Iuliana Soficaru

THE MEDICAL WORK OF PAUL OF AEGINA: THE CASE OF TREATING RABIES

MA Thesis in Medieval Studies

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by

Iuliana Soficaru

(Romania)

Thesis submitted to the Department of Medieval Studies,

Central European University, Budapest, in partial fulfillment of the requirements

of the Master of Arts degree in Medieval Studies.

Accepted in conformance with the standards of the CEU.

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I, the undersigned, **Iuliana Soficaru**, candidate for the MA degree in Medieval Studies, declare herewith that the present thesis is exclusively my own work, based on my research and only such external information as properly credited in notes and bibliography. I declare that no unidentified and illegitimate use was made of the work of others, and no part of the thesis infringes on any person's or institution's copyright. I also declare that no part of the thesis has been submitted in this form to any other institution of higher education for an academic degree.

Budapest, 21 May 2014

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Signature

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LIST OF ABBREVIATIONS

ARG	*Archiv für Religionsgeschichte*
ANRW	*Aufstieg und Niedergang der römischen Welt*
BIFAO	*Bulletin de l'Institut français d'archéologie orientale*
BZ	*Byzantinische Zeitschrift*
CLJ	*Cambridge Law Journal*
CMG	*Corpus Medicorum Graecorum*
DE	*Dictionnaire etymologique de la langue latine. Histoire des mots.*
DOP	*Dumbarton Oaks Papers*
GRBS	*Greek, Roman, and Byzantine Studies*
JAOS	*Journal of the American Oriental Society*
JCraniomaxillofacSurg	*Journal of Oral- Cranio-Maxillar-Facial Surgery*
JECS	*Journal of Early Christian Studies*
JHS	*Journal of Hellenic Studies*
JID	*Journal of Infectious Diseases*
JR	*Journal of Religion*
LCL	*Loeb Classical Library*
ODB	*Oxford Dictionary of Byzantium*
REV	*Revue des études byzantines*
Rev.HistoireSci	*Revue d'Histoire des Sciences*
Rev.Sci.Tech.Off.Int.Epiz.	*Revue scientifique et technique. Office International de Épizootes*
PlasReconsSurg	*Plastic Reconstructive Surgery*
SISMEL	*Società Internazionale per lo Studio del Medioevo Latino*
TAPhA	*Transactions of the American Philological Association*
WorldJSurg	*World Journal of Surgery*

INTRODUCTION

Rabies is a drama with three actors: the rabies virus, the biting mammal, and the man. It is one of the oldest infectious diseases known, affecting humans and animals alike, and equally deadly. Because it was a disease impossible to prevent until the end of the nineteenth century and still without a treatment today, I used rabies as a constant to follow in my research. It offers the possibility to study ancient views on human-animal relations, magic, health, healing, intellectual discourse, literary characters, public space, public health and urban health. This case study of treating rabies in Paul of Aegina offered me the possibility to analyse several aspects, such as the originality of the author, late antique medicine and encyclopaedism, and the means of controlling rabies in an urban environment.

Byzantine medicine is a well-studied topic in recent scholarship and a few articles deal even with rabies, however, there are questions left unanswered: Were those afflicted isolated? Were medicines prescribed by physicians or they were just abandoned to their fate? And if that was the case, what were the reasons behind it? How was this animal disease controlled? What preventive measures were taken to prevent the spread of rabies or other animal-borne diseases? Is there a visible difference between animal and human infectious diseases? What kind of animal control was practiced? Was the environment controlled in such a way as to avoid the contact with rabies? These are just some of the question I intend to answer in this thesis.

Sources

The main primary source I intend to use in this research is the *Pragmateia,* or *Epitome of Medicine,* a medical summary in seven books which deals with the main medical practices

and procedures written by Paul of Aegina, precisely the third chapter of the fifth book tackles rabies.[1]

The first problem raised by this primary source is the originality of the text. Paul of Aegina was a seventh-century compiler who used earlier authors as sources and this raises the question of personal experience: is it still possible to identify the voice of the author? Is his passage on rabies based on his personal experience as physician or copied? Many Greek manuscripts of this medical work survive, which in itself is a sign of its great popularity and wide circulation. Its popularity was due to the fact that it comprises, in a convenient size, the essential medical knowledge.[2] The scarce information about his life, only a short reference of his birth place, the island Aegina, makes it difficult to establish a clear context of his activity. The earliest report on his life is from the tenth century, coming from the oriental milieu: in 987 Ibn an-Nadim mentioned Paul of Aegina as an obstetrician and an author of a Compendium in seven books.[3] The religious background of his life is also problematic, because his collection of seven books on medicine was written as a legal treaty. J. L. Heiberg, the editor of the first Greek edition of Paul of Aegina believed that he was a Christian, basing his assumption on a reference to circumcision as a heathen practice.[4] A particularity of this medical treaty is the fact that the English translation is prior to the Greek critical edition. In 1884 a Scottish medical doctor translated Paul of Aegina's work into English. A critical edition of the same text was published only later, in 1921-1924, in *Corpus Medicorum*

[1] The work of Paul of Aegina has no title mentioned and both titles have been offered by scholars, in my thesis I will used the title proposed by Peter Pormann, *Pragmateia*. The Greek edition published in the *CMG* has no title mentioned: Paul of Aegina, ed. Johan Ludvig Heiberg, I-II, Leipzig, 1921-1924.

[2] The English translation is prior to the Greek edition, proving again the text's popularity, see Peter E. Pormann, *The Oriental Tradition of Paul of Aegina's Pragmateia* (Leiden: Brill, 2004), 8 (hereafter: Pormann, *Pragmateia*). The English translation of the book appeared in 1884, one year before Louis Pasteur's development of an effective vaccine against rabies. This event stirred once more the interest in rabies and eight years later, Michel de Tornéry published a history of rabies until the nineteenth century, Michel de Tornéry, *Essai sur l'histoire de la rage avant le XIX-eme siècle,* (Paris: Imprimerie de la Faculté de Médicine, 1893).

[3] A. Z. Iskandar, "An Attempted Reconstruction of the Late Alexandrian Medical Curriculum," *Medical History* 20, no. 3 (1976): 236 (hereafter: Iskandar, *Medical Curriculum*).

[4] His source for this fragment, Oribasius, mentioned the same practice being a sign of godlessness. Pormann, *Pargmateia*, 6.

Graecorum, by J. L. Heiberg based on seventeen Greek manuscripts out of a total of sixty surviving manuscripts. Another important aspect of this medical treaty is the oriental tradition: writing and living in Alexandria during the Arab conquest Paul of Aegina was one of the first physicians whose work was translated into Arabic or Syriac, thus the text developed a completely different tradition in the Orient as Peter Pormann suggested.

In order to analyze the originality of the author or the lack of it, as stated by many scholars, I will use the surviving medical works, in Greek and Latin which speak about the treatment and symptoms of rabies. Because he was accused of simply copying form Oribasius or other earlier authors,[5] I will also use the descriptions of rabies provided by Celsus (first century CE), Scribonius Largus (first century CE), Oribasius (fourth century CE), Cassius Felix (fifth century CE), Caelius Aurelianus (fifth century CE), and Aetius of Amida (fifth-sixth century CE). This comparative approach gives me the possibility to emphasize whether the treatment of rabies was a matter of originality or all physicians had a common, standard description and treatment, despite their medical school or tradition.

The character of the disease, its being animal borne, influenced the possibility of correlating human medical sources with veterinary sources. The main veterinary medical sources, such as *Hippiatrica*[6] and *Geoponica*, are later than *Pragmateia*. *Hippiatrica*, which deals mainly with horse medicine, was the main Byzantine veterinary treaty. Among the numerous extracts in the collection, rabies is mentioned frequently enough to suggest a knowledge and concern about the disease among domestic animals.[7] *Geoponica*, a Byzantine encyclopedia dedicated to Constantine VII describing remedies against the bites of mad dogs.

[5] For instance, Vivian Nutton, *Ancient Medicine* (London: Routledge 2004), 295 (hereafter: Nutton, *Medicine*); Danielle Gourevitch, "The Paths of Knowledge: Medicine in the Roman World," in Mirko Grmek, "The Concept of Disease" in *Western Medical Thought from Antiquity to the Middle Ages*, ed. Mirko Grmek (Cambridge: Harvard University Press, 1998), 242 (hereafter: Grmek, *Western Medical Thought*), 136; Gotthard Strohmaier, "Reception and Tradition: Medicine in the Byzantine and Arab World," in Grmek, *Western Medical Thought*, 145.

[6] Anne McCabe, *A Byzantine Encyclopedia of Horse Medicine. The Sources, Compilation, and Transmission of the* „Hippiatrica" (Oxford: OUP, 2007).

[7] Jean Théodoridès, "Rabies in Byzantine Medicine", *DOP* 38, Symposium on Byzantine Medicine (1984): 152.

Tenth-century compilations like the *Hippiatrica* and the *Geoponica* used earlier sources, probably written after the fourth century when the veterinary medicine developed as a result of military tactics. The veterinary sources dated before seventh century are Pelagonius (fourth century) and Vegetius (fourth century). Both of them, however, where interested mainly in horse medicine and incidentally described the disease in dogs. The problem of relevance can be solved by the fact that rabies acts like an equalizing factor; it affects both humans and animals in the same way, therefore a comparison is useful for understanding the patterns of disease. Rabies is the same in dogs and horses, thus horse medicine is relevant in this case. The problem of comparison raises the several questions which I will try to answer. Was rabies in animals identified as the same viral infections as in humans? Based on medical sources, was it visible in the seventh century a difference between "animal rabies" and "human rabies"?

Further expanding the evidentiary basis in order to answer the research question led me to the normative sources. Seventh-century Byzantine society, as the earlier Greco-Roman one, was animal-dependent; as a consequence, an animal-borne disease like rabies became a social problem. Specific laws and norms regulated the presence of animals in the urban or rural environment. A relevant source for seventh-century urban health was Justinian's Code. The ninth book of the Digest describes the liability of any animal owner in case of damage produced by the animals, a legal precept called *actio de pauperie*. The normative sources raise the problems of chronology and character: Were these laws connected to animals specific to a city, a region or to the entire empire? And how long were the laws valid? Used with caution and solely when the chronology is confirmed, the laws connected to animal control and urban health support the medical sources.

In many medical sources rabies is described closely connected with the urban environment and with the presence of dogs in this environment. In order to cope with the

violence demanded by dog control methods, namely the killing of dogs, ancient urban populations developed special festivals and later, we find even a saint specializing in rabies, as Saint Tarabo.

The daunting symptoms of rabies and the human relation with the main propagating factor, that is the dog, placed this zoonosis among the best studied diseases. Numerous descriptions of rabies survived, in various forms, from treatments to literary personifications, as a proof of the effect it had on the communities.

Methodology and structure

There are several ways to answer at least some of these questions. My method is to address new questions to familiar sources.[8] I will focus on a close reading of the sources and consider some key concepts such as: *disease*, *aetiology*, *infectious agent*,[9] *incubation period*, *symptoms*, *treatment*, and *prognosis.* These key concepts address all the elements of an illness from a subjective experience to a biologically objective reality. My approach is original because I am using the same criteria for all medical sources, a method which enables me to emphasize a standard common framework of understanding rabies, from the intellectual construction to the basic ingredients used in treatment. A second aspect highlighted though my method is the matter of originality. Because Paul of Aegina and other late antique physicians were many times accused of being mere compilers I think it is important to distinguish between standard medical approach, above any other school tradition, and individual understanding of rabies.

My further original approach of rabies is expanding the sources considered, by consulting normative as well as veterinary sources. Rabies is an infectious disease common to mammals therefore, it affects humans and animals in the same way. A comparative analysis

[8] There is an English translation Paul of Aegina's *Pragmateia* from 1847, edited by Francis Adams, proving the early interest in this source, also for methods of approaching well-known medical sources see Guy Geltner, "Public Health and the Pre-Modern City: A Research Agenda," *History Compass* 10, no. 3 (2012): 236.

of the human and veterinary medical sources will offer a glimpse into the seventh-century understanding of infectious diseases. The same key concepts: disease, aetiology, infectious agent, incubation period, symptoms, environment, treatment, and prognosis will frame a comparison among sources. By widening my analysis to the veterinary sources I will emphasize the differences between human and animal disease, not solely in term of definition and treatment, but also in terms of influencing factors or environment.

This comparison raises further questions: are there any veterinary treaties from the seventh century which can be compared to Paul of Aegina's work and, if there are, is it relevant to compare human and veterinary medicine?

Besides the factors affecting the actual text of Paul of Aegina, there are other variables affecting the content itself, such as: the medical tradition or the medical school of Paul of Aegina and the regional approach. Is it possible to apply the precepts of Paul of Aegina for other provinces of the Byzantine empire or this is a regional approach to rabies, something connected to the Alexandrian medical milieu?

The case of treating rabies in the seventh century benefitted from secondary literature form different areas of knowledge, from social sciences and history of medicine, to philology and medicine.

The life of Paul of Aegina is little known and has enjoyed insufficient attention from the modern research hence, the first chapter will examine the broader context of his life and the pertinent features of the intellectual milieu surrounding the medical school of Alexandria.

The second chapter turns to the analysis of the late antique medical sources describing rabies in humans. First, I analyze the different levels of understanding rabies, as reflected in the sources, from biological entity to communal experience. Second, I apply a series of key concepts in order to emphasize the patterns of compiling medical sources in Late Antiquity.

[9] Lise Wilkinson, "The Development of the Virus Concept as Reflected in Corpora of Studies on Individual Pathogens," *Medical History* 21 (1977): 16.

The third and final chapter will turn to the broader topic of urban health, where dogs play a major role in the spread of rabies inside the city. In order to analyze the ancient methods of identifying and controlling rabies inside the city I expanded my evidentiary basis to veterinary medical sources, normative, and literary sources.

For an effortless reading of the thesis I have attached two appendices, Appendix I offers the English translation and Appendix II offers the Greek text.

In my thesis I would like to show that an apparently minor subject like rabies can answer many questions about seventh-century Alexandrian society. I think that in the analysis of the late antique medical sources tackling rabies as a socio-cultural experience rather than a curiosity is one method of reaffirming the link between infectious diseases, cultural transmission, human behavior, authority, and other elements of the social practice. Addressing new questions to well-studied sources and the correlation with new evidence make the topic of rabies in Paul of Aegina's work relevant for future studies of Late antique medicine, public health, and social practice.

CHAPTER ONE: PAUL OF AEGINA: HIS LIFE AND MEDICAL MILIEU

This chapter is dedicated to a survey of Paul of Aegina's life and activity. This author has enjoyed little attention from modern research and a better understanding of his activity will benefit from a description of the broader context. My investigation into the life and work of Paul of Aegina will be framed by some pertinent features of the intellectual and religious context. The first matter considered is the Alexandrian medical tradition and the second is the late antique medical discourse, considering the Christian component and the differences between practice and theory.

The medical school of Alexandria

Alexandria was one of the important centers of medical studies and had a long tradition of scholarship, both pagan and Christian. The city emerged, soon after its foundation, as a medical teaching center,[10] which shaped and influenced Hellenistic, Roman, Late antique, and Islamic medicine. According to Ammianus Marcellinus, it was enough for a physician to say that he had studied there if he wished to be accepted as a serious practitioner.[11] Ammianus made this remark on the school of Alexandria at the end of the fourth century and there is no reason to doubt its accuracy;[12] for instance, Oribasius, the personal physician of the emperor Julian studied medicine in Alexandria.[13] In the sixth

[10] On the early development of medicine in Alexandria, see Heinrich von Staden, *Herophilus: The Art of Medicine in Early Alexandria* (Cambridge: CUP, 1989), 1-35, in the introduction he gives a short history of the medical tradition in Alexandria and the Egyptian influences on this field; H. N. Sallam, "L'ancienne école de medicine d'Alexandrie," *GynécologieObstrétiqueFertilité* 30 (2002): 10, states that the decline of the school started after the 389 CE fire and mostly after the exile of the Nestorians to the East after 431, thus becoming a factor in the development of the medical school in Baghdad. However, this hypothesis ignores the Late antique development of the school. On the professional healing practitioners in Roman Egypt, see Jane Louise Draycott, "Approaches to Healing in Roman Egypt" PhD dissertation (Nottingham, 2011), 53-108.

[11] *Medicina autem, cuius in hac vita nostra nec parca nec sobria desiderantur ad minicula crebra it studia augentur in dies ut, licet opus ipsum redoleat, pro omni tamen experiment sufficiat medico ad commendanda martis auctoritatem, si Alexandriae se dixerit eruditum*. Ammianus Marcellinus, *Res Gestae* 22.16.18, ed. and tr. Henderson 1940, II, 306-307.

[12] Nigel Guy Wilson, *Scholars of Byzantium* (London: Duckworth, 1983) (hereafter: Wilson, *Scholars*), 48.

