Leprosy (*al-ǧuḏām*) and Smallpox (*al-ǧudarī*) in the *Kitāb al-Malakī* and its Two Latin Translations

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Abstract: The contribution aims to analyze the pathology of leprosy (*al-ǧuḏām*) and smallpox (*al-ǧudarī*) in the Arabic medical encyclopedia *Kitāb al-Malakī*, composed by the physician ʿAlī ibn al-ʿAbbas al-Maǧūsī, and in its two Latin translations, the *Pantegni* by Constantine the African and the *Liber Regalis* by Stephen of Antioch. The study of the Arabic text shows that the etiology of these diseases involves an interplay of different factors, including contagion, and explains to what extent the *Kitāb al-Malakī* presents original doctrines. Secondly, by taking into account similarities and shifts in comparison with the Arabic original, the contribution shows how the two Latin translators faced the challenge of creating a new lexicon as a vehicle for the innovative translated ideas.

Keywords: leprosy; smallpox; *Kitāb al-Malakī*; *Pantegni*; *Liber Regalis*; contagion.

The present contribution aims to illustrate the pathology of leprosy (*al-ǧuḏām*) and smallpox (*al-ǧudarī*) in the Arabic medical encyclopedia *Kitāb al-Malakī* (*KM*), composed by the physician ʿAlī ibn al-ʿAbbas al-Maǧūsī, and in its two Latin translations, the *Pantegni* (*PA*) by Constantine the African and the *Liber Regalis* (*LR*) by Stephen of Antioch. Concerning the Arabic text, this study will outline its content and show its originality; moreover, it will specifically pay attention to the concept of 'contagion', which is considered as a cause of both diseases. In the case of the two Latin translations, the analysis will first focus on the lexicon, and, in the second place, it will consider similarities and shifts in comparison with the content of the Arabic original.[1]

1 Without the constant and fruitful dialogue with my supervisors, Professors Cecilia Martini Bonadeo and Rino Mondonutti of the University of Padua, this work would not

Quaderni di Noctua, volume 7, 2024, ISBN 9788875903183
DOI 10.14640/QuadernidiNoctua7-3 – CC BY

1. The pathology of leprosy (*al-ǧuḏām*)

The *KM* was composed during the second half of the 10th century.[2] Influenced in its structure both by the late Alexandrian medical teaching and by the so-called 'byzantine' physicians, it is divided into a theoretical and a practical section.[3] The first one analyses the six natural and non-natural things in books I-V and the things against nature in books VI-IX, moving from etiology and symptomatology to nosology. Leprosy is discussed in chapter I.VIII.15,[4] inside a section concerning skin diseases, under the Arabic name of *al-ǧuḏām*, derived from the root *ǧaḏama*, 'mutilate'. This word corresponds to ἐλέφας in Greek into Arabic translations and is used by al-Mağūsī to refer to the lepromatous, more serious form of the diseases, thus differentiating it from other skin conditions such as *baraṣ*, *bahaq* and *qūwābā'*.[5] The text of chapter I.VIII.15 (Appendix I) can be divided into three main sections: a general etiology, an etiological distinction between two kinds of leprosy and a symptomatologic part. The most remote cause of the disease is a cold and dry complexion, in which black bile dominates the blood; this has two consequences: first, the mutative faculty is weak in the leper and cannot properly transform food into nutrition; second, the sperm is corrupted and therefore its bad substance can be transmitted from father to son. Moreover, this bad temperament is also transmissible through bad vapors exhaled by the lepers' bodies and inhaled by people surrounding them.

have been possible: I express my sincerest gratitude to them. I also want to thank Rebecca and Lorenzo for their help with the English writing of this essay, underlining that all mistakes are my only responsibility.

2 On al-Mağūsī's life and work, see MICHEAU 1994.

3 I will use the numbers I and II to refer to theory and practice, both in the Arabic text and in its Latin translations.

4 Only in manuscript D (for the codex see *infra*, n. 70) leprosy (*al-ǧuḏām*) is discussed in chapter 14 and smallpox (*al-ǧudarī*) in chapter 13, while in all other manuscripts they are the subject respectively of chapter 15 and 14.

5 ULLMANN 2002, *index*; ULLMANN 2007, *index*. See RICHTER 1911(1) for an effort to associate all these skin conditions to modern ones.

According to differentiations of the most remote cause, two kinds of leprosy are distinguished: the first one is caused by an excess of the black humor itself, which prevents the blood from flowing correctly, and is curable; the second one goes back to a remoter process, the burning of the bile, and is incurable. Finally, a distinction is drawn between symptoms of an initial stage and those related to a further development. An interesting aspect of this text is its hint at interpersonal contagion;[6] to better understand it, other passages of the *KM* in which transmissible diseases are mentioned must be considered. In I.V.11 there is a description of air alterations, one of the non-natural things, and particularly of the "air unbalanced in its substance, which is the infectious (*wabāʾī*) air." After having stated that an unbalance in its substance and quality, due to either geographical or meteorological factors, causes pestilential diseases, it is underlined that

> It must be known that pestilential [*wabāʾī*] diseases do not affect people only because of corruption of the air, but, on the contrary, they mostly affect people in whose body bad, corrupted humors are already collected, and whose bodies are prepared to receive what the air does and induces on them […]. Galen says in his *Book about Fevers* that it is impossible that a cause acts on a body if the body is not prepared to receive what this cause induces on it.[7]

Citing Galen, *De differentiis febrium* I.6[8] and, further on, the doctrines of Hip-

6 SEIDEL 1912 maintains that the Islamic thought did not grasp the possibility of contagion at all. However, more recent studies have underlined that the idea of contagion is not foreign to the ancient thought and have explained in which sense such concept can be ascribed to it: GRMEK 1984; NUTTON 2000; STOK 2000; ROBERT 2011.

7 The translation is based on codex G (see *infra*, n. 70) of the Arabic text, f. 57r.

8 The quotation is basedon the translation of *De differentiis febrium* made by Ḥunayn ibn Isḥāq (GALENUS 2011, *De differentiis febrium libri duo Arabice conversi*, c. I.6): the text of the *KM* corresponds almost entirely with lines 18–22. This notwithstanding, it must be underlined that while Galen is talking about fevers (*ḥummā*), al-Mağūsī applies his reflections to diseases (*marḍ*) in general. It is not possible to analyze chapter I.V.11 in detail, but a deeper comparison with the Galenic and Hippocratic works about pestilences would be much needed to understand how al-Mağūsī has interpreted and reassembled them.

pocrates, al-Mağūsī clarifies that the first condition for the development of a pestilential disease is the natural predisposition of every single body. Accordingly, in chapter II.I.26, pestilential diseases (*wabāʾī*) are treated following the principle of 'contrast': people should maintain their bodies in a complexion opposed to the substance of the corrupted air. Nonetheless, the last part of this chapter abandons pestilential diseases and focuses on the prevention from the infectious ones, called *al-muʿdiyya*, among which leprosy is enumerated (Appendix III). As these are characterized by the fact that they infect healthy people living with sick ones and inhaling the same air breathed by them, different prescriptions are given: one should not sit or live with affected people and should move to places which cannot be reached by the wind that blows by them.

From these passages it must be inferred that al-Mağūsī makes a distinction between *wabāʾī* or *wāfid* diseases – the pestilences – and *muʿdin* diseases – the infectious ones, such as leprosy or smallpox.[9] Concerning the first ones, al-Mağūsī had at his disposal coherent Greek sources where, according to the 'miasmatic' paradigm, contagion plays a minimal role compared to natural predisposition.[10] On the contrary, for at least some infectious diseases, the tradition offered more complex and incoherent information: nomenclature and classification of leprosy, for example, were not firmly established. Al-Mağūsī, living in the Arabic world, had to reconcile disharmonic sources with its experience of leprosy as an endemic disease: for this reason, he classifies it both as a skin disease and as an infectious one, somehow like pestilences, as it

9 SEIDEL 1912, 86–87 maintains that al-Mağūsī distinguishes, among *wabāʾī* diseases, two different kinds (*wāfid* and *muʿdin*), but it is evident that the first two terms are both used to name pestilences, as exposed in ULLMAN 1970, 245; obviously, the lexical aspect concerning pestilential diseases deserves a more thorough study, in order to grasp differences, if any, between *wabāʾī* and *wāfid* and their connection with Greek sources.

