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# Eye diseases in the Ebers Papyrus

Part 4: Eb 418-431

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#### 1 Introduction

The Ebers Papyrus is an important medical papyrus from a West Theban necropolis (el-Assasif) dating from the period of the 17th to early 18th Dynasty. Written in hieratic script, the papyrus contains 877 individual texts consisting of medical prescriptions, instructional texts, and magic spells for a variety of medical problems. The section of the papyrus called the "Eye Book" (Eb 336–431) contains 96 prescriptions for the treatment of various eye diseases and eye injuries.<sup>2</sup> Some additional medical prescriptions for eye diseases appear sporadically in other sections of the Ebers Papyrus, but no eye diseases that are not also included in the Eye Book.

In this fourth and final part of my series on eye diseases in the Ebers Papyrus<sup>3</sup>

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<sup>&</sup>lt;sup>2</sup> L. Popko (online), metadata, <a href="https://sae.saw-leipzig.de/de/documents/papyrus-ebers">https://sae.saw-leipzig.de/de/documents/papyrus-ebers</a>, with literature overview (last accessed 06.02.2024).

Previous parts: E. Traunmüller, *Eye diseases in the Ebers Papyrus*, Parts 1–3 (Vienna 2023), <a href="https://www.egyptological-hypotheses.org">https://www.egyptological-hypotheses.org</a>.

we will continue with Eb 418-431. The names of the diseases were translated<sup>4</sup> and subjected to a modern ophthalmological interpretation. Frequent diagnoses were preferred to rare ones, and the environmental and living conditions in ancient Egypt were taken into account. Since some eye diseases and symptoms appear twice or more in the Eye Book (see the statistical table in section 3), occasional repetition was unavoidable. The so-called "k.t prescriptions" have the simple title "Something else" (k.t) or "Another eye make-up" (ky sdm), but do not specify which eye disease they are intended to treat. There is reason to believe that these are alternative treatments to the last mentioned disease.<sup>6</sup> All statements must be considered hypotheses.

#### **Eye diseases (Eb 418-431)** 2

As in previous parts of this work, the text occasionally refers to images in the online "Atlas of Ophthalmology" (https://www.atlasophthalmology.net).<sup>7</sup>

Dictionaries and translations used:

- A. Erman and H. Grapow, Wörterbuch der ägyptischen Sprache, Vol. I-VII, (Berlin, 1897-1961; unchanged reprint; Berlin, 1971), hereinafter referred to as "Wb" for short;
- R. Hannig, Die Sprache der Pharaonen: Großes Handwörterbuch Ägyptisch Deutsch, Marburger Edition (KAW 64; 4th revised edn; Mainz, 2006), hereinafter referred to as "Hannig" for short.
- B. Ebbell, Alt-ägyptische Bezeichnungen für Krankheiten und Symptome (Oslo, 1938), hereinafter referred to as "Ebbell" for short.
- B. Ebbell, "Die ägyptischen Krankheitsnamen", ZÄS 59 (1924), 55-59, hereinafter referred to as "Ebbell, ZÄS" for short.
- B. Lalanne and G. Métra, Le texte médical du Papyrus Ebers: Transcription hiéroglyphique, translittération, traduction, glossaire et index (Langues et cultures anciennes 28; Brussels, 2017), hereinafter referred to as "Lalanne and Métra" for short.
- L. Popko, "Papyrus Ebers: Übersetzung und Kommentar", in Science in Ancient Egypt (Leipzig, online) <a href="https://sae.saw-leipzig.de/de/documents/papyrus-ebers">https://sae.saw-leipzig.de/de/documents/papyrus-ebers</a> (last accessed 08.12.2023), hereinafter referred to as "Popko (online)" for short.
- W. Westendorf, "Handbuch der Altägyptischen Medizin", Vols 1 and 2, in H. Altenmüller et al. (eds), Handbuch der Orientalistik, Erste Abteilung: Der Nahe und Mittlere Osten (Boston, Cologne and Leiden, 1999), hereinafter referred to as "Westendorf" for short.
- Cf. Westendorf, 55, 89, 91, etc.
- An exception is Eb 362. Based on the directions for use, this is clearly an alternative treatment to the following prescription, Eb 363.
- Such references consist of the abbreviation "AoO" and an image number. To access an image on <a href="https://www.atlasophthalmology.net">https://www.atlasophthalmology.net</a>, select "Search" from the green menu bar, enter the image number in the search field ("Search phrase"). and click the "Search" button.

# Eb 418 (63,2-3)

Text:	
Transcription:	k.t n(j).t dr hnt m fnd
Translation:	Something else to remove secretion from the nose

This remedy is specifically for excessive secretions from the nose (rhinitis).<sup>8</sup> The prescription appears in the Eye Book although there is a separate section in the Ebers Papyrus for diseases of the nose (Eb 761–763). After all, a runny nose may be accompanied by red, glassy eyes. Allergic rhinitis involving the eyes, such as a reaction to flowering grasses, is also possible.