[13] Mark Grant, *Dieting for an Emperor. A Translation of the Books 1 and 4 of Oribasius'* Medical Compilation *with and Introduction and Commentary* (Leiden: Brill, 1997), 1-2.

century CE Alexandria was still synonymous with doctors and medical studies.[14] For instance, surgery must have been practiced with particular devotion in Alexandria, since Fulgentius the Mythographer in the sixth century mentioned that "the assemblage of Galen, which is linked to almost all the narrow streets of Alexandria, where more surgical hangman's butcherings could be counted than there were houses."[15]

The meeting between philosophy and medicine became increasingly intense in the last stage of Alexandrian science (sixth and seventh centuries) and the figure of the physician-philosopher, namely, the iatrosophist, originated in this period and in this school.[16] Vivian Nutton mentions an anonymous geographer who called the city "the foundation of health for all men,"[17] and Saint Augustine suggested that the medical reputation of Alexandria was eclipsed only by the power of God.[18] Despite this recognition of the city's importance as a medical center in late antiquity, numerous scholars have argued that much of the Alexandria school of medicine's activity was devoted to compiling.[19] For instance, in the tenth century an Arab physician argued that the cause of the decline of medicine was the proliferation of compendia, summaries, and commentaries, which started with Oribasius and continued with

[14] John Duffy, "Byzantine Medicine in the Sixth and Seventh Centuries: Aspects of Teaching and Practice," *DOP* 38, Symposium on Byzantine Medicine (1984) (hereafter: Duffy, *Byzantine Medicine*): 21.
[15] Fulgentius the Mythographer, *The Mythologies*, 1. Prologue, tr. Leslie George Whitbread (Columbus: Ohio State University Press, 1971), 44; the same anecdote is mentioned by Owsei Temkin, "Byzantine Medicine: Tradition and Empiricism," *DOP* 16 (1962): 101. (hereafter: Temkin, *Byzantine Medicine*)
[16] Leendert Gerrit Westerink, "Philosophy and Medicine in Late Antiquity," *Janus* 51 (1964): 169, reprinted in *Text and Studies in Neoplatonism and Byzantine Literature* (Amsterdam: Adolf Hakkert, 1980) (hereafter: Westerink, *Philosophy and Medicine*), 169. Nevertheless, the relation between philosophy and medicine is complementary; medicine influenced the field of philosophy as well; on the use of medical ideas in late antique philosophy see Robert B Todd, "Philosophy and Medicine in John Philoponus' Commentary on Aristotle's *De Anima*," *DOP* 38 (1984): 103-110.
[17] Vivian Nutton, "Murders and Miracles: Lay Attitudes to Medicine in Classical Antiquity," in *Patients and Practitioners. Lay Perceptions of Medicine in Pre-industrial Society*, ed. Roy Porter (Cambridge: CUP, 1985) (hereafter: Nutton, *Murders and Miracles*), 35.
[18] Augustine, *De Civitate Dei* 22.8, tr. Green 1972, VII, 217.
[19] Nutton, *Medicine*, 295; Danielle Gourevitch, "The Paths of Knowledge: Medicine in the Roman World" in *Western Medical Thought from Antiquity to the Middle Ages* ed. Mirko Grmek (Cambridge MA: Harvard University Press, 1998) (hereafter: Gourevitch, *Paths of Knowledge*), 136; Gotthard Strohmaier, "Reception and Tradition: Medicine in the Byzantine and Arab World" in *Western Medical Thought from Antiquity to the Middle Ages* ed. Mirko Grmek (Cambridge MA: Harvard University Press, 1998) (hereafter: Strohmaier, *Reception*), 145.

Paul of Aegina.[20] This image is rather unfair and superficial; it seems rather unlikely that a school of medicine produced no original work for four centuries, from Oribasius (fourth century) to Paul of Aegina (seventh century). However, there are also modern scholars who share the same opinion and state that the importance of the school was solely due to the preservation of earlier works which otherwise would have been lost, and the Alexandrians of Late Antiquity have no achievement that could compare with the invention in Hellenistic times of literary scholarship as we know it.[21]

Two issues arise immediately when speaking about the medical school in Alexandria: the difference between practice and theory and the access to books. The emergence of Alexandria during the time of the Ptolemies as the most important center of medical study, challenging the island of Cos in its supremacy, is not solely connected with the progress of anatomy and physiology but also with a theoretical debate which later developed into a medical rationalism or dogmatism.[22] However, as John Scarborough pointed it out, the medical theoretical debate in Late antique Alexandria transformed into a type of exegesis based on practical experience of the physician as a part of the curriculum.[23] In modern scholarship the concept of late antique medicine has remained imbued with ideas of decline and decadence and been analyzed largely by comparison with the early activity of physicians like Hippocrates or Galen.[24] For instance, Paul of Aegina's sixth book on surgery describes surgical standards which lasted for centuries; Francis Adams, in the introduction to his

[20] A. Z. Iskandar, *Medical Curriculum*, 241.
[21] Wilson, *Scholars*, 49 and 57.
[22] Armelle Debru, "Hérophile, ou l'art de la medicine dans l'Alexandrie antique," *Rev.HistoireSci*. 44, no. 3-4 (1991): 435.
[23] John Scarborough, "Teaching Surgery in Late Byzantine Alexandria," in *Hippocrates and Medical Education. Selected Papers Presented at the XIIIth International Hippocrates Colloquium, Universiteit Leiden, 24-26 August 2005,* ed. Manfred Horstmanshoff (Leiden: Brill, 2010) (hereafter: Scarborough, *Teaching Surgery*), 241; Vivian Nutton, "From Galen to Alexander, Aspects of Medicine and Medical Practice in Late Antiquity," *DOP* 38 (1984) (hereafter: Nutton, *Galen to Alexander*): 3.
[24] Nutton, *Medicine*, 295-296 considers the value of Late antique medical compilations solely in terms of the elegant and practical organization of the material, virtues which should not be dismissed in favor of novelty; John Scarborough, "Symposium on Byzantine Medicine: Introduction," *DOP* 38 (1984): ix, he admires Owsei Temkin's views on Byzantine medicine as generating a new tradition, however, Scarborough finds Temkin cautious in his investigation.

translation published in the nineteenth century, stated that the reason behind his endeavor was the high standard of surgical practices described by Paul of Aegina and he stated also that he intended the translation as a pedagogical tool in his daily practice as a physician.[25] For this reason, Late antique medicine should not be related to the earlier periods and branded simply as minor or derivative. In terms of practice, the notion of late antique decline is arbitrary and shallow. Therefore, to cast the change and transformation mainly in terms of the alteration of the Hippocratic or Galenic norm implies a failure in understanding the historical dynamic.

Late antique medicine represents the formation as well as the continuation of a tradition, broken and unbroken,[26] and may be a unique phenomenon in the history of medicine. Moreover, medicine was an integral part of Byzantine culture and numerous sources show a general awareness of medicine and medical practice.[27] At the same time, the medical sources indicate a situation quite different from the aforementioned modern conceptions; in terms of practice late antique medicine achieved high standards,[28] mainly in surgical interventions, such as eye surgery,[29] oral and cranio-maxillofacial surgery,[30] and even plastic surgery.[31] For instance, Paul of Aegina offered the fullest account of military surgery in late antiquity; his commentaries on penetrating wounds or extracting arrowheads

[25] Paul of Aegina, *Pragmateia*, Introduction, tr. Adams 1947, I, 1-2.
[26] Temkin, *Byzantine Medicine*, 97-115.
[27] John Scarborough, "Symposium on Byzantine Medicine: Introduction," *DOP* 38 (1984) (hereafter: Scarborough, *Symposium*): x.
[28] Lawrence J. Bliquez, "Two Lists of Greek Surgical Instruments and the State of Surgery in Byzantine Times," *DOP* 38 (1984): 187, for instance, Paul of Aegina listed no less than 120 different surgical procedures and attempted to perform a mastectomy.
[29] For instance, see Emilie Savage-Smith, "Hellenistic and Byzantine Ophthalmology: Trachoma and Sequelae," *DOP* 38 (1984): 169-186.
[30] For the complexity of the surgical procedures performed by the Late antique physicians see Anastassios I Mylonas *et alii*, "Oral and Cranio-Maxillofacial Surgery in Byzantium," *JCraniomaxillofacSurg*42 (2014): 162, the authors acknowledge Paul of Aegina's merits in the field of medicine, despite being a compiler, mainly in the field of oral surgery and tooth extraction using surgical techniques comparable to modern ones.
[31] On attempts at plastic surgery in Byzantium see John Lascaratos *et alii*, "Plastic Surgery of the Face in Byzantium in the Fourth Century," *PlastReconstrSurg* 102, no.2 (1998): 1270-1280.

from the heart or abdominal cavity demonstrate personal originality and experience not encountered in previous ancient authors.[32]

The seventh-century medical school in Alexandria was the product of a long tradition and one should note that another institution played a major role in the development of this tradition. In Alexandria the library[33] itself reinforced the status of medicine; Hippocratic and Galenic texts gained the status of literature and were expanded by means of large corpora of commentaries or epitomes.[34] The medical school of Alexandria attracted many of the leading physicians from its foundation; many of the names and works of the anatomists, surgeons, and physiologists are known, although the earliest known coherent account of the late Alexandrian medical curriculum (sixth to seventh century) comes from the polyglot physician and translator Johannitius (Hunayn ibn Ishaq 809-873).[35] The medical curriculum, known as *Summaria Alexandrinorum*,[36] came into being in connection with the restructuring of medical higher education, which also included logic.[37] After 717 the Alexandrian physicians moved towards other centers of teaching medicine such as Antioch and Harran (Roman Carrhae,

[32] Raffi Gurunluouglu, Aslin Gurunluouglu, "Paul of Aegina: Landmark in Surgical Progress," *WorldJSurg*27 (2003): 20.

[33] On the Hellenistic library in Alexandria and its status see Edward Watts, *City and School in Late antique Athens and Alexandria* (Berkeley: University of California Press, 2006) (hereafter: Watts, *City and School*), 145-149, also on the influence of the library on the standard of medical practice and teaching in Alexandria see John Vallance, "Doctors in the Library: The Strange Tale of Apollonius the Bookworm and Other Stories," in *The Library of Alexandria. Center of Learning in the Ancient World,* ed. Roy MacLeod (London: I. B. Tauris Publishing House, 2010), 95-114.

[34] Roger Kenneth French, *Medicine before Science. The Business of Medicine from Middles Ages to the Enlightenment,* (Cambridge: CUP, 2003), 32.

[35] Iskandar, *Medical Curriculum,* 236.

[36] The Alexandrian Summaries (*Jawāmi' al-Iskandaraniyin*) were a series of summaries of medical treatises of or attributed to Galen, see Dimitri Gutas, *Greek Thought, Arabic Culture. The Graeco-Arabic Translation Movement in Baghdad and Early 'Abbāsid Society (2nd-4th/8th-10th centuries)* (London: Routledge, 1998) (hereafter: Gutas, *Greek Thought*), 92 mentions the same translator, born in Edessa, as the first one to speak about the medical curriculum of Alexandria. On the division method of medical books and on teaching in sixth- and seventh-century Alexandria based on the Alexandrian Summaries see Peter E. Pormann, "The Alexandrian Summary (Jawāmiʿ) of Galen's On the Sects for Beginners: Commentary or Abridgment?" in *Philosophy, Science and Exegesis in Greek, Arabic, and Latin Commentaries, Bulletin of the Institute of Classical Studies*, ed. Peter Adamson (London: University of London Press, 2004), 11-33.

[37] Dimitri Gutas, "The Greek and Persian Background of Early Arabic Encyclopedism," in *Organizing Knowledge. Encyclopedic Activities in the Pre-Eighteenth Islamic World*, ed. Gerhard Endress (Leiden: Brill 2006), 95.

early Byzantine Hellenopolis, in Nothern Mesopotamia, now south-east Turkey), and later, Baghdad.[38]

That the advent and spread of Christianity introduced new tensions into the relationship between religion and medicine is only too obvious, although the loss of most pagan documents may have helped to exaggerate the difference. In addition to the prominence of secular medicine among late antique intellectuals, paganism had its religious healers in its priests, exorcists, and diviners; it also had its healing centers, among which sanctuaries of the healing deities, Asclepius, Isis, Serapis etc. The discussion in the very earliest writings of Christianity over the place of secular healing within a Christian society did not disappear over time. In the second and third centuries Clement of Alexandria and Origen taught that the existence of medicine was highly laudable - a gift from God who did not wish men to be bereft of help in time of illness. Other writers, such as Sophronios of Jerusalem, have disparaged the science of the physicians in order to extol the miracle-working activity of the Christian healing places. In his describing of the miracles of Saints John and Cyrus he uses the term of Hippocratic medicine. He was most probably a pupil of Stephanus, an Alexandrian medical commentator of the seventh century.[39] Thus, most Christian writers were favorable to secular medicine, even used medical terminology in their spiritual writings.[40]

In the fourth and fifth centuries Egypt still had a strong and varied pagan culture despite the Christianization process. The stronghold of this pagan resistance was the "university;" Alexandria still functioned as a center of teaching, attracting intellectuals from the Eastern Mediterranean area.[41] This pagan intellectual environment faded during the sixth

[38] Iskandar, *Medical Curriculum*, 256-257.
[39] See W. Wolska-Conus, "Stéphanos d'Athènes et Stéphanos d'Alexandrie. Essai d'identification et de biographie," *REB* 47 (1989): 47-59.
[40] Nutton, *Murders and* Miracles, 49-50.
[41] Shirley Jackson Case, "The Art of Healing in Early Christian Times," *JR* 3, no. 3 (1923): 245.

century, although there were still pagan teachers such as Ammonios.[42] In his school Ammonios attracted students from both religious traditions however, free intellectual exchange between Alexandrian pagans and Christians extended beyond the school of Ammonios[43] and beyond the Greek language.[44] Alexandria functioned as a melting pot of different intellectual traditions in which the monopoly on practice or teaching was no longer held by the Greek physicians. Syrian physicians[45] also became active, of which the most famous was Sergius of Reshaina (d. 536), a translator and practitioner educated in Alexandria.[46] Being a doctor was no longer synonymous with being Greek, as it had been earlier with being Egyptian; in the Eastern Mediterranean area the practice of medicine was based solely on efficiency. In effect, the remark about the competence of a Persian physician in a miracle collection of Saint Artemius[47] seems to reflect a typical situation. Jewish doctors, however, had a different status, as reflected by canon 11 of the Quinisext council convened by Justinian II in 691. Along with heretics, this council also represented a new tendency towards Jews, forbidding Christians to "associate" with Jews or turn to Jewish physicians.[48]

Although the capture of Alexandria might be considered a dividing point in the political history of the city,[49] it does not seem to have been a moment of crisis for the

[42] Ewa Wipszycka, "La christianisation de l'Égypte aux IV-VI. siècles. Aspects sociaux et ethniques," *Aegyptus* 68 (1988): 126-127.

[43] Watts, *City and School*, 167.

[44] For instance, the scribal and handbook Egyptian traditions persisted in Upper Egypt in late antiquity, see Christopher A. Faraone, "The Collection of Greek and Egyptian Incantations," *ARG* 2 (2000): 213.

[45] Susan Ashbrook Harvey, "Physicians and Ascetics in John of Ephesus: An Expedient Alliance," *DOP* 38 (1984): 88.

[46] Marshall Clagett, *Greek Science in Antiquity* (New York: Abelard-Schuman, 1955), 180-181. For a list of the works of Sergius see Henri Hugonnard-Roche, "Note sur Sergius of Reš 'ainā, traducteur du grec en syriaque et commentateur d'Aristote" in G. Endress and R. Kruk, *The Ancient Tradition in Christian and Islamic Hellenism; Studies on the Transmission of Greek Philosophy and Sciences dedicated to H. J. Drossaart on his ninetieth birthday* (Leiden: Brill, 1997), 121-43.

[47] *The Miracles of Saint Artemios: a Collection of Miracle Stories by an Anonymous Author of Seventh-Century Byzantium*, ed. Virgil S. Crisafulli and John W. Nesbitt (Leiden: Brill, 1996), 139.

[48] "No one of sacerdotal rank, nor any layman, shall eat the unleavened bread of the Jews, nor associate with them, nor summon them in illness and receive cures from them, nor in any wise bathe with them at the baths. If anyone undertakes to do this, if he is a cleric, he shall be deposed, if a layman, excommunicated"; Canon 11, *The Council of Trullo Revisited*, ed. George Nedungatt and Michael Featherstone (Rome, Vatican: Pontifico Istituto Orientale, 1995) with the canons in Greek, Latin and English, 81-82.

[49] Dimitri Gutas argues that until the end of the Umayyads translations from Greek to Arabic were a quotidian reality and numerous bilingual papyri containing contracts attest this practice as ubiquitous. However,

inhabitants. The structure of the population did not change at once.[50] The Greco-Arabic translation movement that started soon after the conquest of the city was a complex social and cultural phenomenon. Living during the conquest assured Paul of Aegina's work a longer life through translations into Arabic[51].

Paul of Aegina's life and activity

Paul of Aegina's life is little known, apart from his writings only some Arabic bio-bibliographers offer limited information about his life. In the Arabic milieu he was better known as obstetrician; in the tenth century Ibn an-Nadim mentioned his name, his specialization (obstetrician), and his work, a compendium and several works on gynecology. The same details were later repeated in some thirteenth century accounts, among which is Barhebraeus, mentioning that Paul of Aegina lived in Alexandria at the beginning of Islam. The sources he used (the latest is Alexander of Tralles - middle of the sixth century) corroborate this.[52]

From Paul of Aegina's own introduction to the book[53] it is clear that he was teaching medicine in Alexandria. Galen had tried to raise medicine, at least the theoretical aspects, to the level of philosophy, but the pecuniary aspects connected to the practice of this craft determined the legal definition of the doctor.[54] This great variety of evidence for the participation in medicine by men and women[55] of all classes throughout the ancient world proves beyond doubt that medical knowledge was by no means confined to those who called themselves doctors. Alexandria became synonymous with medical teaching in late antiquity

translation of scientific texts appears not to have been taken place during the Umayyad period, Dimitri Gutas, *Greek Thought*, 23; Westerink, *Philosophy and Medicine*, 88-89.

[50] Zsolt Kiss, "Alexandria in the Fourth to Seventh Centuries," in *Egypt in the Byzantine World, 300-700*, ed. Robert S. Bagnall (Cambridge: CUP, 2007): 204.

[51] Peter E. Pormann, Emile Savage Smith, *Medieval Islamic Medicine* (Edinburgh: Edinburgh University Press, 2007) (hereafter: Pormann, *Islamic Medicine*), 24-27.

[52] For more details on the Arabic sources speaking about Paul of Aegina see Pormann, *Pragmateia*, 4-8.

[53] Paul of Aegina, *Pragmateia*, Introduction, tr. Adams 1947, I, 1-2.

[54] Nutton, *Murders and Miracles*, 28-29.