10 See *supra*, n. 5.

might affect more people in the same moment, but also clearly different, as it has another origin and development.

Within this framework, al-Mağūsī introduces the notion of 'infection' using the Arabic root *ʿadā*, 'infect'.[11] In chapter I.VIII.15 contagion is not conceived of as the primary cause of leprosy: humoral pathology occupies the first lines and allows al-Mağūsī to rationally explain how the disease develops. In the case of the transmission from father to son, the simple corruption of humors provides a sufficient explanation, as the substance of the son originates from the father's sperm, and the disease seems to be part of one and the same body. But in the case of people sitting next to each other, al-Mağūsī hints at a process of exhalation and inhalation of vapors that implies the agency of an external factor on the healthy body, viewed as co-existent with the humoral etiology.[12] In the absence of knowledge about bacteria, contagion alone cannot explain why a disease rises in the first place; on the other side, its contemporary development in many bodies is not explained exclusively by an independent recurring of the same cause, but also by the contagion of a healthy body by a sick one – even if the mechanics of this process would call for a deeper explanation (why is the vapor exhaled? What happens after its inhalation? How does it affect the humoral balance?)

Consequently, it must be underlined that there is a difference between the bad vapor transmitting leprosy and the 'pestilential' or 'miasmatic' air, beside the terminology (*hawāʾ*, *buḥār*, *rīḥ*) employed. While that air is conceived of as a universal factor, this vapor is individual, spreading from one person to those physically near. Indeed, ancient physicians contemplated a form of contagion implying exhalation of air, mainly through breath, from

11 Al-Mağūsī uses both the first stem *ʿadā* and the fifth derived stem *taʿaddā* with the preposition *ʾilā* introducing the infected person; see *infra*, n. 71.

12 On such coexistence of different morbid causes, see ROBERT 2011, 46.

the sick body, and subsequent inhalation by other people, but mostly with reference to pestilential diseases: thus, the exhaled air just reproduces the characteristics of the external aerial condition.[13] This is not the case in the *KM*, where the morbid condition of the vapor originates in the patient independently of the environment. The originality of the *KM* clearly emerges if we compare it, on one side, with the Greek sources al-Mağūsī had at his disposal, and, on the other side, with previous Arabic authors.[14] An attentive perusal of the occurrences of *leprai* and *elephas* both in the Hippocratic *corpus* and in the Galenic works has shown only general similarities with the *KM*, for example in symptomatology[15] and etiology,[16] that could also have reached al-Mağūsī via an indirect transmission;[17] anyway, contagion through bad vapor does not play any role.

13 STOK 2000, 80–89.

14 Aretaeus of Cappadocia, in his book about chronic diseases (ARETAEUS 1958, *Editio altera lucis ope expressa nonnullis locis correcta*, VIII.13.1), mentions, concerning leprosy, the mechanics of infection (βαφή) via breath (αναπνοή) as an easy way of transmission (μεταδοσις). One might notice the similarities with the *KM*, but this text was not translated into Arabic.

15 For example, in GALENUS 1830, *Definitiones Medicae*, 346–462: 428 (on the Arabic translation of this spurious work see SEZGIN 1970, 138–139), the symptoms of *elephas* are like those mentioned by al-Mağūsī, but any etiological element is lacking. Under the title *kitāb al-ʿilāl wa al-ʾarāḍ* four Galenic works were translated: see STOK 2000, 89–90; here leprosy is described under a symptomatologic point of view, with a peculiar attention to the changes in the physical aspect: see for example GALENUS 1824, *De Causis Morborum*, 29; GALENUS 1824, *De Symptomatum Differentiis*, 175: there are some points of contact with the *KM*, but also noticeable differences.

16 The *Ad Glauconem de Methodo Medendi* was certainly read by Arabic authors (see SEZGIN 1970, 82–83); here, leprosy is regarded as one τῶν καρκινωδῶν ὄγκων, "of cancer-like swellings," that are caused by an excess of black bile poured by liver and spleen in the blood when producing it. This happens when the human complexion is bad and food digestion does not work properly. Insufficiency in the mutative faculty is here mentioned for the first time as the cause of leprosy: see GALENUS 1826, *Ad Glauconem de Methodo Medendi*, 141–144.

17 For example, the first part of chapter 45.26 of the *Collectiones Medicae* of Oribasius presents a summary of the relevant information coming from the Galenic *corpus*, and this work has been translated into Arabic: see SEZGIN 1970, 153–154.

The *Pragmateia* by Paulus Aegineta has already been recognized by Peter Pormann as an important source for the *KM*;[18] leprosy is discussed in its fourth book, dedicated to diseases manifesting themselves on the body surface. Here, there is the same comparison with a cancer affecting the whole body and the same distinction between two kinds of leprosy.[19] Moreover, relevant similarities can also be found in therapy, discussed in *KM* II.IV.3: this makes it likely that a copy of the translation of the *Pragmateia* was consulted by al-Mağūsī. This is also suggested by the presence of a conclusive paragraph at the end of the relevant chapter in the *Pragmateia* where the disease is considered εὐμετάδοτος, 'easily transmissible', like the pestilential ones, and prescriptions are accordingly imparted.[20] The fact that leprosy and pestilences are compared might explain why al-Mağūsī mentions them in sequence in II.I.26; moreover, the *Pragmateia* can be considered a source for the idea of leprosy as transmissible disease – could *muʿdin* be a translation of εὐμετάδοτος?[21] Anyway, the severity of the prescriptions given in the *Pragmateia* is lessened in the *KM*, where the advice is simply not to associate with lepers assiduously or to avoid the air they breathe. Moreover, the topic of contagion is not mentioned at the end of the therapy, but within the nosological description, where vapor is alluded to as its vehicle.

In conclusion, even if etiology, symptomatology, and therapy of leprosy are discussed in the Greek sources al-Mağūsī had at his disposal, he was able to rearrange and complete them in every domain, achieving new clearness and adding at least some glimpses of novelty. This innovation appears in a

18 PORMANN 2004; concerning skin diseases, similarities had already been noted by RICHTER 1911(1).

19 PAULUS AEGINETA 1921, *Epitomae medicae libri septem*, c. IV.1.1, 317.

20 See PAULUS AEGINETA 1921, *Epitomae medicae libri septem*, c. IV.1.7, 321.

21 In ULLMANN 2006 no such parallel is attested, but not all Greek translated texts are included.

more evident way if we turn to previous Arabic works,[22] such as the *Risala fī-l-bayāḍ allaḏī yaẓhuru fī-l-badan* (*Letter about the whiteness that appears on the body*) of Abū al-Ḥasan Ṯābit ibn Qurra; the *Firdaws al-ḥikma* (*Paradise of Wisdom*) of ʿAlī ibn Sahl Rabbān al-Ṭabarī; the *al-Ḥawī* of al-Rāzī. In these works, there is neither a precise differentiation between *al-ǧuḏām* and other skin diseases, nor a precise etiology, nor a more than sporadic mention of contagion.[23] The physician Abū al-Ḥasan al-Ṭabarī was related to Abū Māhir b. Mūsā b. Yūsuf ibn Sayyār like al-Mağūsī and active as Rukn al-Dawla's court physician; in his treatise *al-Muʿālağa al-Buqrāṭīya* (*The Hippocratic Treatments*) *al-ǧuḏām* is discussed in book VII, chapter 56. Here, it is clearly distinguished from other skin diseases and the author aims to reestablish a correct understanding of two different forms of leprosy on the basis of ancient writings; however, no precise similarities with the *KM* can be found.[24]

When compared to earlier or contemporary Arabic authors, al-Mağūsī seems to have traced a systematic and innovative description of leprosy, also by introducing hints at a dynamic of contagion, even if not as an exclusive etiological factor and under the influence of the miasmatic theory. Moreover, he synthesizes in the *KM* various and incoherent sources into a scientific description of leprosy, where any preoccupation about religious or theological implications is absent and which does not imply prescriptions about social isolation of lepers. Such attitude is maintained by the two Latin translators.