# Eb 419 (63,4-6)

Text:	A TO DE COMPANIE MANDER OF THE PROPERTY OF THE
Transcription:	ky sdm.w jr(.w) n(j) wr m³.w Hwy
Translation:	Other eye make-up prepared for Chuy, the Great of the Seers

This is the first individual preparation for a specific patient.<sup>9</sup> Exceptionally, eye make-up is written in the plural (sdm.w). Perhaps there is not one but two separate mixtures described: a mixture of black and green eyeshadow (msdm.t,  $w^3d.w$ ) and another mixture of minerals, "medicinal herb from far away" 10 and fermented honey. The medical purpose

Translations of *Int m fnd* by other authors: runny nose/catarrh in the nose (Westendorf, 622; Popko [online], Eb 418); khent disease ("[mal-]khent qui est dans le nez"; Lalanne and Métra, 131).

Other expressions for a cold in the Ebers Papyrus: Eb 192 (37,18): "Secretion comes from his 'front',

whereby his eyes have become red and his face is wet" (hnt.y r h .t = f y w fr.t = f s s m.t f w h nt = f t .h b = f). Eb 762 (90,14–15): nj > m f nd (sneeze? from the nose; Hannig, 413 [14847]; Wb II, 201.12). Eb 763 (90,16): s n.t r s (to suffer from a cold/to conjure away a cold; Hannig, 510 [18350], 892 [33077], 893 [33085]; Wb II, 453.19, Wb IV, 496.8–9).

To my knowledge, the name Chuy for a great seer is not documented outside of the Ebers Papyrus. However, the name itself was relatively common (S. D. Schweitzer et al., <a href="https://simondschweitzer.github.io/aed/400017.html">https://simondschweitzer.github.io/aed/400017.html</a> last accessed 06.02.2024).

This translation is based on my personal reading of as  $bt^{-c}$  with a  $bt^{-c}$ 

remains unclear.

#### Eb 420 (63,6-7)

Text:	
Transcription:	k.t n(j).t dr šp.t m jr.tj
Translation:	Something else to eliminate blindness in both eyes

After Eb 356 (57,17–21) and Eb 357 (57,21–58,2), this is the third prescription for blindness.<sup>11</sup> It is not clear what distinguishes the  $\delta p.t$  blindness from those other eye conditions that required an "opening of the eyesight"  $(wb\beta m\beta\beta)^{12}$ . The expression "opening of the eyesight" may have been used only for those forms of blindness caused by some form of externally visible "shutter" (adhesions, opacities).

# Eb 421 (63,7-8)

Text:	
Transcription:	$k.t \ n(j).t \ dr \ hsf.w \ n(j) \ h^c.w \ m \ jr.tj$
Translation:	Something else to remove the "tight closure" of tissues in both eyes

The word  $h^c.w$  ("body parts, flesh, tissue") should actually be classified with hieroglyph F51 (small piece of meat);<sup>13</sup> but in this passage of the Ebers Papyrus it is clearly F21 (cow's ear).

Earlier scholars had translated the verb hsf as "to turn around, to invert". Therefore, it seemed clear that hsf.w nj hst.w m jr.tj ("inversion of the flesh in both eyes") was a vivid description of bilateral  $ectropion.^{14}$  Ectropion is a drooping lower eyelid that, in severe cases, folds outward and can occur bilaterally. It is associated with age-related atony of

See Traunmüller, *Eye diseases, Part 1,* 16–17. The translation of *šp.t* as "blindness" is undisputed (Lalanne and Métra, 131; Westendorf, 623; Popko [online], Eb 420).

<sup>&</sup>quot;Opening of the eyesight" ( $wb \ m$ ) is the purpose of the prescriptions Eb 342, 377, 396–399, and 414.

<sup>&</sup>lt;sup>13</sup> Hannig, 545 (19722, 19731); Wb III, 37.8, 38.26.

Translations by other authors: Turning/inversion of the flesh (Ebbell, 39; Westendorf, 623); ectropion (Ebbell, 27, 39); *hsf*-of-the-flesh suffering (Popko, Eb 421); a displaced part of the flesh (Lalanne and Métra, 131).

the eye ring muscle (*Ectropium senile*; AoO 2629), paralysis of the facial nerve (*Ectropium paralyticum*, very rarely bilateral) or scarring of the eyelid (e.g., after a burn; *Ectropium cicatriceum*; AoO 2628).