[55] Holt N. Parker, "Women Physicians in Greece, Rome, and the Byzantine Empire," in *Women Physicians and Healers: Climbing a Long Hill*, ed. Lilian F. Furst (Lexington: University Press of Kentucky, 1997), 131-150.

and the method used by the physicians-professors was similar to the one used by philosophers: a division of the subject as an aid for memory combined with a form of exegesis.[56] As other medical teachers, Paul of Aegina was well aware of the difference between preaching and practice and often used his own personal experience.[57] Education availed itself in a variety of places and higher education needed a permanent structure to assure comfort for the students and a sort of isolation. For instance, some auditoria in Alexandria could accommodate around 500 students.[58] Medical teaching in Alexandria in fact contained practice and professors really took their students to sickbeds; in some miracle stories involving physicians they appear accompanied by young men, probably their disciples. Both pieces of information complement the picture given by Alexander of Tralles emphasizing *peira*– bedside experience.[59]

The establishing of institutional health care beginning in the fourth century further shaped the teaching and practice of medicine[60] and by the fifth and sixth centuries hospitals became a part of the urban landscape.[61] This environment allowed the development of a system of apprenticeship in surgery. For instance, Alexander of Tralles was probably trained together with his brother by their own father, also a physician.[62]

The closest parallel with Paul of Aegina may be Gesius, a physician who also lived and taught in Alexandria, in the fifth century. During his lifetime, Gesius was described by a pagan philosopher as an exemplar of philosophical behavior and attacked by a Christian for

[56] Duffy, *Byzantine Medicine*, 22.
[57] Ibid. 23.
[58] Grzegorz Majcherek, "The Auditoria on Kom el-Dikka: A Glimpse of Late antique Education in Alexandria" in *Proceedings of the Twenty-Fifth International Congress of Papyrology, Ann Arbor 2007* (Ann Arbor: 2010), 465-476.
[59] Ildikó Csepregi, "Changes in Dream Patterns between Antiquity and Byzantium: The Impact of Medical Learning on Dream Healing," in *Ritual Healing: Magic, Ritual, and Medical Therapy from Antiquity until the Early Modern Period,* ed. Ildikó Csepregi and Charles Burnett (Florence: Sismel, Edizioni del Galluzzo, 2012), 142.
[60] Timothy S. Miller, *The Birth of the Hospital in the Byzantine Empire* (Baltimore: The Johns Hopkins University Press, 1985; Timothy S. Miller, "Byzantine Hospitals, *DOP* 38 (1984): 53-65.
[61] Barry Baldwin, "Beyond the House Call: Doctors in Early Byzantine History and Politics," *DOP* 38 (1984): 15-20.
[62] John Scarborough, "The Life and Times of Alexander of Tralles," *Expeditio* 39, no.2 (1997): 53.

his arrogance and ignorance. Roughly three-quarters of a century after the end of his career, another Christian author presented Gesius as the prototypical representative of a self-confident and misguided Alexandrian medical community.[63] And nearly seven centuries after that, in the twelfth century Arabic scholars still counted Gesius as a link in the chain of medical knowledge joining Abbasid Baghdad to Roman Alexandria. For whatever reason, a sense that Gesius could stand as a representative of Alexandrian medical intellectualism endured far longer than his modest achievements seem to merit.[64]

Paul of Aegina, like Gesius, is mentioned in the *History of Physicians* by Johannitius (Hunayn ibn Ishaq), who was the first translator of his work into Arabic.[65] Paul of Aegina, or Paulus Aegineta, was one of the abbreviators of earlier medical writings[66]. He spent much of his life in Alexandria, teaching and practicing medicine after the Arab invasion of Egypt in 642 CE. His epithet *of Aegina* is the sole evidence of his origin. Witnessing the Arab conquest of the city gave him a special status; he represented both the end of the Greek and the beginning of the Arab encyclopedic tradition.[67]

The scholarly consensus about Paul of Aegina is that, like many other late antique compilers, he lacked originality; often such value judgments have been made merely on the basis of a superficial reading of the surviving text, namely, only approximately a third of his attested work.[68] In this understanding, the issues of decline and originality are highly debatable, since a comparison between Galen and later medicine appears to be fallacious. To give an example for this traditional misconception, according to Robert J. Littman the culmination of Greco-Roman medicine was during Galen's time, although the school survived until the mid-seventh century at a lower level until it was finally destroyed by the

[63] He was the protagonist of a rather embarrassing miracle story in the collection of Sophronios of Jerusalem, Sophrone de Jérusalem, *Miracles des saints Cyr et Jean (BHG* I 477-479*)*, tr. Jean Gascou (Paris: Éditions de Boccard, 2006), 101-107
[64] Edward Watts, "The Enduring Legacy of the Iatrosophist Gessius," *GRBS* 49 (2009): 114.
[65] Pormann, *Pragmateia*, 5.
[66] Pormann, *Pragmateia*, 4.

Arabs. In Littman's assessment, the last great Byzantine physician was Paul of Aegina, who studied in Alexandria and moved on to Rome. His writing on medicine in seven books is his only surviving work. With the rise of the Islam, Alexandria fell in 643. This ended the long medical tradition of the city, although the translation of many Greco-Roman works on medicine by the Arabs contributed to the preservation of the Alexandrian tradition. Thus far goes Littman's presentation.[69]

I think that assessing the originality of an author only in terms of compiling or translating is not valid. Translation is always a culturally creative activity, equal to the composition of original books; everything that has to do with translation has relevance and meaning for the recipient culture that differs from that of the donor culture. The decision to translate something, the time, and how the translation is done are all determined by the receiving culture. The Greco-Arabic translation movement, then, cannot be understood apart from the social, political, and ideological history of the early Abbasid Empire, of which it was an integral part.[70]

The Pragmateia

Pragmateia (also known as *Epitome of Medicine*[71]) is a seven-book medical collection written by Paul of Aegina. However, this represents only a part of his writings because Islamic sources mention three medical writings of Paul of Aegina: on gynecology, toxicology, and medical practices and procedures. The seven-book summary, which survives completely in Greek, is usually called *The Epitome of Medicine*, a three-volume extensive medical work edited by J. L. Heiberg in the *Corpus Medicorum Graecorum* collection in 1921. Francis Adams, a Scottish surgeon, produced an English translation prior to the Greek critical edition 1844-1847 based on several manuscripts and Latin translations.

[67] Pormann, *Islamic* Medicine, 10.
[68] Wilson, *Scholars*, 48 and 57.
[69] Robert J. Littman, "Medicine in Alexandria," in *ANRW* II. 37(Berlin: Walter de Gruyter, 2006), 2705.
[70] Gutas, *Greek Thought*, 187.

Paul intended his work as a general encyclopedia of medicine, borrowing liberally from Galen (129-200/216 CE), Oribasius (325-395 CE), Aetius of Amida (middle of the fifth century-middle of the sixth century CE), and Alexander of Tralles (525-605 CE).[72] Composed as a medical *vade mecum*[73] his *Pragmateia* had a design similar to that of a legal synoptic work. Paul constructed his compilation as a summary of the basics of practice, from essential theory through diagnosis and prognosis to classes of diseases and therapies.[74] The introduction clearly confirms the teaching purpose of this text.[75] However, can one consider the *Pragmateia* a simple manual or an encyclopaedia?[76] Furthermore, what is a pre-modern encyclopaedia?

The terms encyclopaedia and compilation tend to be used rather loosely when speaking about late antique medicine. For instance, works freely characterized as encyclopaedias are subjected to preconceived definitions since the term was defined and used as such in the fifthteenth century.[77] Myrto Hatzimichali states that what one might call today an encyclopedic trend developed in fact under the political patronage of the Ptolemies and as an effect of the developing methods of cataloguing and selecting materials,[78] thus contradicting the scholars who think that this tendency appeared, at least in the field of medicine, in Late Antiquity.[79] Pre-modern encyclopaedic works are propaedeutic and

[71] Pormann, *Pargmateia* 1-3.
[72] Alexander P. Kazhdan, "Paulus of Aegina," *ODB* 2nd edition.
[73] Owsei Temkin, *Hippocrates in a World of Pagans and Christians* (Baltimore: The Johns Hopkins University Press, 1991) (hereafter: Temkin, *Hippocrates*), 231.
[74] Scarborough, *Teaching Surgery*, 249.
[75] Paul of Aegina, *Pragmateia*, Introduction, tr. Adams 1947, I, 1-2.
[76] In the introduction of the volume *Encyclopaedic Trends in Byzantium?*, papers collected for the conference with the same name, Peter van Deun and Caroline Mace define the Byzantine encyclopaedia. Paul of Aegina's *Pragmateia* meets three of the five criteria offered, Peter van Deun and Caroline Mace, "Introduction," in *Encyclopaedic Trends in Byzantium? Proceedings of the International Conference Held in Leuven, 6-8 May, 2009*, ed. Peter van Deun and Caroline Mace (Leuven: Uitgeverij Peeters, 2011), xv.
[77] Jason König and Greg Woolf, "Preface," in *Encyclopaedism from Antiquity to the Renaissance*, ed. Jason König and Greg Woolf (Cambridge: CUP, 2013) (hereafter: König, *Encyclopaedism*), 1.
[78] Myrto Hatzimichali, "Encyclopaedism in the Alexandrian Library," in *Encyclopaedism from Antiquity to the Renaissance*, ed. Jason König and Greg Woolf (Cambridge: CUP, 2013) (hereafter: Hatzimichali, *Encyclopaedism*) 82-83.
[79] See footnotes 19 and 23.

selective[80] and at the same time based on the concept of comprehensiveness.[81] In the case of the *Pragmateia* the concept of *utilitas* or direct applicability governed the compilation techniques.[82]

Paul of Aegina's *Pragmateia* is not a simple organized summary of the earlier medical work with a teaching purpose. The impact on later Byzantine, Syriac, and Arabic[83] medicine and the level of expertise exhibited in his book on surgery[84] portray him far beyond the image of a mechanistic compiler. His approach is critical, scientific, and imbued with personal experience. For instance, in his entire collection there is no religious reference of any kind, either pagan or Christian. The main issue raised by this fact is not whether Paul was a Christian or a pagan - according to his name he was a Christian, but the fact that in the seventh century medicine could be practiced and taught as a self-standing science independent of religious connotations. In Late antique Alexandria practitioners of medicine represented a sort of stronghold of scientific pursuit, sometimes seemingly ignoring any religious or dogmatic coloration of the intellectual debates in the city. Designed as a comprehensive medical manual, Paul of Aegina's work attests that medicine could be separated from pagan and Christian discourse, unlike ritual healing were there was a fierce competition not only between religions, but also between confessions.

[80] Robert L. Fowler, "Encyclopaedias: Definitions and Theoretical Problems," in *Pre-Modern Encyclopaedic Texts. Proceedings of the Second COMERS Congress, Groningen, 1-4 July 1996*, ed. Peter Brinkley (Leiden: Brill, 1997), 8.
[81] Ibid. 9, and Hatzimichali, *Encyclopaedism*, 64.
[82] Marco Formisano, "Late Latin Encyclopaedism. Towards a New Paradigm of Practical Knowledge," in *Encyclopaedism from Antiquity to the Renaissance*, ed. Jason König and Greg Woolf (Cambridge: CUP, 2013), 205.
[83] Peter E. Pormann, "Paulos of Aigina," in *The Encyclopedia of Ancient Natural Scientists. The Greek Tradition and Its Many Heirs*, ed. Paul T. Keyser and Georgia L. Irby-Massie (London: Routledge, 2008), 629 and Peter E. Pormann, "Paulos v. Aigina" in *Antike Medizin. Ein Lexikon* ed. Karl-Heinz Leven (Munchen: C.H. Beck, 2005), 681.
[84] Scarborough, *Teaching Surgery*, 249-250.

CHAPTER TWO:
RABIES IN THE SEVENTH CENTURY: FROM COMPILING TO MEDICAL PRACTICE

This analysis of Paul of Aegina's[85] treatment of rabies aims to present a different approach to the subject of medical compiling and medical practice in Late Antiquity. Neither Paul of Aegina as a physician, nor rabies as a biological reality, constitutes in themselves a topic of investigation in this chapter, rather the manner in which the discourse about an incurable infectious disease was shaped in terms of theory, teaching, and practice. As shown in the previous chapter Paul of Aegina carried out his activity in a professional environment stimulated by Galenism, the school of Alexandria, and medical ecumenism.

The first issue arising is why rabies cannot be a topic of investigation by itself and the answer lies in the history of this daunting and at the same time captivating disease. As Mirko Grmek noted in defining the concept of disease one should consider several levels of understanding, from the biological reality to the collective experience.[86] According to the modern understanding, rabies is a biological entity, a virus which causes a severe inflammation of the brain and spinal cord of mammals. The disease is nearly always transmitted to humans through the saliva of the infected host and, without a vaccine, is invariably fatal. Rabies occurs in Africa, Asia, the Americas, and most of Europe, although it has been eliminated in many parts of the world.[87] This field of research developed in the

[85] Appendix I and II.
[86] Mirko Grmek, "The Concept of Disease" in *Western Medical Thought from Antiquity to the Middle Ages* ed. Mirko Grmek (Cambridge MA: Harvard University Press, 1998) (hereafter: Grmek, *Disease*), 242.
[87] *The Cambridge Historical Dictionary of Disease*, ed. Keneth F. Kiple (Cambridge: CUP: 2002), 270, *s.v.* rabies. For more details on the modern research on rabies there are two collective works which tackle all the aspects of this disease, from short chapters dedicated to ancient and medieval authors to topic like microbiology and genetic research: Alan C. Jackson, *Rabies: Scientific Basis of the Disease and Its Management* (Oxford: Academic Press, 2013) and George M. Baer, *The Natural History of Rabies*, 2nd edition, (Boca Raton: CRC Press, 1991).

nineteenth century, starting with Georg Gottfried Zinke, Louis Pasteur, and later, at the beginning of the twentieth century, Adelchi Negri.[88]

The next level in defining a disease is conceptualization of the disease by physicians. Therefore, I will briefly explore this level of understanding as transmitted by the physicians. Surprisingly, this disease is absent from the Hippocratic Corpus. The first extensive description of rabies comes from the first century CE, from Celsus; he tackled rabies as a poisoning, stating that the dog carries a type of venom, though different from snake venom.[89] Scribonius Largus[90], also in the first century CE, described rabies in the same way: a zoonosis transmitted by infected dogs, without mentioning the contagion factor.[91] Philumenus treated rabies also as a poisoning.[92] Galen mentioned rabies as a violent force which causes an obstruction of the flow of humors and insisted on the anamnesis procedure.[93] Cassius Felix[94] in the fifth century defined rabies as a poisoning resulted from the bite of a rabid dog. In addition, he mentioned the fact that infected humans will bite, although without commenting about the infection occurring from human bite.[95] Oribasius, physician to Julian the Apostate (emperor from 361 to 363 CE) tackled rabies in several works and described it also as a deadly disease, a type of poisoning caused by the bite of rabid animal, against which he offered several possible treatments.[96] A thorough description of rabies survived from the

[88] Alan C. Jackson, *Rabies: Scientific Basis of the Disease and Its Management* (Oxford: Academic Press, 2013), 3-10; Zhen Fang Fu, "Rabies and Rabies Research: Past, Present, and Future," *Vaccine* 15 (1997) (hereafter: Fu, *Rabies Research*): 20-21.
[89] Celsus *De Medicina* 5. 27. 1-2, tr. W. G. Spencer 1961, II, 110-115; he made a clear difference between the poison of the snake and the one of the rabid dog, the snake carries *venenum* and the dog *virus*, a technical term according to Meillet, *DE*, *s.v.* virus, 740, however this does not mean that Celsus could be linked with modern virology, see Lise Wilkinson, "The Development of the Virus Concept as Reflected in Corpora of Studies on Individual Pathogens," *Medical History* 21 (1977) (hereafter: Wilkinson, *Virus Concept*): 17.
[90] John Scaraborough, *Cassius Felix,* in *The Encyclopedia of Ancient Natural Scientists,* ed. Paul Keyser and Georgia Irby-Massie (London: Routledge, 2008), 728 (hereafter *Ancient Natural Scientists*); J. Garzya, "Cassius Felix," in *Antike Medizin*, 188.
[91] Scribonius Largus, *Compositiones* 161, ed. Sconocchia 1983, 81-82.
[92] Philumenus, *De Venenatis Animalibus Eorumque Remediis*, 1, ed. Wellmann, 1908, 4-6; Théodoridès, *Rabies*, 149; Jean Théodoridès, *Histoire de la rage. Cave canem* (Paris: Mason, 1986), 44.
[93] Galenus, *De Constitione Artis Medicae ad Patrophilum*, 18. 3 ed. and tr. Stefania Fortuna 1997, I. 3, 120-121.
[94] John Scaraborough, *Cassius Felix,* in *Ancient Natural Scientists*, 208.
[95] Cassius Felix, *De Medicina*, 67, ed. Rosae, 1879, 164-166.
[96] Oribasius, *Synopsis ad Eusthatium, Libri ad Eunapium,* ed. Raeder, 1926, 251-252; Théodoridès, *Rabies*, 152.

fifth century CE, from Caelius Aurelianus, a physician from Sicca in Northern Africa.[97] He is famous for the translation into Latin of Soranus' work[98] and because the Greek original is no longer extant his extensive description of rabies[99] could be considered an original work.[100] He defined rabies as a deadly acute disease of the body, transmitted mainly by infected dogs, or other mammals, different from rage or melancholia.[101] Aetius of Amida[102] and later, Paul of Aegina[103] treated rabies also as a poisoning from the rabid dog for which they offered several possible treatments.

The dimension of personal experience of the patient is impossible to be grasped in the case of ancient rabies. The reason behind this lies in the character of the disease: a debilitating disease which affects the brain causing paralysis, convulsions, and loss of consciousness, resulting in a rapid death. As a consequence there are no first person accounts of rabies, as experienced by the actual patient, similar for example to Aelius Aristides' accounts of his suffering.[104] Moreover, even the patients and their personal account of the disease experienced were constructs of medicine and their self-perceptions are medically contaminated.[105]

The issue of effect on the wide audience is vast enough to be treated in a separate paper. In the factual prose of Attic Greece the word *lyssa*[106] had a literal meaning: rabies.