22 Müller-Bütow 1981, 56–172 presents edition and translation of some relevant passages.

23 See ʿAlī ibn Sahl Rabbān al-Ṭabarī 1996, *Firdaws al-ḥikmat fī al-Ṭibb*, 318, in which we read that "leprosy is among the diseases that infect who comes near to them (the affected people), such as smallpox," but no further explanation is given. Some similarities can be found with the *Kitāb fī al-iʿdā'* by Qusṭā ibn Lūqā, as quoted in Stearns 2011, 71–73, where: vapors, the vehicle of contagion, are considered as originating from corrupted air and reproduced by the infected body. However, in the *KM*, the inhaled vapor does not have an external origin, and no observation on its interplay with the bodily predisposition is made: thus, it does not depend on Qusṭā ibn Lūqā's treatise.

24 The text can be read in München, Bayerische Staatsbibliothek, Cod. arab. 810, p. 476.

In the bibliography about leprosy in the Latin Middle Ages it is common to state that Constantine's translation, the *Pantegni* (*PA*),[25] added to the Arabic original an element of moral censorship against lepers because the translator chose the word *lepra* to render *al-ǧuḏām*.[26] According to this view, Constantine's lexical choice would mark a continuity with the Early Middle Ages, when, although the ecclesiastical and lay legislation tried to both safeguard and isolate lepers, the disease was considered, in literary and hagiographical works, as a distinct mark of divine punishment.[27] Nevertheless, some 'attenuating circumstances' for Constantine's choice shall be mentioned: on one side, the equation *lepra* – *elephas* was well spread and excluded confusion with the Hippocratic *lepra*; on the other side, the use of *elephantiasis* as a translation might have caused confusion with what the Arabs called *dāʾ al-fīl* and we understand as elephantiasis, i.e., a lymphatic disease.[28]

The only way to judge the *PA* is to reconsider its text in detail and to compare it thoroughly with the Arabic original. To this end, chapter I.VIII.15 can be read both in the digitized manuscript of Den Haag, Koninklijke Bibliotheek, 73 J 6, f. 58r and in the transcription made by Outi Kaltio of the codex Helsinki, National Library of Finland, EÖ.II.14, f. 134r–v;[29] for the present study, all known manuscripts dated to the 12th century containing the text

25 On Constantine and his translation see BURNETT, JACQUART 1994; NEWTON, KWAKKEL 2019.

26 DOLS 1979, 326, asserts that this choice connected medical leprosy with the biblical one and brought back the confusion between *elephas* and *lepra* typical of the Hippocratic *corpus*. Nevertheless, the terms *elephantia* and *elephantiasis* had been known to Latin authors since the I century d.C. (see *TLL*, entry *Elephantia*) and were considered synonyms of *lepra* to designate the disease in its lepromatous form. Only Isidorus in his *Etymologiae* (IV.8.11) tries to differentiate them, but his exposition is mainly based on etymological derivation and is useless for a medical exposition. Thus, the previous tradition left CA free to choose between the two terms.

27 See PIAZZA 2007.

28 Such considerations are made by Dols himself: DOLS 1979, 326.

29 CONSTANTINE THE AFRICAN 2011. The same references are valid for the chapter I.VIII.14, concerning smallpox.

have been collated. Firstly, it must be noticed that almost all components of the Arabic text are maintained, albeit with some omissions. The most significant one occurs at the beginning, where Constantine leaves out the definition of the disease as a "cancer affecting the whole body":[30] such choice has the effect to reduce its gravity, and not to emphasize it, as Constantine would have done, had he wanted to convey a sense of terror surrounding lepers.

In the following sentences, the first occurrence of ʿ*adā* ('infect') is translated as *invadit* (*filios*). The verb *invado* is used already in archaic Latin as a technical term *de accessu morborum vel affectuum animi*:[31] therefore, Constantine's choice cannot be seen as burdened by moral censure against the sexual conduct of lepers' parents, as the 'invasion' of the body by the disease is considered a biological process based on the interplay of substances, humors, and qualities. Similar considerations can be made about *protendo*, another verb used in its passive form to translate *taʿaddā*. The verb is commonly used in Latin to express an "extension" of limbs, an "increase in size" through an effort:[32] it conveys the "extension" of a part of the father's physical constitution to his progeny. The occurrence of *occupo*, a rendering of *taʿddā* as well, in relation to diseases, is ancient, and this verb is commonly united with the indication of the occupying agent,[33] which is in fact specified in the following sentence – the *fumus*.

Such variety in the translation of ʿ*adā*/*taʿaddā* might be partly due to the fact that Constantine perceived different meanings behind these verbs. While *invado* and *protendo* can still be related to the development of the disease in

30 It might be objected that the codex D of the *KM* (see *infra*, n. 69) also omits this sentence, and that Constantine had such a text in front of him, but the following lines in codex D present omissions that are not mirrored in the *PA*: for this reason, it must be inferred that CA purposedly left out these words.

31 *TLL*, vol. VII,2, 108.

32 *TLL*, vol. X,2, 2264–2268.

33 *TLL*, vol. IX,2, 383 sqq.

the frame of humoral pathology, *occupo* is applied to a dynamic where *fumus*, an external morbid 'occupying' entity, is involved. But this plethora of different terms also suggests that the translator could not find in the previous tradition an adapt solution to convey the idea of contagion and strived to coin Latin equivalents.[34] Anyway, he does not use here Biblical words such as *contamino* or *immundus*, and the following symptomatologic section is not influenced by the Biblical description of leprosy at *Lev*. 13: the Latin words adhere to the Arabic original, and this is all the more significant if we consider that Constantine feels free to depart from the *KM* whenever it is necessary to adapt the text to his new audience.[35]

In conclusion, Constantine uses the word *lepra* as an old surface to cover innovative contents: as a monk talking to monks, he recurs to a familiar lexicon and attaches to it a new technical meaning to make the new, Arabic

34 The authors that Constantine might have read in collections circulating in the Early Middle Ages – Priscianus, the Latin Oribasius, Pliny, Quintus Serenus Sammonicus – do not dedicate much space to leprosy and do not seem to mention its transmissibility. Even if the passage of Caelius Aurelianus, *Chron*. IV.13 (CAELIUS AURELIANUS 1990, *Celerum passionum libri III, Tardarum passionum libri V*, 774–782) concerning leprosy and contagion was read by him, there is no resemblance in lexicon. It is more significant that Gariopontus, in his *Passionarius*, chapter V.5 (Berlin, Staatsbibliothek, Preußischer Kulturbesitz, lat. qu. 335, ff. 89r–90r (ca. 1200) not only uses *elepantia* instead of *lepra* but also describes the disease otherwise: the lexicon is different, contagion is not mentioned and there is no etiology. Even if the choice of *lepra* might induce to think of the *PA* as more 'old-fashioned' or influenced by religious conceptions, it is just the contrary: an old designation is used for a substantial innovation.

35 For example, when rendering chapter II.I.26 (Appendix III), Constantine writes: "Oportet etiam intelligi quod quidam morbi ab uno ad alium mutantur, sicut lepra, scabies, ptisis, frenesis, variole, obtalmia et similia, unde sani sunt prohibendi ne cum eis in una mansione maneant neque cum eis comedant vel bibant, ne, ex eorum spiritu contaminate, ad easdem passiones deveniant" (the text is based on manuscripts Paris, Bibliothèque nationale de France, lat. 6887, f. 104r and London, BL, Add. 22719, f. 183r). The Arabic *al-mu'diyya* is translated by a periphrasis newly coined by Constantine, *ab uno ad alium mutari*, where the verb *mutari* defines a generic kind of metamorphosis; he adds to the original both the element of prohibition and the idea of contamination through breath. Thus, when giving a prescription, the terminology becomes stronger and religiously connotated, even if the advice is for healthy people to avoid living with lepers, not for them to be separated from the community.

science acceptable and understandable. By connecting the word *lepra* to this description taken from *KM* he separates leprosy from the Biblical heritage and connects it with one of the most up-to-date and clear medical doctrines, characterized by a scientific and laical approach. This fits well with the recent research about the formation of lepers' communities between the end of the 11th century and the beginning of the 12th century, which has shown that various social changes contributed to this phenomenon much more than the fear of contagion.[36] In this context, Touati acknowledges that the sentence of the *PA* dedicated to *fumus* remained a scientifical speculation, and did not trigger any discrimination against lepers.

