Classical Ideas of Physiology and Pathology: Understandings of the Living Body in the Hippocratic Corpus

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Submitted in fulfilment for the degree of Master of Philosophy

29 August 2021

Word Count: 39892

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Thesis Abstract

The medical texts of the Hippocratic Corpus (fifth to third centuries BCE) were composed by different authors, each with their own ideas about how the human body functions and how it changes in illness and due to injury. But despite diverging views on the functions of the body in the Corpus, the treatises also share a number of fundamental concepts on the body's nature, both in its healthy and diseased or damaged states. This thesis analyses the different ways the authors of the Hippocratic treatises understood the physiology and pathology of the living body, including the body's composition, components, and processes, and how these often-eclectic medical ideas shape essential aspects of Hippocratic medicine. The project is guided by two important questions: *what* did the Hippocratic authors know about the body, and *how* did they know this information. This study aims to contribute to current scholarship on ancient medicine by offering a detailed foundation of physiological and pathological concepts in the Corpus for further studies on the reasoning behind Hippocratic therapies and treatments of diseases and injuries.

Declaration

I certify that this work contains no material which has been accepted for the award of any other degree or diploma in my name, in any university or other tertiary institution and, to the best of my knowledge and belief, contains no material previously published or written by another person, except where due reference has been made in the text. In addition, I certify that no part of this work will, in the future, be used in a submission in my name, for any other degree or diploma in any university or other tertiary institution without the prior approval of the University of Adelaide and where applicable, any partner institution responsible for the joint-award of this degree.

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I acknowledge the support I have received for my research through the provision of an Australian Government Research Training Program Scholarship.

29 August 2021

Acknowledgements

A number of wonderful people have helped me through the last two years I have spent writing this thesis. Firstly, I would like to thank my primary supervisor, Han Baltussen. His knowledge and support have been invaluable to this project and myself, and being one of his postgraduates has given me the opportunity to learn so much about a topic I love. (May the eloquence of the Hippocratic authors treat us a little more kindly in the future). My secondary supervisor, Rachel Ankeny, I cannot thank enough for taking up the mantle of supervisor in the final hour. Her advice and revisions of the final draft have been excellent and so very helpful, and her knowledge on the history of medicine fascinating.

I would also like to thank two dear friends who helped me straighten sentences and saved me from spiralling into an editing nightmare. My fellow (now graduated!) postgrad, Tiana Blazevic-Bastow, blessed me with unforeseen knowledge of gramma that was both horrifying and invaluable. She has been amazing and supportive, and I am so very glad to have such an incredible person in my corner. My love, Savanna Biedermann, has carried me emotionally though so much of this process. Her presence in my life has been the product of an alignment of stars nearly as powerful as her editing skills, and every day I am so thankful that these powers found their way to me. Thank you both for being such important presences in my life over the last two years.

And finally, from the depths of my heart, I would like to wrap my parents in the warmest of gratitude. My mum, Leonie, has been a rock upon which I have bounced off ideas and inflicted with drafts. She has helped me untangle knots of thought and made sure I stayed hydrated, and has been such an amazing support. And my dad, Nick, has been wonderfully supportive throughout this entire process. He has been, and still is, always prepared to help me when I throw Greek at him, and his presence always brings happiness to my mum and myself. Thank you for all your help, and I love you both dearly.

Abbreviations

Reference Works:

LSJ: *A Greek-English Lexicon*, 3 volumes. H. G. Liddell, R. Scott, revised by H. S. Jones, R. McKenzie. Oxford: Clarendon Press, 1940.

Additional Ancient Works:

Author	Title (English)	Abbrev.
Galen (2nd c. CE)	*Commentary on Hippocrates' Epidemics VI*	*In Hp. Epid. VI*
Homer (8th c. BCE)	*Iliad*	*Il.*

Hippocratic Treatises:[1]

Title (English)	Title (Greek)	Title (Latin)	Abbrev.
Affections	περὶ παθῶν	*De affectionibus*	*Aff.*
Airs Waters Places	περὶ ἀέρων ὑδάτων τόπων	*De aëre aquis et locis*	*Aër.*
Anatomy	περὶ ἀνατομῆς	*De anatome*	*Anat.*
Ancient Medicine	περὶ ἀρχαίης ἰητρικῆς	*De vetere medicina*	*VM*
Aphorisms	ἀφορισμοί	*Aphorismi*	*Aph.*
Art	περὶ τέχνης	*De arte*	*de Arte*
Barrenness	περὶ ἀφόρων	*De sterilibus*	*Steril.*
Breaths	περὶ φυσῶν	*De flatibus*	*Flat.*
Coan Prenotions	Κωακαὶ προγνώσιες	*Coacae praecognitiones*	*Coac.*
Crises	περὶ κρισίων	*De judicationibus*	*Judic.*
Critical Days The content of this treatise derives, without much change, from the following treatises:[2] §1 = *Epid. III* 16 §2 = *Hebd*. 46 §3 = *Int*. 48 §4-6 = *Int*. 52-54 §7 = *Morb. III* 6 §8 = *Int*. 51 §9 = *Morb. III* 11	περὶ κρισίμων (ἡμερέων)	*De diebus judicatoriis*	*Dieb.Judic.*

[1] Based on *LSJ* abbreviations.

[2] See Potter (2010), 274.

§10 = *Morb. III* 15 §11 = *Hebd*. 26			
Decorum	περὶ εὐσχημοσύνης	*De decenti ornatu*	*Decent.*
Dentition	περὶ ὀδοντοφυΐης	*De dentitione*	*Dent.*
Diseases 1 – 4	περὶ νούσων	*De morbis I – IV*	*Morb.*
Diseases of Women 1 – 2	γυναικεῖα	*De morbis mulierum I – II*	*Mul.*
Eight Months' Child	περὶ ὀκταμήνου	*De octimestri partu*	*Oct.*
§1-9 = ***Seven Months' Child***	περὶ ἑπταμήνου	*De septimestri partu*	*Septim.*
Epidemics 1 – 7	ἐπιδημίαι	*De morbis popularibus I – VII*	*Epid.*
Excision of the Fetus	περὶ ἐγκατατομῆς ἐμβρύου	*De exsectione foetus*	*Foet.Exsect.*
Fistulas[3]	περὶ συρίγγων	*De fistulis*	*Fist.*
Fleshes	περὶ σαρκῶν	*De carnibus*	*Carn.*
Fractures	περὶ ἀγμῶν	*De fracturis*	*Fract.*
Generation	περὶ γονῆς	*De genitura / de semine*	*Genit.*
Girls	περὶ παρθενίων	*De virginum morbis*	*Virg.*
Glands	περὶ ἀδένων (οὐλομελίης)	*De glandulis*	*Gland.*
Haemorrhoids	περὶ αἱμορροΐδων	*De haemorrhoidibus*	*Haem.*
Heart	περὶ καρδίης	*De corde*	*Cord.*
Humours	περὶ χυμῶν	*De humoribus*	*Hum.*
In the Surgery	κατ᾽ ἰητρεῖον	*De officina medici*	*Off.*
Internal Affections	περὶ τῶν ἐντὸς παθῶν	*De morbis internis Iusiurandum*	*Int.*
Joints	περὶ ἄρθρων (ἐμβολῆς)	*De articulis*	*Art.*
Law	νόμος	*Lex*	*Lex*
Mochlicon	μοχλικόν	*Vectiarius*	*Mochl.*
Nature of Bones	περὶ ὀστέων φύσιος	*De ossium natura*	*Oss.*
Nature of Man	περὶ φύσιος ἀνθρώπου	*De natura hominis*	*Nat.Hom.*
Nature of the Child	περὶ φύσιος παιδίου	*De natura pueri*	*Nat.Puer.*
Nature of Women	περὶ γυναικείης φύσιος	*De natura muliebri*	*Nat.Mul.*
Nutriment	περὶ τροφῆς	*De alimento*	*Alim.*

[3] In Erotian's index of Hippocratic works, *On Haemorrhoids* and *On Fistulas* are listed as a single work, περὶ αἱμορροΐδων καὶ συρίγγων (Erotian 36 [Nachmanson, 9]). Similarly, the lost treatise *On Deadly Wounds and the Extraction of Missiles* was likely a compound work, incorporating two treatises: one dealing with the extraction of missiles (specifically spear and arrow tips), and the other titled *On Deadly Wounds*. Its shortened title is *On Wounds and Missiles* (περὶ τραυμάτων καὶ βελῶν). See Salazar's (1997) study and Witt (2018, 222) on the compounding and division of these treatises.

Oath	ὅρκος	*Jusjurandum*	*Jusj.*
Physician	περὶ ἰητροῦ	*De medico*	*Medic.*
Places in Man	περὶ τόπων τῶν κατὰ ἄνθρωπον	*De locis in homine*	*Loc.Hom.*
Precepts	παραγγελίαι	*Praecepta*	*Praec.*
Prognostic	προγνωστικόν	*Prognosticon*	*Prog.*
Prorrhetic 1 – 2	προρρητικόν	*Prorrheticon I – II*	*Prorrh.*
Regimen 1 – 4	περὶ διαίτης	*De victu I – IV*	*Vict.*
Regimen 4 **alt*: On Dreams***	περὶ ἐνυπνίων	*De insomniis*	*Insomn.*
Regimen in Acute Diseases	περὶ διαίτης ὀξέων	*De diaeta acutorum*	*Acut.*
Regimen in Acute Diseases (Appendix)	περὶ διαίτης ὀξέων (νόθα)	*De diaeta acutorum (spurium)*	*Acut.(Sp.)*
Regimen in Health	περὶ διαίτης ὑγιεινῆς	*De salubri victu*	*Salubr.*
Sacred Disease	περὶ ἱερῆς νούσου	*De morbo sacro*	*Morb.Sacr.*
Sevens	περὶ ἑβδομάδων	*De septimanis* (= *De hebdomadibus*)	*Hebd.*
Sight	περὶ ὄψιος	*De visu*	*Vid.Ac.*
Superfetation	περὶ ἐπικυήσιος	*De superfetatione*	*Superf.*
Ulcers	περὶ ἑλκῶν	*De ulceribus*	*Ulc.*
Use of Liquids	περὶ ὑγρῶν χρήσιος	*De humidorum usu*	*Liqu.*
Wounds in the Head	περὶ τῶν ἐν κεφαλῇ τρωμάτων	*De capitis vulneribus*	*VC*

Introduction

The Living Body and Hippocratic Medicine

The living body is the subject *par excellence* of Hippocratic medicine. In the Hippocratic Corpus we find a multitude of interpretations of human anatomy, physiology, and pathology that culminate into different understandings of how the living body functions and changes.[4] The treatises of the Hippocratic Corpus, a collection of 60-plus Greek medical texts that date from the fifth, fourth, and third centuries BCE, are composed by different authors, each with their own ideas about the human body, its genesis, sustenance, deterioration, and its relationship to medical treatment.[5] This thesis aims to synthesise and analyse the ways in which the Hippocratic authors understood the living body in order to determine how these authors (themselves physicians, thinkers, or both) interpreted the changes happening within the bodies of their patients, and how their intellectual frameworks and methodologies impacted their theories.[6] As the author of *Places in Man* remarks, "the nature of the body is the beginning point of medical reasoning" (*Loc.Hom.* 2). Building on this assertion, my motivation for this study is twofold. Through analysing the Hippocratic understandings of the body itself, including the natures of its constituent parts and processes, I investigate the relationship of Hippocratic theories of physiology and pathology to the living bodies of the physicians' patients. I do so in order to contribute to scholarship a detailed foundation for further studies on the logic of, and reasoning behind, Hippocratic therapies and treatments of diseases and injuries.

Despite its traditional grouping as the 'Hippocratic Corpus', the works brought together under this label do not represent a cohesive set of ideas. The individual treatises were composed by authors who attributed their works to the tradition of Hippocrates of Cos and Hippocratic rational medicine,

[4] Throughout this thesis, I use the Loeb translations of the Hippocratic Corpus (1923-2018) unless otherwise stated. The use of 'physiology' in the context of medicine prior to the nineteenth century is technically anachronistic, but I use this term throughout this thesis since it best describes the interaction of internal parts and bodily processes within and throughout the body, see Porter & Bynum (1993), 5.

[5] See Craik (2015) for the dating and an overview of the treatises, including their authorship.

[6] I will include discussions on Hippocratic embryology, often in relation to the physiology of the female body and the generative power of seed. I do not engage in the debate on the question of whether an embryo or foetus is classified as 'living' or ensouled by the Hippocratic authors due to the limited scope of my study. I incorporate into the classification of a 'living' human body everyone who is not yet dead.

or were grouped together as such a few centuries later.[7] The treatises vary in terms of topics and purpose, and include sophistic and highly theoretical works, handbooks, nosological and dietetic texts, gynaecological treatises, and technical works focusing on the practice of medicine. But they all follow in a tradition of rationality inherited from the natural philosophers of the centuries preceding these authors. This rational tradition is at the core of Hippocratic medicine. Thus, throughout this thesis I use the term 'Hippocratic' not to indicate homogeneity amongst the treatises of the Corpus, but rather as a descriptor for the diverse ideas found in the texts attributed as Hippocratic, and which are part of an eclectic tradition that situates the human body, and its health and illness, within the domain of the natural world and natural causation.[8] To introduce this topic, I briefly situate the Corpus within its intellectual and cultural context (**§1**) before outlining the techniques used by the authors in order to acquire their information on the body (**§2**). I then set out my methodology and review recent and current scholarship on the topic (**§3**), and end with an overview of the thesis' structure (**§4**).

1. Cultural Context

The treatises of the Hippocratic Corpus were composed in the wake of the Ionian tradition of philosophy. The Ionian philosophers undertook inquiries into the natural world that prioritised natural causation above divine or irrational causality, and which based the constituents of nature in the natural world.[9] These early philosophers (identified as the 'Presocratics', or early natural philosophers) looked at the world and sought to understand how it exists, changes, and by what natural rules and regularities it is governed. The questions that these philosophers asked about the natural world are very similar to some of the queries we find in the Corpus, such as:

- What is the nature of the body and its parts?
- How is the body and its parts formed (*in utero* or in terms of anthropogony)?

[7] On the Hippocratic tradition from the fifth century BCE to today, and the early organisation of the treatises, see Smith (1979) and van der Eijk (2016). The question of the 'authenticity' of the treatises, known as the 'Hippocratic Question', has been largely abandoned in current scholarship due to scepticism "about the validity of the traditional and often patently subjective criteria for declaring a work to be genuine or spurious", and a similar scepticism has arisen in the debate on Coan vs Cnidian texts (Craik 2015, xxi-xxii).

[8] See Holmes (2018), 66. In this thesis I treat the works as texts containing Classical (and Hellenistic) medical ideas about the body and its treatment.

[9] See Longrigg (1989) on the Ionian influence on Hippocratic medicine.

- What natural chains of causation lie within the body?
- What natural regularities and rules does the body abide by?

Our medical writers give these questions an added purpose: a better understanding of the body allows physicians to *treat* any afflictions that disrupt the body's natural state. Some treatises, such as *On Fleshes* and *On Breaths* and the more anatomical treatises *On the Heart* and *On Anatomy*, focus more on the body's physiology and its composition and arrangement rather than its relationship to medicine. The majority of the Hippocratic authors, however, ask questions to uncover causal relationships within the body, and between the body and the natural world.

The cultural context of the Corpus has been well studied in previous scholarship, including the tenuous relationship between the Hippocratic physicians and their reputations as medical practitioners amidst the precarious status of medicine in the Classical period.[10] The medicine and medical ideas that we find in the Corpus incorporate a number of traditions, including: field medicine, gathered through first-hand training or through traditional experience; herb lore and drugs (φάρμακα); and traditional cultural beliefs.[11] Hippocratic medicine itself is only one strand of Greek medicine amidst a vast culture that also believed in the aid of the gods (especially Asclepius for the sick and Artemis for fertility), and would have had many practicing physicians who are not named in our surviving literature.[12] The treatises of the Corpus that have survived the last two and a half thousand years are but a sliver of the sum total of Greek medical literature. But these treatises were intellectually and socially important to early Greek medicine, and provide us with a fascinating collection of Classical medical understandings about how the living body functions.

2. How the Hippocratic Authors Acquired Knowledge on the Body

The observations and ideas that we find in the treatises of the Corpus demonstrate the use of a few important methodological techniques that would have aided the authors in their acquisition and

[10] See especially Dean-Jones (2003) on literacy, training, and medical texts in ancient Greece.
[11] For example, *Medic*. 14 recommends training with an army to master surgical practices, see Grmek (1989) and Salazar (2000). Throughout the Corpus, and especially in the gynaecological texts, φάρμακα play a significant role in medical treatment (see **n.50**), and Hanson (1989) argues that Hippocratic understandings of female bodies draw on traditional preconceptions.
[12] Lloyd (1979), 37ff.; McKeown (2002), 54.

interpretation of knowledge on the human body.[13] In this section I provide an overview of *how* the Hippocratic authors acquired their knowledge on the living body by outlining some tools and techniques that will help us to understand the natures of the descriptions that we find in the Corpus. It is important to note that when many treatises of the Corpus were composed (fifth to fourth centuries BCE), there were cultural limitations that restricted access to the interior of the human body. Human dissection was not practiced in mainland Greece during the Classical period.[14] Certain physicians were able to take up the practice briefly in Hellenistic Alexandria, and our later Hippocratic authors likely drew on knowledge gained from these dissections. However, the majority of the Hippocratic authors had to work around a cultural embargo that limited access to the integral interior components and processes in the living human body.[15]

Due to these limitations, the Hippocratic physicians acquired knowledge on the human body predominantly through observation. The senses (sight, hearing, smell, touch, taste) are often highlighted as the physician's primary tools for gathering information on a patient's body, and the body itself as the primary source of information.[16] An important point to note is that these sources of knowledge are predominantly accessible from the *exterior* of the body. For instance, the patient can provide testimonials of their own state and medical history,[17] internal substances make their way out of the body and thus become visible to the physician's senses, and the exterior of the body can offer a range of signs that can be interpreted to understand what is happening within the body.[18]

The physicians also demonstrate specific techniques to access phenomena within the body that are not immediately apparent to the senses. For example, palpation is recommended in *Prorrhetic II* in abdominal investigations (*Prorrh. II* 3), and utilised in *On Joints* for injury examination (*Art*. XX). In *Diseases II* the author informs us that a physician can detect fluid in the patient's lungs through auscultation: "if you apply your ear for a long time and listen to the sides, it [the water, or fluid,

[13] On medical technology, experimentation, and investigation in ancient Greece, see for example, Lloyd (1979), 146-169, Lloyd (1991), 70-99, Cuomo (2007), and Holmes (2012), 83-105.
[14] Craik (2006b), 159.
[15] See Lloyd (1991), 164-193 on the early history of dissection; Jouanna (1999), 308-314. On the dissection of foetuses (mentioned in *Nat.Puer.* 13), see Lloyd (1979), 160, Craik (2006b), 159f., and Wilberding (2016), 330f. Craik (2006b, 159) notes that scholarly arguments on the lack of dissection and internal investigation in mainland Classical Greece perhaps "make insufficient allowance for medical curiosity" and I agree with this statement, although without evidence it is difficult to explore.
[16] See *Off*. I and *Epid. IV* 43, 43b. On the use of touch in the Corpus, see Kosak (2016).
[17] On patient testimonials, and the degree to which they factored into Hippocratic medicine, see Lloyd (1983), 58ff., Holmes (2010), 168f. and Webster (2016), 168.
[18] See **Chapter Two**.

ὕδωρ] seethes inside like vinegar" (*Morb. II* 61).[19] Succussion is another method of hearing what is within the body (e.g. *Morb. I* 16), and in *Diseases I* and *III* clay is smeared over patients with suppurating lungs, and whatever area dries first indicates the *locus* of the heated pus and where to incise (*Morb. I* 17; *Morb*. *III* 16).

But the patient was not the only source of knowledge for these physicians. As Harris notes, Classical Greek physicians were relatively familiar with body parts through clinical practice – but the physicians also made use of external resources, such as the observation of training athletes, and through comparative anatomy with animals.[20] The knowledge of the skeletal system and the shapes of bones in *On Joints* points to a good understanding of human bone structure. This knowledge was possibly gained through meticulous study of denuded and detached bones (and whole human skeletons). Traditional knowledge of wounds, experience in field medicine, and local gruesome injures (the latter blessing a well-timed physician with an eyeful of the interior of the body) would have also provided important information on the vital parts of the interior and their placement within the body.

While these techniques could aid in examining the body, the processes within the interior were in the domain of speculation and theoretical conjecture. *On the Art* tells us, "what escapes the eyesight is mastered by the eye of the mind" (*de Arte* XI.10-11). In the Corpus the authors often use theory to supplement what observation and empiricism could not provide.[21] An important example of the application of theory is the use of analogy to draw on visible processes (often crafts, cooking, or botanical developments) to explain the body's processes.[22] But the authors also inherited a number of fundamental ideas from the natural philosophers that they applied to their understandings of the body's nature and causal change in physiology and pathology.[23]

Among the most important ideas that the Hippocratic authors share with the early natural philosophers is the notion that the living body is interconnected with the living natural world, notably, with respect to its organisation, constituents, and laws. The idea that the body is intimately related to the cosmos (the microcosm-macrocosm relationship), either through imitation (μίμησις)

[19] See Majno (1975), 171.
[20] Harris (1973), 35.
[21] See Jouanna (1999), 248f.
[22] E.g. comparing the body's processes to the sawing of wood and the shaping of statues (e.g. *Vict. I* XII – XXIV), cooking (*Flat*. VIII.17-24), and the growth of plants (*Morb. IV* 3; *Nat.Puer.* 11 – 13). On the general use of analogy in the Corpus, see Lloyd (1966) and Jouanna (1999), 317-322.
[23] Especially the reduction of complex systems into a few fundamental parts or elements, see Jouanna (1999), 149f. and Schiefsky (2005b), 24f.

or being bound by the same natural laws, is especially prevalent in the more philosophical treatises (e.g. *On Regimen*, *On Fleshes*, and *On Breaths*) and works occupied with meteorological medicine (the influence of the weather on human health) and the relation of the body with the natural world (e.g. *Airs Waters Places* and the *Epidemics*). The authors also demonstrate this relationship in dietetics and medical treatments, especially in the reaction of the body to foods and drugs procured from the earth, each with their own perceived capacity to affect the body. The author of *On the Art* tells us that,

> For if a man demand from an art a power over what does not belong to the art (τέχνην), or from nature (φύσιν) a power over what does not belong to nature, his ignorance is more allied to madness than to lack of knowledge. For in cases where we may have the mastery through the means afforded by a natural constitution or by an art, there we may be craftsmen (δημιουργοῖς), but nowhere else (*de Arte* VIII.10-16).

The adherence to the idea of the body as a canvas regulated by its nature (φύσις) is significant in Hippocratic medicine, as is the τέχνη of the physicians as a practice that works *with* (especially in a positive manner) rather than against the governance of this φύσις.[24] Also significant is the role of nature in causation within the body, deviating from the traditional association of divine interference as the cause of health and disease.[25]

The above methods utilised for the acquisition of information on the body were not perfect. The authors of the Corpus utilised a keen and diligent sense of observation that granted them anatomical knowledge, but knowledge on interior physiological relationships was more difficult to acquire.[26] Theory could thus supplement this incomplete knowledge of physical processes and the nature of the interior parts. Although these theory-based explanations are often inaccurate (sometimes alarmingly so: the theory of the 'wandering womb' is notorious and always startling), they do contribute to understandings of the living body that are idiosyncratic of these authors, their medical tradition, and their time.

[24] See also *Alim*. XIV.
[25] Though without discrediting the presence of the divine in nature, or the power of the gods that patients turned to when rational medicine could not (or would not) help. See, for example, Lloyd (1991), 417ff., Flemming (2013), and Nutton (2013).
[26] Sigerist (1961), 277.

3. Framework, Methodology, and Literature

Thesis Framework and Methodology

The study of ancient philosophical and medical ideas relating to the human body requires an investigation that is aware of certain risks and pitfalls. The broader framework of this thesis derives from the history of ideas, in line with the so-called Cambridge School of thought and outlined by Skinner in the mid-twentieth century.[27] This framework, which stipulates that studies of ideas should remain within their socio-cultural and intellectual contexts, helps to minimise anachronistic interpretations and allows us to analyse ideas within the systems of thought of their own time. More specifically, my thesis lies within the general framework of the history of medicine, particularly ancient medicine. Studies on ancient medicine can generally be distinguished by trends rather than distinctive schools of thought. Approaches tend to be marked by whether emphasis is placed on medical ideas or medical humanism, and within these divisions, the level of retrospective application of medical knowledge and human experience. My own study focuses on medical ideas, and my research and methodology is framed by two key factors:

Firstly, I pose questions of the Corpus that are based on 'descriptive medical epistemology' as outlined by Khushf.[28] This framework entails the "empirical investigation into how people come to know the things they know, and how they use this knowledge".[29] I have based my analysis of the texts and the information provided by them on three core questions that loosely adhere to the goals of this framework:

a) What information on the body do these authors demonstrate that they know?
b) How do they know this information?
c) How is this information applied in their medicine?

The body of my thesis addresses question (a), while breadth restrictions have limited (b) to the **Introduction** (**§2,** above) and (c) to some summative comments in the **Conclusion**. This trio frames my research and allows me to examine Hippocratic ideas on the body in relation to the body itself, the authors' methods of acquiring knowledge, and their medical practices.

Secondly, my analysis uses an approach based primarily on a close reading of the medical texts. I predominantly work with the primary texts in translation, and draw heavily on this primary

[27] Skinner (1969); also useful is Rorty (1984), 67-74.
[28] Khushf (2013).
[29] Khushf (2013), 463.

material, while also integrating contemporary Hippocratic scholarship to aid in my conclusions and in understanding the texts. In this approach, I follow studies such as Gundert (1992 and 2000), and Craik (2008). These studies effectively convey research without heavy interpretation of the primary source material. Also akin to the approach in these studies, my analysis focuses on medical ideas and descriptions of physical bodily processes rather than elements of humanism in medicine (for instance, the embodied experience of the patients or physicians). Through utilising this approach, my study contributes an extensive analysis of Hippocratic ideas on physiology and pathology to this valuable analytical trend in Hippocratic studies.

Literature Review

The debate on Hippocratic concepts of the living body has gained considerable impetus since the late twentieth century, mostly as a result of an increased interest in the history of medicine and medical ideas. However, contributions to this debate are rarely undertaken with the primary goal of attaining an overall grasp of Hippocratic understandings of the body. Studies on Hippocratic anatomy, physiology, and pathology generally focus on *parts* of the body – for example, on substances (fluids, air), areas of anatomy, diseases or injuries, the female body, or more broadly, on the influence of philosophical concepts on the understandings of how the body functions in the Corpus.

Two exceptions to this general situation are Brooke Holmes' monograph on the body in ancient thought (Holmes 2010), and her recent chapter on the Hippocratic body (Holmes 2018). The monograph, *The Symptom and the Subject*, astutely studies ideas in the Corpus within a broader framework that seeks to explain the "emergence of the physical body", the inward and outward expression of the self, and takes a more humanistic approach to medical ideas. We work with similar material, and provide similar arguments on the processes within the body in the Corpus.[30] But while Holmes' chapters on the Hippocratic treatises focus on the authors' interpretations of the body through 'symptoms' that act as mediators between the patient's body and the physician, my approach primarily emphasises the importance of 'symptoms'[31] in the context of disease and injury and is not focused on humanism in medicine. The chapter entitled 'Body' in the *Cambridge Companion to Hippocrates* is an up-to-date but very general overview of the body in the Corpus, which is understandable given the nature of the publication, but the chapter lacks many important details. In contrast to these works, this thesis (1) tackles areas and states of the body thematically,

[30] See **Chapter One**.
[31] Or 'signs', see **Chapter Two**.

and (2) focuses on how the authors of the Corpus believed the body functioned and changed through analysing their medical ideas and therapies.

My study incorporates a number of areas in Hippocratic studies, including strands of scholarship that are well-established and those that still require significant expansion. The established areas of Hippocratic scholarship from which I have drawn key interpretations and arguments relate to the philosophical concepts present in the treatises, physiology and pathology, and women's health and the female body. There are several areas of Hippocratic medical philosophy which I cover only briefly as they are beyond the scope of my thesis, but also because these areas have been well discussed in past scholarship. Meteorological medicine in the Corpus, the body's relationship with the environment, the influence of the ideas of the early natural philosophers, and the soul and its relationship to the body (including the mental faculties), are particular areas that I acknowledge in this study as important to Hippocratic understandings of the body, but have been curtailed in favour of analysing less-studied areas.[32]

A critical area of philosophy in the Corpus that I do analyse concerns the nature (φύσις) of the body and its parts. J. W. Beardslee's (1918) thesis remains a foundation for the analysis of the fifth century BCE Greek notion of φύσις and its use by the authors of the Hippocratic Corpus.[33] G.E.R. Lloyd's works also provide a fundamental background to the idea of nature as an organising force, which is significant in the Hippocratic works.[34] In recent years, scholarship on the relation of φύσις and medical skill (τέχνη) has generated thought-provoking ideas on the relationship between the natural world, the living body, and impositions or enhancements consciously placed upon the body. Several authors of the Hippocratic Corpus have their own stance on the relationship of τέχνη to the φύσις of the body. In conjunction with my own analysis, I have made valuable use of the interpretations in Heinrich von Staden's '*Physis* and *Technē* in Greek Medicine', where he establishes a relationship between the φύσις of a thing, the capacity (δύναμις) of it to affect other things, and the relation of both to the τέχνη of the physicians.[35]

[32] Due to constraints of scope, I also cannot cover physical impairments in the Corpus, and consequently do not engage with disability studies in ancient medicine. However, disability is becoming a popular area of study in ancient medicine in recent decades, and my investigation into the living body would be incomplete without due reference to this field, see Laes (ed.) (2017) and Sneed (2018).
[33] Beardslee (1918).
[34] For this study, particularly Lloyd (1966), (1979), (1991).
[35] von Staden (2007).

Modern studies on Hippocratic physiology and pathology often take different forms. Studies on physiology are restricted to general volumes on Hippocratic medicine,[36] smaller works that look at particular aspects of physiology, or translation commentaries and studies that focus on a single treatise or tract.[37] Comparatively, studies on Hippocratic pathology are plentiful, and in response my thesis provides a close textual examination of the ill *body* and how the Hippocratics understood bodily changes during illness. I prefer this approach over looking at analyses of specific maladies, which can be affected by retrospective diagnoses.[38] Particularly prominent in discussions on Hippocratic pathology is rehashing the theories of the humours, including their interpretations and misinterpretations.[39] As I discuss in **Chapter One**, I contend (in alliance with Elizabeth Mary Craik) that there has been a disproportionate amount of focus in scholarship on Hippocratic humoral theories rather than the humours or fluids themselves.[40] In this thesis, I have therefore outlined humoral theories in relation to how they keep the body functioning and their role in illness, but they are not a primary focus of my research on the healthy or ill body in the Corpus. I follow Beate Gundert in her analysis of the body and its parts in terms of these parts and their relationships with each other, without confounding physiology and pathology as simply balance and imbalance of 'humoral' fluids.[41]

The female body in the Hippocratic Corpus has received significant scholarly attention in recent decades, both in terms of female health and physiology, as well as women's diseases.[42] Influential and foundational works on which I have based my own arguments are those by Lesley Ann Dean-Jones, Ann Ellis Hanson, Rebecca Flemming, and Helen King. These scholars examine the female body in the Corpus within a predominately medical framework, but with due attention to social and

[36] E.g. Lasserre & Mudry (eds) (1983), Jouanna (1999), van der Eijk (ed.) (2005), and Dean-Jones & Rosen (eds) (2016).
[37] E.g. Lonie (1981), Langholf (1990b), Craik (1998), and Schiefsky (2005b).
[38] For example, Grmek's (1989) monograph is an excellent study on diseases in the ancient Greek world, but at times the retrospective diagnosis of diseases and wounds can generate anachronistic misinterpretations of the level of knowledge that the ancient physicians had on the body and the classification of its illnesses. While this approach has its benefits, I focus instead on how the Hippocratic authors understood the living body within the framework of their own systems of thought and ideas. However, in line with Dean-Jones, I am not averse to utilising our own modern observations of the body in order to interpret views in the Corpus, see Dean-Jones (2000), 812.
[39] Discussions on humoral theories are found in nearly every general study on Hippocratic medicine, but particularly helpful are those in translation commentaries, and Langholf (1990b), Nutton (2013), and also King (2013).
[40] Craik (2015), 130f.
[41] Gundert (1992), (2000).
[42] See Dean-Jones (1994) and King (1998) for a selection of important modern scholarship on this topic.

cultural influences on the perception of women's bodies and female health in antiquity.[43] Their studies cover a broad area of female physiology and pathology in the Corpus, and I have chosen not to subdivide my chapters into 'male' and 'female', in which the 'female' portion would just be a synthesis of existing material. Rather, I integrate aspects of the female body into larger thematic arguments, whilst maintaining awareness of the inherent differences between male and female bodies in the Corpus.

The areas of Hippocratic scholarship from which I draw and also on which I build with my own arguments and conclusions relate to the components of the body – including substances and parts – and wound theory in the Corpus. In Hippocratic studies, analyses of the substances that comprise or flow through the body are generally confined to translation commentaries or general overviews in larger works on the Corpus. As I discuss in **Chapter One**, studies on the nature and role of particular substances within the body are few but give excellent insight into the ways the authors understood the fluids and air that are imperative to the life of the body. In particular, Jacques Jouanna and Paul Demont's (1981) article on *ichōr* (ἰχώρ), Craik's (2008) chapter on spinal marrow, Volker Langholf's (1990a) analysis of the relationship of air to diseases in the Corpus, and Dean-Jones' (1994) study on menstrual blood, rely heavily on primary source materials and draw from the relationships between substances and bodily parts that the authors discuss. Unlike Michael Boylan's (2015) study on the blood in ancient Greek science, which is an admirable but overly complex study, and Mark Bradley, Victoria Leonard, and Laurence Totelin's recent volume on bodily fluids in antiquity (Routledge 2021), which I found lacking in primary source analyses of early Greek medical ideas, these studies work within a classical framework and closely adhere to ideas found in the Corpus.[44] I follow their text-based approach and combine their interpretations with my own observations and conclusions on bodily substances which have previously received little-to-no attention from scholars. The first chapter of my thesis includes analyses of the Hippocratic understandings of fluids and the varieties of air conducive to the functioning of the body in order to contribute a more expansive and in-depth scholarly discussion on the Hippocratic understandings of bodily substances.

In contrast to scholarship on Hippocratic pathology, wounds and injuries in the Corpus are discussed infrequently, especially in English scholarship.[45] The predominant works on which I

[43] Particularly: Jones (1987), Dean-Jones (1994); Hanson (1989), (1990), (1995); Flemming & Hanson (1998); Flemming (2013); King (1998), (2005).
[44] Boylan (2015); Bradley, Leonard & Totelin (eds) (2021).
[45] See Salazar (2000), xxiii-xxiv on reasons for this sparsity.

draw in my discussion on the Hippocratic understandings of the injured body are the monographs by Mirko D. Grmek (1989) and Christine F. Salazar (2000), and also Markwart Michler's (1962) article. Each of these works provide valuable contributions to the study of wounds and injuries in the Corpus: Grmek, in utilising a retrospective analysis of diseases in the ancient world, evaluates types of injuries and their severities based on our own knowledge of physical trauma; Salazar's study offers a sourcebook of starting points for further research on wounds and their treatment; and Michler discusses wounds in the context of the φύσις of the body, drawing a connection between wounds and physiology.[46] Recent scholarship on surgical aspects of the Corpus have been focused on the practice of surgery and medical techniques, while wounds and the medical ideas and knowledge we find in the treatises on injuries has been relatively neglected.[47] The third chapter of my thesis contributes an analysis and discussion on the understandings of injuries and wound theory in the Corpus to remedy this deficit in modern scholarship.

In sum, this thesis aims to synthesise arguments and interpretations that have become well-established in Hippocratic scholarship and offer new insights on topics that have been less studied and questions that have been relatively neglected. I remain as close as possible to the primary material in my own arguments, and on several occasions, I express disagreement with existing scholarship whenever I observe misinterpretations of the source material. Overall, my thesis provides an analysis of the various Hippocratic understandings of the living body in a systematic and thematic order, and hence makes a fresh contribution to current scholarship.

4. Structure

I have divided my study on the living body into three chapters, each with its own theme: the functioning body, the diseased body, and the injured body. The first chapter, 'The Functioning Body', analyses how the Hippocratic authors understood the components of the body as well as how they function together. It focuses primarily on the body in a state of health, but incorporates evidence from cases of disease and injury to gather a more thorough understanding of physiological tendencies and processes. This chapter especially establishes the various understandings of the body's natural tendencies and its fundamental nature, as well as which parts connect and interact with each other and why. The second chapter, 'The Diseased Body', examines how the authors of

[46] Michler (1962); Grmek (1989); Salazar (2000).
[47] See Witt (2018).

the Corpus understood illness and the effect it has on the body. The focus of this chapter is on the body itself and the Hippocratic interpretations of the changes that take place within the body during sickness, especially how the body manifests disease and its vulnerability to change. The third and final chapter, 'The Injured Body', presents an analysis of Hippocratic understandings of the living body when it has been impacted by physical injury. I analyse the ways in which the authors understood the effects of different injuries and wounds on the body, as well as the relationship of physical bodily damage to Hippocratic theories of pathology and the physicians' τέχνη. This chapter contributes an original analysis of injury-related pathology to current studies on Hippocratic medicine.

Chapter One

The Functioning Body

The living human body described by the Hippocratic authors is not unlike how we would describe our own. We share the same physical appearance, anatomical features, and physiological tendencies (i.e. growth, change, respiration, the need for food and water, etc.) with the bodies of the patients in the Corpus. However, there is a marked difference in how the authors of the Hippocratic treatises understood the components and physiological tendencies of the body, including the reasons for their natural and changed states. In this chapter I focus on Hippocratic understandings of the body in its most general sense: the nature of the body, with a particular focus on the healthy (or at least adequately functioning) body. I examine Hippocratic ideas of the nature of the living body, before turning to the basic, integral components of the body (fluids, air, and structures) in order to establish a foundation for my subsequent chapters on the 'diseased' and 'injured' bodies. In the final section of this chapter, I discuss the life principle in the Corpus and analyse the physiological processes that the Hippocratic authors believed were conducive to sustaining the life of a body.

1.1 The Nature of the Human Body

The Hippocratic physicians supplemented their physical reality with philosophical theory in order to generate knowledge on the parts, connections, and processes within the human body. The most important and prevalent of these theories is the idea of the nature (φύσις) of the body and its components. In the Corpus, the concept of φύσις has the specialised meaning of the character or qualities of a thing, but also ties in ideas of origin and beginning, as well as its etymological link with growth and physical development.[48] The authors use 'φύσις' in relation to the individual characteristics of any given thing – especially bodies, parts and processes (menstruation, speech, etc.) of the body, environments, seasons, foods, and diseases. The Hippocratic authors tend to use the term in three specific ways: (1) φύσις as in the 'constitution' of a thing, (2) φύσις as a thing's

[48] On the usage of φύσις in Greek philosophy and medicine, see Beardslee (1918), Kahn (1960), 201f., and von Staden (2007).