[97] John Scaraborough, *Caelius Aurelianus,* in *Ancient Natural Scientists,* 201; K. D. Fischer, "Cassius Felix," in *Antike Medizin*, 182-183.
[98] Soranus of Ephesus was Greek physician who practiced medicine in Alexandria and Rome during the reign of Trajan and Hadrian; he was the chief of the Methodic school of medicine; Don, Todman, "Soranus of Ephesus (AD 98-138) and the Methodist sect," *Journal of Medical Biography* 16 (2008): 51; I. E. Drabkin, "Soranus and his system of medicine," *Bulletin of the History of Medicine* 25 (1951): 503-518.
[99] Caelius Aurelianus, *On Acute Disease and on Chronic Disease*, 3.9 -3.16, ed. and tr. Drabkin, 1950, 360-389.
[100] Peter van der Eijk, *Medicine and Philosophy in Classical Antiquity. Doctors and Philosophers on Nature, Soul, Health, and Disease* (Cambridge: CUP, 2005), 299.
[101] Caelius Aurelianus, *On Acute Disease and on Chronic Disease*, 3.9, ed. and tr. Drabkin, 1950, 360-363.
[102] Aetius of Amida, *Libri Medicinales*, 6.24, ed. Olivieri, II, 1950, 163-164.
[103] Appendix I, lines 20-22 and Aetius of Amida, *Libri Medicinales*, 6.24, ed. Olivieri, II, 1950, 163-164.
[104] For a perspective of the patient on healing, see Ido Israelowich, *Society, Medicine, and Religion in the* Sacred Tales *of Aelius Aristides* (Leiden: Brill, 2012), 107-109, nevertheless, each patient's perspective on the actual act of healing is personal and subjective, being influenced by numerous factors, as education, background, general state of health.
[105] Roy Porter, "Introduction" in *Patients and Practitioners,* 2.
[106] The Latin name for rabies was *rabia* and the Greek name of the same disease was *lytta/lyssa*.

However in literary sources *lyssa* had a further development as a *topos* to describe the extreme form of rage: in Homer[107] it appears as a form of madness, a wolfish rage.[108] In the fifth century BCE, in the tragedy[109], an extreme form of violence, attacking from the outside is personified as Lyssa, a revengeful goddess of madness.[110] The literary sources[111] in which rabies appears personified suggest that the impact of rabies on the audience was significant. Considering this literary development, probably, the symptoms and the deadly character of this disease were well-known. For instance, because of the incubation period of rabies by the time the disease manifested the bite mark was already healed, thus the neurological symptoms of aggressiveness, convulsions, fear of water, and paralysis appeared at a patient with no visible wound. By comparison, the gangrene for instance, although deadly also was less frightening because the cause was evident, a severe infection of a body part which was clearly visible. For an untrained eye rabies appeared random[112] and unpredictable, causing a patient to behave in a bizarre way. For this reason, rabies and other diseases with neurological symptoms which appeared to have no visible cause, such as epilepsy[113] or mania, developed a rich literary afterlife and were usually attributed to gods.

In the introduction to his medical work Paul of Aegina stated that the main aim of his work was to provide a *vade mecum* for practicing and teaching medicine, similar to legal synopses used by the lawyers.[114] He emphasized once more the interest for the daily practice of medicine, compared to the theoretical debates.[115] Paul of Aegina described the treatment of

[107] Homer, *The Iliad,* 9.239 and 9.305, ed. and tr. Murray, I, 398 and 404.
[108] Lincoln Bruce, "Homeric *Lyssa*: Wolfish Rage," *Indogermanische Forshungen* 80 (1975): 98-105; Abigail Rebecca Dawson, *Madness in Context in the* Histories *of Herodotus* PhD Dissertation, (Auckland, 2006), 252-253; for other forms of rage in epic see Susanna Braund and Giles Gilbert, "An ABC of Epic Ira: Anger, Beasts, and Cannibalism" in *Ancient Anger. Perspectives from Homer to Galen* ed. Susanna Braund and Giles Gilbert (Cambridge: CUP, 2003), 250-254.
[109] Euripides, *Madness of Hercules,* 823-914, ed. and tr. Way, III, 1912, 194-201.
[110] Euripides, *Orestes,* 254, ed. and tr. Way, II, 1912, 146-147.
[111] See footnotes 25 and 26.
[112] Not all dog bites result in rabies infection.
[113] For instance, Owsei Temkin, *The Falling Sickness: a History of Epilepsy from the Greeks to the Beginnings to Modern Neurology* (Baltimore: The Johns Hopkins University Press, 1994).
[114] Paul of Aegina, *Pragmateia,* Introduction, tr. Adams 1947, I, 1.
[115] Ibid. 1.

rabies in the third chapter of the fifth book, which tackles mainly animal related diseases, poisonings, and toxic plants and substances. The main question raised when one speaks about rabies is: what is rabies for Paul of Aegina? This question leads to the first section of this chapter: the definition of the term "disease" in Paul of Aegina.

Disease

The definition of a disease is shaped by the society affected by it and varies significantly in time and space.[116] In this thesis I emphasized numerous times the importance of medical research and practice in Hellenistic, Roman, and Late antique Alexandria. Normally, in the seventh century, the explanations of the concept of disease were based on the Galenic principles of bad mixture of humors, yet Paul of Aegina saw rabies as independent of the humoral imbalance.

In analyzing the fragment on treating rabies one must notice that Paul's approach to disease seems to stay outside the theoretical debate. He uses a semantically neutral form, *pathos* (πάθος), meaning *what one has suffered* or *experience*[117] or affection in the broadest sense. I want to emphasize, however, that despite his uninvolved use of language, Paul of Aegina depicts the disease, in this case rabies, as an outside enemy constantly attacking the healthy body.[118] The author uses verbs like *haliskomai* (ἁλίσκομαι), to fall into the enemy's hands, *sympiptō* (συμπίπτω) to meet in battle, *empiptō* (ἐμπίπτω) to fall, or nouns like *katapeira* (κατάπειρα) attack. The distinct military vocabulary employed contradicts the generally accepted and promoted opinion that Late antique physicians copied and compiled uncritically earlier medical works, without any original interpretation.[119] For instance, out of the sources which extensively investigated rabies, solely three authors use terms which can be

[116] Robert P. Hudson, "Concepts of Disease in the West," *The Cambridge World History of Disease* (Cambridge: CUP, 1993), 45.
[117] Liddell-Scott Lexicon, *s.v. pathos*.
[118] For the interpretation of rabies as a demonic possession see: Andrea Nicolotti, "A Cure for Rabies or a Remedy for Concupiscence? A Baptism of the Elchasaites" *JECS* 16, no. 4 (2008): 532-534.
[119] Théodorides, *Rabies* 155 and Nutton, *Medicine*, 295-296.

associated with the military area: Caelius Aurelianus, Philumenus, and Aetius of Amida. Caelius Aurelianus uses the verb *turbo*[120] which exists also as a noun in Greek: *he turbē* (ἡ τυρβή) meaning breaking a line and causing disorder. Philumenus used the verb *haliskomai* (ἁλίσκομαι), to fall into the enemy's hands, and Aetius of Amida is using once a military inspired verb when speaking about rabies: *empiptō* (ἐμπίπτω).[121] As can be seen, Paul of Aegina's vocabulary choice is original, emphasizing a violent struggle with the disease that is seen as an enemy, attacking viciously the patient so that the physicians had to battle with it.

His definition takes the inquiry further, to the matter of the cause. The cause of the infection was identified as the bite of a rabid dog which transmitted a poison[122], thus affecting the entire body. The Greek ὁ ἰός (*ho hios*) and the Latin *virus,* different from the more ambiguous *venenum* or *pharmakon* (τὸ φάρμακον), do not imply a virology in the modern sense rather, exhibit an interest for accuracy and for a clear distinction between any venomous snake or toxic plant and the saliva of a rabid dog.[123] A similar word is used also by Celsus to describe the cause of contagion.[124] All physicians from Celsus to Paul of Aegina speak about rabies as a poisoning caused by dogs.

Philumenus was the only author before Paul of Aegina mentioning the bite of humans infected with rabies, however, he offered a slightly different cure for human bites than for dog bites.[125] The fact that rabies was considered a zoonosis transmitted solely by dogs or other small mammals to humans impacted severely the degree of infection among humans. If Late antique physicians believed that once infected with rabies from a dog a human could no

[120] Caelius Aurelianus, *On Acute Diseases an on Chronic Diseases*, 3.14, ed. and tr. Drabkin, 1950, 370-375.
[121] Aetius of Amida, editia CMG, 164.
[122] Paul of Aegina. V.3 ἡ δὲ τῶν συμπτωμάτων αἰτία τῶν μὲν ἄλλων εὔδηλος κατειληφὸτος τοῦ ἰοῦ πάντα τὰ μόιρα.
[123] For this meaning, here used as *saliva* see Chantraine, *Dictionnaire etymologique de la langue Grecque. Histore des mots.* 466, s.v. ὁ ἰός (*ho hios*), and Meillet, *DE,* 740, s.v. *virus*, Wilkinson, *Virus Concept,* 17.
[124] Celsus *De medicina* 2.8.43, tr. W. G. Spencer 1961, I, 22-23, *Dixi de iis vulneribus, quae maxime per tela inferuntur. Sequitur, ut de iis dicam, quae morsu fiunt, interdum hominis, interdum simiae, saepe canis, nonnumquam ferorum animalium aut serpentium. Omnis autem fere morsus habet quoddam virus> itaque si vehemens vulnus est, cucurbitula admovenda est;*
[125] Philumenus, *De Venenatis Animalibus Eorumque Remediis*, 5, ed. Wellmann, 1908, 9.

longer transmit it, this means that there were no measures taken to prevent contagion from humans, for instance Caelius Aurelianus spoke about a physician suffering from rabies.[126]

Given these points I can conclude that, in terms of defining rabies as a poisoning caused by the bite of the dog which, at some point, is infected, Paul of Aegina cannot be accused of simply copying from Oribasius, Galen or Caelius Aurelianus. He openly followed a tradition of medical practice, at least from the first century CE when Celsus defined rabies as a poisoning. In fact, all physicians defined the disease as such because there was nothing more to say about it.[127] As a consequence the problem of defining rabies was no longer the matter of originality.

Closely connected with the issue of infection and contagion is that of the symptoms, which will be discussed in the following section of this chapter.

Symptoms

In many ancient, late antique, and medieval medical treatises there is no significant difference between the disease itself and the symptom, for instance fever was perceived as an illness itself, not a symptom. Paul of Aegina followed also the ancient medical tradition and defined rabies using a specific symptom, that is fear of water, and he calls rabies *hydrophobia* in humans in opposition to λύσσα (*lyssa*) which is the disease of dogs:

> Their bite at first occasions is nothing disagreeable except the pain of the wound; but afterwards it brings on the affection called *hydrophobia*, which makes its attack with convulsion, redness of the whole body, but especially of the countenance, sweating, and anxiety; and those afflicted shun water when they see it, and some every fluid that is presented to them.[128]

[126] Caelius Aurelianus, *On Acute Diseases and on Chronic Diseases*, 3.11, ed. and tr. Drabkin, 1950, 364-367, *Item Eudemus Themesionis sectator memorat fuisse hydrophobum medicum, qui cum praenosceret periculum suppliciter ingredientes exoraret, et cum lacrimarum fluore guttis destillantibus tangeretur, exiliens vestem consciderit.*

[127] In the nineteenth and twentieth centuries the microbiology developed and the virus was discovered, Alan C. Jackson, *Rabies: Scientific Basis of the Disease and Its Management* (Oxford: Academic Press, 2013), 3-10; Fu, *Rabies Research*, 20-21.

[128] Appendix I, lines 12-16.

Although Paul of Aegina emphasized from the beginning the close link between canine rabies and human rabies, he clearly made a distinction in terms of the language used. Even though the symptoms are basically the same in humans and in dogs, yet the diseases seemed to be different.[129] As shown above, the late antique physicians believed that once bitten by a rabid dog, which was highly contagious, the human being will get rabies but he will not be contagious. This difference once more stresses the good knowledge of the ancient medical tradition, which described in detail rabies in dogs, without giving any treatment. Paul of Aegina followed the tradition, stating that:

> We have placed the account of persons bitten by mad dogs before all the other because these animals are numerous and domestic, and are frequently seized with madness…When mad they shun drink or food, for they are thirsty but do not drink, and for the most part they pant, hang their ears, and emit much frothy saliva. Generally they utter no sound, and are as it were delirious, so that they do not recognize persons with whom they are familiar.[130]

This description of rabid dogs in a human medical treatise might be linked to a general interest for the public health. The ancient and late antique veterinary medical treaties show no interest in the treatment of small animals, such as dogs or cats. However, the canine pathology was described extensively starting with Xenophon[131] and Aristotle.[132]

In the following figure I will compare the symptoms named by Paul of Aegina with those mentioned by earlier sources.

Paul of Aegina	**Greek or Latin**	**Earlier Sources**
Biting	δάκνω	Aetius of Amida, *Libri Medicinales*, 6.24, ed. Olivieri, II, 1950, 164.
Hydrophobia	*aquae timor* ὑδροφοβία	Scribonius Largus, *Compositiones* 171, ed. Sconocchia 1983, 81-82. Cassius Felix, *De Medicina*, 67, ed. Rosae, 1879, 164-166. Caelius Aurelianus, *On Acute Diseases and on Chronic Diseases*

[129] When speaking about rabies in dogs he uses the expression ἁλίσκεται τῇ λύσσῃ, seized by rabies, and when he speaks about the human version of the same infliction he uses the word ὑδροφοβία.
[130] Appendix, I, lines 1-2 and 8-11.
[131] Xenophon, *Anabasis*, 5.6.26, ed. and tr. Brownson, 1998, 420-421.
[132] Aristotle, *History of Animals*, 604b, ed. and tr. Blame, III, 1991, 163.

		3.9. and 3.11. Aetius of Amida, *Libri Medicinales*, 6.24, ed. Olivieri, II, 1950, 164
Dehydration	*aqua perfuse* Ξηρότης	Cassius Felix, *De Medicina,* 67, ed. Rosae, 1879, 164-166. Caelius Aurelianus, *On Acute Diseases and on Chronic Diseases*, 3.11, ed. and tr. Drabkin, 1950, 364-367. Aetius of Amida, *Libri Medicinales*, 6.24, ed. Olivieri, II, 1950, 164
Melancholia	μελαγχολία	
Barking like dogs	*latratus* ὑλακτέω	Scribonius Largus, *Compositiones* 171, ed. Sconocchia 1983, 81-82. Cassius Felix, *De Medicina,* 67, ed. Rosae, 1879, 164-166. Caelius Aurelianus, *On Acute Diseases and on Chronic Diseases*, 3.11, ed. and tr. Drabkin, 1950, 364-367.
Convulsions	*spasmus* σπασμός	Scribonius Largus, *Compositiones* 171, ed. Sconocchia 1983, 81-82. Caelius Aurelianus, *On Acute Diseases and on Chronic Diseases*, 3.11, ed. and tr. Drabkin, 1950, 364-367.
Redness	*Rubor* ἐρεύθος	Caelius Aurelianus, *On Acute Diseases and on Chronic Diseases*, 3.11, ed. and tr. Drabkin, 1950, 364-367. Aetius of Amida, *Libri Medicinales*, 6.24, ed. Olivieri, II, 1950, 164
Sweating	*sudor* ἐφίδρωσις	Caelius Aurelianus, *On Acute Diseases and on Chronic Diseases*, 3.11, ed. and tr. Drabkin, 1950, 364-367
Anxiety	*anxietas* ἀπορία ἔκστασις	Caelius Aurelianus, *On Acute Diseases and on Chronic Diseases*, 3.11, ed. and tr. Drabkin, 1950, 364-367.

Fig. 1. List of symptoms mentioned by Paul of Aegina

In his translation of Soranus of Ephesus, Caelius Aurelianus described approximately thirty five symptoms associated with rabies while Paul of Aegina listed solely nine. I think that the case of the symptoms was similar to that of the cause or the definition of rabies. From Celsus to Paul of Aegina, seven century had passed and the physicians had enough time to

observe all the possible symptoms of rabies. As visible from the figure no. 2 there was a standard approach of identifying rabies based on the symptoms: I have used Paul of Aegina's description as standard for comparison and the results show that three of the symptoms were mentioned by all other authors describing rabies.

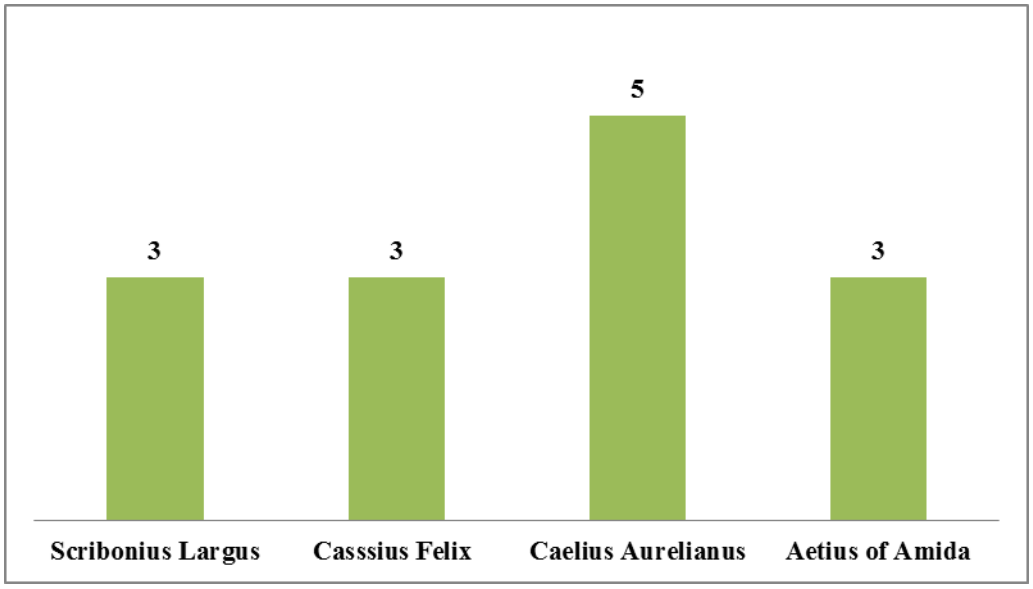

Fig. 2 Number of rabies symptoms common in Paul of Aegina and earlier authors

As a consequence, in the case of symptoms the issue of originality should be also eliminated from the debate, whereas the matter of the genre of *Pragmateia* provides a better grasp of the case of treating rabies.