For what concerns the *Liber Regalis*, the translation made by Stephen of Antioch, the text of chapter I.VIII.15 can be read in two digitized codex: (L) Leipzig, Universitätsbibliothek, MS 1131, f. 127r; and (G) Brugge, Grootseminarie, Ms. 98/134, f. 98r.[37] The translator choses the term *elephantia* to render *al-ǧuḏām* and all occurrences of *ʿadā/taʿaddā* correspond to the Latin *transeo*.[38] This verb, as can be gleaned from the *Lexikon Forcellini*,[39] is employed in classical Latin to define the stages of the development of a disease, that is, a biological mechanic, and there are some examples of its use together with terms referring to a pestilence, such as *lues* or *contagio*, both in a metaphorical and a technical meaning. Such sources might have driven Stephen of Antioch to a different choice from Constantine's one and to the use of one and the same

36 See TOUATI 1998, 139–151; TOUATI 2001; DEMAITRE 2007.

37 The same references are valid for the chapter I.VIII.14, concerning smallpox. About the author see BURNETT 2000 and 2006.

38 The third occurrence of *transeo* results from a correction of the transmitted text: in the sentence "hinc igitur est quod passio hec a patribus ad filios transit. ‹Transit› etiam morbus hic in cohabitantes patientibus eum," a verb for the subject *morbus* is clearly missing. The easiest way to make sense out of it is to suppose that one of two consecutive *transit* was omitted by copyists; they should translate the two occurrences of *yataʿaddā* in the Arabic text.

39 FORCELLINI, FURLANETTO, CORRADINI, PERIN 1940, entry *Transeo* (online: *Database of Latin Dictionaries*).

verb in a univocal correspondence with the Arabic original. Anyway, the translation employs a rather neutral lexicon: the disease can generally 'transfer itself' from a sick to a healthy body and the process remains unrelated to fear or moral censure. Thus, both the *PA* and the *LR* reveal themselves faithful to the sense of the Arabic original by keeping the discussion at a scientific level.

2. The pathology of smallpox (*al-ǧudarī*)

Unlike leprosy, a disease whose history can be traced back to Greek sources, smallpox was first described by Arabic authors.[40] In the *KM* it is classified as a skin disease and described in chapter I.VIII.14, preceding leprosy (Appendix II). Smallpox is named *al-ǧudarī*, a collective noun, and is accordingly identified with a plurality of pustules (*buṯūr*) affecting the whole body or its majority;[41] al-Maǧūsī adds that pustules concerning only some limbs are called either 'burning coal' (*ǧamr*) – by the ancients – or 'daughters of fire' (*banāt al-nār*) – by the Syrians.[42] Both *al-ǧudarī*, a word preexisting in Arabic, and *al-ǧamr*, a semantic loan, are used in Arabic translations to render the Greek ἄνθραξ (usually in the plural form), 'carbuncle';[43] this disease, already men-

40 RICHTER 1911(2); LEVEN 1993.

41 RICHTER 1911(2), 317 explains that its root refers to the act of "building a wall": *al-ǧudarī* thus means an "elevation," a "cutaneous eruption."

42 The text in Appendix II indicates that most manuscripts have the reading *al-suryānūna*, while DEH have *al-yūnāniyyūna*; Constantine translates *siri*, Stephen *greci*. This fact is important as it demonstrates that the two did not use the same Arabic codex; as explained in the following, lexical research shows that the correct reading is *al-suryānūna*.

43 For this reason, the correct reading of the Arabic text is *ǧamr* and not *ḥumr*, "erysipelas," as maintained RICHTER 1911(2), 317: this hypothesis is also supported by the diacritical points of the Arabic manuscripts. In ULLMANN 2007, 112 and 2006, 126 there is proof of the use of *al-ǧamr*/*al-ǧamra*, *al-ǧudarī* and *al-nār al-fārisī* to translate the same ἄνθραξ. It is worth noting that in a recently discovered Greek translation of the *KM*, dated to the 14th century (MIGUET 2022) *al-ǧamr* is translated precisely with ἄνθραξ (the transcription of Paris, Bibliothèque nationale de France, Suppl. gr. 638, f. 70v has been shared with me by Thibault Miguet, whom I sincerely thank). The distinction between *al-ḥumra* and

tioned in Hippocratic and Galenic works, is described in Paulus Aegineta's *Pragmateia* in a way that presents significant similarities with this chapter of the *KM*.[44] It is therefore probable that Arabic authors have found some similarities between this skin affection as described in Greek texts and what they called *al-ǧudarī*, so as to connect them. The same ἄνθραξ was translated in Syriac as *bnāt nurā*, corresponding literally to the Arabic "daughters of fire" (*banāt al-nār*).[45] Al-Maǧūsī is thus trying, in this chapter, to collect and at the same time distinguish the complex and varied vocabulary related to smallpox.

The disease is typical of children, as its remotest cause lies in the bad quality or substance of the mother's body, which is transmitted to the child during either pregnancy or breastfeeding:[46] while the best part of the menstrual blood or of the mother's milk is used by nature for the child's growth, the remaining part dwells in his body as a superfluity and can thus be driven

al-ǧamra is also explained by al-Maǧūsī in I.VIII.9 describing the tumor (*waram*) known as phlegmon: *ḥumra* is a kind of tumor generated by unbalanced, warm and thin blood, while *al-ǧamra* – or *al-ǧudarī* or *banāt al-nār* – is a tumor generated by blood of thick substance. This implies that smallpox was considered as a kind of tumor but appearing on the surface of the body and thus integrated in the chapters concerning skin diseases. A more comprehensive analysis of the whole book VIII might shed better light on the classification of these conditions.

44 See PAULUS AEGINETA 1921, *Epitomae medicae libri septem*, c. IV.25, 346: although the etiology is not the same, the disease is identified with scab-like ulcers, stinging, as big as mill grains, similar to fire burns and prone to breakage and suppuration; sometimes it has an epidemic origin. On the contrary, no similarities between ἐρυσίπελας in the *Pragmateia* and in the *KM* can be found.

45 BROCKELMANN 1928, 94; PAYNE SMITH 1879, 592. I sincerely thank Marianna Zarantonello for her help with the Syriac lexicon.

46 Concerning the nourishment of the fetus by menstrual blood, see *KM*, I.I.XXV ("On the science of the four humors") and I.III.34 ("On the uterus in which there is the fetus"). With the purpose to demonstrate that the four humors in the human body are always mixed with blood, it is recalled that the menstrual blood is not pure but composed by a mixture of blood and humors necessary to nourish the fetus. It is an action proper to the *virtus naturalis* to generate blood in the woman's liver, to push it to the womb and then to make the fetus grow through its nourishment. About breastfeeding, see I.III.35 ("On the breasts"), where the similarity between breast milk and menstrual blood is explained.

to the surface of his body. Such development into a skin disease is caused by different agents, either external, such as the pestilential air or the proximity to people affected by smallpox, or internal, such as a bad regimen. This etiological section is followed by a 'guide' to achieve a differential diagnosis between different forms of smallpox according to the nature of the blood it is caused by. Some of these forms have a specific nomenclature: the 'Persian fire' (*al-nār al-fārisī*) is that originated by black bile;[47] within the category of 'burning coal' (*ǧamr*) there is a specific kind, the measles (*ḥaṣba*), caused by warm but thin blood and recognizable, in its full development, by the aspect of the pustules, red, like a seed of grain, not purulent, but covered by a scab. The final sentences are dedicated to symptomatology.

This chapter is interesting, in the first place, as it proves how complex the etiology of a disease can be: smallpox is hereditary, but its appearance can be triggered by pestilential air, by contagion via proximity and by a bad regimen. While in the case of leprosy the inter-generational transmission is due to the father's sperm and seems to be only one of the possible causes, here the mother's menstrual blood plays a primary role;[48] this difference notwithstanding, the tone of the chapter is similarly neutral, devoid of any censorship against the mother: it is an act of nature (*ṭabīʿa*) – a physiological process – that provokes such passage of superfluities, and the mother's sexual conduct or personal regimen is not considered responsible.