'norm' or normal condition, and (3) φύσις as the creative and healing power of a living thing.[49] These meanings are not exclusive of each other – for example, in the case of a living human body, the body's normal condition and its ability to heal itself can be considered inexplicably linked. However, they highlight important aspects that contribute to the way in which the authors of the Corpus understood the body's composition and processes.

The concept of physical constitutions is used by the authors to classify different types of bodies. The existence of different constitutions aids in the understanding of the effects of food and drink, illness and injury, and therapy (including physical treatment and medications).[50] The authors of the Corpus understood that the same environmental factors, diseases, injuries, and medicines could have both similar and different effects on different people (i.e. understanding "the common nature of all and the particular nature of the individual", *Epid. I* XXIII). For this reason they took several variables into account when evaluating patients, the most important of which was a patient's constitution.[51] The constitutions are types of bodily φύσις specific to an individual person, and are often defined by the body's affinity to a certain variety of fundamental physical imbalance (such as an overabundance of phlegm, bile, dryness, or humidity), by general characteristics (being moist, soft, or dense), or by physical traits (hairiness, or shapes of the body and its interior parts).[52]

The causes of constitutional differentiations depend on the authors' theories regarding a variety of factors, including the physiological, environmental, and cultural aspects that influence the bodies of different people. For example, the treatise *Airs Waters Places* famously draws a connection between human constitutions, temperament, and the environments people live in, including natural landscapes and weather (e.g. *Aër*. XXIV).[53] *Epidemics II* remarks that "what comes from way of life" (such as habits of movement) affects the external and internal shapes of the body and its parts (*Epid. II* 1.8). Conversely, the authors of *On Regimen* and *On the Nature of Man* each have a narrower scope that decides the constitution of the body. *On Regimen* argues that the quality of a constitution (e.g. dry and warm, cold and moist, or a combination in-between) depends on the fire-

[49] Michler (1962), 386.
[50] E.g. *Aph*. II.XVII: "When more nourishment is taken than the constitution can stand, disease is caused, as is shown by the treatment." On dietetics in relation to the body especially in *VM* and *Vict*. see Schiefsky (2005b) and Bartoš (2015). On the relation of plants and drugs (φάρμακα) to the body in the Corpus, see Maloney (1989), Moisan (1990), Girard (1990), and Salazar (2000), 54-67.
[51] Jouanna (2012), 168. On the Hippocratic evaluation of groups of people versus individuals, see Wee (2016).
[52] Langholf (1990b), 195-198; Jouanna (1999), 181ff.; Scullin (2012), 95-99.
[53] For an overview of the body and environment in the Corpus and especially *Aër*., see Jouanna (1999), 211ff.

water soul (ψυχή) that is inseparable from the body (*Vict. I* XXXII), while *On the Nature of Man* maintains that a person's constitution and any fluctuations depend on the four fluids that comprise the body (*Nat.Hom*. VII, IX).[54]

The constitution of a body is also dependent on sex and age. In Hippocratic medicine, the adult male body is taken as a standard norm (i.e. a type specimen) while the bodies of women, children, and the elderly are considered variations on this norm.[55] Individuals can have their own specific constitutions, but in general, healthy males have bodies that are dense, warm, and relatively dry (*Gland*. 16) – a balance that remains so until it changes with illness. In comparison, female bodies are softer, colder (though some are warm), and moister (see *Mul. II* 2 and *Vict. I* XXXIV); women's bodies are fundamentally associated with the excess, transportation, and expulsion of moisture, and this physiology and constitution is highly susceptible to illness.[56] Regardless of sex, the authors understood aging as a process of cooling, a shift in the balance of the body's moisture and temperature, which is substantiated by observations of changes that come with age.[57] For instance, *On Regimen* explains the difference between young and old bodies by utilising the theory of the fire-water ψυχή and its relation to the body. The author states that a child is a "blend of moist, warm elements", a young man "warm and dry", an adult man "dry and cold", and an elderly man "cold and moist" (*Vict. I* XXXIII). The author of *Diseases of Women II* argues that younger women are "moister and richer in blood" while older women are "drier and have less blood" (*Mul. II* 2). But usually the authors differentiate between young and old bodies in terms of their physical resilience and susceptibility. For example, *On Wounds in the Head* states, "the (skull) bones of children are thinner and softer because they contain more blood and are hollow and porous and neither dense nor hard"; the porosity of young bones aids in their healing, but young bodies are also just as quick to heal as they are to perish, and the speed of this healing or deterioration is quicker than in older bodies (*VC* XVIII).

The authors also established connections between the constitution of a body and the individual nature of its own parts (see *Epid. I* XXII). Every part of the body has a φύσις that is specific to itself (an elbow joint, for instance, has a specific composition and functions in a specific way) as well as the φύσις of the body it is physically connected to (an elbow joint in a body with a

[54] Bartoš (2009), 3.
[55] King (2005), 151.
[56] See Jones (1987), 63-96, Hanson (1989), 49, Dean-Jones (1994), 45-60, Demand (1998), and King (1998).
[57] On age, sex, and body differentiation in the Corpus, see Scullin (2012), 95-99.

humid/moist constitution will be more prone to fluid build-up and dislocations). The overall purpose of these theories was to speculate on, and predict, the limitations and tendencies of the body's behaviour so that effective treatment could be applied.[58] Such an approach allowed the authors to construct a framework within which their individual theories of human φύσις could be applied to the changes happening to, and within, the body. For example, the author of *On Regimen* maintains that an understanding of the body requires an understanding of its constituents, components, and the "controlling thing in the body" (i.e. the ψυχή) (*Vict. I* II.1-10). Comparatively, the author of *On the Nature of Man* focuses on the materials that comprise the body (blood, black and yellow bile, and phlegm) (*Nat.Hom*. IV), and *On Ancient Medicine* bases their theory of φύσις on the relationship of the body to food and drink (and particularly the powers of different humours and their flavours) (*VM* XIV).[59]

Von Staden argues that the authors of the Corpus who rely on the idea of φύσις to understand the body linked the "knowability" of this φύσις to the concept of δύναμις.[60] In Hippocratic medicine, δύναμις represents "a distinctive power or capacity to affect the body in a certain way", and is often used in regards to external factors affecting the body, or the interaction between parts or constituents within the body.[61] Importantly, the specific δύναμις of a thing can only be known when it reacts to something else. The observation of these interactions, and the changes that did or did not happen as a result, form into "a cluster of recurrent, stable characteristics" that establish the φύσις of a particular thing – for example, a body, body part, water, or season – in relation to other things.[62]

The use of φύσις to indicate a 'normal condition' incorporates the characteristics and qualities of a body in its normal or natural state, as well as the natural regularities that govern the ways it changes. The 'healthy' constitutions that I outlined above comprise the normal condition of bodies belonging to different environments, cultures, sexes, and ages. The authors also note that internal parts of the body have natural states or conditions; for example, the author of *On Joints* remarks that, "curvature of the spine occurs even in healthy persons in many ways, for such a condition is connected with its nature (φύσει) and use" (*Art*. XLVII.1-3). Lloyd comments that, "the notion of φύσις may be said to build directly on ordinary experience of the regularities of nature", which is one of the

[58] von Staden (2007), 22.
[59] On the theory of human φύσις in the *Vict.* tract, see Bartoš (2015), and in *VM*, see Schiefsky (2005a and 2005b).
[60] von Staden (2007), 23.
[61] Schiefsky (2005a), 79.
[62] von Staden (2007), 23.

reasons why observation was so central to Hippocratic medicine.[63] Imbuing φύσις with natural tendencies, such as the function or growth of a living thing, or, in the case of diseases and wounds, the manner and way in which they change and affect the body, establishes an important core for the Hippocratic ideas of regularity central to one of their most important medical tools: prognosis. Moreover, it helps us to appreciate the ways in which the authors understood the capacities and tendencies of the living body, especially a living body's tendency to heal or deteriorate.

The creative and healing ability of the body's φύσις is one of its more extraordinary attributes. Creation is here understood as the formation of new bodies as well as the growth of existing ones. The authors of the Corpus regard these processes as governed and regulated by components, which are themselves guided by the body's φύσις. The concept of "self-healing nature" encapsulates the notion that the φύσις of a living thing has "an autonomous, non-intellectual but goal-directed healing potency".[64] For example, in the surgical treatise *On Joints*, the author states that in the case of a collarbone broken in a certain way, "no complicated treatment will be required here, for the shoulder and arm left to themselves will bring the fragments together" (*Art*. XV) and in the case of an inward dislocation of the thigh, the body naturally "finds out for itself the easiest posture" to function (*Art*. LII.56-58). The author of *Epidemics VI* famously maintains that, "the body's nature is the physician in disease" (νούσων φύσιες ἰητροί), and this φύσις is capable of maintaining the body independent of training, instruction, or the cognitive powers of the person (*Epid. VI* 5.1).

The φύσις of the body sustains life by regulating everything from the production of tears and saliva to respiration and menstruation. As Holmes points out, the body in the Corpus is "animated by a tendency towards life".[65] This is the goal of the body's φύσις; its constant aim is to sustain the health of the living body. When this state of health is compromised, the body's φύσις will at least attempt to restore the body to its natural state before it had become compromised.[66] But these attempts are not always successful, and as a result the authors observe the opposite of the body's natural healing ability: the preventable or unpreventable deterioration of the body. As I discuss throughout this thesis, the Hippocratic idea of health and the natural state of the body involves a

[63] Lloyd (1979), 51.
[64] Bartoš (2015), 268.
[65] Holmes (2018), 68.
[66] Bartoš (2015), 270. *Epid. VI* maintains that the process of healing is a direct dispute with illness (*Epid. VI* 5.4).

balance of the quantities and qualities of its constituents. This balance is, in the view of the Hippocratic physicians, what the φύσις of the body seeks to maintain or restore.[67]

In the case of diseases or injuries that cause serious damage to the body, the natural tendency for the body to heal itself can shift into a tendency to suffer (often rapid) physical deterioration. This shift is outlined in *Places in Man*. The author explains that when food or treatment masters the body (instead of vice versa), any good that would have originally come from the food or treatment has the opposite effect and harms the body,

> then it follows necessarily that the person to whom it is administered also be changed; so the body, being changed, of little strength, and overwhelmed by everything, makes things get worse (παλιγκοτίας) (*Loc.Hom.* 43).

The φύσις of the body might have a natural tendency toward healing the body, but this tendency can also be overcome. In *Diseases I*, the author remarks that certain ἕλκεα (skin lesions)[68] tend to be incurable, and patient recovery slow or unattainable (*Morb. I* 21). Moreover, in a selection of treatises the authors warn about body parts that, when wounded, inevitably cause death for the body.[69] On this broad scale of health and illness, with the extreme limit of the health representing a state of absolute health that exists as a relative phenomenon specific to an individual body, and the extreme limit of illness as death, there is a point for every body at which its φύσις can no longer tip back toward its original goal of striving for optimal health.[70] As Holmes concludes, "it is precisely when the *sōma* (σῶμα, 'body') has been conquered that it acquires the power to hurt itself" and, with or without medical intervention, deteriorate.[71]

The notion of a self-healing or self-damaging nature is fundamental to Hippocratic understandings of the body's tendencies, but it has variable applicability. The Hippocratic physicians demonstrate that, although they were aware the φύσις of the body had general tendencies toward life or death, the physical body is also capable of saving or sacrificing parts of itself during deterioration or healing respectively. As an example of the former, the very fact that the body as a whole does not always immediately die from a wound or illness to one of its parts is an indication of its ability to maintain the functioning of its most vital parts until such time that the wound or illness should

[67] Nutton (2013), 79.
[68] See **Chapter Three**.
[69] See **Chapter Three**.
[70] Potter (1988a), 135 n.7.
[71] Holmes (2010), 138.

prove fatal.[72] *Diseases I* also observes the retention of sharp cognition even while the patient's body is wasting: "while the patient is chatting and still retains an understanding of every subject just as he had before, he is dried up and breathes out his spirit" (*Morb. I* 19). Conversely, examples of the body sacrificing its parts for the sake of its overall health are vivid in explanations of naturally occurring (or medically aided) detachment of body parts such as bone, flesh, or limbs. This is especially evident in the case of natural amputations of limbs that have been severely injured,[73] or the abortion of a foetus in a "spontaneous" miscarriage.[74] Furthermore, the changes taking place in the body do not always tend purely toward deterioration or healing; Robert observes that when diseases transform into other diseases,[75] this change in nature and manifestation is an indication of neither death nor healing, but another φύσις with its own perils and potentials for the physicians to mediate.[76]

These theories regarding the φύσις of the body and the individual φύσεις of its parts reveal another important characteristic of the Hippocratic authors' understandings of the living body. A body part may change in quantity or quality or even stop functioning altogether, and this change may affect the body on a grander scale; however, it does not derail the natural and regular organisation of the body by its φύσις.[77] The same applies to external influences upon the body: the δύναμις of anything outside of, or within, the body can only affect the body in a manner that conforms to the principles of the body's φύσις. The concepts of κατὰ φύσιν, "according to nature", and παρὰ φύσιν, "contrary to nature", are used throughout the Corpus to describe a process or condition that is either akin to, or contrary to, the 'normal' condition of the body, its parts, or other objects.[78] While κατὰ φύσιν encompasses the normal, healthy, and thus optimal characteristics and processes of the body and its parts, παρὰ φύσιν encapsulates anything that deviates from this norm.[79] However, these deviations are always still within the scope of a natural set of regularities and rules of the body's

[72] See, for example, the long deterioration of Theodorus' wife (*Epid. VII* 25).
[73] Discussed in **Chapter Three**.
[74] Majno (1975), 191f.; Bernier (1990), 374.
[75] See **Chapter Two**.
[76] Robert (1990), 234.
[77] For this idea in early Greek philosophy, see Vlastos (2005), 10.
[78] Beardslee (1918), 33-35.
[79] For example: κατὰ φύσιν is used especially in relation to the natural movement of body, see *Off*. XV and *Fract*. I – III; παρὰ φύσιν is used for bodily secretions (*Alim*. XVII), the qualities of parts (*Nat.Hom*. II.16-20), the progression of diseases (*Dieb.Judic*. 2 = *Hebd*. 46) and wounds (*Medic*. 11), or the body itself with regard to weight and form (*Steril*. 17, 25). See Daremberg (1855), 71 n.32, Michler (1962), 388, Jouanna (1999), 345, and Bartoš (2015), 268.

φύσις, which is what the Hippocratic physicians rely on in order to track and predict the progression of diseases, wounds, and the changing of the body.

To conclude, the Hippocratic authors use the natural state, progression, and especially the self-healing tendencies of the body as points of reference when they describe what is happening to the bodies of their patients. When the body is deteriorating, the physicians must strive to restore the body's normal healthy state by working with (specifically "preserving", or "saving", σῴζω) the φύσις of the body rather than trying to forcibly change it (see *Praec*. IX.10-13, *de Arte* VIII). Knowledge of the natural state of the body in health – specific to each individual body and its φύσις, or the φύσις of a certain group of people – was crucial for the authors' understandings of the sick and injured body as well.

1.2 Substances and Structures

In this section I examine the Hippocratic authors' understandings of the body's basic components. King has surmised that for the Hippocratics, "to understand the body it is thus necessary to appreciate the nature of its fluids and of the structures which collect them".[80] The purpose of this section is to analyse the importance of these core components associated with the authors' understandings of the living body in order to establish a foundation for when we turn to the physiological theories that incorporate these components into functioning, living systems. Due to the specific focus of this thesis, I do not analyse every component in detail. Instead, I have divided this topic into three subsections based on components of the body that the authors considered to be fundamental to physiology: fluids, air, and anatomical structures. For each of these components, I analyse the ways in which the authors understood their natures and roles within the body, and illustrate their importance to Hippocratic understandings of physiological processes that are distinctive of the living body.

1.2.1 Fluids

In Hippocratic medicine, knowledge of the natures and functions of the fluids in the body was essential to understanding and treating the body.[81] Both Hippocratic physiology and pathology are

[80] King (2013), 28.

[81] In **Appendix A** I have compiled a table of the different substances described by the Hippocratic authors, including notable characteristics and functions, in order to aid in my current clarification of the diversity and significance of these bodily fluids in Hippocratic medicine.

built on the idea that fluids interact inside the living body.[82] These fluids have dynamic and changeable natures, and consequently, the authors of the Hippocratic treatises are regularly occupied with the quantities, qualities, and movement of the fluids within the body and those that exit the body. In scholarship these fluids are often discussed in terms of humours and humoral theories, but these discussions can unfairly narrow our field of vision to a selection of fluids when the living body in many texts of the Corpus was a complex system of a multitude of fluids, each with their own natures and functions.[83] The topic of fluids in the Corpus is rich and extensive, and before I broach the less-studied aspects of this area, I will briefly review the aspects that have been treated thoroughly in scholarship.

Academic discussions of fluids in Hippocratic medicine primarily take two forms: they either focus on the so-called humours, especially in the context of humoral theory, or they analyse the practical capacity of fluids in the body. The former has traditionally garnered substantial and, as Craik asserts, disproportionate attention in scholarship; the latter, comparatively, has a few very interesting studies, but overall needs more attention.[84] The way humoral theories tie the fundamental humours of the body (commonly blood, bile, and phlegm, but also water in *Diseases IV*, and flavours in *On Ancient Medicine*) into the living body and the natural world is, of course, an important part of the Hippocratic understandings of the body. Each author has a different understanding of the humours and a different theory detailing how, and to what effect, these fluids interact and react with the body and the natural world. Fundamental to Hippocratic meteorological medicine is the response of the humours to environmental and climatological changes. The affinity of these fluids to the seasons and the consequential impact on the health of the body is expressed clearly in treatises such as the *Epidemics*. Furthermore, the way these fluids react to internal and external stimuli (such as food, drink, and changes in temperature) is an important area of pathology and therapeutics for the authors of the Corpus.[85] I address humoral theories in relation to diseases in **Chapter Two**. In what follows, I analyse the roles of fluids in the body, and argue that the authors maintained that the vast majority of the fluids within the body are vital to the composition and processes of the living body.

[82] *Flat.* differs in its emphasis on air, but I will return to this treatise in the next part of this section.
[83] See Smith (1979) and King (2013), 26f. on Galen's influence on Hippocratic scholarship and the consequential impact on the study of fluids.
[84] Craik (2015), 130f. See **Introduction §3** on this scholarship.
[85] Equally important is the effect external fluids and substances (such as different waters) have on the body, see Jouanna (2012), 155ff.

A distinctive characteristic of fluids in the Corpus is their individual capacity (δύναμις) to affect change. As Lonie aptly comments, "what makes each fluid distinct is the unique proportion and/or combination of the powers which it contains".[86] Although this statement is made in the context of humoral fluids, it is applicable to every bodily fluid that can fundamentally affect other aspects of the body. For example, the fluids in *On Ancient Medicine*, specifically the humours (χυμοί) which this author identifies as the moistures of the living body distinguished by their different flavours, exemplify the close relationship between the nature of a fluid and its δύναμις. The author of *On Ancient Medicine* does not distinguish between the fluids of the body and their δύναμις; χυμοί exist in food and drink, and these χυμοί also exist in the human body, exerting "the greatest power (δύναμις) to affect the human being" when they are unblended, and existing in harmony when they are well blended.[87] Similarly, the four vital moistures (ἰκμάδες) in *Diseases IV* are strongly associated with their δυνάμεις and especially their capacity to nourish living things; and in *On the Nature of Man* the author's four χυμοί possess δυνάμεις that are especially connected to the qualities (i.e. hot, cold, wet, dry) of these fluids (see *Nat.Hom*. V).[88]

These three examples involve fluids that are commonly labelled as humoral. However, the connection between characteristics and the effects fluids have on the body are applied to a wide spectrum of fluids in the Corpus. In their arguments, the authors often proceed from δύναμις to φύσις, i.e. from what can be seen to what cannot be seen, in order to understand a given substance and the capacity it has in the body.[89] The characteristics of a given fluid (including its flavour, strength, purity, temperature, etc.) frequently reflect physiological connections to the associated fluids, as well as the effects the fluids have on the body.

In the Corpus, fluids can be naturally present in the body since birth, but they may also form as a result of the body's natural functions or due to illness and injury.[90] With regards to fluids that are considered to be intrinsic to the body, the authors demonstrate two broad theoretical approaches to their presence: the integration of these fluids into the body's φύσις and physiology, or the incorporation of these fluids, often in converted form, into the structure and composition of the body itself. In the physiology of *Diseases IV*, the four vital ἰκμάδες of the body (blood, bile, phlegm, and water), are allocated "springs" (πηγή) (the heart, *locus* on the liver, brain, and spleen

[86] Lonie (1981), 262.
[87] Schiefsky (2005b), 232f. See *VM* XIV.
[88] Lonie (1981), 262f.
[89] von Staden (2007), 23.
[90] King (2013), 28.

respectively) which act as permanent receptacles and reservoirs for these fluids (*Morb. IV* 2). The author maintains that food and drink are nourishing to the body because they contain portions of these ἰκμάδες; when ingested, the food and drink go to the abdominal cavity (κοιλίη), from which the ἰκμάδες are attracted to their specific receptacles, where they are stored and utilised in the body's nourishment and maintenance (*Morb. IV* 2).[91] In the physiology of *On the Nature of Man*, there is a fundamental relationship of the χυμοί blood, bile (yellow and black), and phlegm with the body. These fluids are a part of the φύσις of the body; their movement and change (in quantity and quality) accounts for changes in the body, but they are also the body's core constituents. The body lives and functions,

> so long as the man can draw breath in and then breathe it out again, or until he is deprived of one of the elements congenital with him. Congenital with him (how should they not be so?) are the elements already mentioned. First, so long as a man lives he manifestly has all these elements always in him; then he is born out of a human being having all these elements, and is nursed in a human being having them all (*Nat.Hom*. V.28-36).

Blood, bile, and phlegm are the substances that maintain life in the body, and their complete expulsion signals the fatal breakdown of the body (*Nat.Hom.* IV – VI). This author also argues that these core fluids (and their qualities in particular) are vital in contributing to the formation of new life. Even though this theory of generation lacks clarity and stages of development, these four fundamental fluids are clearly necessary to generate a new living body (*Nat.Hom.* III).[92]

The authors also attribute a structural role to converted fluids in anthropogony as well as embryology. For instance, in the anthropogony of *On Fleshes*, moisture (specifically ὑγρόν) is one of the primordial components that is changed during the heating and cooling transformations that create the shapes of the human body (*Carn*. 3).[93] In embryology, the role of blood in the formation of the embryo's flesh is described in *On the Nature of the Child,* and water performs the same role in *On Regimen* (*Nat.Puer.* 3; *Vict. I* IX.35-37). In the more detailed theories of embryology in particular, the relationship of the mother's and father's bodies to the embryo developing *in utero* is described via the sharing of vital fluids. Seed (γονὴ) is the fluid of generation, and the authors of the Corpus who mention their views on the topic seem to maintain that seed is contributed by both parents to the embryo (i.e. a two-parent theory of generation).[94] The treatise *On Generation*

[91] Lonie (1981), 269.
[92] See Hanson (2008) on gradual foetal development in the Corpus.
[93] See Potter (1995), 128. On the anthropogony of *Carn*., see Spoerri (1983).
[94] Hanson (2008), 96; Wilberding (2016), 333f. See **Appendix A**.

combines a theory of pangenesis, the belief that seed derives from all parts of the body ("from the solid parts and the soft parts, and from all its moisture [ὑγροῦ]", *Genit*. 3) and an encephalo-myelogenic theory, where the seed derives from the brain and spinal marrow (*Genit*. 1).[95] This author also states that while the ἰκμάδες contribute to the strongest part of the seed, the seed also derives from both weak and strong parts of the body (i.e. inheritance of traits), and these qualities affect the formation of the child (*Genit*. 1, 8).[96] Thus, *Diseases IV* states, "when the offspring is engendered, it has in itself as many kinds of healthy and diseased moisture as its parents" (*Morb. IV* 1); this understanding is very similar to the transmission of humours in the creation of the embryo in *On the Nature of Man*.[97]

Aside from generation, fluids are also an integral part of the body's other natural functions, including digestion, nourishment, regulating the body's temperature, and aspects of bodily physiology such as movement. Fluids are formed for, and during, these processes, and often the authors establish a link between the formation of a fluid and its practical capacity in the body. I have already mentioned seed and generation, but also related to the formation of the embryo are blood (αἷμα) and milk (γάλα), which play important roles in nourishment. Blood and milk are both considered vital nourishing fluids in the Corpus, derived themselves from nutrients (*Alim*. XXXVI).[98] Milk particularly is unique to the female body; it is created in the glands of the breasts according to *On Glands* (*Gland*. 16), its nourishing quality can be affected by diet since it derives from food and drink (*Morb. IV* 24), and it is considered a nutrient of a child *in utero* and post-birth. Blood, conversely, is a nourishing fluid existing in all human bodies: *Diseases IV* asserts that blood is created via the concoction of food in the abdominal cavity (*Morb. IV* 11), and it is considered a fluid that sustains the body and its parts. In the female body, blood is a part of the cycle of menses that the authors believe is a critically vital process that maintains the precarious health of the female body.[99] Menstrual blood is not understood as uterine lining in the Corpus, but considered as excess nutrient that the female body does not need, and can vary in viscosity and purity akin to other fluids.[100] The blood within the female body is absorbed and cyclically expelled from the uterus,

[95] Lonie (1981), 62.
[96] Lonie (1981), 104; On heredity see Lonie (1981), 137-139 and Grmek (1991).
[97] On the aetiology of embryology and conception in the Corpus, and specifically *Nat.Puer*., see Wilberding (2016), 334-338. For the *Morb. IV* tract, see Lonie (1981). On the transmission of sick or healthy seed, see Holmes (2010), 161 n.63.
[98] Hanson & Flemming (1998), 242. See **Appendix A** for examples in the Corpus.
[99] Jones (1987), 73ff.; Demand (1998), 79.
[100] Jones (1987), 68f.; Dean-Jones (1989), 182-184.

except during pregnancy, when the blood instead feeds the growing embryo and contributes to its formation (*Nat.Puer.* 10, 19).[101]

The link between moisture, nutrition, and growth is prevalent in a number of the Hippocratic texts. I will expand on Hippocratic notions of nutrition in the final section of this chapter (**1.3.2**), but here I want to highlight that the connection between moisture and growth is especially stark in the *Diseases IV* tract. The author uses botanical analogies centred around growth and nourishment to establish the relationship of the four ἰκμάδες to the body. The primary analogy explains that the earth contains powers (δυνάμιας) of every kind, and provides plants living in its soil with moistures (ἰκμάδες) specific to the δύναμις needed by those plants (*Morb. IV* 3). If there is too much or too little ἰκμάς, the plant will fall ill or wither, and if there is no suitable ἰκμάς whatsoever the plant (or seedling) will fail to sprout (*Morb. IV* 3). Building on the work of Lonie, Thomas argues that ἰκμάς in nature as well as in the human body is a special kind of moisture with the technical sense of "nutrient-giving moisture".[102] I support this argument, and further add that in *Affections*, ἰκμάς is used in the context of nutrients derived from food. This author explains that the ἰκμάς derived from weak/light foods produces little growth and strength in the body, whereas ἰκμάς from strong foods "being pure and strong, gives the body great strength and growth" (*Aff.* 52).[103]

In a similar fashion, other authors also link nutrition and growth with the fundamental moisture of the body. For instance, in *On Nutriment* moisture (ὑγρόν) is critical in the nourishment of the body, acting as the medium of distribution of the nutriment that keeps the body strong and healthy (*Alim.* LV). In *On Regimen*, the water component of the body and soul's fire-water flux is said to "nourish all things always" (*Vict. I* III, IV). Moreover, this author argues that children and the elderly contain more ὑγρόν than those of middle-age because in children the nourishing ὑγρόν is used up, "partly for the growth of the body, partly for the motion of the fire, and partly through exercise" and returns in the elderly as their natural fire retreats and their bodies become colder and moister (*Vict. I* XXXIII).

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[101] See especially *Mul. I* 34 on the link between the "greenish" complexion of pregnant women and the regular loss of the "pure part of blood" to the baby.

[102] Thomas (2000), 49-52. See also Lonie (1981), 269f.

[103] Even if ἰκμάς was not directly linked with nutrition specifically, in *Morb.Sacr.* the author states that if the air that carries φρόνησις (see **n.112**) into the brain first travels through the body before it reaches the brain, it would be "mixed with the moisture (ἰκμάδι) from flesh and blood, so as to have lost its perfect nature" (*Morb.Sacr.* XIX.19-21) (modified translation). In this example I believe ἰκμάς is denoting a kind of moisture that contains some particular material – perhaps nutritious, since blood at least is heavily associated with nutrition. See also *Morb. I* 28.

The impact of fluids on the temperature of the body is substantial in certain treatises, especially when the authors use a humoral theory that is heavily based on the *qualities* of fluids, such as *On the Nature of Man*. Commonly, the link between fluids and temperature is described in the context of disease. For example, when fluids settle in or flood to a certain body part and cause painful heat in the ensuing inflammation, or when fluids (especially blood) cool and congeal within the vessels.[104] Bile (χολή) and phlegm (φλέγμα) are regular suspects in temperature fluctuations due to their corrupting or inflammatory effects, as well as their natural temperatures and qualities.[105] Bile is characterised as a 'dry' fluid, is tempered between the coolness of phlegm and the heat of blood (*Morb. I* 24), and increases in the body as a result of the climate conditions of summer or autumn (*Hum*. XIV; *Nat.Hom*. VII). Phlegm, comparatively, has a viscid, gluey consistency, and is provoked by winter climates.[106] Phlegm itself is classified as the "coldest constituent of the body" (*Nat.Hom*. VII.2-4), but the Greek φλέγμα also has traditional connotations of heat and inflammation which is reflected in certain works.[107] However, many fluids are also understood to aid in the upkeep of the body's healthy temperature. For instance, the process of perspiration involves the melting of interior moisture, which is then expelled from the body as sweat (ἱδρώς); perspiration is understood to cool an overheated body and help regulate the body's balance of moisture and temperature (e.g. *Morb. I 25*, *Loc.Hom*. 27, *Mul. I* 61).[108]

In Hippocratic medicine, as well as Classical Greek thought more generally, blood also has a strong tradition of being associated with heat and movement.[109] Blood is responsible for the body's warmth in *On Breaths* (*Flat*. VIII) and *Diseases I* (*Morb. I* 24). This natural warmth can flare into feverish heat through change,[110] or through migration and concentration,[111] but the warmth of blood can also counteract the cooling effects of other fluids (such as phlegm, *Morb.Sacr*. XII.1-6). In a few treatises, blood also has a striking relationship with the body's movement. In *On the Sacred Disease*, when the blood has been cooled and congealed by rogue phlegm, it stills in the vessels,

[104] See **Chapter Two**.
[105] See **Appendix A**.
[106] See 'phlegm' entry in **Appendix A**.
[107] See Lonie (1981), 278f. and Craik (1998), 15f. on the semantic development from φλέγμα as heat and inflammation to φλέγμα as the cause of inflammation.
[108] See **Appendix A**.
[109] See Onians (1951), 44ff. and Boylan (2015). We especially see this later in Aristotle's ideas.
[110] E.g. bile mixing with the blood in the vessels and heating the blood, causing fever (*Morb. I* 29).
[111] E.g. blood heating the vessels in the head and boiling the brain (*Morb. II* 17), or blood collecting in the uterus without being released and consequently burning the cavity (*Mul. I* 2).

and as a result blocks the path of φρόνησις (intelligence)[112] being carried through the vessels by breath (πνεῦμα). Consequently, the limbs become paralysed until the blood is able to be distributed again and release the trapped πνεῦμα (*Morb.Sacr*. VII, X.1-30). The author of *Diseases II* describes a more direct relationship: when the blood is cooled by bile, the patient "becomes paralysed in his other parts, and powerless", only to regain movement again when the blood is once again warmed and set in motion. The author further adds that when the blood "has been cooled completely and given up its heat, it congeals and can no longer move, and the patient dies" (*Morb. II* 6).

The spinal marrow (νωτιαῖος μυελός), or spinal fluid, is also structurally linked to movement and sensation in the body. Craik importantly notes that there is no distinction between the spinal cord and the marrow itself in the Corpus, and discusses the connection of spinal μυελός to the brain (e.g. *Carn. 4*), its role as a distributive fluid (*Oss*. 11 – 18), and the significance of the spinal fluid to the encephalo-myelogenic theory of seed and generation.[113] In further support of her analysis, it is important to note that in *Prorrhetic II* and *On Joints* (one possibly derived from the other)[114] the authors describe the vital importance of the spinal marrow not only to the movement of the limbs, but the body itself. *Prorrhetic II* observes that, "if the spinal marrow ails either as the result of a fall or some other manifest cause, or spontaneously" paralysis of the lower limbs sets in, as does the inability to pass stools and urine, which is eventually fatal (*Prorrh. II* 16). *On Joints* similarly describes the effects of severe spinal marrow damage, and emphasises the resulting numbness (ἀπονάρκωσιν), paralysis, loss of heat in the lower limbs and muscles, and general lethality of such injuries (*Art*. XLVI – XLVIII).

The Hippocratic understandings of the formation and function of fluids are diverse in some regards, consistent in others, and integrate these fluids into theories regarding the physiology of the body. As discussed earlier in this chapter, and as I discuss further throughout this thesis, the living body in the Corpus is understood as a system undergoing change and transformation. This change is more prominent in disease and injury than in health, but there is still the near-constant strive for balance undertaken by the body's φύσις in order to keep the body functioning and alive. This capacity for change is also evident in the constituents of the body, and not just in regards to their quantities and qualities. The author of *Decorum* warns that, "instability is characteristic of the moistures (ὑγροῖσι), and so they may also be easily altered by nature (φύσιος) and by chance

[112] On defining φρόνησις and also συνέσις in *Morb.Sacr*. and the Corpus, see van der Eijk (2005), 119-135 and Thumiger (2013), 74 n.47.
[113] Craik (2008).
[114] See Craik (2006a).

(τύχης)" (*Decent*. XIII.4-5).[115] The fluids in the body are unstable and easily changeable; they are reactive to other fluids and the state of the body because each substance in the body has its own δύναμις, but fluids are also capable of more fundamental changes.

Many of the fluids in the Corpus are transmutable, forming from a different material or substance, and capable of turning into another. We have seen this already in the formation of seed, the fluids formed from concocted or changed nutrients (blood and milk), and also those forming from the melted interior of the body (sweat). Moreover, in many treatises, water (ὕδωρ) is described as melted material, and noxious fluids (such as pus) are often changed forms of healthy substances.[116] *On Regimen in Acute Diseases* also argues that bitter bile is capable of being turned into phlegm if it dissolved by the "acidities of vinegar" (*Acut*. LXI). Fluids are thus are capable of supporting and hindering the body's functions, and their dynamic and changeable natures continuously affect change in the body through their δυνάμεις. The authors understood fluids to comprise important aspects of the body's structure, as well as maintain vital physiological processes that keep the body alive and allow it to grow.

1.2.2 Air

Similar to fluids, air also plays an important role in Hippocratic understandings of the body. Air is considered a substance that is vital to life as a nourisher, a moulder, a temperature regulator, and critical to the process of respiration. Similarly, air can also be the cause of the body's pain and detriment. In **Chapter Two** I discuss the connection of air to the diseased body, while here I examine the authors' understandings of the relationship between air and the functions of the living body.[117]

In the Corpus, the varieties of air are identified by a number of terms in the Greek; those most closely related to human physiology are πνεῦμα, πνοή, ἀήρ (Ionic: ἠήρ), and φῦσα.[118] While the author of *On Breaths* famously distinguishes between πνεῦμα, ἀήρ, and φῦσα, establishing φῦσα as πνεῦμα within the body, and ἀήρ as πνεῦμα outside of the body (*Flat*. III), this distinction is not

[115] Translation modified, exchanging 'humours' for 'moistures'.
[116] See **Appendix A** entries on 'water' and 'pus', and **Chapter Two** on the 'corruption' of healthy materials.
[117] A fruitful study on air and diseases in the Corpus has been undertaken by Langholf (1990a), and I will be utilising the conclusions he has drawn as well as my own findings here, and in **Chapter Two**.
[118] On the distinction between these terms, as well as ἄνεμος (breeze) and αἰθήρ, in ancient Greek thought, see Lloyd (2007).

consistent in *On Breaths*, nor does it appear in any uniform way across the Corpus.[119] The terms πνεῦμα and ἀήρ are both used in the sense of interior and exterior air, and while πνοή and φῦσα are often found within the body, φῦσα is also used in the sense of air blown through or into parts of the body.[120] Langholf notes that any differentiation in 'types' of air usually indicates local rather than qualitative differences.[121] This distinction may hold for many cases, but we can also see in the treatises a relationship between the varieties of air and their capacities within the body. The Hippocratic authors held the view that air has a material nature, but unlike fluids, air was not as easily visible or traceable.[122] *On Breaths* states that air has a δύναμις that extends from heaven to earth, and though it may be invisible to sight, it is "visible to reason" (*Flat*. III.13-15).

The authors apply qualitative descriptors to air both inside and outside of the body. Air is often described with reference to its location (external or internal), temperature,[123] the level of moisture it carries,[124] its quality,[125] and finally quantity,[126] the lattermost often in regards to respiration.[127] Despite the transparency of air, the authors still utilise descriptors indicative of colour and composition (e.g. turbid, clear, sooty) to characterise the breath they observe (visually or otherwise) leaving the body, as well as the natural winds of the environment. In the same vein as the assessment of fluids, these characteristics are often indicative of air's δύναμις and its affect upon the body, or at the very least its relationship to the body, through an argument that moves from the visible to the invisible or vice versa.

This relationship is particularly evident in the dependence of the human constitution on climate, which includes the seasonal winds.[128] In *Airs Waters Places*, the author explains the effect that different winds (πνεύματα) have on the environment and the people living in that environment.[129]

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[119] Lloyd (2007), S138; Craik (2015), 98.
[120] See **Appendix A**.
[121] Langholf (1990a), 342.
[122] Langholf (1990a), 342. See Thivel (2005), although I have reservations about Thivel's arguments (see **n.138** and **1.3.2**).
[123] E.g. febrile (*Coac*. 255), turning the tongue black with the heat of the πνεύματος (*Aff.* 11), or fatal cold exhaled breath (ἐκπνεόμενον) (*Prog*. V).
[124] Especially characteristic of external winds, such as the moist south winds and dry north winds.
[125] Turbid or clear ἠήρ (*Aër*. XV.25-26), sooty (λιγνυῶδες) πνεῦμα (*Coac*. 255), rare (*Dieb.Judic*. 2 = *Hebd*. 46).
[126] Shallow, deep, etc. (*Epid. II* 3.7, *VI* 2.3).
[127] See **Appendix A**.
[128] Bashford (2012), 496.
[129] These winds are identified by season, direction (βόρειος, ζέφυρος, νότιος, ἠώς [i.e. the direction of dawn, east]), temperature, or characteristics (rainy winds from the west, cold from the north, etc.), or by a particular name, such as Etesian or *kenchron*.