Pragmateia is a seven book medical compilation composed as a *vade mecum* with a design similar to that of a legal synoptic work. Despite the opinion that Late antique medical compilations were not creative and consisted solely in copying early original works recent works on Ancient encyclopedias emphasized the fact that the organization of large-scale concentration of knowledge was constantly negotiated.[133] However, this constant negotiation of knowledge had to consider the principle of comprehensiveness.[134] In Paul of Aegina's selection of symptoms direct applicability or *utilitas* governed; writing a manual, he needed a

[133] Hatzimichali, *Encyclopaedism,* 67.

short, easy to memorize, and pertinent list of symptoms for rabies. This list resulted from a targeted intellectual activity which cannot be considered simply copying; he had to select the symptoms which unequivocally diagnosed rabies. The issue of diagnosis based on symptom is connected with prognosis, which will be discussed in the following section.

Prognosis

Rabies is seen as an event that expanded over time and the physician had to grasp all the phases, an intellectual operation called prognosis. Consequently, the symptoms have no meaning unless put in a temporal context.[135] Because of its time span, an infectious disease has a dramatic form. It starts at a moment in time, proceeds on a stage limited in space and duration, following a plot of increasing tension, moves to crisis and then drifts toward closure.[136] For instance, after the incubation period, in which the disease is latent, follows a violent attack which is always deadly. Paul of Aegina describes this in the following way:

> Of the persons falling into this affection we know none who has been saved….But before the affection has made its attack many, even those who had been bitten by a dog, have been saved. Wherefore we must begin our treatment from thence. And since often from the attack of hydrophobia having not yet come on (for most commonly it comes on about the fortieth day, and in some cases after six months, nay, instances are related of its coming on after six months) some supposing that the dog who inflicted the bite was not mad, and making haste to heal up the wound have thereby given ride to the complaint.[137]

The incubation period was a point many times overlooked by the physicians,[138] who approached the disease from the first symptom, not from the time of the contagion. Caelius Aurelianus was the only one interested in the stages of evolution in this disease, naming several phases such as *antecedens, causa passionis,* which in this case is the virus in the

[134] Robert L. Fowler, "Encyclopaedias: Definitions and Theoretical Problems," in *Pre-Modern Encyclopaedic Texts. Proceedings of the Second COMERS Congress, Groningen, 1-4 July 1996,* ed. Peter Brinkley (Leiden: Brill, 1997), 8

[135] Grmek, *Disease*, 251.

[136] Charles Rosenberg, *Explaining Epidemics and Other Studies in the History of Medicine* (Cambridge: Cambridge University Press, 1992): 279.

[137] Appendix I, lines 24-32; Appendix II, lines 20-21.

[138] For instance, Caelius Aurelianus ignored the problem of the period of incubation and debated topics as the nature of the disease, the treatment, or the body part affected most.

dog's saliva *venenum*, followed by *signa et manifestioria*, ranging from *alienatio mentis*, *tremor nervorum* or *contractio* to paralysis and death.[139] In Paul of Aegina's description also there is a clear difference between remedies applied during the incubation period and after the violent outbreak of symptoms, which is quite extraordinary, thus proving a complex understanding of the disease and also a good knowledge of the earlier sources, probably Soranus of Ephesus. This fact comes to contradict once more the lack of originality assigned to Paul of Aegina and other Late antique physicians by the scholarly community.[140]

Paul of Aegina put emphasis on the *metasyncritica*, or the preventing remedies, such as the purging of the body, since rabies was an exterior entity attacking the body, or an appropriate diet. Consequently, this medical approach itself raises several questions, such as: was Paul of Aegina a pioneer regarding the treatment of rabies? How important were the preventive measures in tackling an infectious disease?

One noteworthy measure mentioned by Paul is the ingestion of the liver of the dog that inflicted the bite on a person. This is not an original idea, because Pliny mentioned also as remedy the ingestion of salted meat from an infected dog or of capsules made with the spinal fluid from a rabid animal.[141] Despite the appearances, Paul of Aegina or Pliny did not discover the concept of vaccine; this approach was rather wishful thinking, since the disease was deadly. Being a compiler and a professor of medicine, Paul of Aegina made a critical and insightful selection of the sources used. It was not a straightforward list of the remedies he knew, regardless of any effectiveness, but an analytical account of the therapies used based on success, authority, and practice. Consequently, this means that these cures were not only used, but were also recognized by the medical community as effective. For instance, Paul of

[139] Caelius Aurelianus, *On Acute Diseases and On Chronic Diseases* 3. 9-16, ed. and tr. Drabkin, 1950, 361-387.
[140] Théodorides, *Rabies,* 155; Nutton, *Medicine,* 295-296.
[141] Pliny, *Natural History*, 28.27.104, ed. and tr. Jones, VIII, 1963, 248-249.

Aegina's clinical test for a fast diagnosis, the so-called "walnut test", taken from Oribasius is almost identical with the similar passages in Aetius.[142]

These observations prove once again that, at least in the case of rabies, Paul of Aegina did not blindly copy Galen or other earlier authors, but rather he made a critical assessment, combing both human and veterinary medicine with natural history. For this reason, I think that the exploration of the selection criteria he used would be an important contribution to the field of medical history. Equally important in Paul of Aegina's approach was the problem of treatment on which I will focus in the next section of this chapter.

Treatment

A significant part of Paul's description of rabies is constituted by the long list of pharmaceuticals and procedures prescribed for rabies infections. Paul of Aegina's list is almost identical to those of his predecessors. However, some issues must be discussed here: if all physicians knew that rabies was deadly why did they bother to prescribe a treatment? Moreover, what was the actual effect of this treatment prescribed? Another issue connected with the treatment is the accessibility of the ingredients. Were these ingredients exotic in some way?

The first issue I want to address is the futility of any treatment in the case of rabies and in connection with this, the infection path and the symptoms. First, rabies is transmitted through the bite of dogs. Consequently, even in the case when the dog inflicting the wound was not rabid the bite lesion nevertheless needed treatment in order to avoid sepsis[143] as seen in Paul of Aegina's description:

> ….if the dog that inflicted the bite was not mad, then the fowl will live, but if mad he will die the next day; and then you must hasten to open the wound, and after a few days repeat the same experiment; and when the fowl does not die you may bring the wound to cicatrization, inasmuch as the patient is then freed from danger.[144]

[142] Théodorides, *Rabies*, 155.
[143] Guido Majno, "The Ancient Riddle of σήψις Sepsis" *JID* 163 no. 5 (1991): 937-945.
[144] Appendix I, lines 36-39.

If physicians considered that the dog that had bitten the patient was mad, consequently the patient was to develop rabies, two phases of treatment were applied: the care of the skin lesion, which needed specific procedures as cupping, burning, or cataplasms and a series of potions or mixtures of plants, some of them toxic. This approach developed from the actual nature of ancient medical practice: for all physicians healing represented a daily routine, a repetitive act performed[145] in order to achieve a final product, that is, health. Many times, the medical act needed an audience to validate the physician's performance,[146] also the success rate validated his activity. As a consequence, the physician had to be successful in any situation. Yet how could a physician be successful in treating rabies? The first measure taken was to keep the bite wound open and to clean it periodically, so that the poison could be eliminated. Second, they prescribed purgatives[147] which caused a severe dehydration of the patient. Lastly, they used mixtures and potions, whose base was honey, wine, or vinegar, and in which they dissolved sometimes toxic plants, like hellebore[148] or buckthorn.[149] The seventh book of Paul of Aegina treated the administering of plant remedies, and he recommended hellebore for purging, as well as for treating severe paralysis, epilepsy, or gout.[150] Considering the severity of the rabies symptoms, which included convulsions, biting, loss of consciousness, paralysis, and moreover, considering the effects of these symptoms on the audience, family or care giver of the patient, the physician was put under pressure to heal or subdue the violent patient in order to attenuate the effects on the patient, by fastening his death, and the effects on those witnessing the struggle of the patient.

[145] Alf Lüdtke, "What is the History of Everyday Life and who are its Practitioners?" in *The History of Everyday Life . Reconstructing historical Experiences and Ways of Life,* ed. Alf Lüdtke, (Princeton: Princeton University Press, 1995), 5.
[146] Susan P. Mattern, *Galen and the Rhetoric of Healing* (Baltimore: The Johns Hopkins University Press, 2008), 80-83.
[147] Appendix I, line 73.
[148] Alfred Lucas, "Poisons in Ancient Egypt," *JEA* 24, no. 2 (1938): 199; for the toxicity of the hellebore see David Eric Brussell, "Medical Plants on Mt. Pelion, Greece," *Economic Botany* 58 (2004): 194.
[149] Charles Singer, "The Herbal in Antiquity and Its Transmission to Later Ages," *JHS* 47 (1927): 22.
[150] Paul of Aegina, *Pragmateia,* 7.10, tr. Adams 1947, I, 503-306.

For instance, other authors mentioned poppy seeds[151] used in the potions, evidently to calm the patients. Other authors recommend bloodletting[152] or using leeches[153], both procedures causing low blood pressure and weakness, thus calming the patient. In addition, venom from vipers is recommended.[154] This treatment offered by Paul of Aegina seems a rather merciful way of dealing with a deadly disease, with debilitating and frightening symptoms, in which the patient was calmed and subdued with a combination of poisonous plants.

In terms of accessibility to treatment and plants, most of the ingredients mentioned by Paul of Aegina are endemic to the Mediterranean area and easy to obtain.[155] The potions offered were mainly a mixture of medicinal plants still used today in the pharmaceutical industry such as: mint, germander, chamomile, buckthorn, garlic[156], salt, and sage, diluted with milk, wine, vinegar, or honey. It is not surprising that the treatment of the bites inflicted by healthy dogs was based on mainly the same basic ingredients such as: honey, salt or vinegar[157]. For instance, the powder obtained from pounded, burnt river crabs appeared to be a popular remedy for rabies, being mentioned by Cassius Felix[158], Pliny[159], Oribasius[160], and Aetius of Amida.[161] The only exotic ingredient mentioned was balsamon (βάλσαμον), the resin of a rare tree, the balm tree or *opobalsamum*, which was expensive and used also in cosmetics;[162] the plant was coming from the Arabia peninsula. For instance, in the eighteenth

[151] Scribonius Largus, *Compositiones*, 171, ed. Sconocchia, 82; Pelagonius, *Artis Veterinariae Quae Extant*, 29, ed. Ihm, 1892, 113-115; for opium and poppy seeds see Alfred C Andrews, "The Opium Poppy as a Food and Spice in Classical Period," *Agricultural History* 26 no. 4 (1952): 152-155;
[152] Caelius Aurelianus, *On Acute Diseases and On Chronic Diseases* 3. 16, ed. and tr. Drabkin, 1950, 380-389.
[153] Cassius Felix, *De Medicina*, 67, ed. Rosa, 1879, 164-166.
[154] Appendix I, line 63.
[155] John Scarborough, "Early Byzantine Pharmacology," *DOP* 38 (1984): 228; Vivian Nutton, "Focus: Islamic Medicine and Pharmacy," *European Review* 16, no. 2 (2008): 211-217.
[156] Christopher Hobbs, "Garlic-The Pungent Panacea," *Pharmacy in History*, 34, no 3 (1992):154, mentions garlic as a remedy preferred by Galen.
[157] Appendix I, lines 67-68.
[158] Cassius Felix, *De Medicina*, 67, ed. Rosa, 1879, 164-166.
[159] Pliny, *Natural History*, 32.19.54, ed. and tr. Jones, VIII, 1963, 528-529.
[160] Oribasius, *Synopsis ad Eusthatium, Libri ad Eunapium*, 8.13, ed. Raeder, 1926, 250.
[161] Aetius of Amida, *Libri Medicinales*, 6.24, ed. Olivieri, II, 1950, 166.
[162] Laurence Totelin, "Botanizing Rulers and their Herbal Subjects: Plants and Political Power in Greek and Latin Literature," *Phoenix* 66 (2012): 122.

century the plant was still considered exotic, because the Niebuhr expedition to Arabia was particularly interested in the balm tree.[163]

One of the most important aspects of the medical practice was the actual treatment used and when analyzing Paul of Aegina's treatment plan I must clarify several features. For instance there is a distinct difference between the medical procedures and the different potions offered to the patient. This difference is clearly expressed in the vocabulary used, as is visible from the following table.

Procedures applied	**Paul of Aegina**	**Caelius Aurelianus**
cataplasm	κατάπλασμα	*emplastrum*[164] *cataplasma*
washing	ἀπονίζειν	-
burning	καίειν	*cautere*[165]
cupping	σικυάζειν	*(pono) curcubitula*[166]
cutting	περισαρκίζειν	*(uso) scalpellum*[167]
purging	καθαρίζω	*desudare* *clyster*

Fig. 3 Medical procedures applied in the case of rabies

I have opted to compare Paul of Aegina's description of rabies with the one offered by Caelius Aurelianus because the latter is considered to be the major author writing about rabies in Late Antiquity.

In analyzing Paul of Aegina's approach to rabies one should always have in mind the nature of this sources: *Pragmateia* was designed as a manual and encyclopedia, as a consequence its task was to synthesize the most efficient cures, and it had to be governed by the principles of comprehensiveness and concision at the same time. A closer look at the verbal forms used in Paul's description makes visible his voice and opinion, thus exhibiting

[163] Jonathan Sheesan, *The Enlightenment Bible: Translation, Scholarship, Culture* (Princeton: Princeton University Press, 2005): 187.
[164] In Latin it is a term specific to the medical field, borrowed from Greek ἔμπλαστρον. Many remedies of this type were used with the name of the inventor or with a geographical allusion, mainly because of the fame of the medical school in that area; D. R. Langslow, *Medical Latin in the Roman Empire* (Oxford: OUP, 2000): 133.
[165] This remedy is also mentioned by Cassius Felix, *De Medicina*, 67, ed. Rosa, 1879, 164-166.

his experience. For instance, in describing some treatments he used the verbs in the first person plural: *proetaxamen* (προετάξαμεν[168]), *ismen* (ἴσμεν[169]), *memathēkamen* (μεμαθήκαμεν[170]), and *gnoiēmen* (γνοίημεν[171]) while in describing other treatments, the subject is simply *some people/tines* (τίνες[172]), thus proving that he had experience in using some of the treatments. In addition, this supports the principle of comprehensiveness in encyclopedias: from the sources available he made a selection of treatments, while suggesting those he preferred. When used as a manual, *Pragmateia* offered alternatives to treating rabies. Paul of Aegina's approach to rabies proves once more that compiling was a creative intellectual process: he made a deliberate selection of treatments, arranged them in a specific order and some of the treatments were openly tested and preferred.

As shown above, the increased interest in the treatment, symptoms and prognosis of rabies, amplified also by the attention to previous medical tradition indicates that the effects rabies exerted on the ancient and late antique societies. Despite the preventive measures taken, rabies was common in some areas, almost an everyday event. The normative sources which regulated the activity of physician and the presence of animals in the city emphasize the social response to infectious disease and the practices connected to public health.

[166] Celsus, *De Medicina* 5.27.2, ed. and tr., Spencer, II, 184-87; Cassius Felix, *De Medicina*, 67, ed. Rosa, 1879, 164-166; Caelius Aurelianus, *On Acute Diseases and On Chronic Diseases* 3. 16, ed. and tr. Drabkin, 1950, 380-389. 16.
[167] The procedure also mentioned by Cassius Felix, *De Medicina*, 67, ed. Rosa, 1879, 164-166.
[168] Appendix II, line 1.
[169] Appendix II, line 21.
[170] Appendix II, line 24.
[171] Appendix II, line 38.
[172] Appendix II, line 59.

CHAPTER THREE
RABIES IN THE CITY: A MATTER OF URBAN HEALTH

Paul of Aegina's text on rabies begins with a detailed description of rabid dogs.[173] The first question raised by this description is: why would a physician dedicate a part of his work to a description of rabies in dogs?

The answer to this question expands into numerous ramifications, from urban health and public health to personal or communal methods employed to recognize rabid animals and to eliminate risks. This chapter is dedicated to the late antique methods of controlling rabies outbreaks in animals which normally live inside the city, in this case Alexandria. Paul of Aegina lived and practiced medicine in Alexandria, however, the situation described by him might be encountered, with some variations, in other major urban centers of the Mediterranean area, like Constantinople or Antioch. The control of rabid animals in Alexandria was not a random activity, but supervised by an authoritative entity, be it the medical school and tradition in the city, state legislation, or religious ceremonials. In this chapter I will analyze all these approaches in order to emphasize the means of coping with a deadly zoonosis inside Alexandria.