However, this translation of the verb <code>hsf</code> would require the hieroglyph D54 (walking legs) as the classifier.<sup>15</sup> Instead, <code>hsf</code> here is classified with D40 (arm with baton) and therefore belongs more to the spectrum of meanings of "to defend, to deter, to oppose". Based on this idea of defensiveness, the verb <code>hsf</code> can also be found as "to close [a door] firmly", <sup>16</sup> and there was also the participle <code>hsf.w</code> ("defenders"), classified with three door leaves (O31), as a synonym for the locked Gate of Heaven<sup>17</sup>. I therefore disagree with the interpretation of <code>hsf.w</code> <code>nj</code> <code>hβ.w</code> as <code>ectropion</code> and suggest instead "firm closure of the tissue [of the eyelids]" as the proper translation. The use of the verb <code>hsf</code> to describe this condition is understandable because the eyelids can rightly be considered the defensive "doors" of the eyes. In my opinion, the condition in question is adhesions of the eyelids to each other or to the eyeball, e.g., in the final stages of untreated trachoma or after an injury or burn (AoO 9408).

# Eb 422 (63,8-11)

Text:	
Transcription:	k.t pḥr.t n(j).t jr.tj ḏd.t.n ˤsm n(j) Kpnj
Translation:	Another remedy for the two eyes which an Asian from Byblos has shared

This is the traditional and most plausible translation.<sup>18</sup> There was certainly a mutual exchange of medical knowledge between the merchants of the Syro-Palestinian area and the Egyptians (Byblos was a port city in what is now Lebanon). The following transcription and translation of the hieroglyphic sequence is also possible:  $\underline{dd.t}$  n(j)  $\mathcal{S}m$  n(j) Kpnj ("communicated  $\underline{to}$  an Asian from Byblos"). This would make the Asian the patient, and it would then be the second individually prescribed remedy after Eb 419 (page 3). However, the mixture contains ingredients that are unusual in the Eye Book,<sup>19</sup> making it more likely that the Asian was the deliverer rather than the recipient of the

<sup>&</sup>lt;sup>15</sup> Hannig, 669 (24405); Wb III, 337.11–13.

<sup>&</sup>lt;sup>16</sup> Hannig, 669 (47403).

<sup>&</sup>lt;sup>17</sup> Hannig, 669 [24409]; Wb III, 337.17).

Popko (online), Eb 322; Westendorf, 623; Lalanne and Métra, 131.

These ingredients are dates, green barley, alum, salt, lead, and behen oil (oil from *Moringa oleifera*) or olive oil.

### recipe.

Unlike the patient named Chuy in Eb 419 (page 3), the deliverer of this prescription was not deemed worthy of being named. This may reflect the general skepticism of the ancient Egyptians towards foreigners<sup>20</sup> or the low status of this Asian merchant. Unfortunately, we do not know for which bilateral eye disease the remedy was intended, unless it was intended as an alternative treatment for adhesions of the eyelids (as in Eb 421).

# Eb 423 (63,11-12)

Text:	
Transcription:	k.t dr p <sup>r</sup> d's.t m jr.t
Translation:	Something else to remove a globule in the eye

There may have been a scribal error;<sup>21</sup> it should most likely be *pds.t* (globule).<sup>22</sup> As discussed in the comments to Eb 355,<sup>23</sup> the term "globule in the eye" best fits an eye stye, i.e., a *hordeolum* (clogged and inflamed gland at the edge of the eyelid; AoO 2746) or *chalazion* (clogged and encapsulated sebaceous gland [meibomian gland] of the eyelid; AoO 2637), or possibly a small round eyelid tumor (AoO 5001).<sup>24</sup> A spherical foreign body on the cornea cannot be excluded (AoO 9332).<sup>25</sup> In contrast to Eb 355, only the affected eye had to be treated.

Especially in times of military campaigns against the Levant, revilements such as "evil, miserable Asian" were used, e.g., on the second stela of Kamose (L. Habachi, *The Second Stela of Kamose and His Struggle Against the Hyksos-Ruler and His Capital* [MDAIK 8; Mainz 1972], pls IV–VII).

The succession of the two s-sounds is highly unusual; a word pzs.t (pss.t) or pszs.t (pss.t) or a corresponding verb is not listed in the dictionaries.

<sup>&</sup>lt;sup>22</sup> Cf. Popko (online), Eb 423 note 1.

<sup>&</sup>lt;sup>23</sup> Traunmüller, Eye diseases, Part 1, 15–16.

<sup>&</sup>lt;sup>24</sup> Translations by other authors: globule (Popko [online], Eb 423; Westendorf, 623); *hordeolum* (Westendorf, 623); *(formation-)peseset* (Lalanne and Métra, 131; these authors apparently considered "pzs.1" to be correct).