In the case of the people in Phasis, the author attributes the males' rough and deep voices to their watery environment as well as the usual winds which are moist, and the occasional *kenchron* (κέγχρονα) wind which blows "strong, violent, and hot" (*Aër*. XV).[130] On a smaller physiological scale, the authors also link the origin or cause of the air to its relationship to the body. For example, air is taken into the body through inhalation, being blown into the body, or through food or drink, the latter of which can produce wind/gas (φῦσα) in the body during or after digestion. As I discuss at **1.3.2**, air which is inhaled and exhaled is a part of an in-and-out cycle that keeps the body alive. Similarly, the φῦσα generated by ingested material and heat (*Vict. II* LII), or enclosed in consumed food (*Flat*. VI), should be released before it causes violent pain,[131] or, as the author of *Affections* recommends, avoided altogether through a tailored diet (*Aff*. 47, 48).[132]

Moreover, the author of *On the Nature of the Child* gives an explanation on the formation of breath in the context of embryology. This author maintains that breath (πνεῦμα) is created by bodies when they are heated: a warm embryo creates πνεῦμα in itself, and warm πνεῦμα eventually tunnels out of the embryo and forms a passage for the entrance of cold, nourishing air (*Nat.Puer*. 1).[133] In this treatise, the presence of moisture is another contributing factor to the production of πνεῦμα. The author draws on plants in analogy and states that, "when moisture (ὑγρὸν) present in wood is warmed through, it turns to breath and passes out" before attracting fresh cold breath again (*Nat.Puer*. 1). Lonie notes that vegetables and wood generate breath because anything grown out of the earth "is full of moisture"; similarly, human bodies are also generated from, and contain, this fundamental moisture that has the capacity to produce πνεῦμα when heated.[134]

The Hippocratic authors associate air with several functions in the body that were regarded as physiologically and pathologically important. Aside from the process of respiration that keeps the body alive (see **1.3.2**), air also has a number of similarities with bodily fluids in terms of functions and capacities. Air is considered a source of nutriment by a few authors, including the composer of *On Breaths* (*Flat*. III) and *On Nutriment* (*Alim*. XXX, XLVIII). Exhaled air can also act as a vehicle for material exiting the body. In the explanation of sweat in *Diseases I*, the finest part of phlegm and bile is heated and thinned to the point of vapour before "being mixed with the breath (πνεύματι)" and passing out of the body (*Morb. I* 25). *On Regimen* also tells us that food plays such

[130] See also the effect of the seasonal winds in *Epid.* and *Morb.Sacr*.
[131] *VM* is particularly descriptive of the internal rampage of φῦσα, see *VM* XXII.
[132] Langholf (1990a), 345f.
[133] See Lonie (1981), 155ff.
[134] Lonie (1981), 148. See also *Flat*. VIII.

an important part in the production of internal φῦσα, and as a result "a great part" of the nourishment from these foods passes out of the body through various excretions, including breath (πνεύματι) (*Vict. II* XL.15-24).

In many treatises, breath has a marked relationship with temperature. The cyclic exchange of internal air for external air is also a cyclic conversion in terms of quality. In the process of respiration, the body takes in air and the air is heated within, noted in *On Regimen* as the cold giving way to the heat (or vice versa, which causes illness, *Vict. II* LXII). Whether the inhaled air is warm or cool, exhaled air tends to be warmed unless something dire is happening within the body. In such cases, pathological problems can cause the exhaled air to be cold (e.g. *Prog*. V) or, as in the case of ardent fever (καῦσος), overheated to the point that the air burns the tongue and throat (*Aff*. 11; *Morb. I* 29). In *On Fleshes*, the author argues that the heart and the hollow vessels connected to it contain the most heat in the body, thus they also control the breath (πνεῦμα), since breath is hot (*Carn*. 6). Similarly, *On the Nature of the Child* maintains that the warmed embryo draws cool air into itself and releases warmed breath (*Nat.Puer.* 1).

The link of breath with temperature also draws on the Hippocratic notion of opposites, namely, in the process of over-cooled or overheated body parts drawing substances with opposite qualities toward them.[135] In terms of physiology, this connection of opposites is integral in maintaining a balance of qualities within the body. The author of *On Fleshes* states that "the nourishment of hot is cold"; cooling what is overheated, and warming what is overcooled, is beneficial for restoring the φύσις of the affected substance or part.[136] Breath especially is associated with cooling. For example, *On the Sacred Disease* argues that when breath cannot reach the lungs, they overheat and boil, consequently forming the foam that arises in the mouth during epileptic fits (*Morb.Sacr.* X.32-34). *Diseases IV* also remarks that when the body is overheated, if breath cannot be drawn in to cool the interior, then the body's moisture (ὑγρόν) is burned through due to the heat (*Morb. IV* 16). But breath is also associated with warmth: in *Epidemics VI*, Xenarchus' wound near his heart can only be soothed by "inhaling adequate warmth into the sore (ἕλκος); warm to counter the evacuation", emphasising the importance of warm air especially in relation to wounds (*Epid. VI* 7.5).[137]

[135] On heat and breath in Hippocratic respiration and reproduction, see Frixione (2012), 517ff. Heat also attracts other substances, such heated flesh attracting bile and phlegm in *Morb. I* 26.
[136] I expand on this in **Chapter Two**.
[137] I believe this passage is drawing on the belief in the Corpus that cold is detrimental to wounds.

In contrast to fluids, air has a notable link with the body's ability to phonate. The link between a person's breath and their voice seems well established throughout the Corpus, and certain authors also provide theories of *how* a person produces sound. For example, *On Fleshes* explains that breath is taken into the body and resonates within the head to produce sound (*Carn*. 18). Conversely, *Diseases IV* argues that the "hollow lung" gives a person the ability to phonate (*Morb*. *IV* 25), and *On Regimen* explains that the nature of a person's voice is dependent upon the natures of the passages of their breath (including vessels, airways, etc.) (*Vict. I* XXXVI). Also, as mentioned earlier, *Airs Waters Places* associates different climatic winds with the natural voices of the people living amongst that weather. In cases of illness, the authors establish a link between the quality of voice and the qualities of breath and respiration. For example, a voice can become "weaker and softer" while the breath becomes "rarer and feebler" (*Dieb.Judic.* 2 = *Hebd*. 46), or the breath can be "drawn short" and the voice become unclear (*Prorrh. I* 93).

And finally, air has the ability to cause movement. In the context of external winds, the authors observe the effect wind has on the environment; within the body, though, the authors reinforce the materiality of air through its ability to physically move and mould the body and its parts. The author of *Places in Man*, in outlining a recovery from fever, describes the body as "being opened, taking in breath and moving on every side", perhaps illustrating the movement of the whole cavity when a person is healthily respiring (*Loc.Hom.* 27). In medical procedures, air is utilised to reposition internal parts of the body; such procedures involve inflating a bladder attached to a pipe which is then inserted into some part of the body. For example, the author of *On Barrenness* recommends using an inflated bladder and pipe to force air into the uterine cavity in order to reposition a dropped uterus (*Steril*. 26). The author of *Diseases II* also uses a similar treatment in the case of a lung that has "fallen against the side" due to a wound or incision; here, the physician places the pipe into the open wound and blows air into the cavity in order to avoid a pleural adhesion (*Morb. II* 59).[138]

Moreover, the transforming and moulding capacity of air is crucial in the embryology of *On the Nature of the Child*. Here, πνεῦμα is capable of tunnelling through heated organic material; the πνεῦμα "forms a passageway for itself" to allow an embryo to respire (*Nat.Puer*. 1). This author also argues that πνεῦμα has a significant role as the moulder of the embryo: breath articulates the flesh and limbs of the growing child and guides its organic growth *in utero* (*Nat.Puer.* 6).[139] Thus,

[138] Potter (1988b), 269 n.7. Thivel (2005, 242f.) argues that this passage is indicative of the malignity of air present in the lungs and the need to drain the air from the lungs, however I do not agree with this interpretation and instead align with Potter's.
[139] See Lonie (1981), 148f.

to the Hippocratic authors, air, in its various forms, is crucial to maintaining living body and also capable of moving and transforming its parts. Despite the difficulty in perceiving air with the naked eye, the authors still attribute qualities and capacities to the air within and outside of the body. The authors incorporate these characteristics into their observations and theories on the vital processes of the living body. Consequently, in the physiologies of these authors, air is a significant factor in important processes ranging from respiration (which I will expand on in **1.3.2**) to regulating the body's natural temperature.

1.2.3 Structures: Parts and Channels

The authors of the Corpus understood the body as a structure composed of many parts varying in shape, texture, and function.[140] Within the body, these 'parts' include:

- **cohesive internal structures** that we now classify as organs, each identified by their name (brain, heart, lung, intestine, etc.),
- **channels**, including **vessels** (φλέβες, ἀρτηρίαι, which can carry both liquids and air), **passages** (πόροι), and any **pathway through which substances can traverse**, such as the channel created by the spinal vertebrae and the windpipe/trachea (βρόγχος or ἀρτηρίη),[141]
- **hollow spaces**,
- **membranes** (ὑμένες), and
- **structural components**, such as **tendons** (τένοντες), **cords** (or nerves, τόνοι),[142] **bones** (ὀστέα), and **"solid threads"** called νεῦρα (variously translated as ligaments, sinews, or nerves).[143]

Gundert has written a perceptive study of these body parts and how the Hippocratic authors understood the relation between the natures and roles of these parts within the body. Therefore, there is no need to do a full survey. In this section I synthesise important facets of Hippocratic

[140] In this section and throughout the thesis I use terms such as 'part' and 'structure' to describe what we today identify as organs, since ὄργανον is an Aristotelian concept. I will use 'organ(s)' in inverted commas to maintain clarity when I discuss the viscera of the interior body. See Jouanna (1998), 56f.
[141] The terminology of the trachea, windpipe, and bronchial tubes is ambiguous in the Corpus, with βρόγχος, φλέβια, ἀρτηρίη, and σύριγγες (pipe) all used in connection to the lungs, see Craik (2006b), 129f. On the vascular system in the Corpus, see Harris (1973).
[142] See *Epid. II* 4.1-2 for the use of τόνοι (cord, rope, but also musical chord) as nerves or cords. See Smith (1994a), 67 n.31.
[143] Craik (2009), 107.

understandings of the internal structures of the body and detail their relationship to the body's physiology.

In her study, Gundert outlines a relationship between a part, its structure, and the physiological process associated with each part. She argues that in the majority of the treatises, this relationship is not teleological, nor is it often the distinct focus of the authors. Rather, our authors are interested in constructing connections between processes and parts, and in doing so, they draw on the knowledge that certain physiological processes break down when certain parts cease functioning as they should.[144] Some of these processes break down quicker than others; sometimes the body or the physician is given the chance to implement healing before the body's functions cease altogether, while in other circumstances the break down is instantaneous, such as in fatal wounds.[145]

The φύσις of internal body parts, including their textures, shapes, and natural inclinations toward heat and cold, are also utilised to explain why parts have particular capacities within the body. For example, the authors of *On Ancient Medicine* and *On Glands* emphasise the propensity of soft, porous, and spongey parts of the body for absorbing moisture.[146] The author of *On Glands* also states that female bodies overall are "rarefied and porous like a flock of wool in appearance and to the touch: it follows that this rarefied and soft tissue does not reject moisture" in comparison to the "naturally dense and unyielding" male body which apparently does not retain much moisture (*Gland*. 16).[147] In *On the Use of Liquids*, the author draws a connection between the brain "and other parts of similar material"; these similar parts include bones, teeth, and cords (νεῦρα), which are "by nature colder and solider" and physically distanced by some degree from the hotter parts of the body (*Liqu*. 2).[148] These parts react in the same way to heat and cold – appreciating heat, but being pained by cold – whereas the warmer parts of the body have the opposite reaction.[149]

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[144] Gundert (1992), 465 n.144. According to her study, a teleological association is only found in post-Aristotelian treatises such as *Anat*. and *Cord*. See Craik (2006b) and Potter (2010), 52-57.

[145] See **Chapter Three**.

[146] In *Gland*. 1 and 3 these characteristics are associated with areas of the body where glands (ἀδένες) are located (e.g. armpits, breasts in females), and joints. *VM* XXII lists the spleen, lungs, and breasts with these characteristics, and the association of the spleen with absorbing moisture is in several other treatises, including *Morb. IV*.

[147] On this analogy and comparison, see Hanson (1989), 49f.

[148] On teeth in the Corpus, see Macfarlane (2016).

[149] The statement that the brain takes pleasure in heat is understandable in small degrees, however throughout the Corpus the effect of heat on the brain is repeatedly highlighted as detrimental to the health of the body, see Harpas (forthcoming).

Importantly, the internal parts have the ability to create, attract, receive, or discharge substances, resulting in an interior that takes part in the constant flow of substances within and through its cavities.[150] The predominant viscera (i.e. 'organs') can be springs,[151] or have φύσεις that allow them to transform substances.[152] The interior parts have the ability to attract substances because of their temperature (heat especially can draw cooler substances toward it), location, or shape.[153] These parts can act as receptacles that collect substances traversing the pathways within the body.[154] And finally, they can expel substances during physiological processes, as well as in order to cleanse the body.[155] The channels within the body act as conduits between these parts and also as ducts around the body, establishing a system that allows the communication between parts via the passage of substances (air and fluids).[156] The communication can be between viscera, such as the movement of fluxes in disease,[157] or between areas of the body, for instance the obstruction of the spinal marrow causing paralysis in the lower limbs, or incising a temporal vessel on one side of the head and having a spasm seize the opposite side (*VC* XIII.42-50).

The structural parts that house and frame the internal components of the body, especially the skin (δέρμα), flesh (σάρξ), muscle (μῦς), and the bones of the skeletal system, are also important elements in Hippocratic anatomy and physiology. Skin and flesh are among the most external, accessible, and thus observable parts of the human body. They are described in terms of appearance (colour, features), feel (supple, hard), temperature, and whether they are moist or dry, or living (and growing) or dead. The muscles and skeletal system are comparatively less accessible to visual observation (unless the flesh has been severely damaged), but are significant to the physicians' understandings of the movement and anatomy of the limbs (see *Fract*. VIII). The muscles are solid and dense (see *Carn*. 9), and the shapes and positions of the bones are fundamental in the surgical treatises that deal with bone injuries (see also *Mochl*. I on the φύσις of bones).[158] The authors also

[150] Lonie (1981), 266ff.; Gundert (1992), 459.
[151] E.g. the heart, spleen, brain, and *locus* on the liver (*Morb. IV* 2).
[152] E.g. the cavity (κοιλίη) generating heat for concoction (*Salubr*. VII).
[153] E.g. the uterus is described as a vessel that opens and closes, and can receive, expel, and contain fluids and materials. On the uterus' receptive and containing qualities, see Jones (1987), 73-76, Hanson (1989), 43-47, and Hanson (1995), 296. On structures and their shapes, see also *VM* XXII and Schiefsky's (2005b, 293ff.) comments.
[154] E.g. the cavity and intestines receiving food and drink in its journey through the body.
[155] E.g. material leaving the cavity as vomit or travelling further through the digestion process and leaving the body as excrement, and the uterus releasing seed, menses, and noxious fluids.
[156] Langholf (1990a), 348.
[157] See **Chapter Two**.
[158] Jouanna (1998), 58.

describe the healing properties of bones (the more porous the bone, the better it can form a callus and heal),[159] and the softer parts contained within them, such as their marrow (*Fract*. XXXV, *Oss*. 16), and blood vessels that keep the bones nourished (e.g. *VC* I, *Alim*. LIII).

The structural components (especially ὀστέα, νεῦρα, etc.) are also understood to establish networks of connections within the body that affect physical integrity. Broken and dislocated bones hinder movement in the affected limbs, and on a larger scale, cases of convulsions (identified as tetanus [τέτανος] and spasms [σπασμὸς]) are interpreted by the authors as the body's tendons and cords drawing the limbs into contorted positions.[160] I discussed above the benefit of warmth to the "colder and solider" parts within the body, and this notion is also applied across the Corpus in cases of tetanus and spasms; the application of warmth is repeatedly the primary treatment in these cases to soothe the constricting tendons.[161] The authors thus consider the anatomical structures that comprise the body as integral to sustaining the living body for a few important reasons. These structures constitute the very shape of the body, comprising, supporting, and protecting the topography of the interior. In Hippocratic medicine, they also have an important relationship with the substances that flow into and throughout the body. Their natures allow them to act as conduits, receptacles, and sites of creation and transmutation, and they can ultimately be passive parties or actively engaged in the physiological processes of the body.

1.3 The Life Principle and the Living Body

The Hippocratic authors were necessarily occupied with the *living* body, including the parts and processes that maintain life, as well as those that can detrimentally affect the wellbeing and lifespan of a person. In this final section of the chapter I examine the authors' understandings of the most vital characteristics of a living human body: the principle of life, and the crucial processes maintained by the body's φύσις. In Classical Greece, the predominant life principle was the ψυχή, and the authors of the Corpus also understood the ψυχή to be a critical component and life principle of a living body. However, in the Corpus the characteristics that define the living body do not always include an explicit mention of the ψυχή. In the first part of this section, I illustrate the ways

[159] Healing vertebrae (*Art*. XLVI.67-69), healing ribs (*Art*. XLIX.24-26), healing jaw bones (*Art*. XXXIII.42-44).
[160] Our modern understanding of tetanus as a bacterial disease is not present in the Corpus. On tetanus and the case study of *Epid. VII* 8, see Grmek (1989), 341-345.
[161] E.g. *Acut.(Sp.)* 37, *Aph*. V.XVII, V.XVIII, V.XXI, *Int*. 52 – 54, *Epid. II* 5.21, *V* 15, *VII* 8.

in which the authors understood the relation of the soul to the body, and its roles within the living body. In the second part, I turn to the φύσις of the body, and analyse three aspects the authors believed were distinctive of, and crucial to, a living body: heat, respiration, and nourishment.

1.3.1 The Life Principle: ψυχή

The authors of the Hippocratic Corpus rarely discuss the relationship between body and soul in detail.[162] We most often see brief mentions of the ψυχή as the body's life-force that causes death when it departs from the body (e.g. *Nat.Hom.* VI, *Morb. I* 5, *Int*. 27, 39, 40); as the psychic agent in the body (*Aër*. XXIII, *Flat*. XIV); as a component of the body that grows and wastes with it (*Epid. VI* 5.2, *Hum*. VII); or very rarely, all of the above (see *Vict. I – IV*). Generally, the authors will present their theories of ψυχή-σῶμα relations for three reasons.

1) When such an explanation is necessary in their descriptions of the formation of the body: for example, the soul is fundamental in the embryology of *On Regimen*,[163] and in *On the Nature of the Child* the πνεῦμα has a soul-like capacity in its ability to articulate the embryo *in utero*.[164]
2) In descriptions of how the body functions: for instance, in the physiology of *On Regimen*,[165] in the pathological link between body and soul in *Epidemics VI* and *On Humours*,[166] and in the cognition theories in *Airs Waters Places* and *On Breaths*.[167]
3) In justifications for certain medical treatments: for example, the author of *On Regimen* recommends certain regimens in order to alter the soul's balance and thus the patient's intelligence (*Vict. I* XXXVI), and certain exercises to "stimulate both body and soul" (*Vict. II* LXIV).

Philosophical and cultural traditions indicate that the ψυχή was considered to be an integral ingredient of a living body in Classical Greece. However, the soul is not a primary concern of the Hippocratic physicians until it factors into the authors' medical explanations – and in many of these explanations, the soul is not required in order to explain physiology, pathology, or treatment. For

[162] For an excellent overview on the soul in the Corpus, see Gundert (2000).
[163] See *Vict. I* IX, X and Bartoš (2009) on the embryology of *Vict.*
[164] See Lonie (1981), 148f. on the role of πνεῦμα in *Nat.Puer*.
[165] Especially in *Vict. I*.
[166] *Epid. VI* 5.2: "The soul of man grows until death. If the soul be burnt up with a disease it consumes the body." *Hum*. VII.13-15: "These results are the same, whether they come from humours or from wasting of body and soul."
[167] See *Aër*. XXIII and *Flat*. XIV.

instance, in my earlier discussion on what constitutes a theory of human φύσις (see **1.1**), I provided three examples: *On Regimen*, which argues that an understanding of the body requires knowledge of everything comprising the body, including the ψυχή; *On the Nature of Man*'s occupation with the four constituents of the body; and *On Ancient Medicine*, which holds a theory of human φύσις that is based on the relation of the body to food and drink. These three treatises maintain differing theories of bodily φύσις, as well as different levels of concern about the soul.

In *On Regimen*, the φύσις of the body is organised and arranged by the soul. The ψυχή has a special primacy in this tract not only because it is an integral part of the body, but also because the soul plays a role in forming the body *in utero* (*Vict. I* IX, X). Moreover, the elements that comprise the soul have significant associations with the ordering of the natural world according to this author.[168] The author describes the ψυχή as a flux of fire and water that constantly push each other to their respective maximum and minimum, and is inseparable from the living body.[169] The body and soul are interconnected in such a fundamental way that the capacities of the soul, the ability of the fire "to move all things always" and of the water "to nourish all things always", applies to both the soul and body (*Vict. I* III). The author uses this concept in their explanation of nutrition, but also in the arrangement of the body into its parts, hollows, and circuits:

> And in this fire made for itself three groups of circuits, within and without each bounded by the others: those towards the hollows of the moist, the power of the moon; those towards the outer circumference, towards the solid enclosure, the power of the stars; the middle circuits, bounded both within and without. The hottest and strongest fire, which controls all things, ordering all things according to nature, imperceptible to sight or touch, wherein are soul, mind, thought, growth, motion, decrease, mutation, sleep, waking (*Vict. I* X.15-20).

These passages and pathways are articulated and their contents kept in endless motion by the fire until the death of the body and soul (*Vict. I* X).[170] Similarly, external influences that affect the body – food and exercise, for example – also affect the soul (*Vict. I* XXXVI; *Vict. II* LXIV). Bartoš notes that the body depicted in *On Regimen* is constantly moistening, cooling, warming, and drying, experiencing the same processes as the ψυχή.[171]

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[168] Many studies have been done on the ψυχή and cosmos in *Vict.*, see Schluderer (2018) for list of references on this topic.
[169] Bartoš (2009), 3f.
[170] On the articulation and movement of these circuits, and how they are a μίμησις (imitation) of the arrangement of the cosmos, see Bartoš (2015), 111ff. and Schluderer (2018).
[171] Bartoš (2015), 187.

Comparatively, *On the Nature of Man* mentions the soul in relation to the fluids that constitute the living body. Specifically, the author is arguing against monist physicians who "see men who are cut, bleeding from the body, and so they think that blood composes the soul of man" (*Nat.Hom*. VI.7-11). In response, the author poses their own theory of the four fluids that compose the body and are the life source of a person. This author makes no further mention of the soul in the treatise because the soul's primary role as a life source is not the concern of the author, only the interaction of the fluids that comprise the body and most possibly constitute this author's idea of the ψυχή. *On Ancient Medicine*, in contrast, makes no mention of the soul at all, and I contend that this absence is because the soul does not factor into the author's explanation of "what the human being is in relation to food and drinks" (*VM* 20.3 Schiefsky = *VM* XX.20-21 Jones).[172] I apply the same reasoning to the lack of mention of the soul in the theory of φύσις in *Places in Man*, which describes the body as an organic unity where "there is no beginning point of the body, but rather every part is at the same time both beginning and end" (*Loc.Hom.* 1). This author utilises the interconnectedness of the body to explain how diseases in one part can affect others, and does not need the soul in order to explain this theory.[173]

Throughout the Corpus where the soul is mentioned, the soul and its capacities – including its ability to conduct mental functions, and its role as a life source of the body – are analogised to, and integrated with, the body.[174] Accordingly, any problems relating to the soul's domain may be treated by the technical skill (τέχνη) of the physicians. This relationship becomes especially apparent when psychic functions are assigned physical processes or locations that act as intermediaries between soul and body, and vice versa.[175] As a result, with the exception of *On Regimen*, the understandings of the living body in the Corpus are constructed largely without any diligent theories regarding the soul or how it enlivens a body. *On Regimen*'s highly theoretical account of the living body regards the soul as an integral piece in understanding the functioning of the body, but overall in the treatises of the Corpus, the soul is largely identified as a life principle that passively sustains the living body.[176]

[172] I have used Schiefsky's translation here for its gender neutrality.
[173] Craik (1998), 93.
[174] Claus (1981), 154.
[175] See van der Eijk (2005), Rocca (2003), 17-47, and Thumiger (2017).
[176] Conversely, on the soul *actively* sustaining the body's life, see *Vict. I* VI and *Vict. IV* LXXXVI.

1.3.2 The Living Body's φύσις

While the soul may sustain, and even initiate, life, the authors consider several other vital factors and processes to be integral to keeping the body alive. Without the soul the body may not live; however, without the implementation of these processes, it can also not survive. As discussed in the first section of this chapter (see **1.1**), the Hippocratic authors understood the body's φύσις as its organising force, regulating the changes taking place within the body in order to maintain its life and, ideally, its health. As I further explored in the second section (see **1.2.1-3**), the authors demonstrate an interest in the ways the body's substances and parts interact and communicate, and the ways in which the body organises itself.[177] In works that apply theory to the physiology of the body, this interest is evident in the theories of bodily φύσις and the perceived interaction of substances and parts within the body. Alternatively, the less theoretical works establish potential connections between parts, signs, and processes through inquiries that can be built upon through further empirical observation.[178] In this section I examine the authors' understandings of the vital processes that are maintained by the body's φύσις. I begin with the general idea of natural bodily balance, especially in the context of female bodies, before turning to an analysis of the importance of heat, respiration, and nutrition to maintaining a body's life. These aspects of the living body are all maintained by the body's φύσις, and I will demonstrate that this organising force is central in the authors' understandings of these processes.

According to the Hippocratic authors, a state of health in which all the body's parts can function together as they should is established through achieving a state of equilibrium. For all bodies, this equilibrium is acquired through the balance of the quantities and qualities of the body's substances and parts. In health, the body's φύσις and its self-maintaining capacity is naturally inclined toward preserving this balance, but in illness the physicians must employ corrective measures through their τέχνη in order to restore balance when it is lost.[179] For the female body, health and the maintenance of life still depends on this balance, but also on the health of the uterus, which is considered an influential aspect of the φύσις of female bodies.[180] Hippocratic gynaecology is utero-centric, maintaining that the uterus is the cause of, and solution for, most female medical problems. These utero-centric understandings of the female body draw on the notion of the uterus as the primary

[177] Smith (1994c), 8.
[178] For example, inquiries such as: "Do patients that throb through their whole body end up losing their speech?" (*Prorrh. I* 30).
[179] See **Chapter Two**.
[180] Flemming (2013), 575.

regulator of the balance of substances in the body (e.g. *Prorrh. II* 25).[181] Additionally, the uterus is also the hollow place in which seed forms into an embryo that is carried through pregnancy, and is thus a core concern for the physicians in terms of fertility. The ability to carry children is unique to female bodies, and their φύσεις are naturally favourable to growing and nourishing new life despite their apparently "weaker" and more "sickly" bodies (see, for example, *Oct*. 9 = *Septim*. 9). The authors recognised that not all women are able to bear children, but fertility and menstrual regularity are the aspects of female φύσις with which the physicians are frequently occupied.[182]

The Hippocratic authors demonstrate that irrespective of theories on human φύσις and ideas regarding natural balance, empirical and everyday knowledge of the body form the basis for their decisions on the body's most integral characteristics. The author of *Precepts* states,

> For the healthy condition of a human being is a nature that has naturally attained a movement, not alien but perfectly adapted, having produced it by means of breath, warmth and coction of humours (*Praec*. IX.13-17).

The φύσις of the body is an active organising force that is fuelled by, and maintains in return, respiration, innate warmth, and what I take to indicate the nutrition that results from concocted humours. Of these three factors, I firstly demonstrate the importance of warmth to the body, before turning to a broader analysis of respiration and nutrition.

In the Corpus, heat is regarded as a quality that is both dangerous and integral to the body. It is a core characteristic of fever and inflammation, has the ability to dry out and burn up the body, and is capable of attracting other substances and causing acute, localised pain and disease. Heat is also a marker of life. Natural, often innate, heat is associated with growth and nourishment (*Aph*. I.XIV; *Carn.* 6); movement (*Carn*. 6; *Vict. I* III); the interior, especially the torso and its 'organs' (*Morb. I* 11; *Liqu*. 2; *VM* XVI); and importantly the processes of concoction and digestion (e.g. *Salubr*. VII). Analogies related to heat, and particularly cooking, are often used to describe digestion (as well as the concoction of organic substances) and also gestation. Both of these processes take place within the interior of body and require the mixing of materials and the presence of heat to sustain them.[183] The author of *Diseases I* also understands heat to be a primary delineating characteristic

[181] Hanson (1989), 39. But not all medical problems, see King (2005), 157 and Dean-Jones (1994), 110-147.
[182] Dean-Jones (1989), 186; Demand (1998), 76; Flemming (2013), 575. See Hanson (1990), 315-320.
[183] See Bartoš (2015) on digestion and cooking metaphors in the Corpus, and Hanson (1995) on gestation metaphors.

between life and death: "finally, everything becomes cold and the person dies" (*Morb. I* 34). In the Corpus, heat changes into cold and vice versa very readily (e.g. *VM* XVI, *Morb. I* 23, 24, *Flat*. VIII), and an imbalance of too much and too little heat harms the body. The authors recognised natural warmth as integral in the long-term maintenance of the body's processes.

Respiration is a vital bodily process, and we are dutifully informed by the author of *On Breaths* that without air, even for the shortest amount of time, our bodies will die (*Flat*. IV). Inhalation and exhalation are, this author states, "continuous for all mortal creatures" and carry on despite the physiological changes that take place during life (*Flat*. IV). The most important trait of healthy respiration is its regularity and harmony (aside from in exertion), and also the ability to breathe "easily and without pain", which also indicates the good health of the interior (*Prorrh. II* 6). The authors provide a few different explanations on how the body respires and what parts of the body take part in this process, as well as what function respiration has in the body. Thivel has discussed the Hippocratic understanding of the first two, but I have reservations about the details of his overview. For instance, he argues that the understanding of respiration in Hippocratic medicine has three chronological stages: the first lacks specifics of the parts involved in respiration, the second incorporates air and blood into the vitality of the body, and the third connects lungs as the 'organ' of respiration.[184] This attempt at a neat distinction to aid in dating the treatises of the Corpus leaves little room for the subtleties in the Hippocratic texts. These subtleties include the repeated linking of the lungs with respiratory problems,[185] and while this link may not directly indicate their role in respiration, at the very least it connects the lungs with the passage of air though the body.

Regardless of such reservations, Thivel usefully highlights the diversity of Hippocratic theories on respiration. Certain authors only had vague notions of where air went when it was inhaled, but more so what the quality of inspiration and exhalation meant for the body.[186] For example, *Prognostic* argues that in specific acute diseases rapid respiration indicates inflammation of the parts above the diaphragm, deep breaths indicate delirium, cold breaths are fatal, and "good respiration must be considered to have a very great influence on recovery" (*Prog*. V). Some authors describe the exhalation of air through artificially created holes in the body. *Epidemics II*, for example, observes that, "when the intestine is wounded, breath comes (ἀναπνοὴ) below by the

[184] Thivel (2005), 240.
[185] Although not in all treatises, see *Flat*. X.
[186] Jouanna (1998), 58.

wound (τρῶμα) invisibly, and the chest is emptied" (*Epid. II* 6.13).[187] In *Diseases III* the author states that incising the chest under the nipple releases warm breath (πνεῦμα) out of the lungs (*Morb. III* 10), and in *Coan Prenotions* a severe wound to the trachea or lung is fatal because, "with the lung injured, there is less breath coming through the mouth than escaping from the wound" (*Coac*. 499). Other authors, though, maintained that air followed a particular path through the body and the interior vessels. *On the Sacred Disease* is a famous example of this, with the inhaled πνεῦμα (and the intelligence it carries) either travelling first to the brain and then through the rest of the body, or vice versa (*Morb.Sacr*. XIX). In *On Breaths*, air is present throughout the whole body, and although Thivel argues that the author shows no knowledge of the mechanism of respiration, *On Breaths* maintains that air descends from the throat to the chest, and ascends again to exit the mouth (*Flat*. X.19-21). This author also analogises breath escaping an overheated body to steam violently escaping a heated pot (*Flat*. VIII.17-24).[188]

In other treatises, the Hippocratic authors detail a more observation-based understanding of breathing, involving the techniques outlined in the **Introduction** (**§2**). As Gundert notes, the authors mention various anatomical parts in connection with breathing, including the throat, bronchial tubes, the lung, and upper thoracic cavity in general.[189] In many pathological explanations, respiratory problems are connected to these parts. There is also a trend in the gynaecological texts that associates choking, suffocation, and respiratory problems such as ὀρθόπνοια (when respiration is only possible while the body is upright) and ἆσθμα (difficulty of breathing) with the compression or smothering of the chest area.[190] This association is often in cases when the uterus presses against the chest cavity (e.g. *Mul. II* 92, *Nat.Mul*. 41). Interestingly, in *Epidemics VI* the author briefly describes the body's surface and its ability to absorb and also excrete: "the flesh (σάρκες) draws both from the intestine and from the exterior. Obvious in exercise is the perception that there is exhalation also" (*Epid. VI* 6.1). This passage was interpreted by Galen as evidence of the skin's ability to breathe, thus "the whole body inhales and exhales"

[187] Similarly, in *Epid. V* and *VII* the back wounds of two patients nosily release breath (πνεῦμα) (*Epid. V* 96 = *VII* 34).
[188] Thivel (2005), 246.
[189] See Gundert (1992), 454 n.13.
[190] Notably including the heart, but also the diaphragm and lungs.

(Gal. *In Hp. Epid. VI* XVIIB 314K);[191] however there is little other indication in *Epidemics VI* that the author maintains such a view.[192]

In Hippocratic embryology, respiration is one of the key processes that keeps the foetus alive and nourished *in utero*. *On Fleshes* argues that the foetus draws in breath as it "sucks with its lips from the uterus of the mother" (*Carn*. 6). Other treatises such as *On Regimen*, *On the Nature of the Child*, and *Superfetation* establish a passage of air into the child through the umbilical cord. In *On Regimen*, the πνεῦμα from the mother continuously nourishes the embryo until its body begins to grow and harden (due to the heat of fire), trapping the πνεῦμα within while the fire forms the child's body. When the fire eventually runs out of moist nourishment, it is said to "burst forth" and carve passages out of the body, through which πνεῦμα could travel; these passages could indicate the mouth and nostrils, but also potentially the umbilical cord (*Vict. I* IX). In *On the Nature of the Child*, the description of the foetus breathing is more articulate: the foetus breathes and is nourished through the umbilical cord, and its inspiration and exhalation is in sympathy with the mother (*Nat.Puer*. 3, 1). In *Superfetation* this passage is mentioned immediately upon the birth of the child. The author states that, "if the umbilical cord puffs up with air (ἐμφυσῆται) like a pouch, the child will move or sneeze and give voice; then you should remove the cord while the child is taking a breath"; although the breath the child takes is through the mouth and nose, the umbilical cord apparently delivers vital φῦσα into the child's body to kickstart the first signs of life (*Superf*. 15).

Nutrition is considered as crucial by the authors because it sustains the body and allows it to grow, and importantly depends upon the body's ability to digest food and drink.[193] Across the Corpus, digestion is considered to be a process of heating and fermentation that takes place within the abdominal cavity (κοιλίη). Food and liquid have to be concocted (πέψις) and changed before passing out of the body, and the authors utilise cooking analogies (as well as analogies to various crafts) to help explain this process. Jouanna remarks that Hippocratic accounts of the digestion process are vague or metaphorical, relying on imprecise terms (such as 'cavity') and characterised as a dispute between the body and the food taken into the body.[194] However, while many of the authors seem to exhibit a lack of precision in describing the digestive process, there are also elaborate theories of digestion such as in *Diseases IV*, where digestion and nutrition are based on

[191] Gal. *In Hp. Epid. VI* XVIIB 314K: perspicuum sensui est totum animalis corpus exspirabile esse atque inspirabile.
[192] Furley & Wilkie (1984), 12; Smith (1994b), 247 n.33. Although compare *Epid. VI* 4.22.
[193] See *Morb. I* 15 and *Aff*. 24.
[194] Jouanna (1998), 58.

a moisture cycle in the body (*Morb. IV* 11 – 13). Moreover, in *On Regimen*, fire, in a gentle form, is responsible for the digestion of food; akin to smiths and farmers processing their gold and corn respectively, within the body food is processed by heat and broken down so it can be properly used as nourishment (*Vict. I* XX).[195]

Nutrition and nourishment are processes of attraction and reaction. These processes bear similarities to the accretion theories of the early natural philosophers (notably Empedocles and Anaxagoras).[196] Treatises that deal with humours and primary constituents of the body are especially clear on the involvement of like-to-like accretion in the conversion of food and drink. For instance, the assimilation of water, blood, bile, and phlegm to the body in *Diseases IV* (*Morb. IV* 4 – 8), fire and water in *On Regimen* (*Vict. I* VI, VII), the flavours in *On Ancient Medicine* (*VM* XIV), and the qualities ("the hot, the cold, the gluey, the fat, the sweet, the bitter, the bones, and the other parts that are in a person") in *On Fleshes* (*Carn*. 13). These humours, constituents, or elements are fundamental to the body, and are also found in the natural world; as such, the body is nourished and can grow through the assimilation of natural material containing these constituents. In a similar vein, the concept of like building onto like can also be seen in Hippocratic ideas of embryology, especially in how the physical body of an embryo forms, and how the mother's body converts food and drink into sustenance that nourishes and maintains life.[197]

Nutrition importantly relies on digestion and the body's ability to assimilate external food and drink into its own organic matter. In *On Regimen*, the abdominal cavity is said to be "a steward for dry water and moist, to give to all and to take from all, the power of the sea, nurse of creatures suited to it, destroyer of those not suited" (*Vict. I* X.4-7). The cavity is a central point that collects what enters the body, assimilates what is necessary, and expels what is not. In his discussion of this passage, Bartoš notes that,

> the capacity of the sea to assimilate and decompose organic materials and to provide nutrition should apparently illustrate the digestive and nutritive capacity of the largest cavity in the centre of the body.[198]

This cavity also has the ability to digest and transform into nutrient the matter that is already within the body. For example, the "springs" in *Diseases IV* act as reservoirs for storing the four ἰκμάδες

[195] See Bartoš (2015), 156f.
[196] See especially Inwood (2001) and Curd (2007).
[197] See **1.2.1** and **Appendix A**.
[198] Bartoš (2014), 546f.

so that these moistures can be redirected to the cavity when needed (*Morb. IV* 8). Also, in *Airs Waters Places* stagnant water, fresh rainwater, and melted snow apparently have little nutritive qualities; accordingly,

> those who drink it have always large, stiff spleens, and hard, thin, hot stomachs, while their shoulders, collarbones and faces are emaciated; the fact is that their flesh dissolves to feed the spleen, so that they are lean (*Aër*. VII.6-20).

The interior of the body will thus digest what it needs to, including itself, in order to keep the body alive – a biological tendency that we are still familiar with today.