It was during the nineteenth century, with the work of Louis Pasteur, that the control of rabies entered the modern period leading to almost universal harmonization of the methods used. In 1993 a French veterinarian and microbiologist wrote a historical overview dedicated to the surveillance and control of rabies in animals from ancient societies to Late Antiquity, through the Middle Ages up to the modern period, outlining the main components of the rabies surveillance system: ability of diagnose, knowledge of the conditions under which infection occurs, a warning system, and treatments of animals.[174] In this chapter I will analyze all these aspects he mentioned and I will add even legal sources and religious

[173] Appendix I, lines 4-12.

approaches to rabies, as well as ethnic or cultural differences. For instance, were there different views and approaches of rabies or dogs in communities of Semitic origin living in Alexandria? Moreover, I think that rabies offers means of highlighting the reactions to health stress in the city, and the relation between social networks, social environment, and the presence of health facilities[175] and health care professionals. What is the relation between rabies and "urbanicity,"[176] defined as the impact of living in an urban environment on a certain community, for instance, the prevalence of health problems and risk factors in urban areas.[177]

The health of humans is connected with the health of animals and diseases, both human and animal, influence the normal activity. According to modern medical research more than 200 diseases of animals are communicable; almost half are known to be transmissible from animal to man. There are also more than 100 parasites that affect both humans and animals. Animal diseases directly and indirectly affect one's physical, mental, emotional, social, economic, and political well-being. The direct impact is evidenced by the morbidity and mortality resulting from animal pathogens affecting humans.[178] Modern descriptions of rabies state that the main factors influencing the epidemiology of rabies are: the extreme ubiquity in the distribution of the disease, the higher attack rate associated with exposures in the region of the head, the unpredictability of the organism when exposed to normal atmospheric conditions, age, namely younger animals are more susceptible than older,

[174] Jean Blancou, "Early Methods for the Surveillance and Control of Rabies in Animals," *Rev. Sci. Tech. Off. Int. Epiz.* 13 (1994): 362-366. (hereafter: Blancou, *Early Methods*)
[175] By the seventh century the Alexandrian hospital system was well-organized, as seen in a papyri mentioning a guild of professional nurses, Timothy S. Miller, "Byzantine Hospitals" *DOP* 38 (1984):56, the papyrus, number 1028 in the volume is described in *Greek Papyri in the British Museum,* ed. Frederic George Kenyon and Harold Iris Bell, III (London: British Museum, 1907), 276-277.
[176] David Vlahov and Sandro Galea, "Urbanization, Urbanicity, and Health," *Journal of Urban Health: Bulletin of the New York Academy of Science* 79, no. 4 (2002): 55.
[177] Jeremiah Barondess, "Introduction: The Health of Cities," *Journal of Urban Health: Bulletin of the New York Academy of Science* 75, no. 2 (1998): 204-205.
[178] J.D. Martin, "Animal diseases: their relationship to the health of the man," *Annals of the New York Academy of Sciences* 70 (1958): 280-282.

the latter is also true in humans. The main agents are foxes, wolves, cattle, small carnivores, domestic and wild cats, and wild and domestic dogs in urban areas.[179]

In what follows I will examine the Late antique methods of controlling and confronting rabies. First, I will consider the medical approach in human and veterinary sources, by using the same criteria of *disease, symptom, prognosis,* and *treatment.* This method emphasizes the existence of any differences in tackling the same disease in dogs and in humans. I will use as a main reference Paul of Aegina because he is the last major medical text in the Alexandrian Greek tradition and then I will trace back his information, first in other medical sources speaking about rabies in humans and then in veterinary sources which deal with rabies. This will help me emphasize any chronological differences or refinements of the diagnosis or treatments. Second I will analyze the normative and religious approaches to rabies.

Medical approach

Being considered one of the oldest diseases mentioned in history, rabies and its symptoms were observed and described since very ancient times,[180] not solely in medical sources but in literary sources[181] as well. This is certainly due to a number of factors: the very ancient domestication of dogs and the important role of these animals in human societies; the spectacular nature of rabies symptoms; and, above all, the transmissibility of this disease to human beings.[182]

[179] Ernest S. Tierkel, "Recent development in the epidemiology of rabies," *Annals of the New York Academy of Sciences* 70 (1958): 445.
[180] P. B. Adamson, "The Spread of Rabies into Europe and the Probable Origin of this Disease in Antiquity," *Journal of the Royal Asiatic Society of Great Britain and Ireland* 2 (1977): 141; Wu Yohong, "Rabies and Rabid Dogs in Sumerian and Akkadian Literaure," *JAOS* 121, no1 (2001): 32-43.
[181] Lincoln Bruce, "Homeric *Lyssa*: Wolfish Rage" *Indogermanische Forshungen* 80 (1975): 98-105; Abigail Rebecca Dawson, "Madness in Context in the *Histories* of Herodotus" PhD dissertation (Auckland, 2006), 252-253; for other forms of rage in epics see Susanna Braund and Giles Gilbert, "An ABC of Epic Ira: Anger, Beasts, and Cannibalism," in *Ancient Anger. Perspectives from Homer to Galen*, ed. Susanna Braund and Giles Gilbert (Cambridge: CUP, 2003), 168-171. For rabies personified as a goddess in tragedy see: Ruth Padel, *In and Out of the Mind* (Princeton: Princeton University Press, 1994).
[182] Blancou, *Early Methods*, 362.

Disease

Paul of Aegina's description of rabies marked a clear lexical difference between the disease in dogs and the one in humans. He said that:

> We have placed the account of persons bitten by mad dogs before all the others because these animals are numerous and domestic, and are frequently seized with madness… Their bite at first occasions nothing disagreeable except the pain of the wound; but afterwards it brings on the affection called hydrophobia.[183]

In the Greek text he uses the word ἡ λύσσα (*he lyssa*) when speaking about rabies in dogs, and ὑδροφοβία (*hydrophobia*) when speaking about rabies in humans. The bite of a dog seized by λύσσα (*lyssa*) causes in humans ὑδροφοβία (*hydrophobia*). The same distinction is present in all surviving medical texts which speak about human rabies.

In the first century CE Cornelius Celsus and Scribonius Largus, both writing in Latin, make a clear difference between dog rabies and human rabies. However, Celsus described the treatment of rabies in human without naming the actual disease: he states that is a sort of poisoning caused by the bite of a rabid dog, *canis rabiosus*.[184] Scribonius Largus mentioned that dogs are numerous in the city and that is a clear difference between rabies in dogs and the disease developed by humans.[185]

In the second century, according to the dates offered by Jean Théodoridès, a physician called Philumenus wrote a book on different poisons. His description of rabies in dogs is almost identical with the one written by Paul of Aegina.[186] Again a clear distinction between

[183] Appendix, I, lines 4-5 and 12-14; Appendix II, lines 4-5 and 13-15.
[184] Celsus, *De Medicina* 5.27.2, ed. and tr., Spencer, II, 184-87: *Utique autem si rabiosus canis fuit, cucurbitula virus eius ectrahendum est; deinde si locus neque nervosus neque musculosus est, vulnus id adurendum est: si uri nonpotest, sanguinem homini mitti non alienum est.*
[185] Scribonius Largus, *Compositiones,* 171, ed. Sconocchia, 81, *quia in Sicilia plurimi fiunt rabiosi canes. Facit enim ad horum morsum protinus, quidem data per dies triginta, ita ut aquae, id est liquoris timore numquam temptetur. Qui cum accidet, summo cruciatu ad morteme os conpellit, quos ob ante dictam causam* ὑδροφόβους *Graeci apellant.*
[186] Philumenus, *De Venenatis Animalibus Eorumque Remediis*, 1, ed. Wellmann, 1908, 4; Théodoridès, *Rabies,* 149; Jean Théodoridès, *Histoire de la rage. Cave canem* (Paris: Mason, 1986), 44.

human rabies called λύσσα (*lyssa*) and the same sickness in humans, called ὑδροφοβία (*hydrophobia*).

In the fourth century, Oribasius wrote about rabies and said that "those bitten by rabid dogs fall into hydrophobia." Again there is a clear lexical difference between the canine rabies and the human one.[187]

In the fifth century three physicians wrote about rabies: Cassius Felix[188] and Caelius Aurelianus[189] in Latin and Aetius of Amida[190] in Greek. All three authors speak about the differences between rabies in dogs and in humans.

If all the human medical sources saw rabies as different form hydrophobia, which is in fact a symptom, the zoological and veterinary works had a rather different and more complex view on the disease. For instance, Aristotle mentioned the disease solely in dogs and other mammals such as camels, humans being placed outside.[191] Pelagonius[192] and Vegetius[193] described in detail the rabies in horses and dogs and in both cases hydrophobia is a symptom leading to rabies and not a separate disease.

The cause of this disease in dogs is considered many times an environmental hazard, caused by extreme heat or extreme cold,[194] the influence of a star[195] or the temperature of food,[196] also it might be caused by an anatomical feature of the dogs[197] or impurity.[198] For

[187] Oribasius, *Synopsis ad Eusthatium, Libri ad Eunapium*, 8.13, ed. Raeder, 1926, 250.
[188] Cassius Felix, *De Medicina*, 67, ed. Rosa, 1879, 164-166; *Hi autem lyssodecti, id est qui rabidos morsus incurrerunt, si ab initio secundumrationem quod Graeci cata logon appellant, minime fuerint curati, post XL vel LX dieshydrophobici efficiuntur, id est aquam timentes.*
[189] Caelius Aurelianus, *On Acute Diseases and On Chronic Diseases* 3. 9, ed. and tr. Drabkin, 1950, 30-363, *Item Andreas [qui] cynolysson vocavit, veluti ex rabie canina morbum conceptum. Antecedens autem causa passionis est canis rabidimorsus, vel, ut quidam memorant, ceterorum quoque animalium quae sint simile rabieobnoxia, ut luporum, ursorum, leopardorum, aequorum et asinorum, <vel> hominum hydrophobarum.*
[190] Aetius of Amida, *Libri Medicinales*, 6.24, ed. Olivieri, II, 1950, 163.
[191] Aristotle, *History of Animals*, 604b, ed. and tr. Blame, III, 1991, 163.
[192] Pelagonius, *Artis Veterinariae Quae Extant*, 29, ed. Ihm, 1892, 113-115.
[193] Vegetius Renatus, *Digestorum artis mulomedicinae libri*, 2.11, 2.95, 2.148, ed. Lommatzsch, 1903, 105-106, 189-190, 241-242.
[194] Appendix I, 7-8 and Aetius of Amida, *Libri Medicinales*, 6.24, ed. Olivieri, II, 1950, 163.
[195] Pliny, *Natural History*, 2. 40. 107 and 8. 63. 152, ed. and tr. Rackham, I and III, 250-251 and 106-107.
[196] Columella, *On Agriculture*, 6.35 and 7.12, ed. and tr. Ash, II, 1954, 212-213 and 312-313.
[197] Pliny, *Natural History*, 29.32.100, ed. and tr. Jones, VIII, 1963, 247-248, mentioned a worm under the tongue of the dog which causes rabies.

instance, Vegetius noted that the bite of a rabid dog leads to death in beast of burden, humans, and dogs and hydrophobia usually transforms into rabies, being seen as a symptom not as a disease.[199]

Symptom

In the diagnosis of rabies in dogs two methods are mentioned: the clinical diagnosis, where the signs or the symptoms of a presumably infected with rabies and the experimental diagnosis, where a test was used to obtain a fast diagnosis. First, I will describe the symptoms mentioned in the sources, based on which the clinical diagnosis was made. Second I will describe the experimental diagnosis method.

Paul of Aegina mentioned two types of rabies, as identified by the modern medicine, the "dumb rabies" and the violent form. The symptoms mentioned are the ones one might consider today standard for rabies:

> When mad they shun drink and food, for they are thirsty but do not drink, and for the most part they pant, hang their ears, an emit much frothy saliva. Generally, they utter no sounds, and are as it were delirious, so that they do not recognize persons with whom they are familiar. Wherefore they attack equally without barking all animals, whether wild beasts or men, and bite them. Their bite at first occasions nothing disagreeable except the pain of the wound; but afterwards it brings on the affection called hydrophobia.[200]

For an easier comparison I have included a table with the symptoms of rabies in dogs as Paul of Aegina noted and in other human and veterinary medical sources. Through this comparative approach I can easily highlight a common view on symptomatology in both human and animal rabies.

Paul of Aegina	***Locus***	**Other authors**	***Locus***
(dogs) shun water and food, βρῶσιν	Appendix II, lines 5-6.	Philumenus: (dog) shuns water and food,	Philumenus, *De Venenatis*

[198] Pliny, *Natural History*, 29.32.100, ed. and tr. Jones, VIII, 1963, 246-247, mentioned that touching the menstrual blood might cause rabies.
[199] Vegetius Renatus, *Digestorum artis mulomedicinae libri*, 2. 148, ed. Lommatzsch, 1903, 241-242: *Canes rabiosi morsus et iumentis et hominibus exitiun inferred consuevitus que eo ut ipsos qui contacti fuerint hydrophobos faciat et conertat in rabiem.*
[200] Appendix I, lines 8-14.

καὶ ποσίν ἀποστρείφονται (dogs) are thirsty διψώδεις εἰσιν		ἀποστρείφενταικαὶ βρῶσιν καὶ ποσίν Oribasius: (dogs) are not found of water, having refused food and water, ἀπόσιτοι δὲ καὶ διψώδεις μὲν, οὐ ποτικοὶ δέ Aetius of Amida: (dogs) are not found of water, having refused food and water, ἀπόσιτοι δὲ καὶ διψώδεις μὲν, οὐ ποτικοὶ δέ	*Animalibus Eorumque Remediis*, 1, ed. Wellmann, 1908, 4. Oribasius, *Synopsis ad Eusthatium, Libri ad Eunapium*, 8.12, ed. Raeder, 1926, 251. Aetius of Amida, *Libri Medicinales*, 6.24, ed. Olivieri, II, 1950, 164.
(dogs) breathing with difficulty ἄσθμησις	Appendix, line 6.	Oribasius: (dogs) are breathing hardly, ἀσθμαίνουσιν έπὶ πολύ Aetius of Amida: (dogs) are breathing hardly, ἀσθμαίνουσιν έπὶ πολύ	Oribasius, *Synopsis ad Eusthatium, Libri ad Eunapium*, 8.12, ed. Raeder, 1926, 251. Aetius of Amida, *Libri Medicinales*, 6.24, ed. Olivieri, II, 1950, 164.
(dogs) hang their ears τὰ ὦτα κλίνουσιν	Appendix, line 7.	Oribasius: (dogs) hang their ears, τὰ ὦτα κλίνουσιν Aetius of Amida: (dogs) hang their ears τὰ ὦτα ἐπικλίνουσι	Oribasius, *Synopsis ad Eusthatium, Libri ad Eunapium*, 8.12, ed. Raeder, 1926, 251. Aetius of Amida, *Libri Medicinales*, 6.24, ed. Olivieri, II, 1950, 164.
(dogs) discharge abundant and foamy saliva σίελον δὲ καὶ δαψιλὲς καὶ ἀφρῶδες ἀφιᾶσιν	Appendix, line 7.	Philumenus: (dog) discharge humor (flegm) and foamy saliva through the mouth and nose, φλέγμα πολὺ καὶ ἀφρῶδες ἐκ τοῦ στομάτος καὶ τῶν ῥινῶν προβάλλει Oribasius: (dogs) discharge abundant and foamy saliva σίελον δὲ καὶ	Philumenus, *De Venenatis Animalibus Eorumque Remediis*, 1, ed. Wellmann, 1908, 4. Oribasius, *Synopsis ad*

		δαψιλὲς καὶ ἀφρῶδες ἀφιᾶσιν Aetius of Amida: (dogs) discharge abundant and foamy saliva σίελον δὲ καὶ δαψιλὲς καὶ ἀφρῶδες προχέουσι Pelagonius: (horse) when affected by rabies a horse foams at his mouth *spumasagit*	*Eusthatium, Libri ad Eunapium*, 8.12, ed. Raeder, 1926, 251. Aetius of Amida, *Libri Medicinales*, 6.24, ed. Olivieri, II, 1950, 164. Pelagonius, *Artis Veterinariae Quae Extant*, 29, ed. Ihm, 1892, 113-115.
(dogs) do not recognize familiar people μὴ τοὺς οἰκείους γνωρίζουσιν	Appendix, line 8.	Philumenus: (dog) appears very hostile to those familiar, στυγνότερός ἐστι τοῦ συνήθους Aetius of Amida: (dogs) do not recognize familiar people μὴ τοὺς οἰκειοτάτους γνωρίζειν	Philumenus, *De Venenatis Animalibus Eorumque Remediis*, 1, ed. Wellmann, 1908, 4. Aetius of Amida, *Libri Medicinales*, 6.24, ed. Olivieri, II, 1950, 164.
(dogs) attack ἐφορμῶσιν	Appendix, line 8.	Philumenus: (dog) attacks, ἐφορμᾷ	Philumenus, *De Venenatis Animalibus Eorumque Remediis*, 1, ed. Wellmann, 1908, 4.
(dogs) bite δάκνουσιν	Appendix, line 9.	Philumenus: (dog) bites, δάκνεις Pelagonius: (horses) bite *seque morsu lacerat impetumque in homines facit* Vegetius: (horses) bite when affected by rabies *quod si etiam fuerit conversus in rabiem, sic intelliges: subito hinniet tanquam sanus, parem suum appetite morsu vel hominem.*	Philumenus, *De Venenatis Animalibus Eorumque Remediis*, 1, ed. Wellmann, 1908, 4. Pelagonius, *Artis Veterinariae Quae Extant*, 29, ed. Ihm, 1892, 113-115. Vegetius Renatus, *Digestorum artis mulomedicinae*

			libri, 2. 11, ed. Lommatzsch, 1903, 105-106.
		Philumenus: (dog) appears grievous, πονήρος βλέππει	Philumenus, *De Venenatis Animalibus Eorumque Remediis*, 1, ed. Wellmann, 1908, 4.
		Aetius of Amida: (dogs) open their mouth and stick their tongue out κεχηνότες δὲ τὸ στόμα καὶ τὴν γλῶτταν προβάλλοντες	Aetius of Amida, *Libri Medicinales*, 6.24, ed. Olivieri, II, 1950, 164.
		Aetius of Amida: (dogs) have the tail slacky τὴν οὐρὰν κεχαλασμένην ἔχουσι	Aetius of Amida, *Libri Medicinales*, 6.24, ed. Olivieri, II, 1950, 164.
		Vegetius: (burden animals) when affected by rabies have swollen veins *venas omnes habebit extensas*	Vegetius Renatus, *Digestorum artis mulomedicinae libri*, 2. 95, ed. Lommatzsch, 1903, 189-190.
		Vegetius: (burden animals) when affected by rabies have discharge from the eyes *sudabit suffuses oculis*	Vegetius Renatus, *Digestorum artis mulomedicinae libri*, 2. 95, ed. Lommatzsch, 1903, 189-190.
		Vegetius: (burden animals) when affected by rabies have cold chills, shiver and shake *tremorem firendoremque patietur* Pelagonius: (horses) when affected by rabies shake his ears *auriculis micat*	Vegetius Renatus, *Digestorum artis mulomedicinae libri*, 2. 95, ed. Lommatzsch, 1903, 189-190. Pelagonius, *Artis Veterinariae Quae Extant*, 29, ed. Ihm, 1892, 113-115.