Moreover, the text confirms that pestilential air (*al-hawaʾ al-wabāʾī*) is not the same of the infectious one, as the two are considered different external factors; in this case, the root *ʿadā* does not occur, but the physical proximity to

47 See *supra*, n. 43: this term had been used to render the Greek ἄνθραξ as well.

48 This chapter about smallpox is not discussed in VAN DER LUGT 2008 and it appears that in later authors smallpox is not listed among hereditary diseases. Anyway, this passage proves significant as heredity is not conceived of as a cause 'parallel' to other ones, but as the primary one, because the interplay with other factors plays a role only after birth.

the affected people is expressed by the same verbs used in the chapter about leprosy (*ʾawā*, 'dwell'; *ğālasa*, 'seat'), as well as the act of breathing (*ʾistanšaqa)* and the presence of vapor (*buḫār*) in the air. The provenance of the vapor is in this case specified: it dissolves (again *inḥalla)* from the ulcers present on the sick body. The external action of the vapor as a 'morbid agent' is recognized but embedded within the framework of the humoral pathology, as the infected body already has a superfluity prone to develop into a skin affection and the vapor originates from the bad complexion of the pustules.

Even in the case of smallpox, it appears, through a comparison with other Arabic texts, that the description of such a dynamic is an innovative element introduced by Al-Mağūsī.[49] In the *Firdaws al-ḥikma* (*Paradise of Wisdom*)[50] there is only a general symptomology of the disease, but no etiology or differential diagnosis; a short hint at different kinds of smallpox can be found in *al-ḏaḫīra fī ʿilm al-ṭibb* (*The Treasure about the Medical Science*), but without any etiological explanation.[51] The monograph by al-Rāzī, *Kitāb fī-l-ğudarī wa-l-ḥaṣba* (*Book about Smallpox and Measles*) offers a more interesting comparison.[52] According to this physician, the cause of smallpox lies in the heat and humidity of the blood, which naturally tend to diminish during growth through a pro-

49 An overview of Arabic medical works dealing with smallpox is given in ULLMAN 1970, 134.

50 ʿALĪ IBN SAHL RABBĀN AL-ṬABARĪ 1996, *Firdaws al-ḥikmat fī al-Ṭibb*, 307; German translation in SPIES 1966, 189–190. I wonder if the Arabic title (*fī al-ğudarī wa-l-ḥumra*) is a misreading for *wa-l-ğamra*, for the reasons explained above (*supra*, n. 43).

51 SPIES 1966, 190–191. On the work, whose attribution to Ṯābit ibn Qurra is now refused, see ULLMAN 1970, 136.

52 The transcription of the Arabic text from manuscript Leiden, Bibliotheek der Rijksuniversiteit, Or. 585/5, ff. 79v–94r, together with a Latin translation, can be found in RHAZES 1746, *De variolis et morbillis, Arabice et Latine, cum aliis nonnullis eiusdem argumenti*; it has been translated in German in ABŪ BAKR MUḤAMMAD IBN ZAKARIYYĀʾ AL-RĀZĪ 1911, *Uber die Pocken und die Masern (ca. 909 n. Chr.)*. The Latin print is useful as it also presents the passages about smallpox contained in al-Rāzī's major works, the *K. al-Ḥāwī*, the *Taqsīm al-ʿilal*, and the *K. al-Manṣūr*, whose modern Arabic editions are difficult to consult. As they mostly agree with the monograph, I will refer only to it. For a modern analysis of the work, see KATOUZIAN-SAFADI 2017.

cess of ebullition and evaporation: smallpox is a violent form of such expulsion affecting mostly children; in the case of elderly people, it might be triggered either by a hot and humid environment, or by a bad regimen. The differentiation between smallpox and measles is not exposed in a distinct section, but is scattered throughout the work: for example, bodies might be more disposed to be affected by one or the other,[53] the symptoms are different,[54] some therapies might be more effective,[55] the signs indicating the degree of lethality differ;[56] this is since measles arises from a blood dominated by bile.

From this sketch we can infer that the *KM* presents only general similarities with the earlier tradition, as it suggested also by a comparison with the various sources collected in al-Rāzī's *Kitāb al-Ḥāwī*. The most relevant innovation concerns etiology, with its interplay of various factors on the inherited bodily substance. The attempt to systematize the diverse nomenclature connected to the Greek ἄνθραξ in a system of types of smallpox, generated by a different blood composition, is also peculiar. Within this framework, the classification of measles is different from that proposed by al-Rāzī, and the symptomatology, while sharing some elements with the other ones, does not correspond entirely with any of them – for example, it does not refer to any psychological sign of the diseases. The fact that the etiology of the smallpox proposed by al-Mağūsī could be perceived as modern by Arabic physicians is

53 RHAZES 1746, *De variolis et morbillis,* 32–33.

54 RHAZES 1746, *De variolis et morbillis,* 38–39.

55 RHAZES 1746, *De variolis et morbillis,* 164–173; 178–181. In 166–167 it is stated that "morbilli autem, quoniam ex vehementi ebullitione bilis in sanguine gignantur, res illae his magis sunt salutares, quae cum vi earum refrigeratoria, humectant etiam: ut per has temperetur sanguis corruptus." It must be noted, anyway, that the corresponding Arabic word for *ebullitio* is a conjecture by the editor, but *ġalyya* is not attested in Arabic; the direct reading of the manuscript shows that it reads *ġalaba*: "And as measles originates from a strong domination of bile on the blood." This implies that the remotest cause of the disease – the ebullition of blood during growth – is the same of smallpox, but measles arises when this blood is also dominated by bile.

56 RHAZES 1746, *De variolis et morbillis,* 194–195.

suggested by *al-Muʿālağāt al-Buqrāṭīyya*, book VII, chapter 9.[57] The author refers explicitly to different opinons among the physicians of later generations about the origin of smallpox and contrasts al-Rāzī's view with the one proper to others "deviating from the way of the best ones," who maintain that it arises because of a corruption of the mother's milk unaccepted by the child's body and thus counteracted. Al-Mağūsī is not explicitly mentioned as the addressee of such criticism, but this is a proof that an etiology of smallpox similar to his own circulated among Arabic authors and was not widely accepted because it strayed away from the classical idea that the blood ebullition is mainly responsible for the disease. Finally, although al-Ṭabarī views *al-ğudarī as* epidemic (*wāfid),* being influenced by bad air, no mention of interpersonal contagion is made, thus confirming the innovative aspect of the KM.

Constantine the African translates *al-ğudarī* with *variola*: attentive research by Ernest Wickersheimer[58] has showed that this word has been used since the 9th century in a technical sense as designation of a transmissible skin disease whose cutaneous expression is like a burn.[59] The innovation by Constantine consists in associating it with the Arabic *al-ğudarī* and, subsequently, with a completely innovative pathological framework, as previous works did not offer a description of *variola*; in the *Passionarius*, for example, it is not even mentioned. Subsequently, *ğamr i*s translated with the Biblical expression *carbones ignis,*[60] to which a totally new medical meaning is attached; the following *banāt al-nār* corresponds literally to *filiae ignis.* The sentence in which the dynamic of contagion is described is remarkable: "motio eius aut de causa ex-

57 The relevant text is translated in RIHAB 1927, 142–149; for the Arabic text, see Leiden, Bibliotheek der Rijksuniversiteit, Or. 585/5, f. 206v.

58 WICKERSHEIMER 1963.

59 It must be noted that, as testified WICKERSHEIMER 1963, 179, the first occurrence of *variolatus* in Cassius Felix, *De medicina*, c. 22, refers to "carbunculi quos Graeci anthraces vocant": i.e., to the same diseases that Syriacs and Arabs linked with smallpox.

60 *TLL*, vol. III, 430–431.

teriori, sicut aere pestilentiali, vel etiam de sedili in quo prius hanc habens pestem sederit et in sedili remanentis odorem morbi residens postea odoraverit." The periphrasis "hanc habens pestem" as translation of *al-muğaddirūna* ("those affected with smallpox") is relevant, as it uses the term *pestis*, negatively connotated, instead of the neutral *morbus*.[61] The Arabic vapor is not rendered here with *fumus* or *aer* – as in the case of leprosy – but with *odor*, a recurrent, almost technical term in the Latin tradition to designate the morbid and contagious nature of air, but suggesting anyway the idea that the affected bodies, because of their bad smell, are repulsive.[62] Finally, the origin of the vapor given in the *KM* is totally omitted and substituted by the 'remaining disease' (*remanens morbus*), considered as a separate entity detachable from the sick body. Therefore, the impression is that the contagious potentiality of smallpox is described in a less scientific way than the one proper to leprosy, modifying in a sensible way the Arabic original.