The small treatise *On Nutriment* argues that nourishment brings about life and growth in the young and merely the sustenance of life in the old (*Alim*. XXXIV). As discussed above (**1.2.1**), this author believes that "moisture (ὑγρασίη) is the vehicle of nutriment" (*Alim*. LV). The nutriment itself varies in forms (*Alim*. I), but the moisture in the body allows the nutrient's δύναμις to reach all parts of the body, including the bones, vessels, blood, marrow, the brain, and the breath (*Alim*. VII). This author's idea of nutriment also highlights particular relationships between different substances and parts of the body. The author provides two examples: pus as nutriment for an open wound (ἕλκος), and marrow as nutriment for bones. Marrow is always present within the structure of a bone; when a bone is broken in some way, the marrow forms calluses to help harden and heal the fracture (*Alim*. LIII). Pus, conversely, is formed when organic material such as flesh and blood putrefy (*Alim*. LII).[199] The relationship between pus and an open wound thus entails the conversion of material at the wound site, whereas marrow is naturally linked with the health and growth of bones. By establishing that a part of the body (i.e. bone or wound) can be nourished by organic matter that is somehow related to it (marrow or pus respectively), the author of *On Nutriment* builds on the like-to-like relationship of nourishment and applies it to the body's healing capacities.

The Hippocratic authors thus base their understandings of the body's functions in its physical processes. By focusing on the natural causal relations associated with the body's physiology, the authors tend to set aside aspects of the body that cannot be directly impacted by their τέχνη. This is why the soul, while considered a crucial component of a living body, is only discussed rarely in the treatises (with the exception of *On Regimen*). As such, many of the authors demonstrate a concern with the body's vital physiological process, and understand these processes to be governed

[199] See **Chapter Two.**

and maintained by the body's φύσις, the organising force that the physicians can aid or correct through their τέχνη.

1.4 Conclusion

The Hippocratic authors recognised that the body is a complex system undergoing changes regulated by its φύσις and the individual φύσεις of its parts. In this chapter I have shown that the authors construct understandings of the body's functions that are based primarily on the physical body accessible by the τέχνη of the physicians, and supplemented those understandings with theory to explain *how* and *why* physiological processes take place. I have analysed several core aspects of the functioning body, including the regulatory and organisational power of its φύσις, its crucial substances and parts, and the principle(s) of life that maintain the living status of the body. The Hippocratic authors considered these parts and processes to be vital to the living body. As such, these aspects are a priority of the physicians, and thus an active concern in their medical explanations and inquiries. But the authors also establish understandings of the body's functions in order to understand the changes that take place within the body when illness takes over – as I explore in my next chapter, the diseased body.

Chapter Two

The Diseased Body

The Hippocratic authors are actively concerned with diseases, their causes, and the effects they have upon the body. There are over two hundred named and/or described diseases throughout the Corpus, each with a theorised nature (φύσις) that guides its progression through the body, an aetiology, and a course of treatment the physicians recommend or advise against.[200] In this chapter I examine Hippocratic ideas of pathology specifically in relation to the living body, and focus on the body itself and the ways in which it can be affected by illness.[201] The chapter is divided into three sections. Firstly, I analyse the manifestation of disease throughout the body, including the Hippocratic authors' understandings of how diseases arise, and how the authors evaluate a disease's physical presence in the body. Secondly, I examine disease aetiology in the Corpus in relation to the concept of quantitative and qualitative imbalance within the body and the significance of the idea of 'imbalance' in Hippocratic pathology. Thirdly, and finally, I analyse the authors' understandings of corruption and change of substances and bodily parts in disease, and the idea of the 'destruction' of these substances and parts due to the negative effects of disease. My aim is to analyse how the Hippocratic physicians understood the processes and changes happening to, and within, a body that is experiencing disease, and illustrate the importance of the concept of change in Hippocratic pathology.

2.1 The Manifestation of Disease

The Hippocratic authors examine and understand diseases within the context of the living body. Observations on the ways in which disease manifests through the body – including the effect a disease has on the body, and the effect the body has on a disease – play a crucial role in Hippocratic nosology and pathology. In the treatises, the manifestation of a disease is described in a narrative sequence that reflects the progression of the disease through the patient's body; as Smith states,

[200] Potter (1990), 237ff.

[201] Due to the scope of this thesis, I cannot discuss mental disorders. For excellent scholarship on mental afflictions in the Corpus, see, for example, Gundert (2000) and Thumiger (2017).

"the author engages the disease as the physician meets it".[202] The narrative sequences are not always recorded in the precise order of events, but this method of describing diseases situates the disease within the context of the patient's body.[203] In this section I illustrate how the physicians identified a body suffering from disease, and how they understood the changes taking place throughout the diseased body. I focus specifically on (1) Hippocratic understandings of the ways in which disease manifests throughout the body, and (2) the ways in which these observable manifestations are treated as signs designed to aid in classification, diagnosis, and prognosis of disease.

The Hippocratic authors do not provide a clear conceptual framework for nosological classification, nor a precise definition of disease, despite the predominate concern with diseases throughout the Corpus. Rather, the authors use the term 'νοῦσος' (disease, malady) to describe, as Holmes phrases it, clusters of negative biological effects occurring throughout the body that have a specific φύσις and a specific capacity (δύναμις) to affect change.[204] The νοῦσοι and their individual φύσεις are understood through the effects they have on the body, the paths of their progression, the areas of the body in which they are located, and their obvious or speculated causes, and they are often given names based on one (or more) of these categories (see **2.1.2**).[205]

The author of *On Breaths* asserts that "everything is called a disease (νοῦσος) which makes a man suffer" (*Flat*. I.27-29). The term 'νοῦσος' is widely applicable in the Corpus, and is strongly associated with a body that has been negatively altered from the 'norm'. In modern pathology, our conception of what constitutes a 'pathological condition' is broad and encompasses medical problems and abnormalities ranging from diseases to wounds and physical deformities. However, within that scope, modern medicine also usually differentiates between ailments that are classified as diseases and conditions such as wounds and injuries.[206] Our understanding of disease has also been bolstered by medical innovations that allow us to differentiate between pathological conditions caused by the destruction of cells versus those caused by bacteria. In contrast, in the Corpus 'νοῦσος' is used broadly, akin to our use of 'pathological condition'. The authors apply this term to a range of afflictions, including epilepsy, pleurisy, ardent fever (καῦσος) (*Epid. II* 1.2), lientery (*Aff*. 24), a prolapsed uterus (*Mul. II* 36), impotence (*Aër*. XXII), and wounds (*Morb*. *IV*

[202] Smith (1990), 191.
[203] See Roselli (1990) on the fluidity and arrangement of data in *Morb. II* and *Int*.
[204] Holmes (2010), 124.
[205] See Potter (1990) and Jouanna (1999), 141ff.
[206] See especially Boorse (1997), 41ff.

19). This link between νοῦσος/disease and negative physical change that is causing suffering to the patient is an important undercurrent in the way the Hippocratic authors evaluated the diseased body and its relationship to change.[207]

2.1.1 Change and the Diseased Body

Change (μεταβολή) is a fundamental concept in Hippocratic physiology and pathology.[208] Healthy and ill bodies undergo constant change due to internal physiological and pathological processes within the body, as well as external effects acting upon the body. In the Corpus, change initiates and forges passageways between different states of the body – optimal health, 'normal' health, illness, death – and establishes a continuum of health that is vital to Hippocratic pathology. In this section I focus on the relation of the diseased body to this continuum, and illustrate that the authors understood disease as a process that negatively transforms a living body and its parts.

The Hippocratic authors recognised that the transition from health into illness involves a progression of changes which culminate in the manifestation of the disease. Although the authors remark on the 'sudden' onset of a disease (e.g. *Epid. VII* 118), descriptions of diseases suddenly arising with little aetiological explanation are more common in the case studies than in passages that explore pathological theories. In the latter, the authors recognise that by virtue of incorporating natural aetiologies into pathology and linking together chains of causation within the body (see **2.2**), the manifestation of disease becomes a process, often moving from the interior of the body to the exterior. For example, the author of *On Regimen* states,

> for diseases do not arise among men all at once; they gather themselves together gradually before appearing with a sudden spring. So I have discovered symptoms shown in a patient before health is mastered by disease (*Vict. I* II.61-66).

Human diseases gain strength and momentum in increments,[209] and begin to make themselves known to the patient and the physician when this progression of change becomes accessible to the perception of either party.

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[207] For clarity, I primarily use 'disease' rather than 'νοῦσος' in my discussions, with the stipulation that 'disease' indicates the Hippocratic concept of νοῦσος and not our modern understanding of disease.
[208] Jouanna (1999), 328f.; Kosak (2004), 121ff. See especially the entirety of *Acut*., which discusses change in relation to disease and treatment.
[209] In chronic diseases these increments can be longer than in acute diseases, which are overall shorter and more violent.

To offer a simple example, let us look at fever, which the authors considered to be a sign of disease as well as a disease in its own right.[210] Fever occurs when parts of the interior have been heated by a causal agent and febrile heat has manifested throughout the body or in a particular *locus*. This febrile heat signals the presence of fever, and can be generated in a number of ways. Fever theories in the Corpus often depend on the author's specific humoral theory, as well as how they interpret the interaction of fluids and parts within the body. For instance, *Diseases I* links fever with bile and phlegm leaking into the bloodstream and heating the blood, which in turns heats the whole body (*Morb. I* 23, 24, 29, 30); *Diseases IV* attributes fever to diseased moisture settling and sharing its heat with surrounding parts and substances (*Morb. IV* 21); *On the Nature of Man* associates fever with an increase in the body's bile (*Nat.Hom.* XV); and in *On Breaths* feverish heat is due to blood fleeing and settling in concentrated areas around the body (*Flat*. VIII). In all of these fever theories, the manifestation of feverish heat is a process wherein the healthy body is changed by causal factors and produces heat that can then lead to more serious physiological and cognitive effects.[211]

The treatises also demonstrate that for any given disease, the transition from healthy to ill (and even to death) can undergo significant variations that depend on the φύσις of the disease and the φύσις of the body. In understanding the pathological assault on the body and its parts, the Hippocratic authors are thus armed with knowledge regarding two crucial aspects.

1) The φύσις of the disease, which dictates:
    a. the natural path of the disease (in terms of physical trajectory and symptomatic progression),
    b. how the disease affects bodily parts and substances, and
    c. how the disease is affected in turn by the body, medicine, and the natural environment.
2) The φύσις of the body, including:
    a. the body as a whole, encompassing sex, age, constitutions, the possibility of pregnancy, and whether the body was healthy or already ill when this disease began,[212]
    b. individual parts of the body, and how these parts are affected by, and influence, the disease, and

[210] Yeo (2005), 433.
[211] See Smith (1981) and Harpas (forthcoming).
[212] See especially *Morb. I* 22.

c. the body's relation to factors such as the seasons, diet, and regimen.

The Hippocratic authors classify a disease's severity (e.g. benign, difficult, severe, or deadly) based on the effects that it produces throughout the body, linking certain diseases and their φύσεις with the ease or difficulty of treatment and cure (e.g. *Prorrh. II* 30). However, often it is the discrepancies in a body's type and state that are considered to be a major aspect in determining how a disease manifests and its strength. Building on my examination of constitutions in **Chapter One** (**1.1**), here I briefly discuss three of these discrepancies: (1) age and sex, (2) a disease forming within a body that is already diseased, and (3) the Hippocratic idea of a 'healthy' body.

Firstly, the authors consider age and sex as especially important in determining whether a disease is benign or deadly, as well as the impact the disease can have on the body. The strengths, vulnerabilities, and constitution associated with the patient's 'stage of life' contribute to the body being more or less vulnerable to the effects of a disease.[213] For instance, *Prorrhetic II* states that the differences in growths (φύματα) that occur on different bodies depends upon the age of the body. The author provides a list that includes common pimples forming on young bodies, "malignant cysts" and "hidden deep-seated cancers" within adult bodies, and "superficial" cancers in the old (*Prorrh. II* 11).[214] The authors of the *Epidemics* also make distinctions between how a certain season's constitution impacts adult male and female bodies. For example, in Thasos when the season's dominant humour was blood, women suffered different illnesses and physiological effects (including menarche, difficult births, etc.) than the men (*Epid. I* XV, XVI). Additionally, during the summer fevers at Perinthus, the author observed that only women developed rashes, deafness, and fell into comas (*Epid. II* 3.1).[215] This differentiation is based on the different (presumed) constitutions of men and women, but also on the different parts and physiological processes in these disparate bodies. In regards to all bodies – differentiated by constitution, age, sex, etc. – the individual parts within the body react differently to the δύναμις of a disease, and in turn affect the way the disease manifests throughout the body (see especially *Alim*. XXV).

[213] See Bertier (1990) on the maladies of children in the Corpus. On young versus old bodies see **Chapter One**.

[214] Other treatises also divide the span of a person's life into 'stages' that are marked by physical changes (e.g. *Epid. VI* 8.11) and apply numerology to these divisions (e.g. the seven stages of life in *Hebd*. 5 [8.636-637 Littré]).

[215] Hanson (1989), 39f. See also *Epid. I* XII and *Epid. VI* 7.1 (where differences in illness were due to habit).

Secondly, many of the authors also emphasise that whether a disease has formed from another disease, or if it is showing signs of changing into another, must be taken into account when judging a disease and its effect upon the body (e.g. *Morb. I* 22, *Aff*. 8, *Mul*. 5). Parts of the body that have already been changed or weakened by the previous or current disease are cause for greater concern than parts that were healthy before they entered into a diseased state.[216] As a result, the danger of a disease changing into another disease becomes a problem not only for the treatment of the initial disease – transformation is a less favourable outcome than cure, after all – but also for the body, already taxed by the effects of an illness.

Thirdly, and finally, the Hippocratic authors recognised that complete 'health' can appear differently in different bodies, and this variation can impact the ways in which disease affects the body. The idea of health as a relative state is an important part of the Hippocratic authors' understandings of living bodies.[217] Theories of constitutions outline balances of internal mixtures or qualities that amount to optimal health, but these theories also allow for variances that may involve the slight predominance or deficit of individual humours or elements.[218] These variations may not embody the ideal of health, but they are considered as *healthy* and a natural standard of normal for that given body. However, not every variation in constitution is classified as 'healthy'. The authors record cases of patients who are sickly, either as a temporary state of health (e.g. *Oct*. 9), or because these patients have constitutions that are weak and overly prone to the negative effects associated with illness (e.g. *VM* XII, *Epid. II* 5.1, *Aër*. X.37-40). These types of bodies are especially vulnerable to disease, and the weakness of their constitutions contributes to the severity of the disease's manifestation in their bodies. Thus, the changes brought about by disease vary according to a number of factors, including the type of body a patient has and the state it is in, as well as external influences such as the natural environment. But through evaluating the diseased body, and especially the *signs* produced by the body in disease, the physicians can at least attempt to understand and predict the series of effects which a disease will have on the body.

2.1.2 Signs of Disease

The transition from health to illness encompasses different natural states of the body and different body types. But in the Hippocratic treatises, it is evident that the authors make use of a set of

[216] See Robert (1990) on the changeability of diseases in the Corpus, also McDonald (2009), 47.
[217] Jouanna (1999), 333f.; Schiefsky (2005b), 233f.
[218] E.g. *VM* XX and the six constitutions in *Vict. I* XXXII. On *VM*, see Schiefsky (2005b), 229ff. and on *Vict. I* see Enache (2011) and Bartoš (2015), 83ff.

preconceived notions about what the body *should* look like, and how it *should* be functioning. These notions establish a 'norm' from which the physicians can evaluate a body in illness and also injury.[219] By using knowledge of the healthy body to evaluate the diseased body, the authors determined the effect of a given disease on the body through externally accessible signs (σημεῖα) produced by the body. The physicians assessed these σημεῖα in terms of their resemblance to the natural state of an individual body, or to the natural state of the ideal healthy body.[220] In this section I analyse the significance of σημεῖα to the way the Hippocratic physicians understood the diseased body, as well as the benefits and drawbacks of their use in the diagnosis and prognosis of disease. I argue that σημεῖα produced by the living body – in health, illness, and injury – are essential to Hippocratic medicine, and influence the ways in which the physicians interact with, and understand, the bodies of their patients.[221]

The σημεῖα produced by the body are inherently linked to change in the body. In health, this change is predominantly a product of the physiological processes happening within the body, and the σημεῖα produced in health are associated with these regularities – for example, growth, excretions, rate of respiration, and natural movement. In disease, σημεῖα are indications that negative change has occurred, or is occurring, in the body, and they are recognisable due to the physician's knowledge of the natural (and ideal) characteristics of the body and its parts. In the context of injuries in particular, the author of *On the Surgery* informs us that a physician must look for "what is like or unlike the normal" in their examination of the patient to find the cause of the patient's suffering and its effects (*Off*. 1).[222] In illness, this comparison is often implicit in descriptions of the effects of a disease – for example, in the observations of contorted limbs,[223] impaired cognition and behaviour,[224] and discoloured body parts and substances.[225]

The σημεῖα are considered by the authors as a core source of information on the φύσις of a disease and how it is affecting the body.[226] The author of *On the Art* states that the σημεῖα allow the physician to perceive "the conditions which, by their presence or absence in each case, cause the

[219] See **Chapter One**.
[220] Holmes (2010), 156ff.
[221] In this stance, I align with Holmes (2010) and her arguments on the importance of symptoms in Hippocratic medicine.
[222] See also *Art*. X.1-18.
[223] E.g. in tetanus (*Morb. III* 12).
[224] E.g. in phrenitis (*Prorrh. I* 34; *Morb. I* 34).
[225] E.g. yellowing in jaundices (*Int*. 35), pallor in 'white phlegm' (*Aff*. 19).
[226] On 'symptoms' in ancient Greek medicine, see especially Holmes (2010).

diseases to be of the nature they are" (*de Arte* IX.5-15).[227] The σημεῖα are linked to the φύσις of the disease as well as the physician's ability to understand the disease and its relationship to the body. As Lonie notes,

> the occurrence of such and such symptoms identifies the disease for the physician; they are the outward manifestation of inner factors and processes which cause the disease; and upon his knowledge of these factors he prescribes a treatment which will counteract them.[228]

The σημεῖα are taken as identifiable outward manifestations of interior processes and changes and mediate between interior and exterior (see *de Arte* XIII).[229] Sometimes the σημεῖα physically manifest on the exterior (e.g. rashes, growths, flesh discolouration, limb contortion) and other times are conveyed to the exterior through mediums and orifices (e.g. quality of voice, rate of respiration, the characteristics of the usual discharges of the body).[230] Everywhere on the patient's body that is accessible to the physician's senses can be investigated for observable σημεῖα.[231] This investigation can either take place in accordance with the φύσις of the body, or by constraining the body's φύσις and working in brief agon to it in order to extract useful data from the body (*de Arte* XIII).[232]

These externally observable changes to the body's normal (natural, healthy) state shape Hippocratic pathology in important ways, particularly in (1) the identification and treatment of disease, and (2) the prognosis of disease. The σημεῖα are integral to the diagnosis of diseases because they offer important information on what part of the body is being affected by a disease. They also provide indications on the nature of a disease. For instance, the disease 'white phlegm' is characterised by pallor provoked by the phlegm, jaundice by yellowing and the association of yellow with bile and the liver, and fever (πυρετός, from πῦρ, 'fire') by its heat. The σημεῖα also act as signposts for where a physician should begin their treatment: sometimes they signify the *locus* of the disease,[233]

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[227] *Hum*. IV, V and *Alim*. XXVI provide extensive lists of evacuations, body parts, and σημεῖα that can and should be evaluated by a physician.

[228] Lonie (1965), 3. 'σημεῖα' is also translated as 'symptoms' in the Corpus, however as Holmes (2010, 11) notes, the word symptom has a Greek form, σύμπτωμα, which appears once in a Hippocratic treatise from the late Hellenistic period (*Decent.* IV). I will be maintaining σημεῖα as 'signs'. See also Webster (2016), 170f.

[229] Holmes (2010), 124.

[230] See especially *Epid. II* 3.7, *VI* 2.3 on respiration as a sign of ill-health. Fluids are particularly valuable σημεῖα because they transport informative material from the interior of the body to the exterior (including waste material and other internal substances). See **Appendix A** for examples in the Corpus.

[231] See **Introduction §2**.

[232] See especially von Staden (2007), 28-32.

[233] E.g. *Aph*. IV.XXXVIII: "on whatever part of the body there is sweat, it means that the disease has settled there", and *Judic*. 27: "wherever in the body heat or cold is present, that is where the disease is."

while in other cases the physician must use their medical skill (τέχνη) and experience to interpret the σημεῖα.[234]

In Hippocratic medicine, σημεῖα are also essential in prognosis (πρόγνωσις), the art of predicting the progression of an ailment. In prognosis, σημεῖα act as gauges or clusters of indicators for the potential direction of the progression of a disease.[235] Grmek argues that the art of prognosis was inextricably tied with Hippocratic methods of diagnosis: the ability to ascertain the patterns of σημεῖα and the expected progression and outcome of a disease aided in the taxonomic classification of the disease as well as contributed to the social benefit of being able to predict the course of a sickness.[236] In many descriptions of diseases in the Corpus, the authors simultaneously describe what a disease has done, is doing, and what it will (or might) do if allowed to run its course, or if a physician's τέχνη intervenes.[237]

The idea that changes affected by a disease's δύναμις and the body's φύσις have an element of predictability is also the basis of the concept of critical days, the application of numerology to the progression of diseases.[238] Theories of critical days apply temporal rules and predictions of patterns to the progression of diseases as well as injuries. These theories draw on philosophical number theory and naturally significant numbers (such as three, four, seven, eight, and odds and evens) and apply them to the body's changes.[239] Critical days also importantly mark points of crisis (κρίσις), which signify the turning points of a disease – i.e. points at which the body will either begin to heal or relapse into sickness.[240] Points of crisis manifest as significant changes in the progression of a disease (or injury), such as violent vomiting, the breaking or outbreak of fever, or haemorrhages. When these changes involve the expulsion or segregation (e.g. in the form of an abscess) of fluid, this 'segregation' is often identified as an ἀπόστασις. The authors considered an ἀπόστασις to be a positive sign that the body is 'throwing off' a substance that had been ailing it, especially when this

[234] E.g. *Aph*. V.LII: "when milk flows copiously from the breasts of a woman with child, it shows that the unborn child is sickly; but if the breasts be hard, it shows that the child is more healthy." (= *Epid. II* 6.18).
[235] Holmes (2010), 149ff.
[236] Grmek (1989), 292-295. For a summary on the diagnosis versus prognosis debate in Hippocratic scholarship, see Holmes (2010), 125 n.16.
[237] See, for instance, the description of fevers in *Epid. I* XXIV, XXV and *Nat.Mul*. 15. See also *Praec*. XIII.14-15 and *Dieb.Judic*. 2 = *Hebd*. 46.
[238] On numerology and periodicities in health and illness, see Jouanna (1999), 338-342; in embryology and female bodies, see, for example, Lonie (1981), 69, Dean-Jones (1989), 186ff., and Hanson (1995).
[239] E.g. certain fevers flare in periodicals according to odd or even days (*Epid. I* XXVI), and the site of a wound becomes vulnerable to inflammation, foulness, and fevers on the third or fourth day of healing (*Fract*. XXXI.16-29). See Jouanna (1990), 338-342.
[240] Langholf (1990b), 79-181.

substance has undergone the cooking process of πέψις.[241] The author of *Epidemics II* provides a copious list of body parts from which an ἀπόστασις could take place, including "through the blood vessels, or the intestine, or the tendons, or the skin, or along the bones or along the spine, or through other exits, mouth, genitals, ears, nostrils" (*Epid. II* 1.7). This list, as well as the instances of ἀποστάσιες in the Corpus, indicate, as Langholf states, that "the body endeavours to banish the harmful substance and is not too particular about the ways of excretion".[242] The physicians observe these ἀποστάσιες and link them with the current disease, or they observe the progression of the disease and predict the potential for an upcoming ἀπόστασις that will turn the tides of the illness – preferably in the patient's favour.

However, the authors acknowledged that a disease also has the potential to make unpredictable changes to the body, or the body can react in unpredictable ways. Although prognosis and the reliance on an element of predictability – even in the context of therapy, i.e. that the application of X will yield reaction Y – is common in the Corpus, at times diseases and the impact that they have on a body can be unpredictable. Causal links establish connections throughout the body, and the rules of critical days and theories regarding the change and movement of substances and parts establish a theoretical basis upon which the physicians can base their observations of the body. But these factors are little help when confronted with σημεῖα that are, as the author of *Epidemics I* remarks, "protracted, troublesome, very disordered, very irregular, and without any critical signs" (*Epid. I* VIII.1-4).[243] Moreover, even with σημεῖα that may demonstrate an element of predictability, the body itself can react suddenly and in ways that are difficult for the physicians to anticipate. Hence, *Prorrhetic II* warns that apparently minor wounds can be fatal, while severe wounds can cause no difficulty in healing. The author states that physicians should not be surprised that "the minds and bodies of people differ very greatly, and that these differences have great consequences" (*Prorrh. II* 12).

To conclude, every sign produced by the body that is accessible to the observation of the physicians is considered an important source of knowledge about the changes taking place within the body.[244] The physicians utilise this knowledge, and employ important methods of comparison between healthy and unhealthy bodies, in order to evaluate, understand, and attempt to predict the different changes taking place in the body. The σημεῖα that indicate the presence of disease within the body

[241] Langholf (1990b), 125-127; Holmes (2010), 154. See *Epid. I* XI.
[242] Langholf (1990b), 127.
[243] Holmes (2010), 152. See also *Morb. I* 7.
[244] See *Epid. IV* 43.

are thus crucial to the Hippocratic understandings of the diseased body for two significant reasons: (1) they allow the physicians to identify change taking place within the interior of the body, a place their τέχνη could not easily access, and (2) they allow the Hippocratic authors to establish disease as a process of change, with each disease recognisable by the observable changes it makes to the body, and capable of being altered through the body's own healing capacity as well as the physicians' τέχνη.

2.2 Aetiology: Imbalanced Substances

The knowledge and investigation of causes (αἰτίαι) is another key aspect of Hippocratic pathology, and is important to the authors' understandings of the living body as well as the methodology of their medicine.[245] In the Corpus, the predominant cause of disease is attributed to bodily imbalance, especially change in the quantities and qualities of the substances that enter into and flow through the body.[246] In this section I examine the ways in which the Hippocratic authors utilise the idea of bodily imbalance in their pathologies, and the important role that imbalance plays in the processes that change the body in disease. I have divided this section into two parts. Firstly, I examine four types of imbalances that the authors attribute to causing, or resulting from, disease: (1) quantitative imbalance resulting from excess and deficiency, (2) qualitative imbalance due to excess and deficiency, (3) imbalance caused by isolated and mixed substances, and (4) imbalance due to moving and static substances. And secondly, I review these imbalances and illustrate the important information they offer on the authors' understandings of the causal relations and interactions of substances within the diseased body.

Akin to the natural philosophers preceding and contemporary to them, the Hippocratic authors maintained a belief in *natural* causation. The physicians argued that the processes of physiology and pathology establish paths of natural causal relations that could be investigated and, if necessary, altered through therapeutic techniques.[247] Natural causation also played an important part in the social aspect of Hippocratic medicine, not only in the defence of the medical profession and its successes, but also in establishing health and disease as natural phenomena independent of divine

[245] For an overview of scholarship on Hippocratic aetiology, see Holmes (2010), 126 n.20.
[246] Nutton (2013), 77; Langholf (1990a, 341) discusses the inclusion of air in Hippocratic pathology and asserts that in the Corpus there is no pathological theory that is limited to the humours alone.
[247] Lloyd (1991), 432; see especially *de Arte* V.

causality.[248] Hippocratic medicine is not totally divorced from divine influence: *On the Sacred Disease* defends the natural causation of diseases without discrediting the presence of the divine in nature, and *On the Nature of Women* asserts that the divine is the most important factor in the nature and diseases of women (*Nat.Mul.* 1).[249] But the physiology discussed in my previous chapter, and the pathology which I explore here and in my final chapter, are based on aetiologies that rely on natural causal links within the body and the ways in which substances and parts interact.

2.2.1 Imbalances: Quantitative and Qualitative

The association of 'balance' with health and 'imbalance' with illness pervades Hippocratic pathology.[250] In the treatises, the idea of imbalance is used in relation to the 'normal' quantity or qualitative state of a substance or part within the body. Quantitative imbalances are attributed to the increase and decrease in quantity of substances due to food and drink, the effects of the weather, or physical changes to the body. Qualitative imbalances, comparatively, are tied with the φύσεις of the substances and parts, and are linked with the effects of the materials' δυνάμεις on the rest of the body. In disease as well as injury, variations in quantities and qualities – which include temperatures, viscosities, purities, and rates of motion – are regularly the cause of, or caused by, negative change in the body.

Quantitative Excess and Deficiency

In Hippocratic medicine, the perceived quantitative changes of different bodily substances importantly underlie theories regarding dietetics and nutrition, aetiology of disease, and the function of certain physiological processes. Theories regarding dietetics, for instance, are largely based on empirical observations of what foods and drinks benefit or cause detriment to the body. However, the authors' arguments for *why* different bodies have different reactions to foods and drinks, and why certain foods and drinks are harmful or helpful to the body, often depend on their ideas regarding body constitutions. Constitutional variations are predominantly determined by degrees of excess or deficiency of constituent bodily fluids (or elements, as in *Vict*.) and the way the δυνάμεις of these constituents affect the φύσις of a body. In dietetics, these constitutional variations are paired with theories on the nutritional value of food and drink: this value is determined by the presence and magnitude of different substances within the consumables, and the

[248] Lloyd (1979), 49-58; Schiefsky (2005a), 73. See **Introduction §2**.
[249] Lloyd (1991), 417ff.; Flemming (2013).
[250] We find precursors for this concept in early Greek thought, and especially in the medical ideas of Alcmaeon of Croton (fl. fifth century BCE). See Lloyd (1991), 58f. and Jouanna (1999), 325-328.

way the δυνάμεις of these foods react with the φύσις of the body.[251] Consuming too much of a given food or drink causes the fundamental fluids within the body to also increase; too little, and the natural levels of the substances within the body diminish to unhealthy levels.

The author of *Diseases IV* acknowledges that the body itself has the capacity to recognise what it needs or does not need in relation to food and drink. The author argues that when the body is lacking in certain moistures (ἰκμάδες), the person will find the foods and drinks that contain what they are lacking to be pleasant to the taste – and the opposite for ἰκμάδες that are abundant in the body (*Morb. IV* 8). When this advice is not heeded, and without the necessary tailoring of diets, ill-suited diets can lead to flabbiness, pain, and illness (e.g. *Acut*. XXVIII, XXIX, XLVII), or to malnourishment and the resulting deterioration of the body's strength, mass, and ability to grow (*Dent*. XXIX; *Morb. IV* 3; *Morb. I* 34). In disease, certain diets, including increased food intake or fasting, are recommended as treatments. For example, in tenesmus,[252] an increase in diet keeps an empty cavity from causing pain (*Aff*. 26), and abstaining from food for 40 days is endorsed when a woman is vomiting blood after the birth of a child (*Nat.Mul.* 52). Such recommendations are meant to contribute to what the body may lack, or to halt the further introduction of deleterious substances into the body so as to deprive the disease of fuel.[253]

In disease, pathological explanations that involve bodily substances in excess emphasise the detriment to the interior of the body when too much has been added to any given part or substance. For example, excess water (ὕδωρ) accumulating in the body causes the disease dropsy (ὕδρωψ), which is characterised by swelling of the limbs, fevers, trouble breathing, as well as severe physical reactions (see *Morb. IV* 26).[254] As with all diseases in the Corpus, dropsy has the potential to be relatively benign or fatal depending upon the φύσις of the afflicted person, and the way the dropsy has manifested in their body. For instance, the water trapped within the body in dropsy can localise and remain fairly harmless until it disperses (*Morb. IV* 26). Alternatively, dropsy can cause intense pain, fevers, and bloating; in such severe cases, the water can burst through the skin to escape, and the disease can end in death (e.g. *Int*. 25, *Morb. IV* 26).[255]

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[251] Lonie (1981), 260ff.; Schiefsky (2005b), 26f.; King (2013), 35-37. See especially the constantly changing diets recommended for certain constitutions in *Vict. I* XXXII, and the discussions by Enache (2011) and Bartoš (2015), 83ff.

[252] A disease that involves the false sensation of wanting to have a bowl movement, accompanied by pressure and cramps.

[253] See Jouanna (2012), 11f.

[254] See Lonie (1981), 290-292; Langholf (1990b), 56, 73ff.

[255] Holmes (2010), 139 n.71. See also *Int*. 22, 23, 26, *Aff*. 22.

The gynaecological texts also warn of the inherent dangers when female bodies do not menstruate frequently or copiously enough (e.g. *Aph*. V.LVII). The authors maintain that the cycle of expulsion of blood from the uterus prevents the build-up of blood that can lead to pain, vomiting, or increasingly serious effects such as suffocation and cognitive impairment (loss of consciousness, madness, etc.) (e.g. *Mul. I* 2, *Virg*. 1).[256] Alternatively, consequences of heavy menstrual bleeding and losing too much blood include paleness, fevers, weakness, emaciation, and if the patient is afflicted with another disease, death (*Mul*. 5). These treatises also contend that variations in menstrual bleeding indicates an unhealthy uterus and also potential infertility. For example, menses that are longer or shorter in duration than the allotted 'healthy' timespan (three days for the heavy flow), or blood flow that is heavier or lighter than the substantial two kotyls (one pint, approx. 470ml) (*Mul. I* 6). These variations point to the body flushing out too little, or too much, of its bodily fluid, and therefore disease within the patient's body.[257]

Qualitative Excess and Deficiency

In the Corpus, qualitative descriptions frequently characterise bodily substances and parts. Usually these descriptors encompass one or a combination of the four primary qualities of hot, cold, moist, and dry, or provide an indication of the substance's quality, such as:

- viscosity (thick, thin, rare, dense),
- composition (uniform, and also gluey, fatty, etc.),
- flavour (acrid, bitter, sweet, salty, etc.),
- state (liquid, solid),
- strength (strong, weak),
- purity (pure, mixed), and
- rate of motion (disordered, moving, static).[258]

When substances, parts, and the body itself are in a state in which their qualities are said to be 'according to nature' (κατὰ φύσιν), the body complex functions healthily. Conversely, when their qualities are out of balance, i.e. when a substance is too thick or thin, when a part is too dry or moist, or when the body as a whole is too hot or cold, pain and sickness arise in areas where affected substances or parts interact.

[256] Hanson & Flemming (1998); King (1998), 79.
[257] Hanson (1975), 575 n.12. See especially Dean-Jones (1994, 86-103) on heavy versus healthy menstrual blood flow in the Corpus.
[258] Lloyd (1964), 92f.

Within the body, heat and cold are both vital and dangerous to the living body. I have already outlined the dangers and necessities of bodily heat;[259] cold, similarly, is necessary to cool the body's internal heat and prevent the burning up of internal parts,[260] but too much cold can cause the substances and parts with in the body to malfunction and can ultimately be fatal.[261] The same need for balance between extremes of too-much and too-little is needed in the cases of the other qualities as well. For instance, in cases of rarefication and density, flesh that is too rare can develop passages that are filled by a heated, thinned, fluxing fluid (*Loc.Hom*. 9), and air that is too dense cannot pass through the body (*Flat*. IX). Moreover, viscosity can be affected by temperature (heat thins while cold congeals), but when certain fluids are 'damaged' (see **2.3.1**), these fluids can change in viscosity. For example, the author of *Places in Man* states that when corrupted fluid floods into the joints as lubricant, this fluid is constantly forced out because of its thick consistency, and the joints consequently dry out (*Loc.Hom.* 7).[262]

Hippocratic pathologies of digestive disorders are especially characterised by changes in the qualities of the body's parts and substances. Too much dryness and cold, and too little of their opposites, results in fixations, shrivelling, and blockages, while too much heat and moisture can result in the interior of the body boiling or melting.[263] For example, *On Regimen* details the need for the right balance of moisture and dryness in the digestion process. Too much moisture results in too much cold in the cavity and prevents digestion (*Vict. III* LXXIX.1-9), and not enough moisture leaves the bowels dry and similarly prevents digestion (*Vict. III* LXXX.1-5); both alternatives result in the body wasting "through not receiving its proper nourishment" (*Vict. III* LXXIX.1-9). Also, in *Diseases III* the disease ileus is caused when the upper body is warmed while the lower cools, resulting in the intestines drying up; treatment involves draining warm blood so the upper body can cool and the lower can warm (*Morb. III* 14). For the same ailment, the author of *On Breaths* mentions that usual treatments involve the application of warmth to the body to

[259] See **1.3.2**.
[260] Such as air cooling the lungs (*Morb.Sacr*. X), and *ichōr* and bile moistening and cooling the heart (*Cord*. 1).
[261] E.g. cold congealing blood in the vessels (*Morb. II* 6), or cold causing pain the naturally warm parts of the body (see **1.2.3**).
[262] Craik (1998), 127-129.
[263] See Langholf (1990b), 90f.; Craik (1998), 14.

warm the interior and aid in internal movement, and for this author, heat supposedly rarefies the too-cool air causing pain within the cavity, allowing it to escape (*Flat*. IX).[264]

Isolated and Mixing Substances

Imbalances in terms of the 'separating off' of substances from the body's constituent mixture, as well as the mixing and mingling of substances within the body, are causes of disease in Hippocratic aetiology because of how these imbalances intensify, or transform, the δυνάμεις of bodily substances. A notable concept in Hippocratic medicine is the association of health and optimal wellbeing with a positive blending of bodily substances. A balanced blend (κρῆσις) of these substances is conducive to a healthy bodily constitution because the δυνάμεις and qualities of the substances of the κρῆσις have been combined and their distinctive δυνάμεις rendered harmless to the body. *On Ancient Medicine* and *On the Nature of Man* both prominently express this theory. *On Ancient Medicine* states that health is a thorough and balanced blending of the body's humours (χυμοί), whereas illness is caused "when one of them is separated off, and stands alone, then it (the χυμός and its δύναμις) is apparent and hurts a man" (*VM* XIV.37-39). *On the Nature of Man* warns that whereas health is the "duly proportioned" mingling of the four χυμοί, "pain is felt when one of these elements is in defect (ἔλασσον) or excess (πλέον), or is isolated (χωρισθῇ, 'separated') in the body without being compounded with all the others" (*Nat.Hom.* IV.1-9).[265]

Often the pain and disease caused by a substance 'separating off' and becoming isolated within the body are localised, or at least begin in a certain *locus* before spreading. For example, *Diseases IV* argues that when excessive heat or cold disturbs the body's moisture, the four ἰκμάδες can separate (a process analogised to the separating of milk). One or more of these ἰκμάδες can spread pain and heat along the interior paths they traverse and in the *loci* they settle, provoking and feeding disease in the body (*Morb. IV* 20, 21).[266] *On Ancient Medicine* also informs us that when unconcocted and acrid humours are separated from the body's κρῆσις, they ulcerate and eat through flesh,[267] and when internalised they cause disease in the places where they settle (*VM* XIX). Furthermore, the presence of pus corrodes soft flesh (*Fist*. 1), stiffens joints (*Prorrh. II* 15), and hardens internal parts (*Steril*. 10); when it settles in a particular place, especially in the case of empyema and internal

[264] See also the reactions of different foods, drinks, and sleep patterns to digestion in *Vict*. *II* XXXIX – LX.
[265] See Schiefsky (2005b), 229-235.
[266] Lonie (1981), 338ff.
[267] Specifically, when these acrid humours well up in the eyes, the flesh of the eyelids and cheeks corrode (*VM* XIX.1-6).

suppuration, it produces spots of intense pain and heat that can devolve into fever (*Morb. I* 15, 17). When concentrated, bile and phlegm can have a similar corrosive effect on flesh (*Epid. V* 19; *Flat*. X), and concentrations of phlegm are often associated with inflammation and swelling.[268]

The blending of a κρῆσις combines constituent substances into a complex compound in a way akin to cooking (see *VM* XIV).[269] Comparatively, the mixing and mingling of substances is explained by the authors as a less complex process of change, and instead of equalising the δυνάμεις of bodily substances, mixtures regularly exacerbate or diminish the qualities of the mingling substances. Aetiologies that are based on the mixing of healthy materials with those considered to be noxious (see **2.3.1**), or simply where they should not be, are commonly used by the authors to explain how qualitative changes occur in the body.[270] For example, the migration of bile and phlegm into the vessels that carry blood and/or air is a major cause of disease in the Corpus.[271] Due to their temperature and δυνάμεις, the mingling of bile and phlegm with the blood in the vessels can cause fever and chills (*Morb. I* 23, 24), congeal the blood and hinder the flow of substances through the body (*Morb.Sacr.* XII), and cause the vessels themselves to become ill (*Int*. 18). The author of *Diseases of Women I* also argues that menses which contain other substances – particularly mucus, phlegm, and membranes – indicate that phlegm mixing in with the material in the womb is preventing conception (*Mul. I* 11). Throughout this treatise and *Diseases of Women II*, we are given numerous recipes for cleaning out the contents of the uterus so that the menses may flow "clean and pure" (*Mul. I* 11).[272]

Moving and Static Substances

The final set of qualitative changes to be examined relate to the motion and stasis of substances within the body. The authors understood that most (if not all) of the substances within the body have a degree of motion as a result of the body's natural forces and shapes, or because of external influences (see *Loc.Hom*. 33). In the living body, motion is often a positive attribute and conducive to the health of the body. For example, the evacuation of substances and the pathways through

[268] See **1.2.1** and **Appendix A**. See also *Aff*. 16: "phlegm and bile, when gathered, are powerful and have dominance in whichever part of the body they occupy, and they produce suffering and violent pain; but dispersed, they are weaker."
[269] Jouanna (1999), 325f.; Schiefsky (2005b), 233f.
[270] Mixtures were also utilised by the Hippocratic physicians as σημεῖα of disease, see **Appendix A**.
[271] Bile and phlegm are themselves often considered to be a major cause of disease in Corpus (e.g. *Aff*. 1, *Morb. I* 2). On the binary theory of bile and phlegm as a cause of disease, see, for example, Langholf (1990b), 136f.
[272] See, for example, *Mul. I* 11, 74(11), 79, 81, 83, 84, 109 and *Mul. II* 73, 74, 96.

which breath travels emphasise the flow of substances *through* the interior to the exterior. Similarly, the distributive process of nutrition and the interaction of substances within the body emphasise the movement of substances *within* the interior.[273]

But the motion of internal substances is also considered a cause of disease when the substance itself is not behaving nor in a state attuned to its φύσις.[274] The authors of the Corpus describe substances as being 'set in motion' (κινέω), indicating that they have been provoked into movement within the body, or 'disordered' (ταραχώδης), if the quality of motion has been disturbed. For instance, abnormal flows of fluids that have been 'set in motion' (i.e. fluxes) are often caused by excesses of qualities (i.e. hot, cold, dry, or moist) or increases in the fluid taking part in the flux. The predominant fluid among fluxes is phlegm, often collecting in the head where it then heats, melts, and flows down to various regions of the body (see *Loc.Hom*. 1, 9, 10 and *Gland*. 7). However, fluxes can also involve other fluids (such as bile and blood) and begin in different areas of the body (the stomach, uterus, dried vessels, etc.).[275]

The moving moisture produces disease in primarily two ways: by provoking illness wherever it settles (*Loc.Hom*. 11), or by clogging the channels within the body either through its own presence and viscosity, or due to its δύναμις. For example, a flux of phlegm to the lung causes illness and irritation therein because the presence of phlegm in the lung is harmful (*Int*. 10), and when phlegm flows to the genitals, the functions of these parts are compromised and strangury arises (*Morb. II* 1). Moreover, phlegm can block delicate passageways such as the vessels of the eye, resulting in a loss of eyesight (*Morb. II* 1), and also cool and congeal blood in the vessels which stagnates the movement of the blood (often used in explanations of epilepsy, to which I turn shortly).