It occurs mainly when working with wood or metal without protecting goggles. Such foreign bodies can hit the corneal surface with high kinetic energy and can then only be removed with special instruments. If a foreign body remains on the cornea for a long time, the surrounding corneal tissue develops a defensive reaction.

# Eb 424 (63,12-13)

Text:	
Transcription:	k.t n(j).t dr w <sup>c</sup> f šnj.w m jr.t
Translation:	Something else to remove the bending [towards the eyeball] of eyelashes on one eye

Eyelashes that are bent inward most often occur on the lower eyelid.<sup>26</sup> Either the entire edge of the lower eyelid is bent toward the eyeball (*entropion*; AoO 85), or one or more eyelashes are bent toward the eyeball while the eyelid is in a normal position (*trichiasis*; AoO 2633).<sup>27</sup> *Entropion* has similar causes to *ectropion* (see page 4). The inwardly curled eyelashes create a permanent foreign body sensation in the eye. There tips of the lashes can rub against the cornea and cause irreversible damage in the long term. If the problem occurs in the upper eyelid, it is usually due to scarring (*Entropium cicatriceum*; AoO 4909).

Eb 425 (63,14-18) and Eb 429 (64,1-3)

Text:	
Transcription:	$k.t \ n(j).t \ tm \ rd(.w) \ r(w)\underline{d} \ \check{s}nj \ m \ jr.t \ m-\underline{h}t \ fd.t(w)=f$
Translation:	Something else to prevent an eyelash from re-growing on the [edge of the] eye after it has been plucked out

(It literally says: "Something else for not letting an eyelash grow [..]"). If an eyelash that is curled toward the eyeball (*trichiasis*, see above) is plucked out, it will regrow in the same deformity. The prescribed remedy should be applied to the site of the previously plucked eyelash to prevent regrowth.

The three prescriptions inserted in the order between Eb 425 and Eb 429 (Eb 426 [63,18–19], Eb 427 [63,19–20], and Eb 428 [63,21–64,1]) are simply titled "Something else". They are also intended to prevent unwanted eyelash regrowth, as these remedies should also be applied to the site of a previously plucked eyelash. Thus, there are a total of five prescriptions with different formulas to combat this problem.

<sup>&</sup>lt;sup>26</sup> w<sup>c</sup>f: Hannig, 198 (7061, 7062); Wb I, 285.3; šnj: Hannig, 894 (33132); Wb IV, 500.8.

<sup>&</sup>lt;sup>27</sup> Translations by other authors: the eyelash hairs are curved (Hannig, 198 [7062]); Inflection/curvature of a hair (Popko [online], Eb 424; Westendorf, 623); *trichiasis* (Westendorf, 623); inversion of an eyelash (Lalanne and Métra, 131); trapped eyelash hair (Wb I, 285.3).

# Eb 430 (64,3-4)

Text: a = b = bTranscription: a = b = b a = b = cTranslation:

Another remedy to remove a globule in the eye

Like Eb 423 (page 6), this prescription describes a remedy for a *hordeolum*, *chalazion*, small spherical eyelid tumor, or round foreign body in the eye. Only one eye is affected, but both eyes are to be treated.

#### Eb 431 (64,4-5)

Text:	
Transcription:	k.t n(j).t dr qn.t m jr.t
Translation:	Something else to remove "fat" in the eye

As already discussed in detail in Eb 354 (57,14–57,15),<sup>28</sup> *qn.t* ("the fatty one" [neuter]) is most likely a description of a *pinguecula*. It is a variably sized, sharply defined thickening of the bulbar conjunctiva at the edge of the cornea at 3 or 9 o'clock. If it extends in a wedge shape from the corner of the eye to beyond the edge of the cornea, it is called a *pterygium* (AoO 477, AoO 7754).<sup>29</sup> Such thickening of the conjunctiva is visually reminiscent of an accumulation of fat due to its yellowish-white color.<sup>30</sup>

The qn.t disease should not be confused with qnj.t (Eb 416).<sup>31</sup>

<sup>&</sup>lt;sup>28</sup> Traunmüller, *Eye diseases, Part 1*, 14–15.

Translations by other authors: corneal ulcer (Ebbell, 56); fat/something fatty in the eye (Lalanne and Métra, 119, 133; Popko [online], Eb 354, Eb 431; Westendorf, 612, 624); *pinguecula* (falsely written "pinguicula", Westendorf, 612, 624).

<sup>&</sup>lt;sup>30</sup> The name *pinguecula* is a contraction of the Latin words *pinguis* (fat) and *macula* (spot).

