwī* (Hyderabad ed.), 2:304. Interestingly, the thirteenth-century Syrian oculist usually known as Ṣalāḥ al-Dīn ibn Yūsuf al-Ḥamawī cites this statement by al-Rāzī in the 2nd *juz'* of the *Ḥāwī*, but goes on to say

A man came to me to have his eye couched, but it had not become consolidated, so I ordered him to continue eating fish [considered an important cause of cataracts] until the cataract was consolidated to the point that it could be couched. Because if it is couched before the consolidation is complete, it will not remain for long in its place [to which it is displaced by couching].

It is unclear whether al-Rāzī ever saw the unnamed patient again or undertook the couching himself.

The ophthalmological manual of ‘Ammār in the early eleventh century CE provides four clinical cases of couching:²⁴ Two were men from villages along the Upper Tigris River. One of them, aged 30, had a cataract as «hard as a stone» which gave ‘Ammār terrible trouble, for every time he touched it, it turned dark red or sometimes yellow. But then he pressed hard on it and it tore «like the membrane that covers the white of an egg inside the shell». Ultimately he finally couched it in many pieces and sight was restored after 3 days, even though the patient told ‘Ammār that he had not remained lying down for even one day. The other patient, from a nearby village, had a cataract that would not remain depressed, but rather rose and remain suspended in the upper fringes of the ciliary processes; ‘Ammār commented that this cataract reminded him of a piece of solid gypsum.

The third case related by ‘Ammār involved a 20-year-old slave in a house in Cairo with a cataract in both eyes. ‘Ammār operated on both eyes the same day. The left eye was no problem, but the right cataract would not remain depressed. ‘Ammār said he held it down with the needle from early morning to midday prayers, but whenever he took the needle off it rose upward, then he pressed hard on it and it emerged through the pupil to become positioned behind the cornea in the anterior chamber. He then noticed the cornea turning white, so he withdrew the needle, dressed the eye (with egg yolk and oil of violets); on the third day he was amazed

that Rāzī operated on the patient and then gives circumstances when couching is inappropriate. See Hirschberg, Lippert & Mittwoch (1905), 195–260, esp. 250–251; Sezgin (1986), 1:761–828, esp. 816–817. For an English translation Wafai (1993), 235–302, esp. 291. For the author’s name, see Schoeler (1987). For a recent edition of the full text, see Ṣalāh al-Dīn ibn Yūsuf al-Ḥamawī (1987), esp. p. 420.

24. Meyerhof (1937), 153–162; Sezgin (1986) 3:590–712. See also Hirschberg, Lippert & Mittwoch (1905), 1–152, esp. 112–133; Sezgin (1986), 1:563–716, esp. 678–699. For an English translation, see Wafai (1993), 146–164. See also the recent edition of the entire text: ‘Ammār ibn ‘Alī al-Mawṣilī (1991).

to find that the cataract had returned in the eye that had given him no trouble but sight was restored to the other, troubled eye.²⁵ His fourth and final case concerned a woman in a palace in Cairo who also had cataracts in both eyes. The couching of one went easily, but during the second one she went into spasms and fainted twice while he was operating; the needle remained in her eye throughout, but, he says, much to his surprise [and ours too, perhaps] in the event she regained perfect sight.

The Syrian oculist Khalīfa ibn Abī al-Maḥāsīn al-Ḥalabī, writing in the middle of the thirteenth century CE, provides us with two brief accounts of clinical cases of couching — all described as difficult but successful in the end.²⁶ He says he depressed a cataract six times in one woman, but each time it would return; six days later he repeated the couching, and the eye became swollen but it was finally successful. He also stated that in Aleppo he operated on a patient who had only one eye, and in that eye he had developed a cataract. In this instance Khalīfah got tired of repeatedly depressing the cataract and having it rise again, so he placed a heavy mortar on his head and had the patient breathe through his nose; then the cataract finally settled near the pupil and floated about, but the patient could still see.