When the authors characterise a substance's motion as disordered, this description encompasses the trajectory of a substance's movement, as well as its natural velocity and the uniformity of its movement. When these attributes are disturbed in some way (through increase, nearby disordered substances, or the effects of heat or cold), the rate and quality of motion is upset and causes problems within the body.[276] In *Diseases IV*, the author states that the ἰκμάδες in the body can be

[273] E.g. blood and breath interacting in the larger vessels (*Morb.Sacr*. VII; *Oss*. 13; *Flat*. XIV; *Acut.(Sp.)* 7).
[274] The same notion can be applied to internal parts, which I discuss in **2.3.2**.
[275] Craik (1998), 131. For a simple diagram on the types of fluxes in *Loc.Hom*., see Craik (1998), 241. Fluxes can also pass from the female body due to fevers, abortions, or menstrual problems, and these usually begin in the uterus, or the uterus is highlighted as a primary causal factor (*Mul. II* 1).
[276] See Schiefsky (2005b), 252.

stirred up especially on odd-numbered days of an illness, and wherever these disordered ἰκμάδες flow, they will cause harmful heat or physical effects such as shivering (*Morb. IV* 15, 16).[277] *On Breaths* similarly ascribes physical tremors to the motion of the blood (*Flat*. VIII), and *Places in Man* states that throbbing in the temporal vessels is due to the clashing of blood travelling in opposing directions within the narrow channel (*Loc.Hom.* 3). In comparison, the stasis of substances within the body creates stoppages in important channels and pathways such as the vessels and digestive system. Hindering the flow of certain fluids, such as blood haemorrhaging *from* the body, as well as *within* the body, is obviously a positive variety of stasis, and the Hippocratic authors prescribe styptic medicines that promote haemostasis and therapy to aid in healing internal bleeding.[278] However, within the body, stasis of substances that are *supposed* to be moving through the body is associated with negative changes such as settling moisture,[279] paralysis,[280] and the physical and cognitive effects associated with diseases such as epilepsy.

In the Corpus, pathological explanations of epilepsy are often based on blockages or disordering of the motion of substances within the body. *On the Sacred Disease* attributes the effects of epilepsy to phlegm blocking the passage of air through the body (*Morb.Sacr*. X).[281] *On Regimen in Acute Diseases (Appendix)* similarly states that when dark bile and sharp fluids flood the vessels, these vessels become too dry and attract fluxes that "disorder" (διαφθαρέντος, corrupt or destroy) the blood, impeding air from following its usual path through the blood and body (*Acut.(Sp.)* 7). The stasis of air causes chills, loss of vision and speech, heaviness of the head, and convulsions, and "from this, patients become epileptic or are paralysed" (*Acut.(Sp.)* 7). Comparatively, in *On Breaths* the author holds a theory of human cognition that bases intelligence in the quantity, quality, and movement of the blood through the vessels: "so long as the blood remains in its normal condition, intelligence (φρόνησις) too remains normal; but when the blood alters, the intelligence also changes" (*Flat*. XIV.4-8).[282] I am not concerned here with Hippocratic theories of cognition, but rather the effects of a change in the motion of the blood on the body.[283] The author asserts that

[277] On this author's application of number theory, see Langholf (1990b), 119ff. and Lonie (1981), 318ff.
[278] See **Chapter Three**.
[279] E.g. bile settling in the eyes (*Int*. 28), and diseases settling in different bodily locations (*Epid. III* IV).
[280] E.g. body parts become paralysed when the path of πνεῦμα through the vessels is hindered (*Morb.Sacr*. VII).
[281] In this author's theory, air delivers intelligence (συνέσις) to the brain, and in this treatise healthy respiration and paths of respiration are conducive to cognition. See **n.112**.
[282] See also *Morb. I* 30. Blood-based theories of cognition and intelligence associate changes in the quantity, quality, and movement of the blood with changes in cognition, see Harpas (forthcoming).
[283] See **n.162**, **n.175**, and **n.314**.

the psychosomatic effects of epilepsy are caused when too much πνεῦμα in the vessels causes the flow of blood to become irregular, "so in one place it stops, in another it passes sluggishly, in another more quickly" (*Flat*. XIV.32-44). This irregularity in the ideally uniform motion of the blood results in the disordered physical and mental state apparent in epileptic fits.

2.2.2 Imbalanced Substances Conclusion: Antagonistic Interactions and Causal Links

In this section (**2.2**), I have examined how the Hippocratic authors associated negative bodily change in disease with changes in the quantities and qualities of the substances and parts within the body. When the quantities or qualities of substances are in excess or deficit, the body reacts negatively due to the concentration of these somatic (and psychosomatic) aspects, or due to the body lacking a necessary component that contributes to the balance and maintenance of the body. Similarly, when substances have been 'separated off' within the body, the concentration of their δυνάμεις have detrimental effects on the body, and the mixing and mingling of substances can affect each other's φύσεις and generate qualitative change that harms the body. And finally, movement is a vital characteristic of the living body, but when the trajectory and rate of motion of the body's substances are disturbed, it can cause the spread of disease throughout the body, blockages, or general disorder.

Hippocratic theories of disease aetiology that are based on changes in the quantities and qualities of substances and parts are notably concerned with deviations from the 'norm' or natural state of a given bodily material, and the consequences of change to this state. The idea of balance in Hippocratic medicine is associated with the idea of the body's φύσις relying on a harmonious balance of the δυνάμεις of substances within and comprising the body. When the body's substances are imbalanced, particularly in terms of excesses in quantity, extremes in quality, and when they become isolated, the δυνάμεις of these substances affect the body with a greater force (or strength, ἰσχύς) than the φύσις of the body and its constituents have the capacity to negate or counteract.[284] Consequently, these substances and parts can no longer function as they need to, and negative effects associated with disease are caused as a result. These effects continue until the body's φύσις, or the physician, can restore a given substance or part to its natural state.[285]

The determination of aetiology based on quantitative and qualitative change caused by natural means – dietetics, seasonal change, exercise, injury, etc. – reinforces the Hippocratic authors'

[284] On concept of the antagonistic and aggressive interactions between the body and disease (and also food), see, for example, von Staden (1999), Holmes (2010), 137f., and Jouanna (2012), 81-96.
[285] Miller (1952), 193f.

stances on natural causation. The authors had little empirical basis for their theories on imbalance aside from observable excretions, and the migration and accumulation of bodily substances that can be observed from the exterior of the body (swelling, etc.). But these theories establish causal links from the initial *locus* where the disease began, throughout the body, and finally to the external manifestation of the disease. These theories of imbalance also underpin the importance of change to Hippocratic understandings of the diseased body, and the journey an illness can undergo through the inner body before it becomes apparent to the physicians.

2.3 Corruption and Change

The crucial role of change in Hippocratic pathology is also important to the authors' understandings of the 'destruction' of the natures of bodily substances, as well as the ways in which physical components of the body can corrupt and malfunction. As I have already discussed, quantitative and qualitative change in bodily substances is an integral part of Hippocratic pathology. The authors also apply qualitative change to (a) the very natures of substances, rendering harmless substances harmful through corruption and putrefaction, and (b) the body's parts, causing these parts to malfunction. In this section I analyse Hippocratic ideas of organic corruption and malfunction in order to illustrate the importance of these varieties of negative change in Hippocratic disease aetiology, and further demonstrate the significance of change in authors' pathologies. My analysis is divided into two parts: (1) how the very natures of substances can change in disease, and (2) how the body's parts can change and malfunction in disease.

2.3.1 Corrupting Substances

Qualitative change, especially the heating and mixing of substances, notably disturbs the viscosity and purity of bodily substances. The processes of heating and mixing can also transmute healthy substances altogether, turning them into harmful or putrid presences within the body. In this section I outline a variety of damaging transformations that substances can undergo according to the authors of the Corpus. These transformations range from the solidification and putrefaction of fluids and material, to the 'destruction' of a substance's natural state.

The Hippocratic authors often describe noxious or harmful fluids bodily as corrupted forms of healthy substances and materials. For instance, in the Corpus bladder stones are painful ailments that can cause serious internal ulcerations. According to *Diseases IV*, bladder stones are formed when a child ingests milk that is "unclean" (in this case, breastmilk that is "earthy and phlegmatic"),

or from the patient having an "earthy" diet, and this earthy sediment collects in the bladder and forms into stone (*Morb. IV* 24). More notably, pus is understood by the Hippocratic authors to be a noxious substance that is formed as a result of change happening within the body. Pus is a substance in a state of 'cookedness', i.e. other organic materials have undergone the process of πέψις, which involves the application of heat and a period of fermentation/cooking wherein the substances 'ripen' (see *Epid. VI* 3.4, *Aph*. V.XXII).[286] These organic materials can include blood that has pooled in areas of the body where it should not be,[287] or from decayed body parts such as bone and flesh.[288] The transformation of fluids and once-living flesh and bone is described as rendering these substances and parts rotten or putrid (σαπρός),[289] and in disease as well as injury this process occurs most often in abscesses, suppuration, and mortification.[290] Pus is naturally corrosive, and the authors warn that it can rot through parts of the body (*Fist*. 1),[291] melt inseminated seed and prevent conception (*Steril*. 10), and harden the fluids that lubricate joints (*Prorrh. II* 15) as well as harden entire 'organs'.[292] The expulsion of this material is considered conducive to recovery from disease and injury.[293]

The rich vocabulary describing harmful substances and their negative effects in the treatises could indicate how important such damaging transformations are in Hippocratic pathology. The authors use terms such as σαπρός (putrid), νοσώδης (sickly, diseased), and φθείρω (a verb meaning 'to destroy, ruin, corrupt') when describing how substances have changed in a negative sense and are causing harm within the body. I will use blood, bile, and semen as examples to highlight these changes. In the context of substances becoming putrid, menstrual blood that remains in the uterus too long can putrefy (σαπέν) into pus (*Nat.Puer.* 4), as can rotting material that has not been able to escape the cavity in the case of an injury (*Epid. V* 26).[294] Bile can become putrid (σαπεῖσα) and mix in with the blood in the vessels as well as with the fluid in the joints and cause pain and swelling (*Int*. 41).

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[286] Langholf (1990b), 88f.; Kosak (2004), 126.
[287] E.g. blood that leaks into the cavity turns into pus (*Morb. I* 4).
[288] See **Appendix A**.
[289] E.g. *Flat.* X.32-34 and *Nat.Puer.* 4.
[290] Grmek (1989), 123, 389 n.24. See **Chapter Three**.
[291] Especially soft flesh.
[292] E.g. the uterus (*Steril*. 10).
[293] See *Prorrh. II* 13 on the evaluation of expelled pus (colouration, etc.) and the connection between the characteristics of pus and the likelihood of recovery or further complications.
[294] See also *Mul. I* 16, where seed that has remained in the uterus is discharged in a decomposed state (κατασηπόμενα).

In terms of 'diseased' substances, even though flux itself is both a cause and product of disease, the fluid moving in the flux can be diseased (νοσῶδες) and affect susceptible parts of the body, such as the glands (*Gland*. 2). *Diseases II* describes blood that is "dark and turbid" (instead of "red and pure") as diseased (νοσῶδες), highlighting the importance of the colour and motion of a substance in relation to its health (*Morb. II* 4). Also, particularly within the female body, the δυνάμεις of blood to nourish and inseminated seed to grow can culminate in a molar pregnancy (a fleshy uterine growth) when the seed is unhealthy: moles can form as a result of menstrual fluid taking in seed that is sickly (νοσώδεα) (*Mul. I* 71), or because of the retention of seed that is too thick (*Mul. II* 69).

Furthermore, fluids can be 'corrupted' when they mix with other substances, or when the natures of the once-healthy fluids change. *Places in Man* states that when a flux to the vertebrae and flesh is taking place in the body, the moisture (ὑγρότης) taken into the body through food and drink can mix with the fluxing fluid and become corrupted (διέφθαρται). The moisture still nourishes the body, but it can also over-nourish the flesh and cause dropsy (*Loc.Hom*. 10). Accordingly, the compromised purity of this moisture may indicate the integrity of the nourishment it provides to the body. In *Places in Man*, the corruption of fluid is often attributed to otherwise healthy fluid mixing with unhealthy matter (see also *Loc.Hom.* 7); Craik notes that this author is particularly concerned with the connection of health with the "purity of bodily moisture".[295] Comparatively, in *On the Sacred Disease* blood becomes 'corrupted' (διεφθάρη) when it is mastered by phlegm and congealed; here, the temperature, viscosity, and motion of the blood are 'corrupted' or 'ruined', resulting in the blood being incapable of performing its primary role within the body (being warm, of a suitable viscosity, and allowing breath to pass through the vessels) (*Morb.Sacr*. XII). The author of *Diseases I* also describes blood as corrupted when its motion and qualities have been disturbed, particularly in their discussion of phrenitis (*Morb. I* 34). In these examples, the authors maintain that corruption and detrimental change can transform substances to the point where their natures are altered – as in the case of putrefaction – or at the very least, to the point where their δυνάμεις are corrupted and become damaging to the body.

2.3.2 Changing Parts

Despite their restricted knowledge about the interior of the body, the Hippocratic authors maintained that interior parts could change drastically during the course of a disease, as well as cause diseases themselves. On this latter point, we find mixed opinions in the Corpus, often

[295] Craik (1998), 128.

dependent on the ways in which the authors linked their theories of human φύσις with the anatomy and physiology of the body. For example, *On Regimen* has a highly theoretical understanding of bodily φύσις and therapy, the former relying on the fire-water balance, the latter on the effect of dietetics and regimen on this balance; internal parts can be significantly affected by negative changes happening to the body (outlined especially in *Vict. II* and *Vict. III*), but ultimately health and disease depend upon the balance between fire and water, and exercise and nutrition.[296] By comparison, other treatises such as *On Ancient Medicine* and the gynaecological texts acknowledge the importance of parts in disease. *On Ancient Medicine* makes the explicit assertion that diseases can arise from the δυνάμεις of the χυμοί, as well as from structures (σχημάτων), i.e. the parts within the body, including 'organs' and channels (*VM* XXII), and in the gynaecological texts the uterus is a significant pathological entity within female bodies.[297]

The authors of the Corpus describe primarily two types of change in the parts of the body: change in the φύσις of a given part (ranging from relatively benign changes to 'destruction' and putrefaction), and change that has resulted in the malfunction or disorder of parts. Both of these changes are often interconnected and linked to the interaction of a substance with the affected part. In view of these distinctions, I have divided this section into three parts related to changes in disease: (1) the putrefaction of parts, (2) the qualitative change of parts (though not to a fully putrid state), and (3) parts malfunctioning or becoming disordered.

Putrefying Parts

Putrefaction is regarded by the Hippocratic authors as a negative process associated with decay and rot. Ridding the body of toxic material is considered necessary to prevent ulceration, rot, and contamination of healthy substances within the body. This notion is also applied to parts of the body that have died, or have otherwise become putrid. In **Chapter Three** I discuss in greater depth the Hippocratic authors' understandings of mortification, but here it is important to note that the exfoliation of desiccated, contused bone (i.e. splinters of bone that have come away from the primary bone) was an important empirical observation in the process of decay in injuries. The Hippocratic physicians believed that these pieces rot and contribute to the formation of pus if they are not properly flushed from the wound (e.g. *Fract*. XXXIII, *Epid. V* 41). Similarly, a miscarried embryo or foetus must be expelled from the female body, either through the body's own natural

[296] Enache (2011), 53; Bartoš (2015), 133 n.122.
[297] Dean-Jones (1994), 135f.; Schiefsky (2005b), 320ff.

means[298] or through medical intervention. If it is not removed, it will putrefy (σήπω) and swell, and cause serious complications throughout the rest of the patient's body.[299] *Diseases of Women I* lists a number of expulsive suppositories intended to release the decaying foetus from the uterus,[300] and the same author also provides surgical instructions on how to remove larger, more articulated foetuses (*Mul. I* 70).

Qualitative Change of Parts

The Hippocratic authors describe qualitative change in the body's parts in a similar fashion as qualitative change in the body's substances. If the substance or part is not in a state akin to its nature, it will generate pain and disease within the body because its δύναμις has been altered, and because it is no longer able to carry out its usual role within the body complex. The author of *Places in Man* tells us that, "for in each thing that is altered with respect to its nature, and destroyed (διαφθειρομένοις), pains arise" (*Loc.Hom.* 42).[301] The author uses this notion to explain why diseases arise when a body that is naturally hot, cold, dry, or moist is made to be too cold, hot, moist, and dry respectively – the drastic change in the nature of the body and its parts produces pain and causes disease. Moreover, bodily parts can undergo the same process of 'corruption' as substances. For example, flesh that remains unclean from a previous illness can 'corrupt', melt, and turn into water, thus contributing to the water accumulated in diseases such as dropsy (*Aff*. 22). Individual parts can also become diseased. For instance, the spleen can absorb bile into itself and produce sharp pains, fevers, and swelling (*Int*. 30). The intestines can also become diseased when blood mixed with bile and phlegm flood the cavity and dry up and ulcerate the cavity (*Aff*. 23), or through malnutrition (*Vict. III* LXXIX).

When a body part is diseased or harmed, the authors regularly warn that the part's ailment can resonate within the body, especially when this part is vital in the functioning of the body.[302] The author of *Prognostic* offers a contrary argument in the assertion that a negative σημεῖον linked to one 'organ' (for example, urine) does not necessarily indicate the ill-health of the whole body, but only of the relevant 'organ' (i.e. the bladder) (*Prog*. XII.36-39). However, this assertion is only

[298] Only if the embryo or foetus is still very small.
[299] As Hanson (1975, 575 n.14) notes, we use the term 'embryo' to mean "the product of conception within the first three months" and 'foetus' thereafter, but the authors utilise both ἔμβρυον and παιδίον ('young child'), seemingly indiscriminately, to indicate the unborn child.
[300] E.g. *Mul. I* 78(34),(38),(46).
[301] See Craik (1998), 203-205.
[302] Gundert (1992), 464.

applicable when the damage caused by disease is highly localised. Often, when disease arises in one area of the body, if the problem is not promptly addressed by either the body's φύσις or the physician, the disease spreads through interacting substances and parts. The author of *On Glands*, for instance, tells us that when glands become diseased, "they give their disease to the rest of the body", which includes, tubercles, scrofula, and fevers (*Gland*. 2). We are also warned about the widespread effect of cancerous growths forming, for example, in the breasts before spreading and causing pathological problems throughout the rest of the body (*Mul. I* 24).

Malfunctioning and Disordered Parts

In the context of disease, the authors contend that parts within the body become disordered and malfunction often as a result of a change in their natural qualities. Prime examples for this type of change are the digestive system and the uterus. The digestive system is especially vulnerable to change in disease, and we are often told that patients suffering diseases of the cavity or broader bodily problems cannot retain the food they eat, or their body cannot flush it from its system. *Airs Waters Places* also mentions that fluxes of phlegm from the brain can cause the cavity to become 'agitated' or be thrown into disorder (ἐκταράσσω) and contribute to the digestive ailments of the people that live in moist climates (*Aër*. II.10-13).[303] Moreover, as I mentioned in the previous chapter (**1.3.2**), to the authors of the Corpus the uterus plays a central role in female health and disease. Although the Hippocratic physicians regarded the female body as experiencing a perpetual flux of fluids, 'female' diseases and infertility were believed to be caused by, or be the cause of, change in the natural qualities of the uterus. These qualities include the uterus' shape, internal environment, texture, and position.[304]

To the Hippocratic physicians, the shape of the uterus allows it to receive external material in the same way that it has the ability to flush internal material: through the 'mouth' (στόμα) of the uterus, the gateway into and out of the female womb.[305] The 'mouth' of the uterus can cause problems such as infertility and retention of menses through being closed and hard, and thus preventing insemination and the exit of blood (e.g. *Mul. II* 48, 54). Similarly, infertility and too much blood loss can arise when the 'mouth' is too open, thus letting the seed flow out before conception can take place and allowing too much menstrual blood to escape (*Mul. I* 5; *Mul. II* 57, 58).[306] The uterus

[303] See also *Epid. I* XV and *Aph*. IV.LX.
[304] See Flemming (2013), 571f.
[305] Hanson (1989), 43f.
[306] Dean-Jones (1994), 69-77; King (1998), 35.

itself is also evaluated in terms of its perceived size – too large, too small – in determining if it is an ideal shape for gestation (e.g. *Mul. I* 25, *Steril*. 26).

Uterine diseases and problems related to infertility are also associated with the internal environment of the uterus. *Aphorisms* states that fertility is linked to the balanced quality of the uterus:

> Women do not conceive who have the womb dense and cold; those who have the womb watery do not conceive, for the seed is drowned; those who have the womb over-dry and very hot do not conceive, for the seed perishes through lack of nourishment (*Aph*. V.LXII).

While a womb that is too "dense and cold", or too dry and hot, is ill-suited to conception and gestation, the author of this aphorism adds that a balance of these characteristics is fruitful for fertility.[307] Furthermore, when foreign material such as phlegm or mucus enters the uterus from the woman's own body, these substances affect the ability of the uterus to retain both seed and an embryo: as I mentioned above (**2.2.1**), menstrual blood that has become mixed with phlegm and mucus in the womb must be cleaned to allow for conception. The author of *On the Nature of Women* even claims that phlegm in the uterus can cause miscarriages because the fluid dislodges the embryo and causes it to fall out (*Nat.Mul.* 17). A foetus can also dislodge and miscarry if the interior of the uterus is too smooth, so the foetus "detaches" from the walls of the womb when it begins to move at the third or fourth month (*Mul. I* 20; *Aph*. V.XLV).

The uterus is also capable of moving within the interior of the body, a phenomenon that modern scholars refer to as 'the wandering womb'.[308] The Hippocratic authors highlight the uterus' movement by describing how its position or shape has been affected, or what internal part it is pressing against. The uterus is capable of turning on its side, contorting (*Mul. II* 22, 37), prolapsing (e.g. *Mul. II* 35, 44), and shifting to press against various nearby parts as well as the thoracic cavity. The author of *Diseases of Women II* states, "when the uterus moves out of its natural position, it moves sometimes in one direction and at another time in another direction, and wherever it comes to rest it provokes violent pains" (*Mul. II* 28). Particularly when a woman is not having 'enough' intercourse, the uterus can dry out and become light. In this state, the uterus can move in a number of ways that are harmful to the patient's health. For instance, the uterus can shift onto its side in a manner that prevents menstrual blood from escaping (*Mul. I* 2), it can seek out moisture-rich areas within the body such as the liver and cause suffocation until it regains its own moisture and returns

[307] See also *Mul. I* 10, 12.
[308] See Dean-Jones (1994), 69-77.

(*Mul. I* 7), or it can fall against a number of internal parts such as the head, heart, hip, ribs, and lower back (*Mul. II* 14 – 44).

For these cases of changed and corrupted parts and substances, the physicians display a general attitude that aligns with the natural tendencies of the body. When substances and organic material have putrefied or changed into a state that is harmful to the body, treatment involves cleansing the body. When change, even 'destruction', has not yet turned to putrefaction, the part or substance can be targeted with therapy through adjustment and change. The author of *Places in Man* states, "everything that changes from the existing state benefits what is ill, for if you do not change what is ill, it increases" (*Loc.Hom.* 45).[309] However, the author of *On Regimen in Acute Diseases* stipulates that these changes must be small and implemented cautiously. Violent changes caused by disease should not be counteracted by violent changes implemented by the physician, but rather small changes so that the body can adjust (*Acut*. XXVI, XXVII). Both of these authors, however, demand that change should be proportional to the φύσις of the disease so that it may counteract the δύναμις of the disease.[310] This type of therapy often involves curing 'through opposites' (allopathy) – i.e. counteracting hot with cold, dry with moist, etc. – and finds favour amongst a number of the Hippocratic authors (e.g. *Morb.Sacr.* XVIII, *Flat*. I, *Nat.Hom.* IX).[311] The ultimate goal of this approach is to restore the natural φύσις of a given substance, part, and the body as a whole.

2.4 Conclusion

The Hippocratic authors understood the diseased body as undergoing changes that produce negative effects and cause suffering to the patient. Within the interior of the body, substances and parts can undergo quantitative and qualitative changes that affect their δυνάμεις and their roles within the body, provoking pain and disease that eventually works its way from the interior to the exterior. When the effects of these negative changes become observable, the physicians evaluate the effects as σημεῖα and utilise their τέχνη to classify, predict, and treat these negative changes happening to the body, that is, the disease. In the authors' understandings of how and why disease arises within the body, and how the body is affected by disease, three important aspects remain at the core of their theories on pathology: (1) change (μεταβολή) is a cause and an underlying characteristic of disease, (2) disease itself is a process guided by the φύσις of the disease and φύσις

[309] Craik (1998), 203ff.
[310] Jouanna (2012), 31-33.
[311] Jouanna (2012), 32 n.22.

of the body, and (3) natural causal links connect every substance and part within the body and establish a network of interactions within the interior. When change and disorder occurs in the body in disease (as well as in injury, which I explore in my next and final chapter), the body's system – whether it be healthy, or already ill – becomes a hub of negative change that causes imbalance, corruption, and destruction of the interior substances and parts. It is the endeavour of the Hippocratic physicians to counteract these imbalances and cleanse what is corrupted in order to restore order and health.

Chapter Three

The Injured Body

Physical injuries and wounds comprise an important part of Hippocratic pathology, even though the Hippocratic treatises are widely studied for their nosological content. Amongst the 60-plus surviving treatises, six are solely dedicated to surgical matters, and throughout the Corpus the various authors present case studies as well as theoretical discussions on the pathology of injuries and wounds.[312] The understandings of the injured body in the Corpus are distinguished by the medical theories maintained by each author, as well as the circumstances of medical knowledge and innovation in Classical Greece.[313] In this chapter I analyse how the Hippocratic authors examine, evaluate, and treat a body that has suffered physical damage.[314] I examine the ways in which the Hippocratic authors identified injuries and wounds, before turning to an analysis of the classification of wounds and their relationship with disease. My aim in this chapter is to fill a gap in Hippocratic scholarship on wound theory in the Corpus, which has been left relatively neglected in favour of other areas of Hippocratic pathology. I argue that the authors' understandings of wounds and injuries are framed by the methods and limitations of their medical skill (τέχνη), especially in regards to the areas of the body they could or could not access, and their understandings of pathological change in the body.

3.1 Injuries and Wounds in the Corpus: Types and Locations

The Hippocratic authors detail a variety of injuries and wounds that differ in cause, *loci*, and nature. These injuries range from everyday accidents such as crushed limbs and impalement, to ruptures and lesions due to disease. My aim in this section is to examine the ways the physicians identified

[312] *On Wounds in the Head*, *In the Surgery*, *On Fractures*, *On Joints*, *Mochlicon*, and *On Ulcers*. We also have a few fragments of a sadly lost treatise titled *On Wounds and Missiles*, which dealt with deadly wounds and would have added to the knowledge preserved in the surviving surgical treatises. On this lost work, see Salazar (1997) and Witt (2018), 234-237.

[313] Jouanna (1999), 143f.

[314] I will be focusing on the physical component of injuries and wounds in this chapter, not mental, since a lot of work has already been done on mental disorders in the Corpus. See, for example, Harris (ed.) (2013) and Thumiger (2017).

and evaluated wounds and injuries. I argue that these evaluations contribute toward larger theories of pathology and physiology, and highlight important aspects about the realities of medical τέχνη in Classical Greece. To do so, I firstly discuss the types of physical injuries the Hippocratic authors deal with, including terminology related to injuries, differentiations in the causes of physical damage, and the identification of external and internal wounds and injuries. I then analyse the treatability of injuries in the Corpus, especially injuries to body parts that are classified by the authors as vital, and which pose serious difficulties to the τέχνη of the physicians.

3.1.1 Causes and Identification of Bodily Damage

The authors of the Corpus describe bodily damage that has occurred as a result of physical trauma (including intentional violence, falls, exertion, and strain), as well as due to the effects of diseases. The physicians' evaluations of this damage rely on techniques used in general pathology, and highlight fundamental aspects of Hippocratic wound theory. In this section I examine the physiological and pathological knowledge the physicians utilise to determine the presence of external and internal injuries. But firstly, two points should be made on the use of vocabulary associated with the injured body within the Corpus.

The Hippocratic authors use a few important terms to identify bodily damage. The most prominent – σίνος, τρῶμα, ἕλκος, and their derivatives – do not always receive consistent translations in editions of the Corpus. For clarity, I have tabulated examples of this inconsistency in the Loeb editions:[315]

Translations of σίνος, τρῶμα, and ἕλκος in Loeb Editions of the Hippocratic Corpus

Author	**σίνος**	**τρῶμα**	**ἕλκος**
Jones	Serious **mischief** (*Acut*. LIV.7).	**Wound** (*Aph*. IV.XXIII).	**Sores** (*Morb.Sacr*. VIII.25); **Wound** (*Nat.Hom.* V.25;[316] *Aph*. V.LXV).
Withington	**Injury** (*Off*. XVIII.2; *Art*. XXXVI.4); a part **injured** in some way by a weapon (*VC* X.7, XIII.24, XV.6); **Lesion** (*Off*. XII.8-14; *Fract*. XLVIII).	**Wound** (*VC* X.2; *Fract*. XXV; *Art*. XLVI.61); **Injured** part and **wound** (*Off*. XII); **Injury** (*Fract*. XVI.46; *Art*. XXXII.7); **Lesion** (*Art*. XXXVIII.13).	**Wound** (*VC* XIII.22; *Fract*. XXV); **Lesion** (*VC* XIII.4).

[315] This is, of course, not a comprehensive table of every English translation of the Corpus, nor every entry of these words in the Corpus, but adequately illustrates my point.
[316] See Jones (1931), 15 n.4.

Potter	**Harm** (*Morb. IV* 21).	**Injury** sustained during an abortion (*Mul. I* 67); **Wound** (*Prorrh. II* 12; *Loc.Hom.* 33); **wound,** referencing a ἕλκος (*Morb. I* 21); **Ulcerates** (*Prorrh. II* 18); **Injury** (*Prorrh. II* 20); **injury** of a tree (*Nat.Puer.* 12).	**Ulcer** (*Mul. I* 67; *Loc.Hom*. 29); **Ulcerates** (*Prorrh. II* 18); **Wound** (*Morb. II* 60); **Lesion** (*Morb. IV* 19; *Loc.Hom*. 13).
Smith	**Injury** caused by a weapon (*Epid. V* 26).	**Wound** (*Epid. V* 45); **Sore** (*Epid. VI* 4.5).	**Wound** (both ἕλκος and τρῶμα) (*Epid. II* 5.17); **Ulcer** (*Epid. IV* 1).

TABLE 1**:** ***Variations of σίνος, τρῶμα, and ἕλκος translations in the Loeb editions of the Corpus.***

The variations that have arisen in translations of these terms, as highlighted above (**TABLE 1**), are due in part because the medical understanding of wound theory and the associated semantics has changed since Classical Greece, making a precise understanding of these terms difficult.[317] Context is thus important when analysing wound theory in the Corpus: despite the disparity in the translations of these terms, in the Greek they are typically used consistently. The term σίνος is predominantly related to general bodily damage, ἕλκεα to open wounds, abrasions, and lacerations associated with the flesh and skin, and τρῶμα can involve blunt damage to flesh and bone as well as penetrative damage that opens the flesh.[318] For clarity, when the Greek terms are not in use, I use 'wound' to refer to physical damage that has broken flesh, and 'injury' for blunt damage such as fractures and dislocations as well as trauma to the viscera.

It is also worth noting that in the Corpus the terminology of injuries and wounds is shared across cases of physical damage regardless of the primary cause. For example, ulcers and abscesses that form as a result of an illness[319] or during the 'throwing off' (ἀπόστασις) of a disease[320] are identified

[317] See Temkin (1953), Majno (1975), 183, Smith (1979), 13-44, and Grmek (1989), 125.
[318] The treatises *On Ulcers* (περὶ ἑλκῶν) and *On Wounds in the Head* (περὶ τῶν ἐν κεφαλῇ τρωμάτων) exemplify the association of ἕλκεα with flesh wounds and τρῶματα with both penetrating and blunt injuries. Throughout this chapter I provide more examples of the use of both terms in Hippocratic medical cases and theory. We also see the term ἀμυχή refer to scratches and superficial skin wounds that can develop into ἕλκεα, e.g. *Int*. 32 and *Epid. VII* 32.
[319] E.g. mouth ulcers forming in fever (*Epid. III* VII.3), or ulcers forming in the uterus due to putrefying lochia (*Mul. I* 36).
[320] E.g. *Epid. II* 1.7.

as ἕλκεα in the Greek, as are open flesh wounds caused by weapons[321] and physical trauma.[322] Similarly, dislocations that are due to a disease or the body's humid nature[323] are discussed with the same verb (ἐκπίπτω, 'dislocate') as joint dislocations caused by external interference.[324] This may seem like an arbitrary observation, but it contributes to an important and basic aspect of Hippocratic wound theories: particular types of wounds and injuries are categorised and treated in certain ways regardless of their causes. Dislocations due to the body's humidity are treated in the same way as an externally caused injury – with compresses, bandages, and proper positioning (*Art*. IX, LVIII.69-75). Of course, some ἕλκεα resulting from disease may warrant a more complicated method of treatment due to the nature (φύσις) of the disease (e.g. *Loc.Hom.* 29, *Morb. IV* 17). But first and foremost, the ἕλκος is treated the same as any other open wound – properly cleansed, dried, and bandaged where needed[325] – and its φύσις and progression is understood to follow along an established route with particular periodicals and stages, akin to a ἕλκος acquired through physical violence.[326] In this way, terminology is linked to the nature of the physical damage and the way this damage is treated, rather than any specific causation.

External and internal injuries and wounds caused by trauma and disease are identified using the same techniques the authors utilise in the diagnosis of diseases. To take external injuries first, in **Chapter Two** (**2.1**) I highlighted that the Hippocratic physicians use notions of 'health', and specifically what a body should look like and how it should be functioning, in order to identify signs of change in disease. I also noted examples from the surgical treatises that exemplify the same comparative technique being used in injuries and wounds. The comparison of 'sound' and 'unsound' in terms of bodily parts and substances is especially apparent in cases of injuries and wounds. This comparison is utilised not only as a diagnostic method, but as a guide for treatment and healing. As the author of *In the Surgery* outlines,

> Presentation (πάρεξις), extension (διάτασις), setting (ἀνάπλασις), and the rest, according to nature (κατὰ φύσιν). Now nature (φύσις) shows itself in actions, and one must judge what nature wants by the performance of action: for the above matters (judge) from the state of rest, from what is normal, from the customary. From rest and relaxation estimate proper direction, for example as regards the arm: from what is normal judge extension and flexion,

[321] E.g. *Epid. V* 21, *VC* XII.
[322] Such as falling (*Ulc*. 10). See **Appendix B** for more examples.
[323] See especially *Art*. VIII and *Mochl*. V.
[324] E.g. dislocation of the humerus (*Art*. X).
[325] See *Ulc*. 1 – 11 and *Aff*. 34.
[326] I will return to this in **3.2**.

such as the nearly rectangular relation of the forearm to the arm; from habit infer the posture more easy to maintain than any other (*Off*. XV.1-11).