Figure 4. Comparative table of the symptoms of rabies in dogs or other mammals as mentioned in human and veterinary medicine

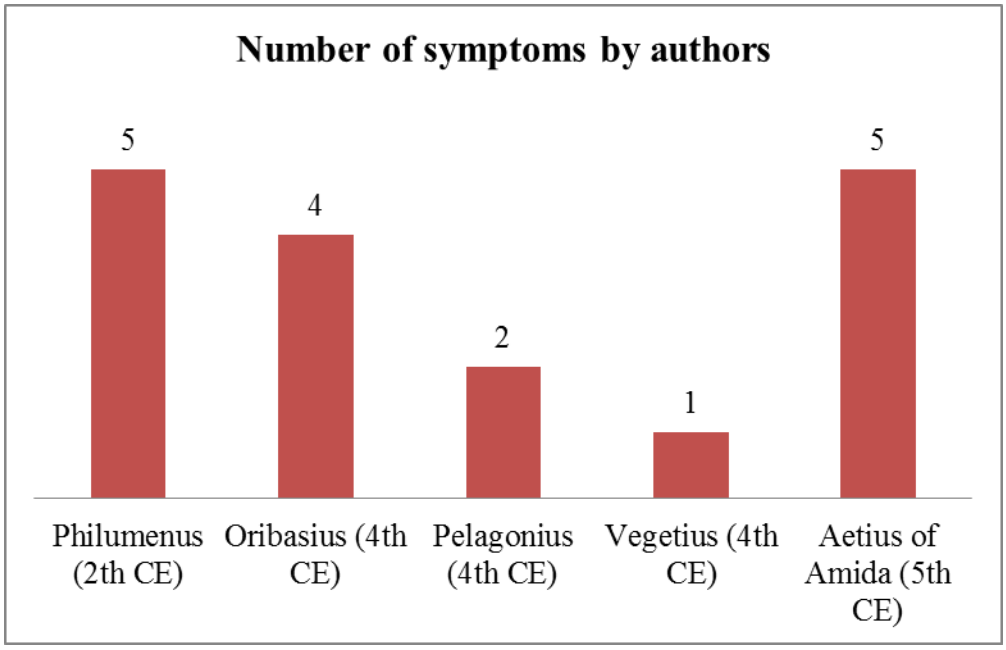

Fig. 5. Number of common symptoms in Paul of Aegina and other authors.

One symptom mentioned by Paul of Aegina, the attack without barking is mentioned also by Philumenus[201] and Aetius of Amida and seems to refer to a paralytic form of rabies, called *la rage mue* or dumb rabies.[202]

Another type or diagnosis for the bite of rabid dogs was the experimental diagnosis, and of particular interest in Paul of Aegina's approach to rabies is the "walnut test",[203] which might be considered an ancient version of a laboratory test. Paul of Aegina and Aetius of Amida[204] stated that is was sufficient to place crushed walnuts on the wound caused by a dog bite, and to offer these nuts to fowl the following day. If the latter ate the nuts and survived, the dog was not rabid.[205] This principle was subsequently restated many times.[206] The important aspects of this test are the contact with the wound[207] (applying crushed walnuts on the wound was used to detect the presence of poison remaining in the bite wound) and the short period of time necessary; consequently, the therapeutic approach was adapted to the

[201] Philumenus, *De Venenatis Animalibus Eorumque Remediis*, 1, ed. Wellmann, 1908, 4.
[202] Théodoridès, *Rabies*, 149 and 154.
[203] Oribasius, *Synopsis ad Eusthatium, Libri ad Eunapium*, 8.12, ed. Raeder, 1926, 251.
[204] Aetius of Amida, *Libri Medicinales*, 6.24, ed. Olivieri, II, 1950, 164.
[205] Appendix I, lines 33-39.
[206] J. Blancou describes a similar text, using however other material in different areas of the world.

results of this rather rapid test (only one day). Besides this test, there was no warning system for rabies, the correct identification of the symptoms was an important part of the warning system, nothing similar to the modern medical alert.

Prognosis

The intellectual process of prognosis, attested in ancient and late antique human medicine, seen as the correct identifying and approaching of the different phases of a sickness is not attested in medical sources in connection with dogs or any other animal. Nevertheless some of the sources mentioned the species susceptible to rabies and the some special conditions under which infection occurred[208] or differences in the virulence of different body parts.[209] For instance Pliny the Elder made a clear connection between the appearance of Sirius or Dog-Star on the sky and rabies.[210]

Treatment

The problem of treating animals with rabies is related to the ancient views on animal hierarchy and value and to the development of the veterinary medicine as a separate field of knowledge.

The ancient and late antique veterinary medical treatises show no interest in the treatment of small animals, such as dogs or cats. However, the canine pathology was described extensively starting with Xenophon[211] and Aristotle.[212] This proves that the interest in dog related zoonosis was limited to identifying the disease, isolating the dog, and probably neutralizing it. For instance, Columella described the rabies in dogs[213], also without offering a treatment. The development of the veterinary medicine as a separate field is linked to the Roman army and its logistical needs, thus the only animals which actually were treated and

[207] Appendix I, line 34.
[208] Extreme heat, extreme cold
[209] Pliny, *Natural History*, 2. 8. 63. 152, ed. and tr. Rackham, 83-84, mentioned the virulence of the cerebrospinal fluid in infected bears.
[210] Pliny mentioned that rabies was closely connected with the Dog-Star or Sirius, see footnote 23.
[211] Xenophon, *Anabasis*, 5.6.26, ed. and tr. Brownson, 1998, 420-421.

castrated were the ones with higher values as horses, mules, and donkeys.[214] Dogs were always highly valued for their loyalty and help in various works, as guarding, hunting, or rounding up flocks of sheep, and became rapidly indispensable for the communities.[215] Despite this fact, when dogs got infected with rabies they were no longer valued, but seen as a health hazard and probably quickly eliminated from the community without any treatment. The ancient *topos* of the monstrous dog when affected by a disease or associated in any way with death,[216] perpetuated in Late Antiquity and Middle Ages not only in hagiographical writings,[217] but in medical sources as well. For instance, the dog was praised by the Greeks and Romans for his many qualities, however in the underworld the dog was a monster, namely Kerberos. This ambivalent attitude is visible in Paul of Aegina's work and this is the reason why he started his inquiry on rabies with the description of the symptoms in dogs, he was a physician, more than that, he was teaching medicine and needed to show other how to control a possible epidemic. When he speaks about dogs which were not infected with rabies his tone is neutral and the symptoms completely ignored, thus showing that dogs were monitored solely when were contagious.[218] His interests were both individual medicine and non-individual medicine and I think that this first fragment about rabies in dogs speaks clearly about medical practice of public health control in Late Antiquity.

The Ancient medical interest in rabies developed not solely as a result of the built-in characteristics of rabies but also as a consequence of the human-animal relation in antique and late antique urban environment.

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[212] Aristotle, *History of Animals*, 604b, ed. and tr. Blame, III, 1991, 163.
[213] Columella, *On Agriculture,* 7.12, ed. and tr. Ash, II, 1954, 312-313.
[214] R. P. Wright, "A Roman Veterinary Physician from the Thames Valley," *Britannia* 8 (1977): 281; Anne McCabe, *A Byzantine Encyclopedia of Horse Medicine. The Sources, Compilation, and Transmission of the* „Hippiatrica" (Oxford: OUP, 2007):6.
[215] Apostolos Karpozilos, Anthony Cutler, "Dogs" *ODB*2nd edition.
[216] Jacques Voisenet, *Bêtes et hommes dans le monde médieval. Les bestiare des clercs du V eme au XII eme siècle* (Turnhout: Brepols, 2000): 71.
[217] Manfred Lurker, "Der Hund als Symboltier für den Übergang Dieseseits in das Jenseits," *Zeitschrift für Religions und Geistesgeschichte* 35 (1983):132–144, *n.v.*
[218] Paul of Aegina, *Pragmateia,* 5.4, tr. Adams 1947, I, 168.

Rabies in dogs was perceived by physicians as a different disease which does not worth a treatment because dogs were easily replaceable and had no apparent economic value. Nevertheless, the high virulence of rabies, the deadly outcome, the violence of the symptoms, and the daily proximity with the main factor of contagion, namely the dog, stirred the interest of many physicians. The closeness between dogs and humans in a stable environment, namely a city, offers numerous advantages to the virus of rabies.[219] This matter raises the question of control, what happened with the animals infected if there was no cure for rabies? How do the city, namely Alexandria, influences rabies control? For instance, different communities in the city approach rabies differently or was it a central authority or a local one solving the problem of infected stray dogs? How communities regulated the hazardous problem of rabid dogs in the city?

Legal and Religious Approaches

Possible evidence for animal control practiced by the communities lies in the legislation issued. The closest chronological body of law to the seventh century is the legislation issued by Justinian[220] and as any legislation with universal claims it tackled also the problem of noxal actions, meaning the liability of a master of slaves, father, or owner of a domestic animal for offenses committed by their slave, son, or animal.[221] Special relevance for dog control in Alexandria has a legal action called *actio de pauperie* which defined the liability for animals.[222] The owner of the domestic animal is noxally liable if damage is caused by the instinctive behavior of an animal that has not been provoked by anything or anybody. The action in justice can be brought even when human fault is excluded.[223] Book

[219] T. A. Cockburn, "Infectious Diseases in Ancient Populations," *Current Anthropology* 12 (1971): 49.
[220] Carol Humfress, "Law and Legal Practice in the Age of Justinian," in *The Cambridge Companion to the Age of Justinian,* ed. Michael Mass, (Cambridge: CUP, 2005), 161-184.
[221] Adolf Berger, "Encyclopedic Dictionary of Roman Law," *TAPA* 43, no. 2 (1953): 610.
[222] For a historical overview of the *actio de pauperie* and the influence of the Jewish law see Bernard S. Jackson, "Liability for Animals in Roman Law: A Historical Sketch," *CLJ* 37, no. 1 (1978): 122-143.
[223] Milena Polojac, "Actio de Pauperie: Anthropomorphism and Rationalism," *Fundamina*18, no. 2 (2012):130.

nine of the Digest offers hints to the animal control inside the city: when speaking of dogs it stated that:

> However, if a dog that has been taken out on a lead by someone attacks because of its wildness and does any kind of harm to someone else. If it could have been better restrained by the person who took it out, or if it should not have been taken to that particular place, this action is not applicable and the person who had the dog on the lead will be liable.[224]

This law corroborates the hypothesis of control of the dogs with owner inside the city, naming the obligation to wear the dog in a leash whenever in public. There are other texts which mention dog collars, for instance Xenophon in *On Hunting* described the characteristics of good collars of hunting dogs.[225] This, however, does not explain the situation of stray dogs living in the city. Castration seems highly unlikely because this was performed solely on high value animals, like horses.[226] One method of controlling the number of stray dogs which could get rabies at any point was killing them.

I have mentioned the connection between Sirius or the Dog-Star and rabies[227] however, some aspects of this influence should be analyzed. The most important fact about Sirius was its rising, in late July, marking the beginning of the hottest period of the year. The period after its rising was so much associated with it that the Greek named the days ὑπὸ κύνα (*hypo kuna*), "under the dog" and the Romans *dies caniculares,* "dog days." Rabies is seen as a natural effect of Sirius: dogs are dry by their nature, Sirius brigs heat, thus causing an excessive dryness in dogs, making them to pant and have fiery eyes. "Dog days" mark the

[224] Digest. 9.1.1.5 *Sed etsi canis, cum duceretur ab aliquo, asperitate sua evaserit et alicui damnum dederit: si contineri firmius ab alio poterit vel si per eum locum induci non debuit, haec actio cessabit et tenebitur qui canem tenebat.*
[225] Xenophon, *On Hunting,* 6.1, ed. and tr. Marchant, 1946, 400-401.
[226] For the methods of castrating horses in Roman times see J. N. Adams, "The Forfex of the Veterinarius Virilis (Vindolanda Inv. No. 86⁄470) and Ancient Methods of Castrating Horses," *Britannia* 21 (1990): 271. Anne McCabe, *A Byzantine Encyclopedia of Horse Medicine. The Sources, Compilation, and Transmission of the* „Hippiatrica" (Oxford: OUP, 2007): 229.
[227] Footnote 209.

time of rabies' greatest incidence.[228] An allusion to the ceremonial killing of dogs during these hot summer days is present in Athenaeus' *The Learned Banqueters,* a festival called Κυνόφοντις (*Kynophontis*). The killing of dogs was probably in connection with the spread of rabies during the summer,[229] as one of the characters stated:

> In reply to this Ulpian said with a cheerful laugh, but do not bark at me, my friend, and do not be savage with me, putting on a sort of rabies, especially now, that this is the season of the dog-days. You ought rather to fawn upon and be gentle toward you mates, lest we should institute a festival for dog killing in the place of that one which is celebrated by the Argives.[230]

The killing of dogs for medical or apotropaic reasons was a usual practice, attested in many ancient texts. Dog flesh was believed to relieved high fever and to strengthen the person who ate it.[231] In Antiquity, dogs were closely connected with magical medicine and its greater healer, Asklepius, and many of the beliefs connected with the powers of dogs survive today.[232]

The rise of Christianity affected the social and political framework of Alexandria, thus the medical profession also. The perception of healing was highly influenced by the new Christian religion and rabies was among the cases for miraculous healings, although it was very different from the typical illnesses that were cured by the saints (those without a clear cause and symptoms visible on the body, like paralysis, blindness, deafness, skin diseases or mental disorders). Among the Byzantine saints healing through their relics, we find some specialized ones, like the cult of saint Tarabo. His figure was probably the transformation of saint Therapon (whose name means generally the Healer) and in Egypt he was specialized in

[228] Roger Charles Ceragioli, *Feruidus ille canis: The Lore and Poetry of the Dog Star in Antiquity* PhD dissertation (Cambridge, 1992), 42.
[229] The great incidence of rabies during the summer is it clearly not connected with the rise of Sirius but rather with dog's natural reproductive cycles, in the absence of neutering.
[230] Athenaeus, *The Learned Banqueters,* 3.59, ed. and tr. Olson, II, 2006, 542-543.
[231] Ingvild Saelid Ghilhus, *Gods, Animals, and Humans. Changing Attitudes to Animals in Greek, Roman, and Early Christian Ideas* (London: Routledge, 2006), 30; Peter Garnsey, *Food and Society in Classical Antiquity* (Cambridge: CUP, 1999), 83.
[232] Manolis G. Sergis, "Dog Sacrifice in Ancient and Modern Greece: From the Sacrifice Ritual to Dog Torture (*Kynomartyrion*)" *Folklore* 45 (2010): 61-88.

curing rabies.[233] According to his legend, the saint encountered one day a rabid dog and was saved by the presence of an angel.[234] After this, any person mentioning the name of saint Tarabo was instantly cured of rabies.

The attention paid to disease in human and veterinary medical sources, in legislation, and the presence of a saint specialized in curing rabies, as well as the ritualized killing of dogs during the summer months, all indicate ways of controlling an uncontrollable and untreatable disease, with frightening symptoms which affected the animal considered a companion. As sources point out, in seventh century Byzantium rabies was no longer a mysterious disease similar to madness, but a deadly infectious zoonosis, transmitted through the bite of an infected host, with clear symptoms, which no longer caused hysterical reactions.

[233] Marie-France Auzépy, "La carrière d'André de Crète", *BZ* 88 (1995), 1-12.

CONCLUSIONS

In this study I focused on a single aspect in Paul of Aegina's *Pragmateia*, namely the description and treatment of rabies. I investigated this particular disease intending to question the issue of originality versus tradition in describing and treating rabies in late antique medicine. I chose to center my study on this particular author because he has been rather disregarded and quite unjustly catalogued as a mere compiler by modern scholarship.

I have tried to emphasize how Paul of Aegina valorized in his work the Alexandrian medical ecumenism and his personal experience as a physician. The recent studies coming from the medical field acknowledge the high standards of the medical procedures described by Paul of Aegina. The type of experience-based medical exegesis practiced in Late antique Alexandria proved that the notion of decline is, indeed, an arbitrary one and based on comparisons with Hippocratic and Galenic norms.

Moreover, I have also tried to show that by the seventh century conceptualizing a disease like rabies was no longer a matter of originality: rabies was defined as a deadly acute disease of the body, transmitted mainly through the bite of an infected dog or other mammals. Although numerous treatments were proposed, the deadly character was unanimously recognized. Innovations in the definition and prevention of rabies will appear solely in the nineteenth century with the development of the microbiology as a separate medical field. By using key-concepts like symptom, cause, prognosis, or treatment and by investigating their use in Paul of Aegina and in other earlier medical works, I have proved that Paul of Aegina made a critical and insightful selection of sources, based on authority, success of the therapies, and practice.

[234] We have his Life in Coptic and Arabic, analysed by Emile Galtier, "*Contribution* à l'étude de la littérature arabe-copte," *BIFAO* 4 (1905): 8-23.

The deadly nature of the disease and the proximity with the contagion source offered me the possibility to analyze this disease in a broader context, considering numerous ramifications, such as urban health, animal control, or legislation. I have emphasized that rabies offers means of highlighting the reactions to health stress in an urban environment, also the influence of health care professionals on the community. The Ancient medical interest in rabies developed as a result of the built-in characteristics of rabies and as a consequence of the proximity with dogs. I have pointed out that in seventh century Alexandria there were used some methods of fighting rabies, like using dog-collars, the ritualized killing of possibly infected dogs, or the cult of a saint specialized in curing rabies.

The analysis of rabies in a seventh century medical work enabled me to demonstrate that the approach on certain diseases was a matter of standard understanding, not originality. Also, I could emphasize how the Alexandrian intellectual and medical traditions influenced the urban therapeutic landscape: beyond the theoretical debate, rabies had also been a social event. Consequently, my study could contribute to a clearer understanding of the social practices connected to public health and Byzantine city life.

In my future research, I would like to develop this subject in two different directions: analyzing compilation techniques applied in other diseases and studying public health concerns expressed in medical sources, such as non-individual medical practices. It could be fruitful to follow other animal borne or contagious diseases in order to see the effects on public space, as well as the effects of the therapeutic tradition on the diseases. I hope to use this present study as a solid basis of my further enquiries as to deepen and widen the questions addressed here.