The *qnj.t* disease is described in Eb 416 [62,22–63,1]; See Part 3 of this work (Traunmüller, *Eye diseases, Part 3*, 15–16). B. Ebbell and Lalanne and Métra considered *qn.t* and *qnj.t* to be the same disease. Ebbell suggested that it was corneal ulcer (Lalanne and Métra, 129; Ebbell, 56). All other authors described *qnj.t* as an eye injury or left the word untranslated.

#### 3 Additional remarks and statistics

The ancient Egyptian doctors were high-ranking officials who received remuneration from the royal court in the form of food, precious metal (as a reward), and a tomb befitting their status.<sup>32</sup> According to the late Greek historian Herodotus (Late Period), they were specialists in various parts of the body.<sup>33</sup> The structure of the entire Ebers Papyrus according to body regions seems to confirm this also for the medical profession of the Middle and New Kingdoms. In any case, it is undisputed that there were specialized ophthalmologists (zwnw jr.tj). There was even a hierarchy of royal ophthalmologists, i.e., an "palace ophthalmologist" (zwnw jr.tj pr-5), a "senior palace ophthalmologist" (wr zwnw *jr.tj pr-*?), and a "head of the palace ophthalmologists" (*hrp zwnw jr.tj nj pr-*?). There were also doctors assigned to specific temples. The "houses of life" (pr.w-cnh) attached to the temples were probably the places for outpatient medical treatment, medical training, and the archiving of medical writings, among other things. Patients too ill to be taken to the doctor were visited in their homes.<sup>34</sup> Diagnoses were made by examinations involving all five senses. The distinction between pharmaceutical medicine, surgery and dentistry was not as strict as it is today.<sup>35</sup> Applying bandages seems to have required special knowledge, and there may have been specially trained personnel for it (jrj nj wt).<sup>36</sup>

As mentioned in the introduction, most of the medical prescriptions for eye diseases in the Ebers Papyrus are found in a section entitled "Compendium for the eyes"  $(dmd.t \ n(j).t \ jr.tj)$  which is now called the "Eye Book". With the exception of the alternative prescriptions ("k.t-prescriptions"),<sup>37</sup> the prescriptions are not arranged according to medical indications, i.e., the same indications can be found in different places in this compendium.

The most frequent medical indications are "opening/strengthening/treating vision" (wb3/s.rwd/srwh m33, 15%), "decay" (3dt/3dy.t, 13%), "the whitened ones" (s.hd.w, corneal scars, 8%), "blood in the eyes" (znf m jr.tj, paraphrase for severe inflammatory redness of the conjunctivae, 5%), and prevention of regrowth of a plucked eyelash (5%).<sup>38</sup> For some descriptions of eye diseases, I have followed the traditional interpretation; for others I have introduced additional options or expressed an opinion that is completely different from that of previous authors. Several disease descriptions, e.g., whd.w (papules), s.hd.w

Westendorf, 478.

<sup>&</sup>lt;sup>33</sup> Herodotus, Book II, *The Land of Egypt and its History*, 84.

<sup>&</sup>lt;sup>34</sup> Westendorf, 473–474, 476–477.

<sup>&</sup>lt;sup>35</sup> Westendorf, 480, 482–483.

Westendorf, 486.

<sup>&</sup>lt;sup>37</sup> Those with the simple title "Something else" (k.t) or "Another eye make-up" ( $ky \, sdm$ ).

<sup>&</sup>lt;sup>38</sup> According to my disease interpretations.

(corneal scars),  $nh\beta$ .(w)t ("bumps", probably another word for papules), and hsf.w nj  $h^c.w$  (adhesions of the eyelids), as well as cases of blindness ( $\delta p.t$ ,  $wb\beta$   $m\beta\beta$ ), can be at least partially explained as symptoms or sequelae of trachoma. This underlines the great suffering that this eye infection must have caused in ancient Egypt. Trachoma is still common among the rural population of Egypt and other countries and is the leading infectious cause of blindness worldwide.<sup>39</sup>

At least one of the prescriptions in the Eye Book (Eb 419 [63,4–6]) was made individually for a distinguished patient. His high rank as the "Great of the Seers"<sup>40</sup> was certainly the reason why he could enjoy "personalized medicine". However, the ingredients of the remedy made for him are ordinary. In contrast, the recipe shared by a foreigner from Byblos lists some unusual ingredients (Eb 422).<sup>41</sup>

In this work, the ingredients of the eye medicines were mentioned only in exceptional cases. They can be looked up in the previously published translations of the Ebers Papyrus.<sup>42</sup> However, many of the ingredients have not yet been identified. In any case, they were natural solids of mineral, plant or animal origin,<sup>43</sup> usually mixed with an aqueous or viscous carrier substance (pond water, plant sap, women's milk, oil/fat, honey, bone marrow). Very different recipes could be used for the same medical indication. The mixtures were to be placed into the eyes (*m jr.tj/m-hnw jr.t*, 20%), "to the eyes" (*r jr.tj,* 15%), on the outside of the eyes (on the outer surface of the lids; 29%),<sup>44</sup> or used to make up the eyes (14%). In addition, there were special methods of administration (20%), such as in the form of an eye bandage or compress, poured in using a vulture feather, or applied to special areas of the eye. The incantations contained in three prescriptions of the Eye Book (Eb 356, 360, and 385) show that an eye treatment (like all medical treatment in ancient Egypt) was essentially a magical-religious ritual.<sup>45</sup>