In this passage, the author indicates that the presentation, extension, and setting of an injured limb should be modelled on the φύσις of the limb, including its natural appearance, positions, and movements. This method of incorporating the idea of a body part's natural state[327] into treatment is utilised by a variety of authors in relation to different injuries and wounds. For example, in fractures, awareness of the natural shape of the damaged limb is integral in the resetting of bones and extensions. *On Fractures* explains that positioning a limb with fractured bones in a manner that maintains its natural angles aids in the solidification of bones and the formation of strong calluses (*Fract*. XXIII). In dislocations, knowledge of a limb's natural movement enables the physician to properly set the limb in a relaxed state so that this natural movement can eventually be regained. The author of *On Fractures* is especially concerned with proper positioning techniques when bandaging limbs (*Fract*. I – III), as is the author of *On Joints* (e.g. *Art*. XLVII). These authors also maintain that knowledge of the way bones naturally connect is necessary when 'reducing' (i.e. relocating, setting) dislocations.[328]

In discussions of open wounds, an obvious comparison is drawn between the wound and unharmed flesh. This comparison is based upon sensory evaluation (identification of pain, swelling, and leaking fluids, etc.) and the nature of the flesh itself. For instance, in *On Ulcers*, the author states that ἕλκεα which are not near a joint should not be moistened with anything but wine since "dryness is nearer to health, and moistness to unhealthiness, since a lesion is moist, but healthy tissue is dry" (*Ulc*. 1). This passage also implies that either ἕλκεα affecting joints should not be completely dried (perhaps based upon the association of healthy fluids lubricating healthy joint sockets, and the damage caused to joints when they are dried out) or at the very least, the method of treating ἕλκεα close to the joints is different from regular lesions.[329] The comparison of a part's natural state and position with its injured state is used especially in cases of external injuries and wounds. External

[327] See my earlier discussion on the nature of the body and the concept of κατὰ φύσιν (**1.1**).
[328] E.g. rotating the elbow and pressing on bones in order to bring a dislocation back into proper position (*Art*. XVIII).
[329] *Prorrh. II* mentions that wounds at the joints, especially the elbow, are liable to undergo a number of complications including: the joint stiffening (ankylosis) and remaining swollen beyond the healing of the ἕλκος, inflammation, and suppuration. These wounds also frequently require incisions and cauterisations (*Prorrh. II* 15).

damage is evaluated through a physician's direct observation, or through methods such as palpation[330] to access what a physician can not immediately see.

When we turn to internal injuries and wounds, especially those that are within the torso and sustained during pregnancy, in childbirth, and from abortions, the signs (σημεῖα) that indicate this physical damage are similar to those that indicate the presence of a disease acting within the body's interior. The physicians diagnose internal injuries on the basis of three factors: (1) the pain and physical discomfort reported by the patients, (2) the substances that have escaped the body, and (3) the observable deterioration of the natural functions of the body.[331] For example, *Internal Affections* describes diseases arising when the bronchial tube or one of the vessels leading to or within the lung tears (ῥαγῇ) or ulcerates (ἑλκωθῇ) (*Int*. 1, 2). These internal injuries can be caused by exertions, falls, and blows to the thorax, as well as violent vomiting and fever. The author highlights the general σημεῖα as including coughing, expectorating blood, froth, and pus, fevers and chills, and chest pain (*Int*. 1, 2). According to the authors of *Internal Affections* and *Diseases I*, these σημεῖα point to an internal thoracic injury despite the fact that the physicians did not have the ability to confirm the rupturing of the internal vessels. Coughing and respiratory problems relate to the lung and airways, blood and pus to the wound, froth/foam to the lung, and fever, chills, and pain to the progression of both a serious wound and disease (*Int*. 1, 2; *Morb. I* 14, 15).[332] *Diseases I* also states that when the lower cavity develops tears (ῥήγματα), the blood from these small wounds putrefies and forms internal abscesses (*Morb. I* 17). These abscesses either push to the surface of the skin, where they become an observable σημεῖον and are subsequently expelled through an ἀπόστασις, or they rupture internally and the patient dies. In the case of the latter, the author states that these internal abscesses can only be detected through pain (reported by the patient) as well as potter's clay smeared over the abdomen, used to identify spots of intense heat caused by the pus (*Morb. I* 17; *Morb*. *III* 16).[333]

The gynaecological texts pay special attention to female injuries and wounds, especially those associated with the uterus and childbirth. In these treatises, the internal parts of the female body are described as especially vulnerable to damage caused by the trauma of childbirth and the side effects of abortive methods. Childbirth in ancient times was dangerous for mothers, especially

[330] E.g. separated bone in the arm is recognised through palpation "where the blood vessel of the upper arm bifurcates" (*Art*. XX).
[331] See especially Scullin (2012) on the use of pain to indicate events taking place within the body in Hippocratic medicine.
[332] On the airways see **1.2.2**, and on blood, pus, and foam see relevant entries in **Appendix A**.
[333] Majno (1975), 491 n.102.

young mothers bearing their first child. The authors of the gynaecological texts acknowledge the undertaking as especially violent (as suggested by the use of βίη, 'an act of violence or bodily force', e.g. *Nat.Puer.* 19) and physically taxing.[334] The authors describe a number of injuries that the mother's body, as well as the child, can sustain during pregnancy and the birthing process. I examine these injuries in three stages: (1) injuries of the mother sustained during pregnancy (and before childbirth), (2) injuries of the embryo/foetus sustained during pregnancy, and (3) injuries of the mother and child sustained during, and after, childbirth or an abortive procedure.

The authors record a variety of pathological problems that can cause complications during pregnancy and result in miscarriage or the death of both mother and child. These complications are predominantly due to disease – erysipelas (ἐρυσίπελας) affecting the uterus is among the deadliest of these diseases (*Aph*. V.XLIII; *Morb. I* 3; *Nat.Mul.* 12) – but physical injuries and exertion can also easily cause miscarriage (*Genit*. 10; *Nat.Puer.* 2; *Mul. I* 25).[335] The mother's injuries and overexertion can result in the foetus sustaining damage and dying, or the membranes attaching the foetus to the interior of the uterus tearing; both are signified by pain felt by the mother in her abdominal cavity and lower back (*Mul. I* 25). Although these injuries have medical repercussions for both mother and child, the authors of the gynaecological texts tend to focus on how this damage affects the *pregnancy* rather than the long-term health of the woman.

This active concern for the foetus in particular is clear in a number of the Hippocratic treatises. For instance, some authors (and especially the author of *On Joints*) are notably concerned with potential complications that can occur for a baby *in utero* and that can explain congenital deformities and injuries. During pregnancy, embryos and foetuses are vulnerable to physical damage and changes in the shape of their growing environment that can result in injuries and eventual malformations. When this damage is minor, for example, when a baby girl delivered in Larissa was born with an otherwise unremarkable and non-concerning ἕλκος on her hip (*Epid. V* 11), the authors do not emphasise any long-term effects to the growth of the child. However, in the case of significant congenital injuries, as well as and malformations that are due to the environment of the womb, the authors of *On Joints* and *On Generation* are especially concerned with the consequences for the body of the child and potential treatment.

[334] See, for example, *Nat.Puer*. 19. Hanson (1989), 42f, and 48f.; Hanson (1991); Dean-Jones (1994), 211f.

[335] On the abortive method of the singing girl in *Nat.Puer*. 2, see Lonie (1981), 158ff.

To begin with, the author of *On Joints* states that some "congenital displacements" are slight and can be corrected. Clubfoot, for example, can be treated through binding techniques that resemble our modern-day corrective therapies (see *Art*. LXII). Comparatively, other "displacements" can permanently affect the way a certain body part grows and functions. For example, when the elbow is injured *in utero*, the bones beneath the injury grow to be shorter than normal:

> those of the forearm nearest the injury (σίνεος) the most; secondly, those of the hand; third, those of the fingers, while in the upper arm and shoulder are stronger because they get more nourishment (*Art*. XXI.1-5).

This author maintains that when a limb is injured *in utero*, the bones of the limb will have affected growth depending on their proximity to the injury. Any bones situated *above* the point of injury (to use the elbow injury as an example, the upper arm and shoulder bones) form to be of healthy size because they still receive the nourishment they need to grow. However, the bones *beneath* the injury (i.e. the forearm, hand, and finger bones) display this affected growth and form to be shorter and smaller than they typically should because they receive less nourishment. Of these affected bones, those proximal to the injury (the forearm) are more affected than those farther from the injury (the hand and fingers). This concept of affected growth is also reflected in other congenital dislocations, such as that of the hand (*Art*. XXVIII), the thigh (*Art*. LII.48-63, LVIII; *Mochl*. XX), and the shoulder (*Mochl*. V). The flesh and muscle below the injury are also prone to atrophying, and as a result a child can be born and grow up with limb that may not look or function as a healthy limb typically should.[336] We also see that dislocations of both thighs at the hip are used to explain the stunted growth of the body (except the head) evident in dwarfism (*Art*. LVI).

Moreover, the author of *On Generation* glosses over the potential damage that can "maim" or abort a foetus, but extrapolates on the idea that malformations of the child can be due to the *shape* of the uterine environment:

> if there is a narrowness in the uterus in the region that corresponds to the part of the embryo that is maimed, then its body must have been maimed by moving in too narrow a space, just as trees in the earth that lack an open space because they are blocked off by a stone or some other object grow twisted or are thick in one part and thin in another (*Genit*. 10).

[336] Notably, *Art*. maintains a clinical but positive attitude toward the usefulness of malformed limbs. See Sneed (2018), 36.

A botanical analogy is once again used by this author.[337] Here, the comparison between the growth of a tree and that of a child is used to explain how a misshapen uterus can cause the part of the child developing in that area to underdevelop due to the lack of available space. This misshapen environment contributes to the numerous ways a child could be born with one or a number of injuries or birth defects.[338]

While the period of gestation had its risks, childbirth and abortive procedures posed an even higher risk of injury, especially for the mother. The injuries recorded by the authors are predominantly internal – related to the uterus or the parts near the uterus – and are identified using similar techniques as the physicians employ in disease. Violent and often fatal diseases that occur in the wake of childbirth are often linked to damage sustained during the birthing process. Examples of this damage include, the trauma of birth or postpartum cleaning (*Mul. I* 39), the laceration or putrefaction of a part inside the mother during childbirth (*Mul. II* 11, *Mul. I* 43 = *Nat.Mul*. 52), and birthing injuries to parts such as the joints (*Mul. II* 5). The σημεῖα that accompany these diseases often include σημεῖα related to wounds and injuries: for instance, fevers, chills, swelling, abdominal pain, and vomiting blood.[339]

Abortive procedures are liable to cause harm to the patient due to the harshness of the methods implemented by physicians. Although the author of the *Oath* states that a physician should not prescribe abortive suppositories (*Jusj*. 20-21), other authors still detail recipes and procedures for flushing an embryo from the uterus.[340] However, warnings concerning abortive procedures are frequent. As the author of *Diseases of Women I* states,

> The pathologies connected with the (cleaning of the) lochia are the same whether a woman has aborted a foetus or given birth to one, unless she has aborted a very small foetus, but women with abortions run more danger, since abortions are more difficult than births. For it is not possible to abort a foetus without violence – whether subsequent to a potion, a particular food, a suppository, or something else – and violence does damage. In this case

[337] The author of this tract often draws on process in nature in order to explain the growth and nutrition of the human body. See **1.2.1**.
[338] See Lonie (1981), 139-146, Garland (1995), and Sneed (2018).
[339] Dean-Jones (1994), 130 n.52.
[340] As Dean-Jones (1994, 174) notes, in the case of *Nat.Puer.* the author emphasises that the aborted embryo was less than seven days old, perhaps to adhere to the stipulation of *Jusj*. See Dean-Jones (1994), 174 n.88 and Hanson (1987), 596 on the association of stages of embryo growth with the number seven. See also Edelstein (1967), 13f.

there is a danger that the uterus will become ulcerated or inflamed, and this entails danger (*Mul. I* 72).

Regardless of the method of procedure, abortions can severely damage the uterus and run the risk of endangering the patient herself. This damage can result in ulcerations, identified through discharges of blood and pus from the internal ἕλκεα (*Mul. I* 64), external swellings (*Prorrh. II* 24), and also physical injury (τρῶμα) due to the suppositories or the physical intervention sometimes required in extracting foetuses (*Mul. I* 67).[341] Damage to the uterus (as a result of childbirth, abortives, or other causes) has wider consequences that affect the entirety of the patient and can produce σημεῖα throughout her body. As a result, the author of *Diseases of Women I* warns that cues should be taken from the patient's body as a whole to determine the appropriate treatment when the uterus is harmed (*Mul. I* 66). This mentality of taking the body as a whole as an indication of the health of its parts is reflected in each author's diagnoses of internal injuries irrespective of the sex of the patient.

3.1.2 The Treatability of Injures

When a patient is injured or suffering a wound, the Hippocratic authors present a positive or negative outcome: the body heals and the patient survives, or the injury, often coupled with pathological complications,[342] causes in the death of the patient. In this section I discuss the factors which distinguish fatal and non-fatal injuries and wounds in the Corpus. I begin with a discussion on the 'hard limits' of the physicians' τέχνη, before turning to an analysis of several lists of vulnerable and vital parts in the Corpus. I argue that the authors acknowledged two important limitations to their medical skills, attributed to (1) the division between internal and external domains of the body, and (2) the natures and locations of vital body parts.

As we know in modern medicine today, complications can turn even minor injuries and wounds into life-threatening situations. In the Corpus, this threat is acknowledged by the author of *Prorrhetic II* when they warn that "a person can die from any kind of injury" (*Prorrh. II* 12). This warning is meant to remind physicians of the different ways in which the φύσεις of people's bodies can react to injuries and diseases, and also the element of unpredictability that can accompany the pathological due to these differences.[343] However, this threat of fatality does not prevent the physicians from treating most injuries. Rather, it is in cases where treatment would result in the

[341] See Bernier (1990), 372-374 on medically-induced and spontaneous abortions. See also *Foet.Exsect*.
[342] See **3.2**.
[343] See **2.1.2**.

certain death of the patient that the authors implement a limitation on the abilities of their τέχνη. As von Staden asserts, "when the perfectly feasible cure of a particular disorder would entail the death of the body as a whole, non-intervention therefore is the healer's only acceptable response".[344] Several authors maintain this stance regarding injuries and diseases. The author of *On Joints*, for instance, recommends against setting combination fractures because the patient will die within seven days due to the pain, tetanus, spasms, or supervening gangrene (e.g. *Art*. LXIII, LXIV). The author of *On Fractures* also warns against reducing any dislocation of the elbow joint when the patient has a fever "for the pain of a violent operation would kill him" (*Fract*. XLIII).

In recognising that medical τέχνη has little capacity to help the state of the body in certain cases of injury and disease, the authors establish a line of demarcation between what they *can* treat, and what they *cannot* and *should not* attempt to treat. In the context of disease, the author of *Diseases I* instructs the reader to "treat the diseases that can be treated, but to recognise the ones that cannot be, and to know why they cannot be" (*Morb. I* 6). This last point is a significant addition: the knowledge of why treatment would be ineffectual in certain diseases arises from empirical experience with the φύσεις of different diseases and bodies and the interpretation of σημεῖα. This same notion of recognising what the physicians can and cannot treat and *why* also applies in the context of injuries. For example, the author of *On Fractures* recommends against treating, and even accepting cases of, fractures of the upper arm and thigh because of the major vessels in the area and the high mortality rate of these injuries. The author states,

> One should especially avoid such cases if one has a respectable excuse, for the favourable chances are few, and the risks many. Besides, if a man does not reduce the fracture, he will be thought unskilful, while if he does reduce it he will bring the patient nearer to death than to recovery (*Fract*. XXXVI.20-25).

The deciding factor determining whether a physician should treat or leave any affliction is tied to the chances of survival of the patient, as well as how the outcome will reflect on the reputation of the physician.[345] However, this discretion is only useful in cases that will obviously provoke complications. More often, we see the use of prognosis, or at the very least a cautious approach to evaluating the body (see especially *Prorrh. II* 12), to signal the point at which the body cannot

[344] von Staden (1990), 104.

[345] See Jouanna (1999), 75-111. On the Hippocratic physicians' stance on 'incurable' and 'hopeless' cases, see von Staden (1990) and Prioreschi (1992).

recover from a disease or injury, regardless of the extent of medical intervention.[346] On the continuum of health outlined in **Chapter One** (**1.1**) and **Chapter Two** (**2.1.1**), this point indicates when the deterioration of the body cannot be reversed and changed into healing. The physicians recognised this point as a hard limit of their τέχνη, signifying that their skills can no longer change the body in a positive sense and that the affliction is incurable.

A clear example of this defined limit is in *Diseases I*. The author explains that when the body is wounded by a missile (specifically a spear, dagger, or arrow), there is still hope for recovery as long as the "ulcer (ἕλκος) maintains a connection to the external air through the original wound (τρῶμα)" (*Morb. I* 21). This entry point of the missile is also the exit point of pus that needs to be pushed out of the body for the wound to properly heal. But if this entry point heals before the interior of the wound closes up or expels the pus, then internal suppuration takes place within the body. The ἕλκος within the body is boiled by the body's heat, preventing it from adequately drying and healing, and so it produces sharp pain, coughing, fever, and the patient dies (*Morb. I* 21).

In this passage, the distinction between an injury that can be healed, and one that is fatal, depends on the physical connection between the internal parts of the wound and the exterior of the body. In an ideal progression of the wound, pus is forced out of the body through the opening of the wound since there are no traditional channels (such as the digestive tract) accessible to the material that could transport it out of the body (e.g. *Int*. 15). When the exterior of the wound (i.e. the exterior skin) heals before the interior (the deeper fleshy material), the physicians are cut off from any observational access to the state of the wound. Moreover, any remaining noxious material no longer has an easy method of exit from the body and will eat through any soft interior flesh it encounters (e.g. *Fist*. 1, *Epid. V* 26). Treatment for internal suppuration often involves incising the flesh and inserting tubing to allow the pus to drain; when the procedure is completed, the tubing must be removed in increments to allow the ἕλκος to heal behind the tube (see *Morb. II* 47). This procedure further emphasises the need to heal the interior part of the wound before the exterior.

This division between interior and exterior, as well as the problems posed by any barriers that prevent an interior-to-exterior progression of healing, play significant parts in how the Hippocratic physicians approach understanding and treating the injured body. The τέχνη of the physicians importantly relies on an element of direct accessibility.[347] In cases of σημεῖα that manifest on the

[346] The use of prognosis to identify this point has the added benefit of transferring potential blame for the outcome of the injury or disease from the physician's course of treatment, to the nature of the disease and/or the patient's body.
[347] See also *Morb. III* 3.

exterior of the body, or injuries that are fundamentally accessible from the exterior, the physicians can apply techniques such as cleansing,[348] compresses, bandaging, external suturing,[349] and setting. Comparatively, when the changes that have caused the body harm are within the interior (as often is the case in disease), or injuries have caused internal damage, the physicians are limited in their options for treatment. Internal injuries predominantly rely on therapies involving careful body posture, and the administration of drugs (φάρμακα) and other therapeutic materials (including liquids, as well as heat and cold) as close to the injury site as possible to aid in the body's natural healing.[350]

Internal injuries become particularly deadly when the limited access of the physicians' τέχνη is coupled with the vital and complex natures of many interior parts. In four of our surviving treatises, the authors provide lists of deadly wounds. These lists outline vital body parts that, if severely injured, would cause the patient's death. I have quoted these lists in full and provided the Greek for reference:

	English	**Greek**
***Prorrh. II* 12**	The more deadly wounds are those to the **wide vessels of the neck and the groins**, then to the **brain** and the **liver**, and then to the **intestine** and the **bladder**.	Τὰ δὲ τρώματα θανατωδέστερα μὲν τὰ ἐς τὰς φλέβας τὰς παχείας τὰς ἐν τῷ τραχήλῳ τε καὶ τοῖς βουβῶσιν, ἔπειτα εἰς τὸν ἐγκέφαλον καὶ ἐς τὸ ἧπαρ, ἔπειτα τὰ ἐς ἔντερον καὶ τὰ ἐς κύστιν.
***Aph*. VI.XVIII**	A severe wound of the **bladder**, **brain**, **heart**, **diaphragm**, **one of the smaller intestines**, **cavity** or **liver**, is deadly.[351]	Κυστιν διακοπέντι, ἢ ἐγκέφαλον, ἢ καρδίην, ἢ φρένας, ἢ τῶν ἐντέρων τι τῶν λεπτῶν, ἢ κοιλίην, ἢ ἧπαρ, θανατῶδες.
***Morb. I* 3**	It is inevitable in the following conditions, for that to occur which does occur: … if a person is wounded in the **brain**, **spinal marrow**, **cavity**, **liver**, **diaphragm**, **bladder**, **blood vessel**, or the **heart**, for him to die, **but if he is wounded in areas in which these organs are not present or that are farthest from them, not to die.**	Ἀνάγκη δὲ τὰ τοιάδε ἔχει ὥστε γίνεσθαι, ὅ τι ἂν γίνηται· … ἀπο|θνήσκειν δέ, ἤν τις ἐγκέφαλον τρωθῇ ἢ ῥαχίτην μυελὸν ἢ κοιλίην ἢ ἧπαρ ἢ φρένας ἢ κύστιν ἢ φλέβα αἱμόρροον ἢ καρδίην· μὴ ἀποθνῄσκειν δὲ τιτρωσκόμενον ἐν οἷσι ταῦτα τῶν μελέων μὴ ἔνι ἢ τούτων προσωτάτω ἐστίν.

[348] Local and full-body, e.g. *Ulc*. 9.
[349] E.g. *Morb. II* 36, *Acut.(Sp.)* 61.
[350] Witt (2018), 234ff. For example, for Xenarchus' "affection by the heart" the author recommends inhaling warmth to combat the pain and evacuations of the internal ἕλκος (*Epid. VI* 7.5).
[351] Modified translation.

***Coac.* 499**	Patients usually die from wounds to the **brain**, the **spinal marrow**, the **liver**, the **diaphragm**, the **heart**, the **bladder**, or **one of the wide vessels**. A patient also dies if especially great blows strike the **trachea and the lung**, so that, with the lung injured, there is less breath coming through the mouth than escaping from the wound. Persons wounded in the **intestines –** either part of the small ones or of the large ones – **also die if the blow was at an angle and great**; if the blow was minor and oriented lengthwise, some survive. **Patients die least often if they are wounded in parts not located among the ones mentioned, or which are farthest from them.**	Ἀποθνήσκουσι δὲ μάλιστα ἐκ τῶν τρωμάτων, ἢν τις ἐγκέφαλον τρωθῇ ἢ ῥαχίτην μύελον ἢ ἧπαρ ἢ φρένας ἢ καρδίην ἢ κύστιν ἢ φλέβα τῶν παχειῶν· θνήσκει δέ, κἢν ἐς ἀρτηρίην καὶ πλεύμονα μεγάλαι σφόδρα αἱ πληγαὶ γένωνται, ὥστε, τοῦ πλεύμονος πληγέντος, ἔλασσον προερχόμενον πνεῦμα κατὰ στόμα γίνεσθαι, ἢ τὸ ἐκπῖπτον ἐκ τοῦ τρώματος· θνήσκουσι δὲ καὶ οἱ ἐς τὰ ἔντερα, ἤν τέ τι τῶν λεπτῶν τρωθῶσιν, ἤν τε τῶν παχέων, ἢν ἐπικάρσιος ἡ πληγὴ γένηται καὶ μεγάλη· εἰ δὲ μικρὴ καὶ εὐθεῖα, περιγίνονται ἔνιοι· ἥκιστα δὲ θνήσκουσιν οἱ τιτρωσκόμενοι, ἐν οἷσι ταῦτα μὴ ἔνι τῶν τοῦ σώματος μερῶν, ἢ τούτων προσωτάτω.

The 'organs' and parts recorded in these lists are familiar, critical parts of the body and are unsurprisingly points of concern for these medical authors. They are also useful in the analysis of Hippocratic τέχνη and the authors' understandings of the injured body. These lists first came to my attention in Salazar's valuable study on war wounds in Graeco-Roman antiquity.[352] While Salazar's observations on these lists are helpful, they are also preliminary, so I have tabulated and arranged the list data below for analysis.

Loci* of Lethal Injuries According to the Lists in *Prorrh. II, Aph., Morb. I*, and *Coac.

		***Prorrh. II* 12**	***Aph.* VI.XVIII**	***Morb. I* 3**	***Coac.* 499**
1	**Brain (ἐγκέφαλος)**	●	●	●	●
2	**Liver (ἧπαρ)**	●	●	●	●
3	**Bladder (κύστις)**	●	●	●	●
4	**Heart (καρδίη)**		●	●	●
5	**Vessels (φλέβες)**	neck & groin		wide vessels	wide vessels
6	**Diaphragm (φρένες)**		●	●	●
7	**Intestine (ἔντερον)**	●	small		small & large

[352] Salazar (2000), 20.

8	**Spinal Marrow (ῥαχίτης μυελός)**[353]			●	●
9	**Lungs (πλεύμων)**			●	●
10	**Cavity (κοιλίη)**[354]		●	●	
11	**Trachea (ἀρτηρίη)**[355]				●

TABLE 2**: Loci *of lethal wounds according to lists provided by* Prorrh. II, Aph., Morb. I, *and* Coac.*, ordered by frequency of mentions.***

In all four columns of the table (**TABLE 2**), we see a primary concern with severe injuries to the brain, liver, and bladder (rows 1 – 3); three mention the heart, blood vessels, diaphragm, and intestines (rows 4 – 7); two mention the spinal marrow, lungs, and cavity (rows 8 – 10); and one notes the trachea (row 11). In examining this data, a few qualifications should be made. Firstly, I have ordered the data according to frequency to highlight a general preoccupation with certain vital parts; however, in the treatises the lists do not seem to be arranged in any particular order. The exception to this observation is *Prorrhetic II*, which arranges the most dangerous places to be injured as (1) the major vessels, (2) the brain and liver, and (3) the intestine and bladder. Secondly, we should keep in mind the potential influence these four treatises had on each other: *Coan Prenotions* especially contains a lot of synthesised material from a number of other treatises, including *Prorrhetic II*, *Diseases I*, and *Aphorisms*.[356] Thirdly and finally, certain areas of the body, such as the 'cavity', often encompassed much of the interior of the torso, including the digestive tract and its associated 'organs'. As such, the absent entry under 'intestine' in *Diseases I* can likely be explained by the author grouping all abdominal damage under 'cavity', and a reverse of this situation could apply to the missing 'cavity' entry in *Coan Prenotions*.

Bearing these factors in mind, these lists help to illustrate the link between the vulnerability of vital parts, the body's physiology and structure, and the types of injuries the physicians treat in the Corpus. The theories regarding the importance of the 'organs' and parts mentioned in the lists were predominantly built on the empirical experiences of the physicians, as well as knowledge accumulated in everyday life and in higher-risk activities such as war. The awareness that severe

[353] See **Appendix A, n.407**.
[354] See Schiefsky (2005b), 336f. Here I take 'cavity' to indicate the abdominal cavity.
[355] See **n.141**.
[356] See Craik (2006a).

injuries to the head, thoracic cavity, and abdomen can result in instant death or incurable wounds establishes a range of parts that a body cannot function without.

Throughout the Corpus, many authors incorporate these vital 'organs' and parts into larger theories of physiology. The authors do so in order to explain *why* these parts are vital to the body, and consequently why any harm caused to them would be life-threatening to the patient. These functions include digestion, respiration, movement, cognition, generation, and providing passage for the body's blood supply.[357] Conversely, other authors forego providing a reason for why a certain part is critical to the body. Rather, they focus on *what* happens to a body when this part is injured or severely affected by disease, including complications such as the fatal cognitive repercussions of severe head wounds and haemorrhaging from the major vessels.[358] The treatises of these latter authors especially accentuate the limitations of the physicians' medical τέχνη.

Limitations in medical treatment were due to the complex natures of the body's parts and the processes they participate in, and difficulties gaining access to the viscera located within the body's interior. In regards to the complex natures of internal parts, the τέχνη of the Hippocratic physicians could do little when faced with injuries to parts that they did not have the expertise to treat. For example, in the case of the brain, although the physicians could trephine to drain any pus accumulating between the bone and membrane of the brain, they did not operate on the brain itself. The author of *On Wounds in the Head* is emphatic that the membrane which shrouds the brain should not be perforated during trephination (*VC* XXI.7-10), and that the brain itself is delicate and vulnerable to damage (see *VC* II.15-28). Not all wounds and injuries to the head were fatal – the very fact that *On Wounds in the Head* is dedicated to the treatment of head trauma supports this, as well as the cases of patients in the *Epidemics* who survived head wounds.[359] But often when the brain was damaged in some way, the physicians did not have the technical expertise to do much else than apply therapies to promote the body's healing.

In a similar fashion, haemorrhaging from ruptured vessels was a significant danger for the Hippocratic physicians because they had not mastered arterial ligatures. Nor could the physicians use tourniquets without strangulating the affected limb and causing complications such as necrosis

[357] In **Appendix C** I have organised the 'organs' and parts mentioned in the lists of deadly wounds with corresponding passages from the Corpus that offer insights on descriptions, roles, accessibility, and associated injuries of these parts.
[358] See **Appendix C**.
[359] See **Appendix B**.

(see **3.2**).[360] In light of this risk, *On Fractures* warns against setting fractures near the major vessels (*Fract*. XXXV, XXXVI). *Diseases I* also maintains that all wounded vessels deposit blood within the body, and this deposited blood putrefies into pus and causes internal suppuration (*Morb. I* 21). When the ruptured vessels fail to heal, this leaking of blood and internal suppuration become chronic and the patient dies (*Morb. I* 21).[361] The healing of these smaller ruptured vessels (see **3.1.1**) depends on therapy applied to the whole body through external means. But when the larger vessels are severed and lose the substantial volume of blood they carry, options for treatment (and chances of patient survival) are significantly diminished.

Many of these vital parts are also difficult to directly access. Minimal physical access is certainly *possible* for many of these 'organs' and parts.[362] But without technical expertise and medical innovation, the physicians did not have the ability to stop fatal occurrences such as internal haemorrhaging and the spread of noxious material from 'organs' such as the bladder and intestines.[363] Moreover, certain 'organs' were likely inaccessible altogether. The heart, for instance, is a good example of the limitations of the physicians' τέχνη in terms of the location of injuries. It is noteworthy that in the surviving treatises of the Corpus, the only cardiac trauma discussed is the ἕλκος by Xenarchus' heart, which I have understood as a wound near his heart and not on it (*Epid. VI* 7.5).[364] The absence of trauma to the heart in the Corpus could be due to a number of reasons about which we can only speculate.[365] Perhaps these authors, like many physicians, did not encounter injuries that affected the heart. Anatomically, the heart is one of the best protected organs in the body. Consequently, in early Greek literature and art it is often the *liver* that is the target of fatal thoracic damage rather than the heart due to the liver being a larger and easier target.[366] This reason could account for the absence of the heart in *Prorrhetic II*'s list of deadly wounds. The author not only identifies the liver as the primary reason thoracic injuries are fatal, but also the

[360] Salazar (2000), 44f. Haemorrhage itself was not always bad – the term αἱμορραγίη is applied both in terms of profuse bleeding from wounds (e.g. *Liqu*. 1, possibly in *Aph*. VII.XXI) or from parts such as the nostrils in an ἀπόστασις (e.g. *Epid. I* XIX).
[361] See also *Flat*. X and *Aph*. VII.XXI.
[362] See **Appendix C**.
[363] Grmek (1989), 32.
[364] *Epid. VI* 7.5: Τὰ παρὰ καρδίην Ξενάρχῳ· καὶ θερμὸν ἄλες ἐσπνεῖν ἐς τὸ ἕλκος· ἀντὶ τῆς κενώσιος θάλπειν.
[365] We must also keep in mind that the lost surgical treatise, *On Wounds and Missiles*, likely contained didactic descriptions relating to wounds and injuries of the thoracic cavity, including the heart. Witt (2018), 222, 234-237.
[366] See Grmek & Gourevitch (1998), 139-141 for a discussion on the artistic depictions of Ajax's suicide and the awkward angle the weapon traverses in order to pierce his heart.

vessels around the neck (and possibly leading into the chest cavity), whereby accounting for what they perhaps assumed to be the predominant vulnerable *loci* in the thoracic area.

However, this reasoning would imply that any patient with a serious injury to the heart either did not approach a physician for help, died before they made it to the physician, or were not recorded by the (usually diligent) authors. Any conclusions on these possible reasons would be speculative, but I have doubts concerning the idea that every patient with a heart injury died before a physician could meet them. In the *Iliad*, Homer provides us with a gruesome description of Alcathous' heart struggling to beat while impaled by a spear, indicating that the ancient Greeks knew that the heart was strong enough to struggle against a serious injury, at least for a short period of time (Hom. *Il*. XIII.438-444).[367] We know from modern medicine that without surgical intervention, this struggle is ultimately futile. The presence of the heart on the lists of these authors (sans *Prorrhetic II*) and the lack of heart injuries in the Corpus may attest to a recognition of the lethality of trauma to the heart. Additionally, the absence could exemplify the reoccurring warnings against accepting cases where treatment would cause more harm to the patient than good, and be detrimental to the acting physician's reputation.

To conclude, the treatability of injuries in the Corpus was defined by the limitations posed by the physicians' medical skills. Their τέχνη could easily treat externally-accessible damage, but injuries to the interior of the body could not be directly accessed to perform necessary tasks such as suturing ruptured viscera. Therefore, treatment of the *interior* had to be applied from the *exterior* through methods such as the ingestion of medications, application of compresses, and physical therapies. This awareness of the limitations of the physicians' τέχνη also aided in the identification of what types of injuries are fatal, and how this reflects on the relationship of the medical τέχνη to the locations and natures of the body's most vulnerable and vital parts.

3.2 The Natures of Wounds and Diseases

Any wound or injury can become life threatening when its healing process is hindered. In modern medicine, we recognise complications in wound healing as infection caused by microbes entering

[367] Hom. *Il*. XIII.438-444: "While fighting, Idomeneus stabbed at the middle of his (Alcathous') chest with the spear, and broke the bronze armour about him which in time before had guarded his body from destruction. He cried out then, a great cry, broken, the spear in him, and fell, thunderously, and the spear in his heart was struck fast but the heart was panting still and beating to shake the butt end of the spear. Then and there Ares the huge took his life away from him." (Lattimore transl.)

the body, as well as 'conditions' that result from any initial infection.[368] The authors of the Corpus similarly observed negative pathological reactions to poor wound healing, especially inflammation, suppuration, and mortification. However, their understandings of these phenomena are drastically different to ours. These authors based their understandings of the injured body on medical beliefs characteristic of the state of medical technology in Classical Greece and their own ideas of human physiology and pathology. In this section I analyse the relation of wounds to disease in the Corpus, and argue that while this relationship is not clear-cut, it does highlight important facets of the authors' understandings of wounds and injuries within the context of their pathologies.

The Hippocratic authors display a degree of ambiguity in their distinctions between a wound and any detrimental pathological complications that occur as a result of the wound. Modern medicine maintains a fairly clear distinction between a wound (including its natural progression through the stages of healing), an infection caused by external microbes entering the body, and a condition which can result from infection. The Hippocratic authors do not maintain such a clear division, primarily because physicians of Classical Greece had no way of knowing the microbial causes of infection and disease.[369] Instead, the wound theories in the treatises of the Corpus link wounds and their pathological repercussions in predominantly two ways: (1) by identifying the wound or injury as a cause and initial site of disease, or (2) through the fluidity in identifying what σημεῖα have (a) arisen during the natural progression of a healing or deteriorating wound, and (b) those that are linked to diseases occurring due to the presence of the wound.

The identification of wounds and injuries as causes of disease is an important characteristic of Hippocratic aetiology of disease. Due to the lack of framework and technology needed to differentiate infection caused by external sources and disease, most negative physiological σημεῖα that appear in the wake of a wound or injury are classified as signs of a disease that has an aetiology directly linked with the wounding of the body. Earlier in this chapter (**3.1.1**) I analysed the internal ruptures discussed by the authors of *Internal Affections* and *Diseases I*: these internal injuries are treated as initial catalysts of diseases that assault the thoracic cavity and manifest as σημεῖα associated with the injured parts. For instance, *Internal Affections* states,

> If the bronchial tube is torn, or one of the vessels extending to the lung, the patient suffers the following: the disease (νούσου) begins with a violent cough, chills and fever; he

[368] Drexler (2010), 4-10.
[369] See Temkin (1953), Majno (1975), 183, Grmek (1989), 123-126, and Craik (2015), 256.

> expectorates copious white frothy sputum, sometimes charged with blood, and pain occupies his head and neck (*Int*. 2).

The author locates the primary *loci* of this disease around the torn parts of the lung and bronchial tubes. In treatment, the ultimate focus is the internal injury, while σημεῖα such as coughing and fevers are targeted as they appear. For the internal injury, treatments include "roots effective against tears", cautery of the chest and back, internal cleansing, and physical rest (*Int*. 1, 2).[370] In cases such as this, the Hippocratic authors make a distinction between a wound or injury (i.e. the split or burnt flesh, broken bone, dislocated joint) and the disease that occurs because of this damage: cause and effect.

However, the Hippocratic authors are not highly selective in their claims about what types of physical and psychosomatic suffering constitute diseases (see **2.1**). For example, the author of *Diseases IV* explicitly classifies wounds (specifically ἕλκεα) as diseases: "if an injury (τρῶμα) occurs, the flesh is cut and a wound (ἕλκος) ensues; I call that a disease (νόσημα)" (*Morb. IV* 19).[371] Here, the ἕλκος (i.e. a *locus* of broken flesh) is what the author is calling a disease, indicating that ἕλκεα share similar or important enough traits with diseases to be classifiable as one (I will elaborate on this point shortly). In comparison, the author of *On Fractures* focuses on the similarities of ἕλκεα and diseases: in their assertion of the importance of critical days in the healing of wounds, the author states,

> For what is there of most vital importance in the healing art to which it does not apply, not only as regards wounds (ἕλκεα) but many other maladies (νοσήματα)? Unless one calls all maladies wounds, for this doctrine also has reasonableness, since they have affinity one to another in many ways (*Fract*. XXXI.26-32).

The idea put forth in this passage seems somewhat inverted: the author indicates that we should classify all diseases as wounds, rather than all wounds as diseases. However, it is worthwhile noting that *Diseases IV*, which classifies wounds *as diseases*, is a treatise with a nosological focus, whereas *On Fractures* is concerned with injuries, wounds, and surgery. Lonie plausibly suggests that these two authors take up contrary positions "in some (background) controversy about the

[370] The use of φάρμακα and the implementation of cleansing and physical rest have clear rationales: clean the wound and allow it to heal. The purpose of cautery is predominately to obstruct the spread of harmful substances, see McDonald (2009), 50.
[371] Translation modified based on Muellner & Muellner's translation in Grmek (1989), 125.

name and nature of disease".[372] It is noteworthy that regardless of the "name" of disease, these authors seemed to have observed enough similarities between the progression of wounds and diseases to warrant assertions implying the shared or similar natures of the phenomena.