At the beginning of the section about differential diagnosis, *ğamr* is translated differently, as *ignite prune*, making it difficult for the Latin reader to identify them with the previous *carbones ignis*. The following description of the pustules is meaningful insofar as it is based on a specific interpretation of the diacritical points of the Arabic text: the verb *camerari*, 'take the shape of a vault', must render the Arabic *tataqabbaba*, while *aperiuntur* corresponds to *tatafattaḥa*. An interesting point is also the translation of 'the Persian fire' (*al-nār al-fārisī*) by *ignis sacer*, which can be explained in two ways: on one side, the Arabic *al-fārisī* can be easily confused with a word stemming from the root *qds*, designating 'holiness'; on the other side, *ignis sacer* as a skin disease was surely familiar to Constantine from the previous Latin tradition and this

61 On the use of this term in relation with epidemics, see STOK 2000, 61–62.
62 STOK 2000, 81–84.

might have prompted him to interpret the Arabic text accordingly.[63] The Arabic *al-ḥaṣba* is omitted in the following sentence ("est item variola de sanguine calido et subtili"); this might explain why the title of the chapter is simply *de variola*. Another word that Constantine does not render with a Latin equivalent, but rather with several expressions, is *ḫaškarīša*, 'scab': "(pustule) habentes pruriginem atque duritiem; habent putredinem et ardorem"; "(variola) dilatatur et evanescit"; such variety might be explained either by the fact that the technical meaning of the Arabic word was not clear to him, or that he purposedly tried to describe the final stage of the development of the pustules in a different way for every kind of *variola*.

In the *LR*, the title of the chapter mentions both *variola* and *rubeola*: this second term, translation of *al-ḥaṣba*, is not attested before and has probably been coined by Stephen, not based on the Arabic semantic – as the root *ḥṣb* refers to 'pebbles', 'gravel' – but on the external appearance of the disease, causing a redness of the skin. Here, *ǧamr* corresponds to *carbones adustos*, while the following *filiae ignis* translates literally *banāt al-nār*, as in the *PA*. The dynamics of contagion is rendered in a more faithful and neutral way than in the *PA*: the disease might be caused by "in locis sessione que habitacula sunt variolam patientium, in quibus qui sedent aera respirant quem vapores miscent ab ulceribus variolarum dissoluti."[64] Subsequently, *ǧamr* is rendered with the same expression, *carbones ignis*, which Constantine had used, thus creating a certain incoherence. The same difficulty in understanding *ḫaškarīša* occurs. The term is translated by Stephen, in its first appearance, as *prurigo et*

63 On the history of the disease see WICKERSHEIMER 1960, 167–168; FOSCATI 2013.

64 A remarkable feature of this sentence is the use of the verb *misceo*. Clearly, the vapors do not 'mix the air', but 'mix themselves with the air': Stephen ascribed to the Latin verb the same reciprocal meaning that the Arabic *ḫālaṭa* (third derived stem) has, as well as its grammatical construction subject + verb + accusative = 'someone mixes with something'.

duricies, clearly on the basis of *PA*; later, he chooses the periphrasis *vesice et scalpores*, whose second word is not attested before and might derive from the verb *scalpo*, 'carve', 'scratch', and mean 'scratches of skin' like those caused by *adustio*.[65] Another word that has caused some struggle for both translators is *ṣadīd*, 'pus (of a wound)': Constantine uses *acuta putredo*, Stephen *rubigo*, which, designating a 'reddish deposit', might be considered as an effective choice. Lexical difficulties also arise in the recognition of *nafṭ*, 'blister' (especially those arising on a hand because of hard work): while Constantine does not translate it,[66] Stephen does not read the Arabic text with the correct diacritical points and interprets the word as *nuqaṭ*, occurring also in the precedent lines, whose translation is *gutta* – obviously, for the Latin reader, the expression "guttis que ex adustione fiunt ignis" could not be totally clear.

The 'Persian fire' (*al-nār al-fārisī*) is here *ignis (s)acer*:[67] evidently, Stephen was influenced by Constantine in reading in the Arabic *al-fārisī* the root *qds*. In correspondence to the third occurrence of *ḫaškarīša* there is probably a textual corruption: in the text "nec aperiuntur pustule sed fiunt/fient,"[68] translating the Arabic "laysa tatafattaḥu bal taṣīru ḫaškarīša," a final noun is missing. An omission by the scribes can be supposed, or the difficulty of the

65 The model for this noun formation should be the one described in LEUMANN 1977, 377–379: a masculine deverbal noun formed with the suffix *-or, oris*; although such formation usually gives origin to abstract nouns, *scalpor* as 'scratch' refers to an 'external', perceivable property of the skin, and for this reason it might have been coined this way by Stephen.

66 His translation is: "fit vesica sicut igni incensa," where *vesica* corresponds to both *naffāḫa* and *nafṭ*.

67 The most ancient manuscripts read *ignis acer*, but this might be due to a copyist's error; as both *ignis acer* and *ignis sacer* are used in Latin to refer to the disease, only an extensive edition of the *LR* could suggest which one was the translation chosen by SA.

68 I interpret as *fiunt* the text of codex G, whereas L has the verb *fient*; in a rather uncommon way, these verbs are not abbreviated in manuscripts, and this might be a sign of the difficulty of the scribe to make sense of the sentence. The printed edition of *LR* (*editio princeps*, Venezia, Bernardinus Ricij da Novara, 1492) has *fluunt*, probably an attempt to make sense of the text.

term might have prevented Stephen from rendering *ḫaškarīša*, maybe in view of a later completion (never achieved); this second hypothesis could be confirmed only if such a phenomenon was observed in other parts of the work. The final paragraph, dedicated to symptomatology, does not present significant peculiarities: evidently, this lexicon was more familiar to both translators. Both Constantine and Stephen have had a hard time at finding Latin equivalents for the complex Arabic vocabulary describing cutaneous lesions, and their translations of this chapter shows what kind of challenge they were facing: clothing in expressions familiar to their readers an innovative and complex medical theory.

Conclusion

The analysis of leprosy and smallpox in the *KM* has shown that the etiology of a disease, for medieval physicians, often involved an interplay of different factors, not excluding one another but variously combined, and that a certain dynamic of contagion certainly was not unknown to them. Since the body is a complex organism, contagion was considered as a cause among others; there was also an effort to grasp its mechanics, at least in theoretical treatises. These texts prove that no contradiction was perceived in the co-existence of different harmful causes, as they are all integrated in the general humoral theory and coexist with other changes in the bodily complexion.

Secondly, the necessity to set the *KM* in a precise historical context has been highlighted: only a thorough comparison of these chapters both with the Greek sources and with other Arabic treatises has allowed to observe its originality in the field of pathology as well as its attempt to arrange in a coherent picture the traditional doctrines. The comparison with the two Latin

translations demonstrates that, while Stephen of Antioch completely adheres to the scientific approach of the Arabic original, Constantine the African manages to use a totally neutral language only in the description of leprosy. Anyway, the overall impression is that the Latin readers were provided with an innovative and laical pathology of these diseases. Finally, the challenge to create a new lexicon as a vehicle for new ideas has been underlined, thus suggesting that the field of cutaneous diseases is one of the best 'case studies' for comparative readings of medical treatises.[69]

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69 I have dealt with the relationship between the powers of the rational soul and bodily complexion elsewhere: ZUCCOLIN 2019.