As a dosage information for solids, the unit "1" (a vertical line) is usually added after each

Unfortunately, trachoma is still left untreated today, although local treatment with an inexpensive antibiotic eye ointment is sufficient to cure the infection before irreversible consequences occur.

This title was held, among others, by the high priest of Heliopolis (Westendorf, 622; K. Sethe, "Die Sprüche für das Kennen der Seelen der heiligen Orte: Totb. Kap. 107–109, 111–116", ZÄS 57 [1922], 12, 17).

The unusual ingredients in Eb 422 are dates, green barley, alum, lead, and fresh behen oil (b3q w3d; Westendorf, 623; Popko translates b3q as "olive oil" [Popko online, Eb 422]).

See note 4. A list of officinal ingredients for all medical fields is given in H. von Deines and H. Grapow, Wörterbuch der ägyptischen Drogennamen, GMed VI (Berlin, 1959), with additions in Westendorf, 494–511.

<sup>&</sup>lt;sup>43</sup> Westendorf, 511–514.

<sup>&</sup>lt;sup>44</sup> See note 59.

<sup>&</sup>lt;sup>45</sup> For example, the British Museum papyri (BM 10685, 10687, 10688, 19695 and 10698) and the Leiden I/348 papyrus contain many incantations against various diseases, scorpion stings, or to hasten childbirth. Cf. Westendorf, 524–535.

ingredient. It is interpreted as a unit of volume. According to T. Pommerening, it is an abbreviated form of the hieratic symbol for the unit 1  $d\beta$  (it corresponded to ~300 cm³ in the New Kingdom).<sup>46</sup> In the case of eye prescriptions, however, this would result in a much too large total volume.<sup>47</sup> Therefore, at least for the Eye Book, Westendorf's interpretation of the symbol as 1  $r\beta$  (Coptic "ro", ~15 cm³) seems more plausible.<sup>48</sup> I suspect that an ancient Egyptian doctor was free to choose a unit of volume at his discretion, as long as he followed the prescribed mixing ratio.<sup>49</sup> With few exceptions, the Eye Book prescribed a mixing ratio of equal parts for solids.<sup>50</sup> In some prescriptions, this mixing ratio is only indicated at the end of the list of ingredients with the expression  $w^c r.t \ r \ w^c r.t$  (literally "part to part", i.e., "in equal parts"<sup>51</sup>).<sup>52</sup> Only in 13 (13.5%) recipes the mixing ratios are somewhat more complicated; they contain various whole number volumes and fractions.<sup>53</sup> Liquids and consistency-imparting substances (e.g., oil, honey) were often added freely, depending on the desired consistency. For simple solid-liquid or liquid-liquid mixtures, any dose information may be missing.<sup>54</sup>

The table in the annex shows a descriptive-statistical analysis that gives an overview of the frequency of the individual medical indications in the Eye Book and the way the remedies were administered.

#### Abbreviations

AoO: Atlas of Ophthalmology; QSGMed: Quellen und Studien zur Geschichte der Medizin (Berlin); MDAIK: Mitteilungen des Deutschen Archäologischen Instituts, Abteilung Kairo; NA: Not applicable; ND: Not determined; Wb: Adolf Erman/Hermann Grapow, *Wörterbuch der ägyptischen Sprache*, Vol. I–VII, Berlin 1897–1961, unchanged reprint 1971; Vol/vols: Volume(s); ZÄS: Zeitschrift für Ägyptische Schrift und Altertumskunde.

<sup>&</sup>lt;sup>46</sup> T. Pommerening, "Altägyptische Rezepturen metrologisch neu interpretiert", *Berichte zur Wissenschaftsgeschichte* 26 (2003), 1–16.

For example, Eb 339: 2400 cm<sup>3</sup> (!) of solids plus oil.

Westendorf, 522. A set of New Kingdom bronze measuring cups has survived, covering volumes from 0.1 to 6.4 cm<sup>3</sup> in dyadic increments (ibid.). This corresponds roughly to 0.008 to 0.5 r? (1/128 to 1/2 r?). However, it is not known what was actually measured with these cups (Pommerening, Berichte zur Wissenschaftsgeschichte 26, 5).