The Hippocratic authors evaluate the general progression of wounds using the same theoretical frameworks that they believed underlie disease.[373] In the progression of a wound, the combination of empirical observation to determine *what* is happening, and theories to determine *why* and *how* these phenomena are occurring, culminate in conceptions of the φύσεις of wounds and injuries. In the same way that a disease has a specific φύσις, which incorporates the σημεῖα that manifest in the disease's progression, the Hippocratic authors maintain that wounds and injuries also have notable σημεῖα that manifest while they heal or deteriorate. These σημεῖα include:

- **pain**, which can be associated with physical damage, ensuing inflammation (e.g. *Fist*. 7), or with treatment (e.g. *Fract*. XLII, *Art*. LXIX);[374]
- **bleeding**, wherein blood itself is utilised as a σημεῖον in external and internal injuries;[375]
- **suppuration**, since most if not all of the wounds in the Corpus generate "the unavoidable minimum of pus" (*Ulc*. 1). The authors note that cases of wounds that involve contused flesh and bone are more likely to suppurate than wounds made by sharp objects (*Ulc*. 1; *VC* XV.19-14);[376]
- **swelling and inflammation** attributed to fluids flooding to the area of the injury or wound (e.g. *Ulc*. 24, *Morb. IV* 17);
- **spreading**, especially across the surface of the skin. The authors observe that ἕλκεα as well as growths (φύματα) caused by injury and illness have the potential to spread;[377]

[372] See Lonie (1981), 329.
[373] Including the application of theories regarding critical days (e.g. *Fract*. XXXI, *Art*. LXVII, *Mochl*. XLI, *VC* XIX) and the identification of evacuations of wounds as ἀποστάσιες (e.g. *Epid. VI* 3.4, *Fract*. XXVI.2, *Prog*. IX.16-18). See Lonie (1981), 327.
[374] Theories on why pain occurs in injuries can also be linked with the authors' general arguments on nature and pathology: for example, *Flat*. argues that lacerations (ῥήγματα, 'tears') are painful because of the air (πνεῦμα) that slips between the freshly severed flesh (*Flat*. XI).
[375] Also, blood that has been heated from the violence of a blow or fall can flood into dilatated vessels and create an identifiable bruise (φλάσμα) just beneath the skin (*Morb. IV* 19).
[376] On suppuration in ancient medicine see Majno (1975), 183ff. and Grmek (1989), 123ff.
[377] E.g. spreading ulcers (including shingles) as deadly or especially chronic (*Prorrh. II* 13), the directions of growth for φύματα (*Medic*. 11), and φαγέδαιναι as 'eating' or 'rodent' ulcers (*Ulc*. 11; *Epid. IV* 19). See Jouanna (1999), 142f.

- **fever**, in regards to the feverish inflammation of the flesh around a wound/injury, or the full-body fever that signifies the presence of an internal injury or that some part of the body is not healing as it should;[378]
- **affected cognition**, such as confusion, delirium, or loss of consciousness due to the pain of the injury or psychosomatic repercussions;[379]
- **exfoliation of dead skin or bone**, which is understood as a necessary step in the natural cleansing process of the body (*VC* XV.19-14);
- **spasms and tetanus**, which are often associated with damage to the temples (*VC* XIII), or when certain physical injuries are reduced too early, improperly, or at all (*Fract*. XXXII.76-84), or when the injured part becomes too cold (*Art*. LXIII, LXVII);[380] and
- **mortification** (I return to this shortly).

When the body is damaged and produces some form of injury, the authors note one or more of these σημεῖα in their records and prognoses because they are known and predictable stages in the aftermath of physical damage to the body. The Hippocratic authors thus outline a symmetry between the nature of disease (understood as clusters of negative biological effects occurring throughout the body that have a specific φύσις and a specific δύναμις) and the nature of wounds and injuries (also understood as entailing biological effects with specific φύσεις and specific δυνάμεις). This symmetry is likely reflected in the remarks of *Diseases IV* and *On Fractures*. Moreover, obscurity in the differentiation between wounds and diseases could also have contributed to the claims of these authors. To illustrate this, I have chosen two examples from the Corpus in which the authors who discuss wounds and injuries maintain an unclear distinction between the *progression* of a healing or deteriorating wound, and the *manifestation of disease* due to the presence of a wound or injury

My first example is related to the claim in *Diseases IV*: although the author of *Diseases IV* explicitly classifies a ἕλκος as a disease, this view should be taken in the broader context of the treatise itself. This author's theory of pathology is heavily based on the body's moisture (both the ἰκμάδες and general ὑγρόν). Diseases are manifestations of the effects of disordered and unbalanced moisture

[378] Fever from internal injuries: e.g. thoracic tears (*Int*. 1, 2; *Morb. I* 14, 15), and uterine ulcers (*Mul. I* 64). Fever from external injuries: e.g. head wound (*VC* XIX), humerus dislocation (*Fract*. XLIII), and elbow injuries (*Art*. XIX).
[379] E.g. Ariston's confused thinking is noted as a σημεῖον in the case of his gangrenous leg (*Epid. VII* 110), and severe fevers and coma are associated with dislocations of the jaw (*Art*. XXX, XXXI).
[380] See **1.2.3.**

in the body. When the author calls ἕλκεα diseases, it is after they have already established that certain pathological characteristics of a ἕλκος are due to the effects of moisture. For example,

> Lesions (ἕλκεα) too become most inflamed on those (sc. odd-numbered) days, since when the moisture (ὑγρὸν) is stirred up it passes into all the vessels, and fills them when the disease (νοῦσος) arrives in the lesion. Now if such a case is attended to, and the pus being driven out by disturbed moisture coming to the lesion has a way to escape, the lesion will be cleaned to the exterior; but if the case is not attended to, and the pus does not find a way out, it will remain there together with what comes thither, provoke pain, and swell the flesh around the lesion (*Morb. I* 17).[381]

In this passage, a ἕλκος that has produced pus but not yet released it is met with disturbed moisture flooding to the wound, which is what provokes disease (i.e. swelling and inflammation) at the site of the ἕλκος. To this author, swelling and inflammation are characteristic of a disease associated with wounds that have not been properly cleansed. These σημεῖα are avoidable if adequate treatment is applied and the pus is released; but even if this is the case, the disturbed moisture has still been attracted to the wound (likely due to the heat produced by the wound and pus) and drawn 'disease' to the wound site.[382] Whether the ἕλκος itself is classified as a disease before the body's moisture begins to interact with it is not clear in this passage. The relation with *Diseases IV* 19 is also unclear, which could be a product of inconsistency in the author's argument or the manuscript tradition. Or, plausibly, the assertion that ἕλκεα are diseases in *Diseases IV* 19 could have less to do with the *ἕλκος itself* being a disease, and rather the *interaction* between the site of the ἕλκος and the body produces negative effects that are identifiable and predictable, much like diseases.[383]

Comparatively, the author of *On Joints* states that wounds and injuries can be a single site of disease, as well as produce diseases that spread through the body:

> One may observe in medicine many similar examples of violent injuries which are harmless (ἀσινέα), and contain in themselves the whole crisis of the disease (νοσήματος), while slighter injuries are malignant, producing a chronic progeny of diseases (νοσημάτων) and spreading widely into the rest of the body (*Art*. XLIX.1-6).[384]

[381] Translation modified, replacing 'raise' with 'swell'.
[382] On the semantic association of 'disease' with the moisture causing disease, see Lonie (1981), 315.
[383] This reasoning has greater appeal to wounds caused by physical damage rather than those arising from illness.
[384] Translation modified, replacing 'lesions' with 'injuries'.

The author provides two types of examples. Firstly, fractured ribs that are not forced out of position or into any internal parts often heal without fever, empyema, blood-spitting, or necrosis of bones. The area of the fracture consolidates and heals and the effects of the injury are localised and minimal (*Art*. XLIX). Secondly, when the flesh is contused around the ribs, the wound site often becomes purulent, painful, flesh stops adhering to bone, and bone comes away. Healing is consequently difficult and prolonged (*Art*. L). For this author, the healing injury is understood to be a 'disease' that is either (a) relatively benign and highly localised, containing all the σημεῖα and interactions of the disease within the site of the injury, or (b) disturbed by an aberration in the healing process of the injury, whereby disease begins at the site of the injury and spreads, producing σημεῖα as it advances.

My second example to illustrate the unclear distinction between the progression of wounds and the manifestation of diseases in the Corpus involves the changes that parts of the body undergo when a wound or injury deteriorates. Aside from the general σημεῖα which are used to indicate that a wound or injury has advantage over the body's ability to heal (including fevers, impaired cognition, vomiting, and diarrhoea), the authors describe sites of injury as becoming purulent and rotting, or that gangrene or necrosis has supervened. In these cases, the deterioration of the wound is labelled and treated as a disease that is (a) caused by a fault in the healing of the wound due to complications or inadequate treatment, and (b) can spread prolifically through the body. For instance, one of the many cases of injuries in *Epidemics V* details a man from Malia who was run over by a loaded cart (*Epid. V* 26). The impact broke his ribs, which in turn began to suppurate, and over the course of ten months the pus was periodically drained with lint plugs. The outcome was poor for the patient: the lint plugs caused more harm than good and the interior of his cavity rotted. This case provides us with a couple of important pieces of information.

Firstly, the author observed that after the initial ten-month period of treatment, "when the skin was cut, an opening into the peritoneum appeared which led in both directions: a rotten channel ran to the kidney and to the bones" (*Epid. V* 26). The pus present within the interior, which had evidently failed to be drawn off by the plugs, had caused fistulas that had eaten through and rotted out the abdominal cavity. The site of the injury, which this author highlights as "the site of the disease" was putrid: from the incision flowed "a black, foul-smelling corruption" – a changed, purulent form of the natural materials beneath the skin (*Epid. V* 26).[385] And secondly, the author states that the treatment failed because "the nature of the disease was farther off than below the skin" (*Epid. V*

[385] See **2.3**.

26). Lint plugs are designed to draw off fluid that has accumulated at an accessible depth. Suppuration that occurs deeper is not only unreachable by the plug, but the plug keeps the incision moist and liable to further suppuration and, eventually, rot. The limitations posed by applying external treatments to internal injuries are acknowledged by this author, as is the likelihood that the patient would have died from his wounds regardless of whether he had been "properly cared for" (*Epid. V* 26).

When this corruption or rotting of organic material is labelled, often as γάγγραινα (gangrene) or σφάκελος (translated as 'necrosis' by Withington, 'gangrene' by Smith, and 'sphacelus' by Jones and Potter),[386] the authors focus on the appearance and behaviour of this mortification.[387] For instance, the author of *Epidemics VII* notes that Ariston's toe lesion developed gangrene (γάγγραινα) that ran up to his knee and turned the limb "black, rather dry, and foul-smelling" (*Epid. VII* 110), and in *On Wounds in the Head*, the author describes the necrosis of bone through its changing colours (dark, then yellowish or "dead white") (*VC* XIX.14-19). The Hippocratic authors maintain that the purulent material produced in cases of both γάγγραινα and σφάκελος need to be cleansed from the body to aid the healing process (e.g. *Prorrh. II* 13). But when mortification has supervened through entire limbs, the removal of dead and damaged tissue is necessary to save the patient's life.

Due to its "self-healing nature", the body is capable of 'throwing off' dead parts of itself in both injury and illness.[388] This elimination is often identified as an ἀπόστασις and conducive to the healing of the body. For example, *On Fractures* observes the exfoliation of bone ("ὀστέων ἀπόστασις") (*Fract*. XXVI.2), and *Prognostic* states that, "the illness may be expected to turn to an abscession (ἀπόστασιν), with the result that the patient loses the blackened members but recovers" (*Prog*. IX.16-18). In an intriguing passage on amputations, the author of *On Joints* tells us,

> As for gangrene of the tissues occurring in wounds with supervening haemorrhage, or much strangulation, and in fractures which undergo greater compression than is opportune, and in other cases of tight bandaging, the intercepted parts come away (ἀποπίπτει, 'fall off') in many cases. The majority of such patients survive (*Art*. LXIX.1-6).

[386] Loeb volumes III (Withington, LCL 149), VII (Smith, LCL 477), IV (Jones, LCL 150), and V, VIII, IX (Potter, LCL 472, LCL 482, LCL 509) respectively.
[387] Salazar (2000), 32f.
[388] See **1.1**.

The process of the natural separation of mortified parts from the rest of the body is reliant on the bone and flesh dying and simultaneously coming away from the living parts. The author describes a line of demarcation that appears at the point where dead flesh meets live flesh. It is at this point and no higher where the amputation procedure – a gradual process of waiting and removal of bone and dead material that can take in excess of 80 days – takes place. The complications inherent in this procedure are numerous. Any part of the limb that remains alive while others turn necrotic creates issues, as does trying to remove any living part during the procedure (the author warns that many have died from the associated pain, *Art*. LXIX.23-26), and in cases of certain limbs the procedure itself has a high death toll (*Art*. LXIX).[389]

Many authors evaluate and treat deteriorating wounds and injuries in the same way as severe diseases, especially when these injuries involve supervening mortification. In discussions of mortification, little is said of the role humours play in the way flesh and bone change, and but the authors still employ their pathological concepts of corruption and putrefaction in explanations of how and why a foul wound can spread and rot through an entire limb.[390] This mortification is understood as a disease caused by the wound, and also as a sign that the wound is changing the body in a negative manner. The rotting of damaged limbs and interior body parts is also comparable to the 'melting' of the body's interior in disease. The perceived heating, softening, boiling, and liquifying of the interior in disease has a destructive effect on the natures and functions of the interior parts in a similar way as the rotting destruction of mortification.[391] However, at least in the boiling of the interior in disease, there is still hope that cooling and drying therapies can restore the balance of the interior (e.g. *Vict. II* LX); attempts to treat the man from Malia with φάρμακα to dry up the purulence was ultimately futile (*Epid. V* 26).

In modern scholarship, discussions of Hippocratic pathology rarely include the physical destruction of flesh, tissue, and bone as a cause of disease in the Corpus. A likely explanation is that the central focus of studies on the Corpus' pathology is often on humoral medicine. It should be acknowledged, however, that Hippocratic disease aetiology is not confined to the disturbance of substances through imbalance. The legitimate position that wounds and injuries hold in the aetiologies of the Hippocratics highlights how physical damage done to the body is not only a problem in itself, but also one of the many potential causes of pathological suffering by the patients. In this sense, the injured body and the diseased body have a relationship of cause and effect: a body

[389] See Majno (1975), 191f.
[390] See **2.3**.
[391] On the interior of the body being boiled or cooked, see Langholf (1990b), 90f.

that has been injured can provoke illness, thus changing into a body wracked by disease. In contrast to other causes of disease that may originate from the exterior but ultimately affect the body's interior (e.g. ingested food, seasonal changes), wounds, and especially external ἕλκεα, are *external* causes of disease, beginning on the surface of the body and affecting the bodily substances around it.[392] But when authors associate wounds with diseases, and classify one as the other, the line of demarcation between what constitutes the 'wound' and what constitutes the 'disease' becomes obscured. Attempting to neatly define the boundaries between wounds and diseases in the Hippocratic treatises proves difficult, due in part to the varying opinions of each author, as well as the inconsistencies in their own works. By outlining two prominent ambiguities associated with the authors' interpretations of the relationship between wounds and diseases, I have shown that, even if the nature of the relationship is not clear cut, the links the authors establish between wounds and diseases is significant to how the authors understood injured and diseased bodies.[393]

3.3 Conclusion

Physical injuries are a reality of everyday life, and life in Classical Greece was no exception to this. In the medical theories of the Hippocratic physicians, injuries and wounds are integrated into broader theories of pathology alongside diseases. These physicians understand, examine, and treat injuries and wounds using the same frameworks and techniques as they use in cases of disease. Evaluations of curability and incurability are based on the natural vulnerabilities of the body and its parts, as well as the limitations of the physicians' technical abilities, and are shared among wounds, injuries, and diseases alike. Consequently, lines of demarcation between what constitutes a wound or injury and what constitutes a disease are blurred, and injured and diseased bodies are understood as inherently related. In the context of Hippocratic pathology, this relationship is important to their understanding of the body's pathology, and for us, this relationship aids in our scholarly interpretations of Hippocratic nosology, pathology, and the circumstances in which these physicians could or could not help their patients.

[392] Lonie (1981), 329.
[393] Grmek (1989), 125.

Conclusion

In this study I set out to analyse the ways in which the authors of the Hippocratic Corpus understood the living human body. While much scholarly work has been done on medical ideas in individual treatises, and broad pathological ideas such as Hippocratic humoral theories, the ways in which the Hippocratic authors understood *how* the living body functions and malfunctions have received far less attention. In analysing the authors' understandings of physiology and pathology, I have undertaken a close examination of the ideas regarding the body in the Corpus, and in particular the views on how the body functions, and why certain processes and parts are vital. My aim has not been to construct a coherent picture of Hippocratic medical doctrine, for such an endeavour would eliminate the nuance in each individual author's theories, but rather a comprehensive picture of Hippocratic analysis of the living body. Keeping in mind that each author has their own ideas regarding the nature and processes of the body, within the Corpus a contrast quickly became apparent from my text-based analysis of the works: while some authors maintained clear theoretical ideas regarding the body's composition and physiology and explain these ideas in detail, many others refrain from using explicit theories of the body's nature. The latter group explained their understandings of the body by focusing on the pathological changes to the bodies of their patients as they observed them, adding conjectures on the causes, and proposing treatments.

Drawing on my discussion of the broader framework used in this thesis (**Introduction §3**), I have structured my analysis by formulating three central questions, inspired by the descriptive medical epistemology outlined by Khushf (2013). These questions ask (1) what information the physicians know, (2) how they know this information, and (3) how do they apply this information in medical practice. The first question (what they know), has comprised the body of this thesis (**Chapters One** to **Three**). I have illustrated and examined the anatomical, physiological, and pathological knowledge the authors demonstrate in their writings, and the importance of cause, effect, and change in understanding the transitions the body undergoes during life. The second question (about their manner of acquiring knowledge), was outlined in the **Introduction** (**§2**). I have also shown throughout this thesis the importance of the senses in observation, and the application of theory, in order to collect data and draw conclusions on the body's processes. The Hippocratic physicians had restricted access to the interior of the body. Consequently, while anatomical knowledge frequents the treatises, knowledge of interior physiological processes relied on theory to supplement information their medical skill (τέχνη) could not reach. The third and final question

(their application of knowledge), has only briefly been addressed throughout this thesis, but it is an important motivation underlying this study. A better understanding of the reasoning behind the therapies recommended by the Hippocratic authors allows us to better appreciate the connection between their medicine and the human body. It also allows us to appreciate the way we look at our own connection with modern medicine in the 21st century.

Throughout this thesis, I have synthesised and analysed Hippocratic ideas on the body's composition, parts, and processes according to three primary states of the body: functioning (**Chapter One**), diseased (**Chapter Two**), and injured (**Chapter Three**). In the first chapter, I demonstrated the diversity of the medical views within the Corpus, and importantly highlighted the significance of fundamental concepts which were shared by many of the authors. Particularly significant is the importance of the body's nature (φύσις) as a regulating and organising force. Regardless of the constituents involved in an individual author's theory of bodily φύσις (fluids, elements, etc.), the body's nature will maintain and heal the body, generate growth, create new forms, and it will also organise the body so that it either continues to live, or deteriorates and dies. Moreover, everything inside and outside of the body is understood to have a capacity (δύναμις) to affect change. Any substance can affect the quantities and qualities of the body's components, inciting change that is either conducive to maintaining the health of the body, or provokes disease.

In the second chapter, I focused on how the Hippocratic authors understood the way a body changes in disease. Diseases are understood by the Hippocratic authors in relation to the physical body: they are manifestations of harmful signs (σημεῖα) throughout the body that are ideally predictable in their progression. These σημεῖα and the diseases they signify are caused by qualitative or quantitative imbalance within the body. The authors understood everything within the body to have a φύσις and a δύναμις; when an individual substance or part is affected and its nature changed, it can no longer perform its proper role and the body starts breaking down. Such a view emphasises a mechanistic understanding of the causal links within the body, and the need for the majority (if not all) of the body's vital parts to be well functioning in order to sustain the body. This understanding reinforces the idea of the 'healthy' body and its 'healthy' functions existing in a natural, harmonious, and balanced state, in contrast to the 'diseased' and 'injured' bodies and their upset processes in a state of turbulence, negative change, and malfunction.

In the third chapter, I built on my analysis of the diseased body by exploring an area of Hippocratic pathology that has been relatively neglected by scholarship: wounds and injuries. This chapter demonstrated the abilities and limitations of the physicians' medical τέχνη, especially in regards to

the interior of the body and complex 'organs' and parts. I also highlighted the vague distinction between wounds and diseases in the Corpus, and the cause-and-effect relationship of the injured body to the diseased body. The physicians' methods of evaluating and treating pathological problems do not discriminate between cases of injury and disease – from a medical perspective, anything that is causing suffering to the patient is evaluated as an occurrence that can be assessed, understood, and (hopefully) treated by medical τέχνη. This chapter contributes important insights on Hippocratic wound theory, and the relation of wounds and diseases in the Corpus, to modern scholarship on ancient medicine.

A crucial insight that has emerged from this study is that different understandings of physiological and pathological processes inspire diverging understandings of treatment.[394] While the Hippocratic physicians adopted natural methods of treatment in pointed opposition to the purifications and religious-orientated medicine also active in Classical Greece, their differing understandings of the body affected how they evaluated the effectiveness of certain therapies. In areas that the authors share similar theories, especially in regards to the self-healing φύσις of the body, the authors recommend similar treatments: therapies intended to assist in the body's natural healing, non-intervention, and so on. In areas where their theories differ, such as the constituents of the body, their explanations as to why certain treatments are helpful can differ because their ideas of causation differ. These diverging views on aetiology were impacted by the limitations placed upon the τέχνη of the physicians; however, also due to these limitations, the authors strove to establish theories of causation that could supplement what they could not observe. The physicians' limited access to the body's interior had a major impact on *where* their τέχνη could reach, and the need to work *with* the body in the application of medicine. Therefore, gaining a thorough understanding of *what* is happening within or to the body, *how* these biological and pathological processes are occurring, and *why* changes occur in the body, was crucial to the Hippocratic physicians in order for them to effectively employ their τέχνη and help their patients. The τέχνη of the Hippocratic physicians relies on physiological and pathological knowledge, but also works in sympathy with the nature of the body. Thus, the physicians' attempts at constructing their own understandings of the living body reinforces the importance of the body's natural processes to their own natural methods of treating it.

[394] See Jouanna (2012), 126.

Appendix

Appendix A: Descriptions of Bodily Substances in the Hippocratic Corpus

TABLE 3**: *Organic substances described by the Hippocratic authors*[395]**

Table data is ordered alphabetically.

Substance	Formation, General *Loci*, Descriptions	Physiological and Pathological Roles
Air Varieties:[396] πνεῦμα (breath) ἀήρ/ἠήρ (air) φῦσα (wind/air) πνοή (breath/air) ἄνεμος (breeze)	**πνεῦμα:** Breath or atmospheric wind (e.g. *Loc.Hom*. 14; *Vict*. *II* XXXVIII; *Flat*. III). Created by bodies when they are heated: including people/animals and plants (*Nat.Puer*. 1, 19). Environmental winds differ in nature and power according to different regions: e.g. moistening and cooling, drying and heating (*Vict. II* XXXVII, XXXVIII; *Morb.Sacr*. XVI; *Aër.* IX, X, XV). Is inhaled and brought into the lung (*Morb. III* 10), or the heart (*Carn*. 5, 6). Traverses vessels, and shares this path with the blood (*Oss*. 11; *Acut.(Sp.)* 7, 9; *Flat*. X; *Morb.Sacr*. VII). Fills the ears (*Morb. II* 17). Escapes from back wound (*Epid. V* 96 = *VI* 34). Descriptions: sooty (λιγνυῶδες) (*Coac*. 255); rare (*Dieb.Judic*. 2 = *Hebd*. 46); hot and cold (*Epid. VI* 4.22).	**πνεῦμα:** Breathing is as important to life as the presence of the humours (*Nat.Hom*. V); is necessary and continuous for all mortal creatures throughout life (*Flat*. IV). In health, the cavities of each of the limbs are filled with air – in disease, they are filled with *ichōr* (*de Arte* X). Nourishing (*Alim*. XLVIII; *Nat.Puer*. 1; *Flat*. III); not nourishing but counterbalances internal dispositions (*Cord*. 3). When a person inhales breath (**πνεῦμα**), the air (**ἀήρ**) carries intelligence (φρόνησις) to the brain (*Morb.Sacr*. XIX). In sleep, breath diffuses throughout the body and is calm (*Vict. III* LXXI). Embryology: articulates the embryo/foetus *in utero* (*Nat.Puer*. 6); congeals seed and flesh during formation (*Nat.Puer*. 11). Stoppage of air in the vessels: causes paralysis (*Morb.Sacr*. VII); chills, darkening vision, loss of speech, convulsions (*Acut.(Sp.)* 7). Cools heated interior: prevents lungs from boiling (*Morb.Sacr*. X). Cool breath inhaled, drawn into the heart because it is hot, and heated (*Carn*. 5, 6); cool

[395] These entries do not include every record of a given substance within the Corpus because there are many reoccurrences of certain descriptions and *loci* of these materials. But they do provide a general overview of the variety of description and ideas in the Corpus on these substances.
[396] See Lloyd (2007) and Craik (2015), 98f.

Substance	Formation, General *Loci*, Descriptions	Physiological and Pathological Roles
	ἀήρ/ἠήρ: ἀήρ is πνεῦμα outside of the body (*Flat*. III). Air outside of the body which can enter the body (*Aër*. XV; *Morb.Sacr*. X; *Morb. I* 11). Breath (**πνεῦμα**) comes from the air (**ἠήρ**) (*Vict. IV* LXXXIX.120-121). Descriptions: turbid or clear ἠήρ (*Aër*. XV). **φῦσα:** φῦσα is πνεῦμα within the body (*Flat*. III). Air blown into the body or through something: e.g. into the anus (*Aff*. 21); into the uterus (*Mul. II* 22); as fomentation to straighten and dilate the uterus (*Mul. II* 24); "injection of air" (*Mochl*. XXXVIII); blow air into the cavity (*Art*. XLVIII); through an excised heart (*Cord.* 10); into a bladder which is then inserted into the body (*Morb. II* 59); passes through the flesh and dilates the passages of the body (*Flat*. XII). Air produced within the body: *Superf*. 28; by foods (*Steril*. 26); by food/drink heating the cavity (*Vict. II* LII). Air trapped within the body: in cavity (*Steril*. 22, *Prorrh. I* 140; *Nat.Mul.* 41; *Coac*. 44: "In patients who have a collection of wind (**ἐμφυσωμένης**) in their cavity during a fever, for the air (**πνεῦμα**) not to escape is a bad indication"); within uterus (*Mul. II* 45; *Hum*. III; *Nat.Puer*. 19); within a miscarried foetus (*Foet.Exsect*. 1).	breath drawn into warm bodies and heated (*Nat.Puer*. 1). In ardent fever, heated breath burns the mouth and tongue (*Aff*. 11). Mother/child sympathetic respiration (*Carn*. 6; *Nat.Puer*. 1). Voice: passages of breath (**πνεῦμα**) and the way the air (**ἠήρ**) interacts with these passages decides the character of the voice (*Vict. I* XXXVI); speech takes place through drawing in breath (*Carn*. 18). **ἀήρ/ἠήρ:** Cause of life and illness (*Flat*. IV). Sneezing: *Aph*. VII.LI: "Sneezing arises from the head, owing to the brain being heated, or to the cavity in the head being filled with moisture <or becoming chilled>. So the air inside overflows, and makes a noise, because it passes through a narrow place." Voice: cold air (**ἀήρ**) and hot bodies are associated with loud/big voices (*Epid. VI* 4.19); deep voices due to air (**ἠήρ**) being moist and turbid (*Aër*. XV). **φῦσα:** Cool, inspired air cools the lungs which keeps the left ventricle of the heat from overheating (*Cord*. 5). When the forming embryo comes in contact with air, it forms a membrane like a crust on baking bread (*Nat.Puer*. 1). Uterus filled with air can cause miscarriage (*Mul. I* 26).

Substance	Formation, General *Loci*, Descriptions	Physiological and Pathological Roles
	Flatulence (*Fist*. 1; *Vict. II* XL; *Epid. VI* 3.5; *VM* XXII). **πνοή:** Breath or air moving in the body (*Nat.Puer*. 4, 6; *Morb. IV* 26). **ἄνεμος:** A flowing current of air (**ἠήρ**) (*Flat*. III). Wind inside the body: *Mul II* 102: "If wind (**ἄνεμος**) arises in a woman's cavity, she will have a violent pain and the air (**φῦσα**) does not come out." (also *Mul. II* 68).	
Bile **χολή** Varieties: Black bile (μέλαινα χολή) Yellow bile (ξανθὴν χολή) Bitter bile (πικρόχολος)	Originates in the body at birth (*Morb. I* 2). Predominant in summer and autumn (*Nat.Hom*. VII; *Hum*. XIV). Associated with the liver (*Morb. IV* 2; *Int*. 28; *Prorrh. I* 53). Drawn from food and drink (*Morb. I* 23; *Morb. IV* 5). Traverses the body: into bloodstream (*Morb. I* 29); joints (*Aff*. 30); into the liver and causing 'heartburn' (*Morb. IV* 5); lungs (*Morb. I* 28); spleen (*Int*. 34); small vessels (*Int*. 43); in a flux to the chest (*Loc.Hom*. 10); brain (*Morb.Sacr*. XVIII); uterus (*Superf*. 33; *Nat.Mul*. 89; *Mul. II* 73); in menses (*Mul. I* 11). Temperature: warm, between phlegm (cold) and blood (hot) (*Morb. I* 24). Weight: lightest of the four ἰκμάδες (*Morb. IV* 20). Descriptions: thin (*Morb. IV* 9; *Mul. I* 74(11)); yellow-green (*Morb. II* 73), pale yellow and can discolour eyes and skin in	One of the four χυμοί that constitute the body (*Nat.Hom.* V); one of the four ἰκμάδες that are vital to the body (*Morb. IV* 1; *Genit*. 3). Cause of illness: one of the primary causes of disease (*Morb. I* 2; *Aff*. 1); cause of fever (*Nat.Hom*. XV; *Morb. I* 23, 29; *Loc.Hom.* 27); suppuration and growths (*Morb. I* 17, 20); ulcerates flesh (*Epid. V* 19). Congeals the blood (*Aff*. 29); heats the blood (*Morb. I* 29; *Haem*. 1); overheats blood in the head, which attracts more bile (*Morb. II* 3). Vomiting and evacuations of pure (unmixed) bile in injuries (*Fract*. XLIII; *Art*. XXXI). Melts, and finest part turns into sweat (*Morb. I* 24). Associated with madness (μανίη): from the breaking out of hepatic bile (*Int*. 29); caused by black bile (*Epid. V* 2; *Acut.(Sp.)* 16, 29); bile madness is evil, noisy (*Morb.Sacr.* XVIII). Yellow bile in left cavity of the heart, along with *ichōr*, flushes through the heart regularly and prevents it from overheating (*Cord*. 1, 11). Bile causes hot and fiery hostile influences in dreams (*Vict. IV* LXXXIX).

Substance	Formation, General *Loci*, Descriptions	Physiological and Pathological Roles
	jaundice (*Int*. 28, 35), reddish and black (*Epid. V* 22); putrid (*Int*. 41; *Morb. II* 2); congealed (*Int*. 41).	
Blood **αἷμα** Varieties: Described as general, menstrual, lochial (often mixed with other material) depending on where in the body the blood naturalises, where it exits from, or especially if the patient is male or female. But these are all simply blood, without any compositional differentiation.[397]	Predominant in spring (*Nat.Hom*. VII; *Hum*. XIV). Associated with major 'organs': liver (*Alim*. XXXI; *Anat*. 1), vomiting blood when liver pipe is injured (*Mul. I* 43; *Nat.Mul*. 52); heart (*Alim*. XXXI; *Morb. IV* 2); traverses blood-vessels (αἱμόρρους) (*Oss*. 7). Created from nutrients: leftover from nutrient (*Alim*. XXXVI); from food concocted in the stomach/cavity (*Morb. IV* 11); increased by food and drink (*Morb. IV* 7); white wine thins and weakens blood (the opposite strengthens it?) (*Vict. II* LII); drink (wine, specifically?) increases blood (*Flat*. XIV). Complex composition: contains ἰκμάς (*Morb.Sacr*. XIX); associated with *ichōr* (*Cord*. 11); "sweetest part" (*Nat.Puer*. 19); fibres of blood are cold and gluey (*Carn*. 8). Discolours flesh (*Int*. 47); diseased blood changes complexion (*Aff*. 33). Temperature: hot versus thin, cold, scanty, watery (*Morb.Sacr*. XII); not warm by nature but becomes warm (*Cord*. 11); can be heated by violence (*Morb. IV* 19), or by intercourse (*Genit*. 4). Weight: second lightest of the four ἰκμάδες (*Morb. IV* 20). Descriptions: pure and red (*Morb. II* 4); pale yellow or dark (*Int*.	One of the four χυμοί that constitute the body (*Nat.Hom.* V); one of the four ἰκμάδες that are vital to the body (*Morb. IV* 1; *Genit*. 3). Female bodies: younger are richer in blood, older have less blood (*Nat.Mul*. 1; *Mul. II* 2); older women have more mucous in their menses than blood (*Loc.Hom*. 47); women have hotter blood than men (*Mul. I* 1). Influences mental functions: motion and quality of blood contributes to intelligence (*Flat*. XIV; *Morb. I* 30); drink increases the blood, results in alteration of thoughts in the soul (drunken optimism) (*Flat*. XIV); migrating blood results in loss of consciousness (*Morb. I* 18); fearful dreams (or hallucinations) when blood boils the brain (*Morb.Sacr*. XVIII); inflammation of the blood contributes to madness of a fiery soul (*Vict. I* XXXV); blood in breasts causes madness in women (*Aph*. V.XL; *Epid. II* 6.32); stopping in veins causes fainting (*Epid. VI* 7.2); blood dissolves in sleep (*Vict. III* LXXI). Affects movement and sensation: blood blocking the passage of πνεῦμα through vessels causes paralysis (*Morb.Sacr*. VII, X); congealing and stilling blood causes paralysis and powerlessness (*Morb. II* 6, 8); blood congeals around cords resulting in loss of control of limbs (*Mul. I* 4). Linked with body's temperature: cooling blood causes shivers (*Flat*. VIII; *Morb. I* 24); during sleep blood retreats to the interior (*Epid. VI* 5.15); heated blood results in a rapid rotation of the internal circuits, heating the body, and the body expels heated moisture as hot sweat (*Vict. II* LXVI). Linked to the body's structure: converted blood forms flesh of foetus (*Nat.Puer*. 5; *Carn*. 9). Nourishing: blood (or more precisely, "warm, moist, and congenial" lochial material) protects

[397] See Jones (1987), Dean-Jones (1989), Boylan (2015), 26-48, and Hankinson (2016), 436f. n.46.

Substance	Formation, General *Loci*, Descriptions	Physiological and Pathological Roles
	36), "serum-like" (ἰχωροειδέος) (*Epid*. *VI* 2.20), dark (*Morb. I* 14), dark and putrid (*Ulc*. 8), dark, turbid, and diseased (*Morb. II* 4), black (*Aph*. IV.XXIII); bilious (*Epid*. *IV* 13); thin membranous menstrual blood (*Nat.Mul*. 10); thin (*Morb. I* 20), watery (*Superf*. 17); liquid (*Alim*. XLIV; *Carn*. 8), solid (*Alim*. XLIV), frothy from being in the lung (*Aph*. V.XIII) or liver (*Coac*. 402, 441).	and nourishes the embryo in the uterus (*Oct*. 12); foetus nourished by "sweetest part" of blood to grow (*Nat.Puer.* 19); embryo grows due to mother's blood passing into uterus and initiates the birthing process when this nourishment runs out (*Nat.Puer.* 3, 19); old blood cannot nourish seed, diseased blood will turn seed to 'whey' (*Steril*. 1); the lung nourished by blood (*Cord*. 12); skull bones (*VC* XVI, XVIII). Evacuation of blood in females regulates levels of bodily moisture (*Aph*. V.XXXII-XXXIII); can exit from uterus or through mouth (*Mul. I* 41); general apostasies of blood in all are good or bad (*Prorrh. II* 7). Glands are in locations rich in blood (*Gland*. 3). Rots into pus (*Flat*. X; *Morb. I* 20; *Ulc*. 1; *Medic*. 8); can be burned up and dried out (*Morb. I* 19) or cool and congeal (*Morb. I* 24, 33; *Aff*. 29); clots (*Int*. I); provokes pain in disease (*Loc.Hom*. 33); linked to pain, "tender and full of blood" (*VM* XXII). Bloodletting as treatment (*Vid.Ac.* 9; *Morb. II* 73; *Morb. III*); haemorrhage as dangerous (*Medic*. 6); Scythians incising blood vessels resulting in impotence (*Aër*. XXII). Bleeding can be stopped or slowed through styptic φάρμακα (*Vid.Ac.* 4); or through ligatures (*Medic*. 8); or cauterization (*Loc.Hom*. 40). Rivers in dreams indicate levels of blood in the body (*Vict. IV* XC).
Bone Marrow **μυελός** (i.e. marrow without the stipulation of 'spinal')	Larger bones contain more marrow, e.g. the bones of the thigh and upper arms (*Fract*. XXXV). Unlike spinal marrow: doesn't have a membrane, has more fat, no νεῦρα (*Carn*. 4). The wide blood vessel, when travelling down the leg, supplies the bone marrow there with nourishment (*Oss*. 16).	Aids in nutrition and healing: bone marrow is nutriment of bone, and is connected to the formation of calluses (*Alim*. LIII). Utilised as a σημεῖον (*Epid. IV* 43). Marrow of animals used in remedies (especially gynaecological): - Beef/cow: *Superf*. 33; *Nat.Mul.* 100; *Mul. I* 74(6), 34. - Deer: *Nat.Mul.* 32(104); *Steril*. 9, 18(5); *Mul. II* 49, 52, 62, 96(4, 13); *Mul. I* 74(6), 90(8).

Substance	Formation, General *Loci*, Descriptions	Physiological and Pathological Roles
	Can be heated and used as fuel by diseased moisture (*Morb. IV* 21).	- Goose: *Nat.Mul.* 109(11, 12); *Mul. I* 74(6, 7). - Swine: *Mul. II* 85(4). - Unspecified: *Mul. I* 90(6).
Foam **ἀφρός**	Used to describe a quality of moisture ("all liquids foam when agitated", *Genit*. 1) or of porous 'organs' (in *Carn*. the lungs are gluey moisture that was dried out by the heat of the heart and formed into "a kind of foam" (*Carn*. 7). Associated with generation and genitalia: seed is foamed bodily moisture (*Genit*. 1); when pain is present in the loins, frothy material is coughed up when the body is purged (*Coac*. 304).[398] In epilepsy: foam is formed from the lungs overheating and boiling (*Morb.Sacr*. X), or from air mixing with the thinnest part of the blood (*Flat*. XIV). Emerges from mouth (*Flat*. XIV; *Morb.Sacr*. X; *Mul. II* 14; *Epid. VII* 46; *Aph*. II.XLIII). In divine causation, its appearance in epilepsy was blamed on Ares (*Morb.Sacr*. III). Foam is white because it is stirred by the air (*Flat*. XIV). Foam disperses itself (*Flat*. *XIV*); changes from bright foam into thin, bilious vomit when settled (*Epid. VI* 4.4).	An evacuation, or accompanies an evacuation (*Hum*. IV). Literal and symbolic association with fertility.
Ichōr **ἰχώρ**[399]	Flows from open wounds (*VC* XIX), esp. suppurating areas (*Mul. I* 64; *Epid*. *V* 97 = *VII* 35, *V* 74 = VII 36); collects beneath the flesh in fluxes (*Medic*. 7); flows	Considered harmful to the body, with the exception of *On the Heart* (*Cord*. 1, 11). Harmful to the flesh, can cause suppuration (*Loc.Hom.* 32) and φύματα (tubercles, growths) (*Gland*. 8).