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APPENDIX I

Leprosy (*al-ǧuḏām*)[70]

في صفة الجذام وأسبابه وعلاماته

فأمّا الجذام فهو مرض يجفّف سائر أعضاء البدن ويفسّدها باليبس وهو بمنزلة سرطان حادث في جميع البدن وحدوثه يكون من ضعف القوّة المغيّرة التي في اللحم إذا كان ذلك من سوء مزاج بارد يابس ومن غلبة الخلط السوداوي على الدم وإفساده إياه فيصير إلى سائر الأعضاء ليغذوها فيجفّفها ويفسّدها باليبس ويفسّد مع ذلك أخلاط البدن ويفسّد المنى إذا كانت الأخلاط والمنى إنّما حدوثهما عن الدم حتّى أنّ هذه العلّة تعدو[71] إلى النسل فتحدث بالأولاد وذلك أنّ جوهر المنى ممّن هذه حاله يكون مختلطاً بالأخلاط الرديئة المحدثة لهذا المرض والولد المتكوّن من هذا المنى تكون أخلاط بدنه مشاكلةً لهذه الأخلاط وأعضاؤه الأصلية متكوّنة من جوهرها فلهذا ما تتعدّى هذه العلّة من الإباء إلى الأولاد وقد يتعدّى هذا المرض أيضًا إلى من يجالس أصحابه ويأوي معهم لمّا يتحلّل من أبدانهم من البخار الرديء ويستنشقه من يحضرهم

70 A list of all preserved manuscripts of the *KM* is edited in TROUPEAU 2018; an Arabic edition of the whole work has been published as ʿALĪ IBN AL-ʿABBĀS AL-MAǦŪSĪ 2018 [*Kāmil al-ṣināʿa al-ṭibbyyia*], based on the collation of three manuscripts. The texts I will quote in Appendix I and II rely on the collation of the following manuscripts: (D) Dublin, Chester Beatty Library, Ar. 3996 [13th c.], ff. 135v–136r; (G) Princeton, University Library, Garrett Suppl. 1S [1190], ff. 105r–106v; (H) London, British Library, Or. 6591 [1153], ff. 82r–83r; (I) Paris, Bibliothèque nationale de France, ar. 2791 [1261], ff. 165rv; (E) Madrid, Biblioteca Nacional de España, Ar. 129 [15th c.], ff. 149rv; (Bi) Birmingham, Selly Oak Colleges Library, Mingana Ar. 1284 [14th c.], ff. 93r–94r; (Par) Paris, Bibliothèque nationale de France, ar. 2874 [1151], ff. 81r–82v; (Par1) Paris, Bibliothèque nationale de France, ar. 2875 [13th c.], ff. 26r–27r; (L) Leiden, Bibliotheek der Rijksuniversiteit, Or. 450/1 [1279], ff. 108v–109r.

71 All manuscripts have the reading *tuʿdī / tuʿdā*, depending on the diacritical points: so written, the verb should be the fourth derived stem from *ʿadā* (*ʾaʿadā*). This verb has the usual meaning of 'infect', but, as it is common for causative verbs of the fourth derived stem, it is always constructed with the accusative, and not with the preposition *ʾilā* (see the corresponding entry in LANE 1863–1893). For this reason, I am inclined to read *taʿduwa*, subjunctive of the first stem *ʿadā*, which means 'infect' with the preposition *ʾilā* introducing the infected person; the script of the manuscripts might be due to the fact that the final *waw* of the subjunctive is vocalized with *fatḥa*.

والجذام نوعان فمنه ما حدوثه من الخلط السوداوي الذي هو عكر الدم وثفله وهذا الجذام لا يكون منه تساقط الأعضاء وربّما أنجب[72] فيه العلاج وبرئ منه صاحبه برءاً تامًّا إذا تلوحق في أوّل حدوثه والنوع الثاني يكون حدوثه عن المرّة السوداء الحادثة عن احتراق الصفراء وهذا النوع معه يكون تأكّل الأعضاء وتساقطها ولا يكاد يبرأ صاحبه

وعلامات الجذام في أوّل حدوثه أن تكون في بياض العين كمودة وتراها كأنّها مستدرة الشكل ولذلك سُمِيتُ هذه العلّة داء الأسد وإذا استحكمت كان معها تساقط الأعضاء وانتثار شعر الأجفان والحاجبين وتحدث في الحلق بحوحة ويصير الوجه منتفخًا متعجرًا مائلاً إلى الحمرة وتشقّق الأنامل وتبس الخياشيم وتغلظ عروق اللسان وربّما سقط الأنف فهذه صفة أسباب الجذام ودلائله

On leprosy, its causes, and symptoms.

Leprosy is a disease that desiccates all the organs in the body and corrupts them through dryness: it is like a cancer affecting the whole body. Its appearance is originated by the weakness of the mutative faculty which is in the flesh, since this (disease) originates from the harmfulness of a cold and dry complexion, and from the black bile dominating and corrupting the blood; as a consequence, it (the blood) reaches the other limbs to nourish them, but then it desiccates them, corrupts them through dryness – and consequently corrupts the humors of the body. It (also) corrupts the sperm because both humors and sperm generate from blood, so this disease also propagates to the progeny and appears in the children. This happens because the substance of the sperm of men affected by this condition consists of bad humors, which originate this disease, and the humors of the body of the child generated by this sperm are similar to these humors and his main limbs are generated by

72 This reading is shared by all manuscripts, but its sense is not clear: *ʾanǧaba* means "to beget a noble child" (see the corresponding entry in LANE 1863–1893). The Latin translations use the verb *prosum*, therefore they probably read in the Arabic text *ʾanǧada*, 'help'. A confusion between the letters *bāʾ* and *dāl* is possible, but only a more thorough knowledge of the *KM* will help establish the correct reading; for now, the translation will be based on the verb *ʾanǧada*.

their (of the humors) substance. And it is because of this that such illness is propagated from fathers to children. Moreover, this illness may infect also who sits next to the sick and dwells with them, as their bodies give off a bad vapor and those who visit them inhale it.

There are two kinds of leprosy: one which is generated by the black humor, which is a turbidity and a sediment of the blood; there is no limb loss and sometimes its treatment is successful, and the patient recovers perfectly, if it (the treatment) is applied directly after its initial stages. The second kind is generated by the black matter formed by the burning of the bile: this kind causes corruption and loss of the limbs, so that the patient hardly recovers.

Concerning the symptoms of leprosy, at the first stage of development they consist of dullness in the white of the eye, and (the eye) appears to you as if it were of a round shape: that is why this disease is called 'leontiasis'. Moreover, when it acquires strength, it is accompanied by the loss of the limbs and the fall of the eyelid and eyebrow hair; raucousness affects the throat; the face becomes swollen and wrinkled and tends to be reddish; the fingers crack; the nostrils desiccate; the veins of the tongue thicken; sometimes, the nose flattens. These are the causes and signs of leprosy.

APPENDIX II

Smallpox (al-ǧudarī)

في صفة الجدري والحصبة وأسبابهما

فأمّا الجدري فهو بثور[73] صغارة تنفرش في جميع البدن أو في أكثره وربّما حدثت في بعض الأعضاء دون بعض وهو الذي يسمّيه القدماء الجمر ويسمّيه السريانيون[74] بنات النار وهذه البثور تحدث بأكثار الناس في زمان النشوء وذلك لأنّ الجنين في الرحم يغتذي من دم الطمث الذي هو فضل من فضول بدن المرأة تدفعه الطبيعة من الكبد في العروق إلى الرحم كالذي ذكرنا في غير هذا الموضع

وهذا الدم مخطفة في جوهره وكيفيته أمّا في جوهره فربّما كان الغالب عليه جوهر الدم وربّما كان الغالب عليه جوهر الصفراء والسوداء أو ربّما كان الغالب عليه البلغم وأمّا في كيفيته فيكون إمّا دمًا محمودًا وإمّا دمًا مذمومًا والجنين يغتذي بأجود ما فيه وتتربّى به أعضاؤه ويبقى الباقي في أعضائه وعروقه فإذا خرج الجنين أيضًا من بطن أمه فغذاؤه من اللبن واللبن كونه من دم الطمث والأعضاء تغتذي بأجوده ويبقى البقي فضلاً في بدنه إلى أن يحرّكه سبب ما إلى الظهور فيظهر