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Appendix I

Paul of Aegina, *Pragmateia,* II, translated by Francis Adams (London: The Sydenham Society, 1846): 162-165.

We have placed the account of persons bitten by mad dogs before all the others because these animals are numerous and domestic, and are frequently seized with madness; because the complaint is difficult to guard against, and the danger inevitable, unless one has recourse to many and suitable remedies. Dogs, for the most part become mad during violent heat, but also, as Lycus says, sometimes in extreme cold. When mad they shun drink and food, for they are thirsty but do not drink, and for the most part they pant, hang their ears, an emit much frothy saliva. Generally, they utter no sounds, and are as it were delirious, so that they do not recognize persons with whom they are familiar. Wherefore they attack equally without barking all animals, whether wild beasts or men, and bite them. Their bite at first occasions nothing disagreeable except the pain of the wound; but afterwards it brings on the affection called hydrophobia, which makes its attack with convulsions, redness of the whole body, but especially of the countenance, sweating, and anxiety; and those affected shun water when they see it, and some every fluid that is presented to them. Some bark like dogs and bite those who approach them, and so doing they occasion the same affection. The cause of the other symptoms is obvious, being occasioned by the poison affecting all the parts, but as to the dread of water some have said that it is occasioned by inordinate dryness, as if the whole fluids of the body had undergone a change. But Ruffus has pronounced it to be a species of melancholy which affects them, the poison putting on the nature of that humour in like manner as we know melancholic persons dreading some one thing and some another; which reason accords also with those who say that they think they see the image of the dog that bit them in the water. Of persons falling into this affection we know none who has been saved, except that we have learned the histories of one or two cases, and these were of persons who had been bitten, not by a mad dog, but by some person who had been bitten and imparted the

disease to them. But before the affection has made its attack many, even of those who had been bitten by a dog, have been saved. Wherefore we must begin the treatment from thence. And since often from the attack of hydrophobia having not yet come on (for most commonly it comes on about the fortieth day, and in some cases after six months, nay, instances are related of its coming on after seven years,) some supposing that the dog who inflicted the bite was not mad, and making haste to heal up the wound have thereby given rise to the complaint. By the following experiment you may ascertain whether the bite was inflicted by a mad dog or not: pound walnuts carefully and apply them to the wound, and the next day take and present them for food to a cock or hen. At first indeed he will not touch them, but if he is compelled by hunger to eat of them, observe, for if the dog that inflicted the bite was not mad, then the fowl will live, but if mad he will die the next day; and then you must hasten to open the wound, and after a few days repeat the same experiment; and when the fowl does not die you may bring the wound to cicatrization, inasmuch as the patient is then freed from danger. Oribasius recommends this experiment: if from the symptoms which we have mentioned we know for certain that the dog is mad, we must have recourse to medicines for laying open the sore, the principal of which is that from pitch, very acrid vinegar, and opoponax, which is described accurately in the section on the wounds of nervous parts. But if the person who has been bitten has a tender skin, it is to be diluted with oil of iris, of balsam, or the like; or having first fomented the sores, apply a cataplasm of garlic. This also forms eschars. A dry escharotic for person bitten by mad dogs: of fossile salts, one acetabulum, of chalcitis, one mna, of squills, one mna, of green rue, one cyathus, of scraped verdigris, one cyathus, of the seed of horehound, one great mystrum, use it at first dry that it may form an eschar, and then with rose-oil that the eschars may fall off. Keep the parts from cicatrizing for forty-two days at least. A cataplasm for persons bitten by mad dogs, which keeps the mouth of the wound open: Apply a cataplasm of onions with salt and rue, or of laserwort with salt,

or of old pickle, or of the cinders of burnt wood with oil, or of garlic, or apply the leaves of the elder tree, or mint, or baum, each with salts, or walnuts with onions, salts and honey, or the ashes of figs mixed with cerate. Wash the sore with a decoction of chamomile in water, and the root of the wild dock. But some burn the sore with heated irons. They ought in the place to get draughts of simple things, such as buckthorn, wormwood, the juice of laserwort, germander, the water germander, and poley. These are compound applications: Of river crabs, of the shoots of the white vine burnt in a vessel of copper or bronze two spoonfuls, of gentian root triturated one spoonful, give to drink for forty days, with two cyathi of old undiluted wine. Some add two spoonfuls of the blood of the partridge. The crabs are to be taken when the moon is the increase before sun-rising. But to those who do not drink it every day a double doze, and sometimes a triple. And the theriac from vipers, may be given with advantage. The patient is to be purged with the preparation from the wild cucumber, which is to be given every day with the decoction of sage, or with the Heraclean ironwort, which is also called alysson. Some also give the liver of the dog that inflicted the bite to eat. Such a diet is to be given as blunts and extinguishes the power of the poison, and at the same time prevents it from being carried deeper into the system. Both these ends may be accomplished by drinking old sweet wine that is both undiluted and strong, or milk, and in like manner by eating garlic, onions, and leeks. But if from some hinderance at the commencement the remedies which we have described have been neglected, scarification, cupping, or burning the wound, must not be had recourse to, because the poison has already been carried to the deep-seated parts; but we must use the remedies called metasyncritica, that it to say, when the attack of hydrophobia has not come on. Purging with hiera and divided milk is also to be had recourse to, with sudorifics; and calefacient plasters, and sinapism are to be applied to every part of the body. But the most effectual of all remedies is a course of hellebore frequently repeated.

Appendix II
Paul of Aegina, *Pragmateia,* ed. Heiberg, 1924, II, 7-10.

Γ Περὶ λυσσοδήκτων καὶ τοῦ ὑδροφοβικοῦ πάθους

Τὸν περὶ τῶν λυσσοδήκτων λόγον τῶν ἄλλων προέταξαμεν, ἐπειδὴ τὸ ζῷον πολύ τε καὶ σύνηθές ἐστιν καὶ συνεχῶς ἁλίσκεται τῇ λύσσῃ καὶ δυσφύλακτον καθέστηκεν, καὶ ὁ ἀπ' αὐτοῦ κίνδυνος ἀπαραίτητός ἐστιν, εἰ μὴ πολλοῖς τις καὶ προσφόροις χρήσαιτο τοῖς βοηθήμασι. Λυσσῶσι δὲ οἱ κύνες ὡς τὸ πολὺ μὲν ἐν τοῖς σφροδρότεροις καύμασιν, ὡς δέ ὁ Λύκος, ἔσθ' ὅτε κἀν τοῖς ἐπιτεταμένοις κρύεσιν. Λυσσήσαντες δὲ καὶ βρῶσιν καὶ πόσιν ἀποστρέφονται καὶ διψώδεις μέν εἰσιν, οὐ ποτικοὶ δέ, καὶ ἀσθμαίνοθσιν ὡσ ἐπὶ τὸ πολὺ καὶ τὰ ὦτα κλίνουσιν, σίελον δὲ καὶ δαψιλὲς καὶ ἀφρῶδες ἀφιᾶσιν καὶ ἄφονοι τοὺπίναν εἰσίν καὶ οἷα ἄφρονες, ὡς μηδὲ τοὺς οἰκείους γνωρίζειν. ἐφορμῶσι γοῦν χωρὶς ὑλαγμοῦ πᾶσιν ὁμοίος καὶ θηρίοις καὶ ἀνθρώποις καὶ δάκνουσιν, δάκνοντες δὲ παραχρῆμα μὲν οὐδὲν ὀχληρὸν φέρουσι πλὴν ὅσον ὀδύνην τὴν ἐκ τοῦ τραύματος, ὕστερον δὲ πάθος ἐμποιοῦσι τὸ καλούμενον ὑδροφοβικόν, ὅ συμπίπτει μετὰ σπασμῶν καὶ ἐρεύθους ὅλου τοῦ σώματος, μάλιστα δὲ τοῦ προσώπου, καὶ μετὰ ἐφιδρώσεος καὶ ἀπορίας, καὶ τὸ ὕδωρ φεύγουσιν ὁρῶντές τε καὶ προσφερόμενοι, τινὲς δὲ καὶ πᾶν ὑγρόν· ἔνιοι δὲ καὶ ὑλακτοῦσιν, ὥσπερ οἱ κύνες, καὶ δάκνουσιν ἐπιόντες καὶ δάκνοντες αἴτιοι τοῦ αὐτοῦ κατέστησαν πάθους. ἡ δὲ τῶν συμπτωμάτων αἰτία τῶν μὲν ἄλλων εὔδηλος κατειληφότος τοῦ ἰοῦ πάντα τὰ μορία, τὸ δὲ φοβεῖσθαι τὸ ὕδωρ τινὲς μὲν ἔφησαν διὰ τὴν ἄμετρον γίνεσθαι ξηρότητα, οἵα παντελῶς αὐτῶν ἠλλοτριωμένης τῆς ὑγρᾶς οὐσίας· ὁ δὲ Ροῦφος μελαγχολίας αὐτοῖς εἶδος τὸ τοιοῦτον ἀπεφήνατο γίνεσθαι τοῦ ἰοῦ τὸν χυμὸν ἐκεῖνον μιμησαμένοθ, καθάπερ ἑτέρους ἴσμεν μελαγχολικοὺς ἄλλους ἄλλα φοβουμένους, ἥτις αἰτία συντρέχει καὶ τοῖς φάσκουσιν αὐτοὺς οἴεθαι τὸν δακόντα κύνα ἐν τοῖς ὕδασιν εἰκονίζεσθαι τῶν δὲ ἐμπεσόντων εἰς τὸ πάθος οὐδένα ἴσμεν περισωθέντα, πλὴν ἐξ ἱστορίας ἕνα ἢ δύο μεμαθήκαμεν, καὶ αὐτοῦς οὐκ ἀπὸ τοῦ λυσσῶντος κυνὸς δηχθέντας, ἀλλ' ὑπὸ δηχθέντος τινὸς μετειληφότας. Πρὸ δὲ τῆς τοῦ πάθους καταπείρας πολλοὶ καὶ τῶν ὑπὸ τοῦ κυνὸς δηχθέντων περιεσώθησαν. ἀρκτέον οὖν τῆς

θεραπείας ἐντεῦθεν. ἀλλ᾽ ἐπεὶ πολλάκις ἐκ τοῦ μὴ συστῆναι τέως τὸ ὑδροφοβικὸν πάθος (ὡς τὰ πολλὰ γὰρ περὶ τὴν τεσσαρακοστὴν ἡμέραν εἴωθεν ἐνσκήπτειν, τισὶ δὲ καὶ μετὰ ἕξ μῆνας, ἱστόρηται δέ τισι καὶ μετὰ ἑπτὰ σθστῆναι) τινὲς οἰηθέντες μὴ λυττᾶν τὸν κύνα τὸν δακόντα συνουλῶσαί τε σπουδάσαντες τὸ ἕλκος αὐτοὶ τοῦ πάθους αἴτιοι κατέστησαν, τῇδε τῇ δοκιμασίᾳ χρησάμενος εὑρήσεις, πότερον λυττῶντος εἴη τὸ δῆγμα ἢ οὔ. Κάρυα βασιλικὰ λειοτριβήσας ἐπιμελῶς κατάπλασσε τὸ ἕλκος, τῇ δὲ ἑξῆς λαβὼν αὐτὰ παράθες εἰς βρῶσιν ἀλέκτροι ἢ ἀλεκτορίδι. Καὶ τὸ μὲν πρῶτον οὐχ ἅψεται· εἰ δὲ ὑπὸ λιμοῦ πιεσθὲν φάγοι, σκόπησον· εἰ γὰρ μὴ λυττῶν εἴη ὁ δακὼν κύων, ζήσεται τὸ ὀρνίθιον, εἰ δὲ λθττῶν, τῇ ἐπιούσῃ τεθνήξεται· καὶ τότε πρὸς ἀναστόμωσιν ἐπείγου τοῦ ἕλκους· πάλιν δὲ μετ᾽ ὀλίγον τῇ δοκιμασίᾳ κέχρησο, κἀπειδὰν μὴ ἀπουάνῃ τὸ ὀρνίθιον, τηνικαῦτα τὸ ἕλκος εἰς οὐλὴν ἄγε ὡς ἀπηλλαγμένου κινδύνου τοῦ κάμνοντος. Ταύτην μὲν οὖν τὴν δοκιμασίαν Ὀριβάσιος παραδίδωσιν· εἰ δὲ διὰ τῶν εἰρημένων σημείων ἀκριβῶς γνοίημεν λυττᾶν τὸν κύνα, τοῖς ἀναστομωτικοῖς αὐτίκα χρηστέον. Πρῶτον μὲν οὖν ἐστι τῶν ἀναστομωτικῶν τὸ διὰ πίσσης καὶ ὄξους δριμυτάτου καὶ ὀποπάνακος ἐν τῷ περὶ νευροτρώτων ἀκριβῶς εἰρημένον· εἰ δὲ τρυφερόχρως ὁ δηχθεὶς εἴη, ἀνετέον αὐτὸ ἰρίνῳ ἢ βαλσάμῳ ἢ τινι τοιούτῳ, ἢ προπυριάσας τὰ ἕλκη σκόρδῳ κατάπλασσε· τοῦτο καὶ ἐσχαροῖ.

ἀλῶν ὀρυκτῶν <κ, χαλκίτεως <ις, σκίλλης <ις, πηγάνου χλωροῦ <δ, ἰοῦ ξυστου <δ, πρασίου σπέρματος <α· χρῶ πρῶτον ξηρῷ, ἵνα ἐσχαροθῇ, εἶτα μετὰ ῥοδίνου, ἵνα ἐκπέσωσιν αἱ ἐσχάραι· φυλασσέσθω δὲ ἀκατούλωτα τὰ μέρη ἐπὶ ἡμέρας μβ τοὐλάχιστον.

Κατάπλασμα λυσσοδήκτοις εὐρέα φυλάττον τὰ στόμια. κρομμύῳ μετὰ ἁλῶν καὶ πηγάνου κατάπλασσε ἢ σιλφίῳ μετὰ ἁλῶν ἢ ταρίχει παλαίῳ ἢ τέφρᾳ κληματίνη μετὰ ἐλαίου ἢ σκόρδα ἢ ἀκτῆς φύλλα ἢ ἡδύοσμος ἢ μελισσόφυλλον ἕκαστος μετὰ ἁλῶν ἢ κάρθα βασιλικὰ σὺν κρομμύῳ καὶ ἁλσὶ καὶ μέλιτι ἢ τέφρᾳ σύκων κηρωτῇ ἀναληφθείσῃ. ἀπονίζειν δὲ τὸ ἕλκον ἕψοντας ἐν ὕδατι χαμαίμηλον καὶ τὴν τοῦ ἀγρίου λαπάθου ῥίζαν. Τινὲς δὲ καὶ καυτηρίοις σιδηροῖς τὸ ἕλκος καίουσιν. Προποτίζειν δὲ αὐτοὺς ἁπλᾶ μὲν τὸ λύκιον καὶ τὸ ἀψίνθιον καὶ

τὸν ὀπόν τοῦ σιλφίου καὶ χαμαίδρυν καὶ σκόρδιον καὶ πόλιον , σύνθετα δὲ ταῦτα· καρκίνων ποταμίων ἐπὶ κληματίδων λευκῆς ἀμπέλου καθυέντων κοχλιάρια β, γεντιανῆς τῆς ῥίζης λείας κοχλιάριον α μετὰ οἴνου παλαιοῦ κυάθων β. Πότιζε ἐπὶ ἡμέρας δ·τινες καὶ πέρδικος αἵματος κοχλιάρια β. Λάμβανε δὲ τοὺς κκαρκίνους αὐξανομένης σελήνης, πρὶν ἢ ἥλιον ἀνασχεῖν. Τοῖς δὲ μὴ αὐθημερὸν ποτισθεῖσιν διπλῆν δίδου τὴν δόσιν, ἔσθ’ὅτε δὲ καὶ τριπλῆν· καὶ ἡ δι’ἐχιδνῶν θηριακὴ καλῶς ἄν δοθείη. Καθαίρειν δὲ τῷ διὰ τῆς Σικυωνίας διδόντα καθ’ἡμέραν τοῦ φαρμάκου μετὰ ἀφεψήματος ἐλελισφάκου ἢ τῆς σιδηρίτιδος τῆς Ἡρακλείας, ἣν καὶ ἄλθσσον καλοῦσιν. Τινὲς καὶ τοῦ ἥπατος τοῦ δακόντος κυνὸς ἔδοσαν φαγεῖν. Δίαιτα δὲ τοιαύτη παραλαμβανέσθω, ἥτις ὁμοῦ μὲν ἀμβλύνει καὶ σβεννύει τὴν τοῦ ἰοῦ δύναμιν, ὁμοῦ δὲ καὶ κωλύει τὴν εἰς τὸ βάθος φοράν· δύναται δὲ τούτων ἑκάτερον οἴνου ἀκράτου, γλυκέως παλαιοῦ ζωροτέρου, γάλακτος πόσιν, ὡσαύτως δὲ καὶ σκορόδων καὶ κρομμύων καὶ πράσων ἐδωδή, εἰ δὲ μὴ κτ’ἀρχὰς παραλεφθείη τὰ λεχθέντα βοηυήματα διά τινα ἐμποδισμόν, τὸ μὲν περισαρκίζειν ἢ σικυάζειν ἢ καίειν τὸ ἕλκος μὴ παραληπτέον φθάσαντος ἤδη τοῦ ἰοῦ χωρῆσαι παρὰ τὸ βάθος, ταῖς εἰρημέναις δὲ μετασυγκριτικαῖς ἀγωγαῖς χρῆσθαι μὴ προγεγονότος δηλονότι τοῦ ὑδροφοβικοῦ πάθους. Κάθαρσιν τε τὴν διὰ τῆς ἱερᾶς καὶ τὴν διὰ τοῦ σχιστοῦ γάλακτος παραληπτέον ἱδρωποποιιάς τε καὶ δρωπακισμοὺς καὶ σιναπισμοὺς κατὰ μέρος ἐφ’ὅλου τοῦ σώματος. ἀνυσιμώτατον δὲ πάντων ἑλλαβορισμὸς ἐγνώσθη πλεονάκις παραλαμβανόμενος.