Likewise, other authors translated this unit simply as "1" (Lalanne and Métra) or "1 dose" (Popko [online]).

In general, the simple "equal parts"-dosage ratio of ingredients predominates in the Ebers Papyrus for remedies for external administration. For orally administered remedies, dosage information is mostly given as whole numbers ≥1 or fractions.

<sup>&</sup>lt;sup>51</sup> Hannig, 199 (7109); Wb I, 288.1.

<sup>&</sup>lt;sup>52</sup> Eb 386–388, 390, 393–395.

Eb 367, 369, 377, 391, 398, 400, 401, 409–413, 416 (these are mainly prescriptions for secretion, the  $\frac{\partial dt}{\partial dy}$  disease, or to improve eyesight). They may have been contributed by a particular author.

<sup>&</sup>lt;sup>54</sup> E.g. Eb 357, 358, 399, 404, 405, 406, 408, 414, and others.

#### **Statistics**

Medical indication <sup>55</sup>	Own interpretation	Number of pre- scriptions explicitly for this indication	Number of pre- scriptions implicitly for this indication	Total number of pre- scriptions for this indication	Both eyes are affected <sup>57</sup>	Mode of administration of the remedy					
						Into the eye(s) <sup>58</sup>	To the eye(s)	To the outside of the eye[lids] <sup>59</sup>	As eye make-up	Other instruction	No in- struction
						m jr.t/jr.tj	r jr.t/jr.tj	r s3 nj jr.t/jr.tj	sdm		
w <u>h</u> d.w <sup>61</sup>	Generally: efflorescences; in the eyes: conjunctival lymph follicles (e.g. in trachoma)	3	0	3	2			1	1	1	

<sup>&</sup>lt;sup>55</sup> In the order of appearance in the Ebers Papyrus.

So-called "k.t-prescriptions", i.e., prescriptions which only have the title "Something else" (k.t) or "Another eye make-up" (ky sdm). They are considered by me (and other authors) as an alternative treatment for the last mentioned eye condition.

<sup>&</sup>lt;sup>57</sup> Criteria: Both eyes are mentioned in the title, or it is a "*k.t*-prescription" after both eyes have been mentioned in the last full title, or the prescription is intended to improve eyesight. If both eyes are to be treated, it cannot be concluded with certainty that both eyes are diseased (see for example the prescriptions in Eb 345, 349, 355, 382, 409, and 430).

In two prescriptions (Eb 338, Eb 365) it is "into the inner eye"  $(m-\underline{h}nw\ jr.t)$ .

The interpretation of *r s3 nj jr.tj* is controversial (Popko [online], Eb 340 note 3). In Eb 381, as an exception, it is *ḥr s3 jr.tj* ("on the outside of the eye[lids]"). I do not think that the surface of the eyeball is meant, since such remedies often contain granular or mineral ingredients. I believe that the term *s3 jr.tj* primarily means the outside of the upper eyelids.

<sup>&</sup>lt;sup>60</sup> Includes special ways or sites of administration of the remedy.

<sup>61</sup> Includes *whd.w* and *rwd.t nj.t whd.w*.

Medical indication <sup>55</sup>	Own interpretation	Number of pre- scriptions explicitly for this indication	Number of pre- scriptions implicitly for this indication	Total number of pre- scriptions for this indication	Both eyes are affected <sup>57</sup>	Mode of administration of the remedy						
						Into the eye(s) <sup>58</sup>	To the eye(s)	To the outside of the eye[lids] <sup>59</sup>	As eye make-up	Other instruction	No in- struction	
						m jr.t/jr.tj	r jr.t/jr.tj	r s³ nj jr.t/jr.tj	sdm			
tḫn	Puncture or scratch wound	3	1	4	0	1		1		2		
<u>h⊰t.j</u>	Blurred vision	2	1	3	1			2		1		
m33 <sup>62</sup>	Eyesight (to be improved)	9	6	15	15	4	1	4	5	1		
s3q <u>dfd</u>	Contraction of the pupil	1	0	1	0		1					
wḥ3.wt	Rash	1	0	1	1			1				
s.ḥd.w	Corneal scars	4	4	8	7	5	1	2				

Includes m33, wb3 m33, srwh m33, and s.rwh d m33.

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						Into the eye(s) <sup>58</sup>	To the eye(s)	To the outside of the eye[lids] <sup>59</sup>	As eye make-up	Other instruction	No in- struction			
						m jr.t/jr.tj	r jr.t/jr.tj	r s3 nj jr.t/jr.tj	sdm					
znf/snf <sup>63</sup>	Paraphrase of severe inflammatory redness of the conjunctiva	5	0	5	4	2		1		2				
nḥ3.(w)t <sup>64</sup>	Papules (in trachoma) or "the aggressive ones" (severe infection, invasive tumor)	3	0	3	2	1		1		1				
<i>š</i> 3(r).w	Corneal epithelial defects	1	0	1	1		1							
₿.w <sup>65</sup>	Burning sensation in the eyes due to corneal epithelial defects	3	0	3	2	1		2						

<sup>63</sup> Includes snf m jr.t, znf m jr.tj, and znf ḥr jr.tj.