وتحرّكه يكون إمّا عن سبب من خارج بمنزلة الهواء الوبائي أو الجلوس في المواضع التي يأويها المجدّرون فيستنشقون الهواء الذي قد خالطه البخار المنحلّ من قروح المجدّرين وإمّا من داخل فبمنزلة تدبير الصبي بالأغدية الحارّة الرطبة الغليظة الجوهر بمنزلة الأكثار من أكل اللحمان والحلواء والتمور وغير ذلك من الأغذية الملائمة للفضل الرديء المجتمع في البدن فيزيد في كميّته فيحدث له غليان فتقوى عليه الطبيعة فتدفعه إلى ظاهر البدن فتحدث عنه البثور المعروفة بالجمر فتكون في قوّة الرداءة وضعفها بحسب كيفية الفضل الرديء وجوهره

فإن كان الدم المحدث له حارّ المزاج غليظ الجوهر وليس يردؤ الكيفية كان منه النوع من الجدري الذي أوّل حدوثه بثور صغار حمر وتتزيّد في العظم حتّى تنتهي إلى قدر العدسة الكبيرة وتستدير وتنثقب[75] ويصير لها بريق وتتقيّح[76] سريعًا وإذا تقيّحت كان لونها أبيض برّاقًا شبيهًا باللؤلؤ وتحدث لها مع التقيّح

73 كثيرة: *post add.* GEHLPar1Bi
74 اليونانيون : DEH
75 وتتقبب : GLBiPar1] وتتفتح .: H] وتثقب : E
76 وتتفتح : EH (such difference in vocalization recurs in all occurrences of the verb تقيّح)

خشكريشة صلبة وهذا الصنف منها أسلم ما يكون

وإن كان حدوث الجدري من دم غليظ سوداوي رديء الكيفية فإنّ ابتدأ حدوثه يكون بثورًا كمدة اللون في وسطها نقط سود وإذا عظمت تفرطحت وانبسطت واتّصل بعضها ببعض ولم تستدر بل يصير شكلها مختلف الجوانب ولونها شديد الكمودة إمّا في لون الرصاص وإمّا مائلاً إلى السواد كلون الرماد وإمّا مائلاً إلى الصفرة أو الباذنجانية وإذا انفجرت تصير لها خشكريشة سوداء شبيهة بحرق النار وربّما لم تتقيّح وما كان منها كذلك فهو رديء مهلك وإذا خالط الدم صديد حدث فيها بين هذه القروح نفّاخات فيها صديد شبيهة بالنفط الذي يحدث عن حرق النار ويُقَالُ لذلك النار الفارسي وهذا أيضًا رديء جدًّا

وفي الجمر نوع يُقَالُ له الحصبة وحدوثه عن دم حارّن رقيق ليس بالقوى الرداءة وهذا النوع إذا انتهى منتهاه كان شبيهًا بحبّ الجاورس أو أكبر منه قليلاً وكان لونه أحمر وليس يتقيّح بل تصير خشكريشة

والدلائل العامّية في ابتدأ حدوث الجدري هي الحمّى وانتفاخ الوجه والأصداغ والأوداج وحكّة في الأنف وتلهّب وحمرة في الوجه وفي العضو الذي يحدث فيه ذلك وثقل في الرأس وخشونة في الحلق فإذا رأيت هذه العلامات مع الحمّى اللازمة فلعلم أنّها تدلّ على حدوث الجدري

On smallpox and measles.

Smallpox consists of small pustules which spread over the whole body or most of it. Sometimes, they appear in some limbs and not in others, and this is the (smallpox) that the ancients used to call ‘burning coal’ and the Syrians used to call ‘daughters of fire’. These pustules appear, in most people, during the age of growth, since the fetus in the womb feeds on the menstrual blood, one of the superfluities of the female body, which nature drives away from the liver, through the veins, to the womb, as we have said in other places.

This blood is various in its substance and quality. For what concerns (the variedness) in its substance, sometimes the substance of blood dominates it, sometimes the substance of bile or of black bile, or sometimes the substance of phlegm dominates it; for what concerns (the variedness) in its quality, sometimes it is praiseworthy blood, sometimes it is blameworthy blood. The

fetus feeds on the best which is in it and his limbs grow because of it, while the rest remains in its limbs and vessels. Also, when the embryo goes out from the mother's womb, his nourishment is from the milk, and the essence of the milk is from the menstrual blood, and the limbs feed on its best part, and the rest remains as a superfluity in his body, as long as some cause moves it towards the outside, so that it comes out.

And its movement is due either to an external cause, such as pestilential air, or to sitting in places where those affected by smallpox dwell, so that they (the healthy people) breath the air with which the vapor given off by the ulcers of those affected by smallpox is mixed, or to an internal one, such as a regimen of the boy based on warm, humid foods and of thick substance, such as most meats, the sweet foods, the dates, and other foods in accordance with the bad superfluity collected in the body, the consequence of which is that it (the superfluity) increases in its quantity, ferments, nature acts on it and pushes it to the surface of the body, so that on it (the surface) appear the pustules known as 'burning coal'. These are in the intensity of their harmfulness and weakness according to the quality and the substance of the bad superfluity.

If the blood which produces it is of hot complexion, thick of substance and not of bad quality, from it we have the kind of smallpox whose first appearance consists of small, red pustules that increase in dimension until they reach the measure of a big lentil, become round and are perforated, on them comes a glitter and become quickly purulent; if they become purulent, their color is white, shining, similar to a pearl; when becoming purulent, on them appears a hard scab. And this kind of theirs is the healthiest.

If the appearance of smallpox originates from thick, melancholic blood of bad quality, the beginning of its appearance will consist of pustules of livid color,

with black dots in their middle, and when they increase, they broaden, expand and unite with one another, and they do not become round, but their shape becomes irregular on the sides and their color of strong dullness, either in the color of lead, or inclining towards blackness, as the color of ashes, or inclining towards yellowness or (towards the color) of eggplants. If they erupt, a black scab appears on them, like a burn caused by fire, and sometimes they do not become purulent. And what comes from them, if they are in this state, is harmful and destructive; and if the blood mixes with pus, bladders appear between these ulcers, like the vesicles that appear because of a fire burn and (this kind) is called 'the Persian fire', and it is also very harmful.

In 'burning coal', there is another kind which is called 'measles', whose appearance is caused by warm, thin blood, and in the intensity, there is no harmfulness. When it reaches its acme, it is like a seed of grain or something bigger, and its color is red, and it does not become purulent, but a scab appears.

The general signs of the beginning of the appearance of smallpox, are the fever, the swelling of the face, of the temples, and of the jugular veins, itching in the nose, inflammation and reddening in the face and in the limb where this (disease) appears, heaviness in the head, coarseness in the throat. When you see these symptoms together with fever inherent to them, know that they indicate the appearance of smallpox.

APPENDIX III

Transmissible diseases[77]

فأمّا التحرّز من الأمراض المعدية كالجذام والجرب والسلّ والبرسام والجدري والرمد والسبل فإنّ هذه أمراض تتعدى[78] إلى من يجلس أصحابه فليس ينبغي أن يجالس الإنسان أمثال هؤلاء ولا يأوي مع من هذه حاله في بيت واحد وأن يتباعد عنهم إلى مواضع تكون فوق الريح الهابّة بهم فهذه جملة من التدبير ينتفع بها من أراد التخلّص من الأمراض الوبائي والمعدية

As for the prevention from transmissible diseases, such as leprosy, scabies, phthisis, pleurisy, smallpox, *sabal*,[79] these are diseases that infect who sits together with people affected by them, so that people should not sit with them and should not dwell in the same house of those whose condition is this, and they should move away from them to places above the wind that blows by them. This all about the regimen that benefits who wants to be free from pestilential and transmissible diseases.

77 This text is based on the collation of the following manuscripts: (Ch) Dublin, Chester Beatty Library, Ar. 5437 [XIV], f. 95v; (P) Dublin, Chester Beatty Library, Ar. 3995 [1145], f. 23r; (R) Paris, Bibliothèque nationale de France, Arabe 2877 [XI], ff. 80v–81r; (S) Paris, Bibliothèque nationale de France, Arabe 2878 [XI]; (G), f. 92r.

78 In this passage, codex Ch, P and G read *tuʿdī ʾilā*, thus presenting the same problem described above (*supra*, n. 71); the accepted text is that of codex R, while S has *tuʿdī man*, without *ʾilā*, which would be correct as well.

79 *Sabal* is an eye disease (see the corresponding entry in LANE 1863–1893: "A certain disease in the eye, resembling a film, as though it were the web of a spider, with red veins").

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