The only other instance so far discovered in the recorded literature of a cataract being couched is also from the thirteenth century, but in this instance from a non-medical treatise. A seventh/thirteenth-century historian recorded the following account of an Egyptian scholar and man-of-letters by the name of al-Tīfāshī, most often remembered today for his treatises on sexual hygiene and the magical uses of stones. Of al-Tīfāshī, whom he knew personally, the historian Ibn al-ʿAdīm (d. 660/1262) said:²⁷

It has been reported to me that a cataract descended in his eyes, so that he was blind. So both [eyes] were couched, and he could see and write and was free of it. But then

25. If we accept the observation as accurate, in modern terms ʿAmmār had either ruptured the capsule and milky cortex then spilled into the anterior chamber, or his manipulation had produced endothelial damage thus producing corneal oedema. After three days, the repair process by the endothelium could have caused the cornea to recover, at least temporarily. I thank Hung Cheng, Consultant Ophthalmic Surgeon and former director of the Oxford Eye Hospital for providing these observations.

26. See Hirschberg, Lippert & Mittwoch (1905), 153–194, esp. 181–183; Sezgin (1986) 1:719–760, esp. 747–749. For an English translation, see Wafai (1993), 219–220. See also the recent edition Khalīfa ibn Abī al-Maḥāsīn al-Ḥalabī (1990).

27. Ibn al-ʿAdīm (1988), 3:1291; see also Morray (1994), 51. I wish to thank Dr Chase Robinson for this reference.

he drank a purgative medicine and his end came quickly, for he died 13 Muḥarram 651 [15 March 1253].

It is notable that few details are given in this instance, and it is difficult to know exactly what was done to Tīfāshī's eyes.

However, couching was not the only form of cataract surgery attested to in the medieval Islamic literature. There are also accounts of the *removal* by suction through a hollow needle — as opposed to employing the traditional technique of «couching» or displacement. In these instances, however, the evidence becomes even more problematic.

Abū Bakr Muḥammad ibn Zakarīyā' al-Rāzī briefly recorded in his working notes later assembled in *Kitāb al-Ḥāwī fī al-ṭibb* two procedures for extraction of a cataract, both attributed to a Greek physician of the second century CE named Antyllus.²⁸ According to al-Rāzī, Antyllus said that «certain doctors have made an incision in the lower part of the cornea and extracted the cataract». Antyllus continues (according to al-Rāzī), «that can be done in thin [soft] cataracts but not thick ones», and, Antyllus adds, «others have introduced a glass tube and aspirated the cataract along with the vitreous and aqueous humours».

Thus, according to the citation recorded by al-Rāzī, the Greeks had two procedures, but Antyllus (according to al-Rāzī) did not approve of either, for he says they did not give favourable results. No other details are given, and no mention of the extraction of cataracts is preserved in any of the extant Greek or early Latin literature on ophthalmology.

A treatise titled *The Book of Vision and Perception* (*Kitāb fī l-baṣīr wa-l-baṣīra*) was composed not long after 318/930, but falsely attributed to a ninth-century scholar and near contemporary of al-Rāzī, Thābit ibn Qurra (d. 288/901). The unknown author of this *Book of Vision* said that the operation of extraction was an illusion, that it could not be performed, and that a person should avoid anyone who says he can do it, even if he calls himself an oculist (*kaḥḥāl*).²⁹

28. Hirschberg (1906); Meyerhof (1932); al-Rāzī, *al-Ḥāwī* (Hyderabad ed.), 2: 315–318, 343–346; al-Rāzī, *al-Ḥāwī* (Beirut 2000), *jūz'* 2, 305–307, 318–319. See also Pergens (1902) and Hirschberg (1908), 230–231; Sezgin (1986) 3:238–239.

29. Meyerhof & Prüfer (1911); Sezgin (1986), 3:360–368. See new edition, [pseudo] Thābit ibn Qurra al-Ḥarranī (1991), pages 38–162 of the first of the two volumes bound as one. Thābit's disapproval is repeated verbatim by Ṣalāḥ al-Dīn ibn Yūsuf al-Ḥamawī; see Hirschberg, Lippert