Includes  $nh\beta$ . wt and  $nh\beta$ .t.

<sup>65</sup> Includes *t3.w* and *swš nj t3.w*.

Medical indication <sup>55</sup>	Own interpretation	Number of pre- scriptions explicitly for this indication	Number of pre- scriptions implicitly for this indication	Total number of pre- scriptions for this indication	Both eyes are affected <sup>57</sup>	Mode of administration of the remedy								
						$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$								
						m jr.t/jr.tj	r jr.t/jr.tj	r s3 nj jr.t/jr.tj	sdm					
qn.t	Pinguecula or pterygium	2	0	2	1		1	1						
pds.t	Hordeolum, chalazion, small, spherical eyelid tumor, or corneal foreign body	3	0	3	0			1	2					
šp.t	Blindness	3	1	4	3	1		2		1				
<i>m</i> 3 <sup>c</sup>	Temporal headache or temporal arteritis	1	2	3	NA <sup>66</sup>					3				
3d.t/3dy.t	Decay (smelly ulcerating process)	3	10	13	0	2	6	3		2				
hnt m jr.tj	Secretion from both eyes	1	0	1	1	1								

<sup>66</sup> NA: not applicable.

Medical indication <sup>55</sup>	Own interpretation	Number of pre- scriptions explicitly for this indication	Number of pre- scriptions implicitly for this indication	Total number of pre- scriptions for this indication	Both eyes are affected <sup>57</sup>	Mode of administration of the remedy								
						Into the eye(s) <sup>58</sup>	To the eye(s)	To the outside of the eye[lids] <sup>59</sup>	As eye make-up	Other instruction	No in- struction			
						m jr.t/jr.tj	r jr.t/jr.tj	r s3 nj jr.t/jr.tj	sdm					
bjdj	Possibly a special type of visual impairment	1	0	1	1				1					
<u>dfdf</u> .t	Watery eye (excessive tearing, <i>epiphora</i> )	1	0	1	0		1							
<sup>c</sup> h.t nj.t mw	Glaucoma or nasolacrimal duct obstruction	2	2	4	4	1	1	1	1					
<u>h</u> nt	Secretion (from the eyes or nose)	1	0	1	ND <sup>67</sup>						1			
jḫ.wt nb.wt dw.wt	"All evil things"	1	0	1	0				1					
šsm.w dšr(.w)	Inflammatory redness	1	0	1	1			1						
kk.w	Night blindness	1	0	1	1			1						

ND: not determined.

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						Into the eye(s) <sup>58</sup>	To the eye(s)	To the outside of the eye[lids] <sup>59</sup>	As eye make-up	Other instruction	No in- struction			
						m jr.t/jr.tj	r jr.t/jr.tj	r s3 nj jr.t/jr.tj	sdm					
<u>h</u> 3(r).w	Strabismus with or without amblyopia in one eye	1	0	1	1			1						
qnj.t	Blunt eye trauma or incipient jaundice	1	1	2	ND			2						
hnt m fnd	Secretion from the nose (rhinitis)	1	0	1	NA				1					
hsf.w nj h <sup>c</sup> .w	Adhesions of the eyelids	1	0	1	1		1							
w <sup>c</sup> f šnj.w	Eyelashes bent inward (trichiasis, entropion)	1	0	1	0					1				
tm rd(.w) r(w) <u>d</u> šnj	Prevention of regrowth of a plucked eyelash	2	3	5	0					5				

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						m jr.t/jr.tj	r jr.t/jr.tj	r s3 nj jr.t/jr.tj	sdm				
Seasonal <sup>68</sup>	(ND) <sup>69</sup>	3	1	4	ND	1	1	1	1				
Individual <sup>70</sup>	ND	2	0	2	1				1		1		
Total		68	32	100 71	50	20	15	29	14	20	2		

<sup>&</sup>lt;sup>68</sup> Prescriptions that specify a seasonal period during which the remedy can be made.

<sup>&</sup>lt;sup>69</sup> In only one case is the medical indication given, namely "to strengthen the eyesight".

<sup>&</sup>lt;sup>70</sup> Recipes made for a specific patient or communicated by a specific person.

With this total number of medical indications, all blue numbers can be taken as both, absolute and percentage results. The difference to the total number of prescriptions in the Eye Book (= 96) is explained by three prescriptions, each intended for two or three indications.