[398] Nutton (2013), 99.

[399] See Peck (1965), 23 n. a., Harris (1973), 141ff., and Jouanna & Demont (1981).

Substance	Formation, General *Loci*, Descriptions	Physiological and Pathological Roles
	in the wake of or instead of blood (*Vid.Ac.* 4; *Ulc*. 27). In female bodies can flow from the uterus (*Mul. I* 45) or from the nipples in a case of breast cancer (*Epid. V* 101 = *VII* 116). Occasionally appears in the wake of blood: scarification on the eyelids should stop when "pure blood no longer flows out, but a bloody or watery serum (*ichōr*)" (*Vid.Ac*. 4), and *ichōr* as a "distillate of the blood" (*Cord*. 11). Descriptions: a thin "urine-like liquid" (*Cord.* 1); light or dark (*Prorrh. II* 13); sharp (*Gland*. 8); bilious (*Oss*. 17); red and thick (*Nat.Puer*. 2); bloody (*Epid. VII* 116 = *V* 101); gluey (*Epid*. *V* 65 = *VII* 61).	
Milk **γάλα**	Link with female breasts: as receptacles (*Gland*. 17), as glands that draw nutriment to them and create milk (*Gland*. 16). Created from everything consumed by a female: consequently, diet affects quality of milk (*Morb. IV* 24); can dry up as a result of consuming hard waters (*Aër*. IV); considered, along with blood, as leftovers of nutriment (*Alim*. XXXVI). Fig juice cools and congeals milk (*Morb. IV* 21);[400] worms grow/form out of putrefied milk and blood in the intestines of a foetus (*Morb. IV* 23).	Indicative of the level of moisture in a female body: too little milk and menses equals dry and dense flesh (*Nat.Puer.* 19); comparatively, to have milk without a child indicates suppression of the menses (*Aph*. V.XXXIX). Production of milk instigated by uterus and development of embryo (*Nat.Puer.* 10); appears after eight-month period of pregnancy when nutriment becomes surplus (*Epid. II* 3.17); the failure of milk to appear indicates a serious state (dead or near-dead) of the embryo (*Mul. I* 27). Small portion of milk nourishes foetus while in utero (*Nat.Puer.* 10).
Moisture (General) **ὑγρόν**	Is present in anything that is moist. Defining characteristic is the moist quality it brings to bodily components.	Necessary to prevent the drying out of organic material. Integral to digestive process (*Vict. III* LXXXII).

[400] See Majno (1975), 150-153.

Substance	Formation, General *Loci*, Descriptions	Physiological and Pathological Roles
Often used to describe the liquid state of substances, or general moisture that is otherwise unidentified.	A primordial building block of organic material: in *On Fleshes*, ὑγρόν is changed during the heating and cooling transformations that create the shapes of the human body (*Carn*. 3). Especially located in areas with glands (*Gland*. 3); in flesh and vessels (*Morb. I* 20); in joints (*Int*. 51). Can originate in a liquid state or be liquified by heat (*Genit*. 1); can congeal as blood congeals (Int. 36); cold congeals (*Vict. II* LX); heat burns up/vaporises (*Morb. I* 29, 33). Descriptions: gluey (*Carn*. 7); aerated to form foam (*Flat*. XIV).	The soul consumes the moisture of the body for nourishment (*Vict. II* LX). Contributes to formation of seed (or describes the ἰκμάδες that contribute to the seed) (*Genit*. 1, 3, 11). In youth, a body has more moisture to use up for growth, and as age increases, the body becomes moister and colder (*Vict. I* XXXIII).
Mucus **μύξα,** **κόρυζα – alt. rheum**[401]	Present throughout body: in the head, exit via sneezing (*Aff*. 2); in ears (*Morb*. *II* 12); bowels (*Aff*. 26); uterus (*Aph*. V.XLV), joints and tissues (*Aph*. VI.LIX; *Art*. VIII, XL, L; *Loc.Hom*. 7). Form in abscesses of healing broken ear (*Mochl*. III). Descriptions: "clots" of μύξα (*Prorrh. II* 23); thick and purulent (*Morb. II* 19); coughs up "a mushroom-like object formed as if from mucus" (*Epid. VII* 83).	Expelled from the body: nasal discharge (*Aff*. 2; *Morb. II* 19; *Salubr*. VIII); from bowels (*Aff*. 26; *Epid. VII* 45; *Prorrh. II* 23); uterus in cleaning (*Mul. I* 84(3), 88(2)). Uterus full of mucus prevents embryo from lodging in womb (*Aph. V*.XLV). Present naturally in the joints and allows movement (*Loc.Hom*. 7); too much allows slippage (*Aph*. VI.LIX; *Art*. VIII, XL, L).
Phlegm **φλέγμα**	Originates in body at birth (*Morb. I* 2); common variety only temporarily present (*Int*. 20). Predominant in winter (*Nat.Hom*. VII; *Salubr*. V; *Epid. VII* 70); increases in winter because of lengths of nights and rains (*Nat.Hom*. VII); frosty, cold, turbid, snowy waters are conducive to phlegm (*Aër*. VII);	One of the four χυμοί that constitute the body (*Nat.Hom.* V); one of the four ἰκμάδες that are vital to the body (*Morb. IV* 1; *Genit*. 3). Clogs: deposits of phlegm can block hearing and sight (*Morb. I* 3); in vessels phlegm clogs the passage of air (*Morb.Sacr*. X). Cause of madness: phlegm madness is quiet (*Morb.Sacr.* XVIII); when white phlegm congeals in the cavity, the patient cannot stand the smell of rain and earth (*Int*. 50); loss of

[401] See Craik (2008), 64f.

Substance	Formation, General *Loci*, Descriptions	Physiological and Pathological Roles
	southerly weather and rains after snow (*Epid. IV* 7). Associated with the head and brain (*Morb. I* 15; *Morb.Sacr.* XIII); head as the reservoir for phlegm (*Morb. IV* 4); nostrils, throat, tongue (*Morb. III* 10; *Mul. I* 36). Travels around the body: in fluxes (*Aff*. 24; *Loc.Hom*. 9); heated brain attracts phlegm, then it trickles back into body (*Morb. II* 11); finest part of phlegm travels in a flux (*Morb. I* 15); melted from brain and travels (*Morb.Sacr*. XIII; *Morb. II* 1); attracted by heat (*Morb. I* 26; *Fist*. 8; *Morb. II* 8); travels through vessels (*Aph*. VII.LIV); movement of phlegm will also move a foetus (*Mul. I* 32); flux of phlegm can move uterus away from liver (*Mul. I* 7). Heats the body when fixed (*Morb. I* 26); heats blood when fixed (*Haem*. 1). Temperature:[402] coldest constituent of body (*Nat.Hom*. VII); can be heated/cooled through food, drink, exercise, wounds, heat, cold, seeing, or hearing (*Morb. I* 23); its burning heat can melt fat (*Int*. 22); blood attracted by heat of phlegm (*Int*. 47). Weight: third lightest of the four ἰκμάδες (*Morb. IV* 20). Increased by food and drink (*Morb. IV* 4). Descriptions: thick and clear (*Aff*. 9); white (*Epid. VII* 83; *Int*. 50; *Superf*. 17); watery (*Epid. VII* 9); viscid (*Nat.Hom*. VII); putrefies	consciousness when phlegm (or bile) invades cardia (*Morb. II* 5). Cause of disease (*Aff*. 1, 37; *Morb. I* 2); fevers (*Morb. I* 24; *Loc.Hom*. 27); venery helps diseases caused by phlegm (*Epid. VI* 5.15). Cause of miscarriage: uterus filled with phlegm dislodges foetus (*Nat.Mul*. 17); disturbs pregnancy (*Mul. I* 25). Causes internal malfunctions: phlegm from the head causes the 'derangement' of internal 'organs' (*Aër*. II). Cause of baldness: too much venery when phlegmatic burns the phlegm in the head and results in hair loss (*Nat.Puer*. 9). Cause of ulceration: phlegm in healing scar causes ulceration (*Morb. I* 21); ulcerates flesh and bursts open vessels because it is acrid (*Flat*. X). Causes swelling (*Aff*. 4; *Loc.Hom*. 27); uterus swells up with phlegm from ulcers (*Mul. I* 8); uterus can swell up with phlegm after childbirth (*Mul. I* 78(64), 78(66)). Produces pain (*Aff*. 4); heaviness (*Loc.Hom.* 33; *Mul. I* 29; *Int*. 20). Changes other fluids and parts: corrupts blood (*Aff*. 23); corrupts tissue (*Aff*. 22); corrupts brain, corrodes and melts (*Morb.Sacr*. XVIII, XIV); congeals blood (*Aff*. 29); congeals and arrests blood (*Morb.Sacr*. X); cools blood (*Morb. I* 34; *Morb. II* 8); with bile, phlegm heats blood (*Morb. I* 24); in the disease 'white phlegm', phlegm is no whiter than other fluids but turns the flesh white (*Aff*. 19); changes colour of tongue (*Epid. VI* 5.8); colours flesh (*Aff*. 19); colours tongue, urine, faeces (*Mul. I* 29); menses appear like cobwebs because they contain phlegm (*Mul. I* 29); when uterus is full of phlegm, menses are smaller in volume (*Mul. I* 47) Can putrefy into pus (*Morb. I* 15, 19); forms into pus between skin (δέρμα) and flesh (σάρξ)

[402] See **Chapter One** (**1.2.1**)

Substance	Formation, General *Loci*, Descriptions	Physiological and Pathological Roles
	(*Morb. I* 19); thick and putrid (*Int*. 10); salty and putrid (*Int*. 10); acrid (*Mul. II* 19); dries up and hardens (*Morb. I* 28); sharpness (e.g. radish) and acrid food and drinks can melt/disperse phlegm (*Vict. II* LIV; *de Arte* XIII).	(*Morb. I* 17); forms into pus and eats the lungs (*Gland*. 14; *Morb. IV* 25(3)). Can turn into glue (*Morb. IV* 24); in kidneys it solidifies into sediment (*Int*. 14); sweat is the finest part of phlegm (*Morb. I* 25). Forms between bone and skin (δέρμα) of skull and separates latter from former (*Morb. II* 7).
Pus **πύον**[403]	Forms internally due to disease and injury, and externally due to injury: in the chest cavity (*Loc.Hom*. 14; *Morb. I* 21); accumulates in the lungs in the wake of pleurisy (*Aph*. V.VIII); coughed up when bronchial tube is torn (*Int*. 4); from growths in the uterus (*Steril*. 10); from an ulcerating uterus post- birth or abortion (*Superf*. 28); forms around bones of hip, perineum, and groin area (*Epid. V* 7); settles between skin (δέρμα) and bone (*Epid*. *VII* 35); forms in external ἕλκεα (*Ulc*. 1). Develops from displaced and putrefied fluids (*Morb. I* 4, 21; *Ulc*. 1; *Nat.Puer.* 4; *Flat*. X) and detached bone (*VC* XV.19-24; *Epid. V* 28). Causes heat where it forms/settles (*Morb. I* 15, 17; *Morb*. *III* 16). Descriptions: thick and white (*Prorrh. II* 13; *Judic*. 16); white, smooth, uniform in colour (*Prog*. XVII); "yellow-green and evil smelling" (*Morb. II* 57); mixed with blood (*Morb. I* 14; *Morb. II* 57), mixed with bile (*Prog*. XV), mixed with phlegm (*Morb. I* 14).	A part of the body's natural mechanism of cleansing wounds and rotted material: pus as putrefied material (flesh, blood, etc.) that needs to be pushed out of or sloughed off the body (*Morb. I* 4, 21; *Ulc*. 1; *VC* XV.19-24; *Nat.Puer.* 4; *Flat*. X); concocted bodily material (*Epid. VI* 3.4); nutritive quality, "pus is nutriment for a sore (ἕλκεος)" (*Alim*. LII). When in the uterus, melts inseminated seed and prevents conception (*Steril*. 10). Corrodes soft flesh (*Fist*. 1). Hardening: if pus is not removed from uterus, it can harden (petrify, πωρόω) the uterus (*Steril*. 10); "if pus forms in the joint, it will inevitably become very stiff" (*Prorrh. II* 15).
Rheum **ῥεῦμα,** **λήμη**	In the eyes, mixed with tears (*Prorrh. II* 18); discharges from nostrils, settles in eyes, acrid (*VM* XVIII, XIX); when thickened and	Considered a bad sign (*Prog*. II; *Epid. I* V); ῥεῦμα must be concocted and mixed to restore health, if not it ulcerates the nostrils and eyes (*VM* XVIII, XIX).

[403] See also Grmek (1989), 119-132.

Substance	Formation, General *Loci*, Descriptions	Physiological and Pathological Roles
	concocted, ῥεῦμα becomes λήμη (*VM* XIX).	
Saliva and Sputum **πτύαλον,** **σίαλον**[404]	"**Saliva**" translations: Descriptions: acrid, acid (*Mul. II* 16; *Morb. II* 73), sticky, insipid, bland (*Mul. I* 11); "vomits hot saliva" (*Morb. II* 67). "**Sputum**" translations: In lung (*Coac*. 18; *Morb. I* 29); coughed up (*Loc.Hom.* 14; *Morb. III* 15; *Prog*. XIV-XV). Descriptions: congealed (*Loc.Hom.* 14), thick, frothy (*Dieb.Judic.* 10), viscid (*Acut*. LIII); sweet or salty (*Coac*. 397; *Morb. II* 50); bilious (*Prog*. XV), bloody (*Morb. II* 54, 56, 62); yellow or green (*Prog*. XIV; *Dieb.Judic.* 10; *Morb. II* 56); mixed or unmixed (*Prog*. XIV); ill-smelling (*Morb. II* 50), odourless (*Coac*. 168).	Sputum bad if not removing pain (*Prog*. XIV). Sputum ripens (*Morb. III* 16; *Morb. I* 29; *Epid. IV* 28; *Coac*. 436). Ideal: white, uniform in colour and consistency (*Prorrh. II* 7).
Scum **λάπη,** **ἐπάνθισμα (coloured froth),** **ἐφίστημι (to stand upon, e.g. cream),** **λιπαρός (shiny with oil, greasy, fatty)**[405]	**λάπη:** With urine (*Prorrh. I* 92; *Coac*. 182; *Epid. II* 3.11). Vomits bile and scum after eating (*Int*. 12); vomits saliva (σίαλα) and scum (*Morb. II* 15); vomits scum and material like vinegar (*Morb. II* 55); among fluids people vomit in a "withering disease" and "dark disease" (*Morb. II* 66, 73). Descriptions: sharp (*Int*. 6); sharp or salty (*Int*. 47); putrid (*Int*. 49). **ἐπάνθισμα:** Descriptions: rusty red scum in mature urine (*Prorrh. I* 59; *Coac*.	An evacuation, with or without other substances.

[404] In the Loeb translations, sputum (coughed up from the lungs) and saliva are both translated inconsistently from the Greek terms πτύαλον and σίαλον. Context seems to be the only way to determine whether the author means sputum or simply saliva, and even then the differentiation is not entirely clear.
[405] *LSJ*, s.v. ἐπανθ-έω, III.2; ἐφίστημι, I.1; λιπαρός, I.1 "oil, shiny with oil", and I.2 "fatty, greasy".

Substance	Formation, General *Loci*, Descriptions	Physiological and Pathological Roles
	568); frothy scum on bilious stools (*Prorrh. I* 21; *Coac*. 595). **ἐφίστημι:** Forms when serous matter enters vessels during a flux and travels to the bladder, where heat turns it hot and white and it separates and sits on top of the urine (*Nat.Hom.* XII). Descriptions: resembles seed (*Coac*. 327); very white and copious (*Coac*. 455); like fat (*Epid. IV* 15). **λιπαρός**: Description: scum in urine greasy and massed together (*Aph*. VII.XXXV).	
Seed, Semen, Sperm[406] **γονὴ,** **σπέρμα,** **λάγνευμα,** **θορός**	Provided by both parents for conception (two-parent theory of generation (*Nat.Puer*. 1; *Genit*. 7; *Morb. IV* 1; *Morb.Sacr*. V; *Vict. I* XXX; *Mul. II* 20). Pangenesis (*Aër*. XIV; *Morb.Sacr*. V; *Genit*. 3). From brain and spinal marrow (encephalo-myelogenic) (*Genit*. 1). Female seed is stronger when they feel sexual desire (*Mul. I* 24). Can be melted by pus (*Steril*. 10) and mint (*Vict. II* LIV). Descriptions: watery (*Aph*. VI.II); moist (*Morb. II* 51); suppurates (*Mul. I* 14); livid and charged with blood (*Int*. 47); sickly (*Aër*. XIV; *Morb.Sacr*. V; *Genit*. 8).	Fluid of generation. Can be divided to engender twins (*Nat.Puer*. 20); if the seed is strong it engenders twins (*Vict. I* XXX). Contributes the strengths and weaknesses of the parents to the child: “For the seed comes from all parts of the body, healthy seed from healthy parts, diseased seed from diseased parts” (*Aër*. XIV and *Morb.Sacr*. V); *Genit*. 1, 8; *Morb. IV* 1. “Strong” seed engenders males, “weak” seed engenders females (*Genit*. 6, 7). When heated, the conceived seed inhales and exhales breath (*Nat.Puer*. 1). Sickly seed can result in a molar pregnancy (*Nat.Puer*. 21; *Mul. I* 71), or thick seed (*Mul. II* 69). Corruption and deterioration can take place during its process of coagulation (into an embryo) (*Aër*. XIX); can drown in a watery uterus, or die from lack of nourishment in a dry and hot uterus (*Aph*. V.LXII).

[406] See Bartoš (2009), Fallas (2021), 120-133.

Substance	Formation, General *Loci*, Descriptions	Physiological and Pathological Roles
		In dreams, fruitless trees (and any change to the trees' qualities) signify the corruption of the person's seed (*Vict. IV* XC).
Spinal marrow **νωτιαῖος μυελός,** **ῥαχίτης μυελός**[407]	Description in *Oss*. 14 with little clear distinction between parts of the spine (backbone, cord, marrow). Connection between brain and spinal marrow: made of cold, gluey material just like the brain, to which it is connected (*Carn*. 4); a sphacelous brain heats the spinal marrow (*Morb. II* 5); passage of seed between the head and genitals is through the spinal marrow (*Genit*. 1, 2); the marrow of the spine can become dry "when the small vessels extending into the marrow are blocked, and also the passage out of the brain" (*Int*. 13); the path of flux from the head down to the hips is through the spinal marrow (*Gland*. 11, 14); flux from head into marrow initiates an undetected consumption (wasting/melting) (*Loc.Hom*. 10E). Consumption of the spinal marrow and back: spinal marrow fills with blood (*Int*. 12); caused by too much sexual intercourse (*Morb. II* 51).	Critically important to the body: death if severely injured (*Morb. I* 3; *Coac*. 499); "if the spinal marrow ails (νοσέῃ) either as the result of a fall or some other manifest cause, or spontaneously" paralysis of the lower limbs sets in, as does the inability to pass stools and urine, when incontinence sets in death follows (*Prorrh. II* 16), also addressed in *Art*., where the author discusses dislocated vertebrae, the resulting paralysis, loss of heat in the lower limbs and muscles, and general lethality of such an injury (*Art*. XLVIII).
Sweat[408] **ἱδρώς**	Not restricted to a specific *locus*, but full-body (*Prorrh. II* 102), upper-body (*Prorrh. I* 163), or head (*Prorrh. II* 39) perspiration is common; link of location with disease: "on whatever part of the body there is sweat, it means that the disease has settled there" (*Aph*. IV.XXXVIII).	Sweat as a melted or converted form of bodily moisture or fluid: "the finest part" (τὸ λεπτότατον) melted from phlegm and bile and excreted through skin or vapoured and exhaled with the breath (*Morb. I* 25); formed when pneuma rising from heated and melted blood strikes the channel of the body and condenses into ὕδωρ, like steam rising from boiling water and condensing on a nearby surface (*Flat*.

[407] See Craik (2008), and Grmek (1989), 323. In Greek 'νωτιαῖος' is spinal, whereas 'ῥαχίτης' indicates the back.

[408] See Debru (2005).

Substance	Formation, General *Loci*, Descriptions	Physiological and Pathological Roles
	Descriptions: foul-smelling, foul, copious (*Int*. 47, 49); hot or cold (*Morb. I* 25).	VIII); excretion of the melted interior of the body (*Vict. II* LXVI); should be proportional so the body does not waste from lack of moisture (*Morb. IV* 14; *Mul. I* 16). The act of sweating cools the body and releases excess moisture: cools even beyond healthy temperature (*VM* XVI.46-48); aids the body in fever (*Loc.Hom.* 27);[409] its presence indicates an excess of moisture (*Judic*. 29; *Aph*. IV.LVI, VII.LXII); sweating releases moisture stored in the spleen (*Mul. I* 61).
Tears **δάκρυον**	Caused by brightness and causes warmth (*Vid.Ac*. 9). Linked to the brain and to feeling (*Morb.Sacr.* XVII). Descriptions: salty (*Hum*. IV; *Prorrh. II* 18); hot or cold (*Epid. VI* 8.8).	Cleanses eyes (*Loc.Hom.* 13) or irritates eyes (*Liqu*. 6); a mechanism of φύσις (*Epid. VI* 5.1); voluntary tears are good, involuntary are bad (*Aph*. VII.LXXXIII; *Epid. VI* 8.8).
Urine **οὖρον**	Descriptions: white, reddish, green, "red like vetch meal" (*Dieb.Judic*. 9) or like the "juice of roasted beef" (*Int.* 16; *Morb. III* 16); thick, thin, watery, hot (*Judic*. 40; *Int*. 17), garlic-like smell (*Morb. IV* 25(5)), salty (*Morb. IV* 11), bilious (*Morb. II* 38). "Natural colour"[410]: the major vessels leading down the cavity (what we know as the inferior vena cava and the thoracic aorta) is what conveys drink to the kidneys, which then filters this fluid into the bladder and is	Urine often transports sediment or another liquid out of the body: "fine white sediment" (*Judic*. 23); "sediment resembling seed" (*Prorrh. I* 140); πῶροι, porous stones[412] (*Nat.Hom.* XIV); or liquids such as blood or pus (*Aph*. VII.XXXIX; *Int*. 18; *Nat.Hom.* XII). In health, linked to regimen: the body's purging of melted moisture during exercise (*Vict. II* LXII), and proportional intake and expulsion of fluid (*Prorrh. II* 4, 6). Undergoes a conversion process: "it should be slightly thicker than what was drunk" (*Prorrh. II* 4); it should "become mature" (πεπαίνω, ripen) before it passes out of the body (*Acut.(Sp.)* 17, 18).

[409] This passage in *Loc. Hom.* states that warmth from a drink "will take something away from the ailing body, whether it passes off in the urine or as sweat" (*Loc. Hom.* 27). Potter's translation is not as precise as it could be: the statement "passes off in the urine or as sweat" implies that urine is acting as a vehicle for eliminated matter, however sweat *is* the eliminated matter – in the Greek, however, both urine and sweat are treated identically as being vehicles, "passes out through sweat and urine", for what is being expelled from the body.

[410] By "natural colour" in this context, I mean a healthy but darker hue judging from the following description.

[412] Jones translates πῶροι here as "sand or chalk", however I prefer the more generic interpretation of the noun.

Substance	Formation, General *Loci*, Descriptions	Physiological and Pathological Roles
	expelled from the body. The author states that within the kidneys, the fluid that makes up the urine is mixed in with blood, and only separates when the urine is filtered through to the bladder: "for which reason, I imagine, it is reddish" (*Oss*. 4).[411]	
Vomit **ἔμετος**[413]	A composition of mixed or unmixed matter and fluids (*Prog.* XIII; *Coac*. 545); undigested food (*Epid. I* V). Least-harmful vs harmful: "the least harmful vomitus is a mixture of phlegm and bile, and should not be vomited in too great a quantity. More unmixed vomitings are a worse sign; leek-coloured, dark, and livid vomitus bode ill; if the same person vomits all these colours, it indicates death; the most rapid death is indicated by livid and fetid vomitus. Red vomitus is also deadly, and most especially if it is vomited with a painful retching" (*Coac*. 545).	Expelling materials from the interior of the body, caused spontaneously by the body's own workings or artificially provoked through purgatives.
Water **ὕδωρ**	Associated with the spleen (*Morb. IV* 6; *Loc.Hom.* 24); found in an empyema (*Aph*. VI.XXVII); "diseased" (*Morb. IV* 21); affinity with cold and moist (*Vict. I* XXVII). Weight: heaviest of the four ἰκμάδες (*Morb. IV* 20).	One of the four ἰκμάδες that are vital to the body (*Morb. IV* 1; *Genit*. 3). Fire-water soul and body in *On Regimen*: water nourishes all things (*Vict. I* III), cool to the fire's hot (*Vict. I* IV), in the formation of the foetus water congeals and becomes flesh (*Vict. I* IX). A poor nutriment for fever (*Morb. IV* 20). Water as melted material: melted corrupt tissue (*Aff*. 22), melted brain matter, corroded by

[411] The adjective is a little odd – nothing in this explanation indicates that the "reddish" (ἐρυθρόν) urine is unhealthy urine, however urine with a red tint is certainly bad. The descriptor could indicate dark, brownish urine, however red seems somewhat alarming to me.
[413] See Demand (1998), 77, Jouanna (1999), 156-159, Nutton (2013), 99.

Substance	Formation, General *Loci*, Descriptions	Physiological and Pathological Roles
		phlegm (*Morb.Sacr.* XIV.20-23), fat melting from the burning heat of phlegm (*Int*. 22). Causes internal pain when it is not properly flushed from the body: overfilling the spleen without draining "old water" (*Morb. IV* 7); an overfilled spleen saturates the omentum (ἐπίπλοον) and causes the fat to melt (*Loc.Hom*. 24); when chilled it migrates downwards and provokes inflammation around bones and cords (*Morb. IV* 21).

Appendix B: Injuries and Wounds in the *Epidemics* Treatises

TABLE 4: ***Injuries and wounds in the* Epidemics *treatises***

Table data ordered according to citations. Entries marked with an asterisk denote wounds that could be from physical trauma or from disease.[414]

Epid.	Person Injured	Injury	Outcome
***IV* 1**	Man	Cut on his calf, developed blackness on the flesh and spread. Pains in ribs and chest, fever.	Fatal
***IV* 3**	Chalcedonian man	Fracture, severe pain by the right breast.	Unknown
***IV* 4**	Aristodemus, Philis' son	Developed a disease from a fall, pain in the upper chest. Cauterised.	Unknown
***IV* 11**	A boy from Metrophantus' house	Wounded on the head with a potsherd.	Fatal
IV* 19*, *V* 44	Children (unnamed, son of Athenades)	Corroding ulcers inside the mouth that eroded certain teeth.	Unknown
***IV* 39**	Minos' wife	An incision or wound that succumbed to gangrene and migrated into the lung. "She gave brief signs, in the time she survived, of further internal troubles."	Survived – for a period of time
***IV* 47**	Man	A wound in his calf.	Unknown
V* 15	Scamandrus in Larissa	Mortification of the hip, incised down to the bone and then cauterised. Spasms, contractions.	Fatal
***V* 16**	Hippocomus, son of Palamedes in Larissa	Struck on the forehead above right eye by horse.	Survived
***V* 21**	Man in Larissa	Wounded through abdomen, just below the navel, by spear.	Fatal
***V* 26**	Man from Malia	Cart wheel broke his ribs.	Fatal
***V* 27**	Autonomous in Omilus	Head wound from thrown rock.	Fatal
***V* 28**	Girl in Omilus	Head damaged by door.	Fatal
***V* 32**	Man in Salamis	Fell on an anchor, belly wound, immune to effects of purgatives.	Unknown
***V* 33**	Woman	Cut her throat.	Unknown
***V* 39**	Child	Kicked in belly and liver by a mule, rapid breathing, fever, loss of consciousness.	Fatal
***V* 45**	Shoemaker	Stabbed thigh with a needle, wound closed and leg eventually swelled.	Fatal

[414] In the entries that are shared between *Epid. V* and *VII* there are minor disparities in the names of the patients, as highlighted in the brackets. See the relevant passages in the Loeb translation and Smith's notes for further explanations.

Epid.	Person Injured	Injury	Outcome
***V* 46**	Man	Hit by an arrow in the gland at the groin, never removed the arrow, no vessels lacerated.	Survived
***V* 47**	Man	Hit from behind just below the neck by a dart, suffered tetanus.	Fatal
***V* 48**	Young man	Sprinted on a rough road, pain in the heel. Area blackened and spread.	Fatal
***V* 49**	Man	Struck in the eyelid by a barb (arrow perhaps? Or something smaller and penetrating).	Survived
***V* 50**	Daughter of Nerius	Struck on bregma.	Fatal
***V* 55 = *VII* 77**	Girl	Fell off a cliff and suffered a head wound.	Survived
***V* 60 = *VII* 32**	Man	Hit on the head with a thrown stone.	Fatal
***V* 61 = *VII* 33**	Man from Aenea	Wounded by javelin at Delos in upper left back.	Fatal
***V* 62 = *VII* 31**	Man	Struck by javelin near (or at) the liver.	Fatal
***V* 65 = *VII* 61**	Leogeniscus (Cleogeniscus?), Demarchus son of Agleuteles (Aglaoteles?), Aeschylus' child	*V* 65: Forearm wounded in fall, becomes purulent and fever sets in. *VII* 61: "pierced by a wound in the tip of the elbow."	Unknown
***V* 74 = *VII* 36**	Commander of the large ship	Anchor crushed his forefinger. Inflammation and gangrene.	Fatal
***V* 75 = *VII* 37**	Telephanes, son of Harpalus and his freedwoman	Sprain behind his thumb (or received a blow at the base of his thumb), devolved into *opisthotonos*.	Fatal
***V* 76 = *VII* 38**	Thrinon (Rhinon?), son of Damon	Wound in the tendon by his ankle, devolved into *opisthotonos* due to drugs.	Fatal
***V* 95 = *VII* 121**	Tychon	At the siege of Datum, he was hit in the chest by a catapult, wooden splinters embedded in diaphragm.	Fatal
***V* 96 = *VII* 34**	Billus (Abdelos? Audellus?) and Dyslytas (Dyslotas? Dyschytas?)	Wounded in back, haemorrhaged.	Both survived
V* 97 = *VII* 35	Sons of Phile (Philia?), Phanias, and Euergetes	Skull laid bare, bone became livid.	All fatal
***V* 98 = *VII* 29**	Aristippus	Shot in the upper belly with an arrow.	Fatal
***V* 99 = *VII* 30**	Neopolis	Wounded similarly to Aristippus, received a successful enema and his skin became yellow and black.	Unknown
***V* 103 = *VII* 49**	Wife of Simus	Shaken (likely, a physician performed succussion) during childbirth and had pain in the chest and ribs.	Fatal

Epid.	Person Injured	Injury	Outcome
***VI* 3.9**	Man beside the bridge	Thighs wasted from working (or falling?) in the mountains.	Survived
***VI* 4.5**	Patient (male?)	Corroding on the head from an ulcer above the ear.	Unknown
VI* 7.5	Xenarchus	An internal wound near the heart.	Unknown
***VI* 8.30**	The wrestling master in Abdera (son of Cleisthenes)	During a wrestling match, fell on his head. No bowel movements, eventual delirium.	Fatal
VII* 110	Ariston	Lesion on his toe, with fever and delirium. Gangrene supervened and ran up to his knee.	Fatal
***VII* 117**	Deinias' child in Abdera	A small incision was made at the naval, and a fistula was left behind. Intestine fell into the fistula and eroded.	Unknown
***VII* 124**	Philotimus' son	In military training, the bone of his skull was exposed.	Unknown

Appendix C: Descriptions, Roles, Surgical Accessibility, and Injuries of 'Organs' and Parts from the Deadly Wounds Lists (3.1.2)

TABLE 4: ***'Organs' and parts from the lists of deadly wounds in* Prorrh. II *12,* Aph. *VI.XVIII,* Morb. I *3, and* Coac. *499.***

Table data is organised "from head to toe", beginning with the brain and ending with the bladder. Order:

1. Brain
2. Spinal Marrow
3. Vessels
4. Trachea
5. Lungs
6. Heart
7. Liver
8. Diaphragm
9. Cavity
10. Intestine
11. Bladder

Descriptions	Examples of Roles	Surgical Accessibility (where mentioned)[415]	Associated Injuries/Wounds (where mentioned)
Brain (ἐγκέφαλος)			
• Described as cold, moist, "gluey" (*Carn*. 4), and gland-like (*Gland*. 10). • Shrouded in a membrane and protected by the hard bone structure of the skull (*VC* XXI).	• Spring of phlegm (*Morb. IV* 4). • Key to intelligence (*Morb.Sacr*. XVII). • Associated with cognitive functions and senses, especially hearing and sight (see associated injuries).	Can be accessed through trephination (*VC* XXI).	Several head injuries are recorded in the *Epidemics*, including open wounds and blunt trauma (see **Appendix B**). *On Wounds in the Head* is dedicated to the identification and treatment of head trauma. Noteworthy are remarks on the cognitive repercussions of head wounds: • Stupefaction, blindness, vertigo, and loss of balance (*VC* XI.55-60; *Prorrh. II* 14).

[415] References of more extensive and potentially invasive surgical procedures were likely present in the lost treatise *On Wounds and Missiles*, see Witt (2018), 235.

Descriptions	Examples of Roles	Surgical Accessibility (where mentioned)[415]	Associated Injuries/Wounds (where mentioned)
			• *Morb. I* 4 = *Coac*. 489-490: "if the brain is shaken and suffers damage as the result of a blow, the patient immediately loses his speech, sight, and hearing; if the brain is wounded, fever and the vomiting of bile ensue, the patient becomes paralysed in some part of his body, and he dies." • Mood swings, blindness, and speechlessness manifested before the head wound of Nerius' daughter became fatal (*Epid V* 50).
Spinal Marrow (ῥαχίτης μυελός)			
• Made of cold, gluey material (*Carn*. 4).	• Key in encephalo-myelogenic theory of generation (*Genit*. 1, 2). • A distributive fluid (Oss. 11-18). • Linked to sensation of the lower limbs (*Prorrh. II* 16).	The spine can be manipulated through physiotherapy using equipment such as inflated bladders and succussion, but not directly accessed. The author of *On Joints* speculates on the benefits of opening the abdominal cavity to realign a damaged spine from the interior, but concludes that, "one might do this with a corpse, but hardly with a living patient" (*Art*. XLVI.26-32).	• *Prorrh. II* 16: "If the spinal marrow ails either as the result of a fall or some other manifest cause, or spontaneously, the person loses the power over his legs, so that on being touched he does not perceive it, and over his belly and bladder, so that in the early days of the disease he passes neither stool nor urine, unless forced. As the disease becomes older, stool and urine pass without the person's perceiving it; he dies not very long after that." • *Art*. XLVIII.1-11: "In cases where the vertebrae are curved inwards from a fall or the impact of some heavy

Descriptions	Examples of Roles	Surgical Accessibility (where mentioned)[415]	Associated Injuries/Wounds (where mentioned)
			weight, no single vertebra is much displaced from the others as a rule; and if there is great displacement of one or more, it brings death. But, as was said before, this dislocation also is in the form of a curve and not angular. In such cases, then, retention of urine and faeces is more frequent than in outward curvatures; the feet and lower limbs as a whole more usually lose heat, and these injuries are more generally fatal."
Vessels (φλέβες)			
• Dry, cold, membranous (*Carn*. 3). • The "hollowest vessel" is heated and carries breath (*Carn*. 5). Descriptions of the vascular system are present in several treatises, e.g. *Oss*. 1-19, *Loc.Hom*. 3, *Epid. II* 4.1, *Carn*. 5.[416]	• Transport blood, breath, and nourishment through the body and to all its parts; in illness, can also transport other fluids as well (phlegm, bile, etc.).	The physicians could access vessels close to the exterior of the body, especially when the surface flesh was injured, or through incisions for phlebotomy.	In injury it is especially the *volume* of blood the major vessels carry and can haemorrhage that causes fatalities. • *Fract*. XXXV.15-19: "It also makes a great difference whether the bone protrudes on the inner or outer side of the arm or thigh, for many important blood vessels stretch along the inner side, and lesions of some of them are fatal; there are also some on the outside, but fewer." The author of *Epidemics II* notes that tight bindings around the limb hold the blood back in phlebotomies (*Epid. II* 3.14), but in cases of injury we only see warnings

[416] On the vascular system in the Corpus, see Harris (1973).

Descriptions	Examples of Roles	Surgical Accessibility (where mentioned)[415]	Associated Injuries/Wounds (where mentioned)
			regarding the mortification that can occur as the result of tight bandaging (e.g. *Mochl*. XXXV).[417]
Trachea (ἀρτηρίη)			
• Grows out of both sides of the lung (*Anat*. 1). • Is "composed of symmetrical rings, which in their circular course meet one another in a plane" (*Anat*. 1). • "Cartilaginous conduits", carries breath to the lungs (*Oss*. 13).	• Takes part in respiration, especially as the solid passage that allows air into the lungs.	Direct accessibility not addressed. Treatments of injuries depend on ingesting medicine to aid in the body's natural healing, and ensuring exertion does not impede this healing process.	• Mentioned in *Coac*. 499, but focus is on how damage to the trachea affects the passage of breath to the lungs. • Ulceration and tearing of the bronchial tubes (*Int*. 1, 2, *Morb. II* 53).
Lungs (πλεύμων)			
• "Of ashen colour, marked with spots, and in structure like honeycomb" (*Anat*. 1). • "Possesses five prominences called lobes" (*Anat*. 1). • In young bodies the lung is denser than in the elderly, where it is	• Often associated with respiration or at least the passage of air through the body (though only 'chest' is mentioned in *Flat*. X). • Associated with phonation (*Morb. IV* 25).	Accessible through incisions used to drain pus from the lungs (e.g. *Morb. II* 47).	Damage to the lungs (caused predominantly by disease) is primarily described in *Morb. I*, whose author is concerned with internal suppuration, especially of the lungs.

[417] See Majno (1975), 153.

Descriptions	Examples of Roles	Surgical Accessibility (where mentioned)[415]	Associated Injuries/Wounds (where mentioned)
rarer and hollower (*Morb. I* 22).			
Heart (καρδίη)			
• Shaped like a pyramid, deep red in colour, with cavities that house blood, liquid, breath, and intelligence (*Cord*. 1, 9-11). • Spherical, cloaked by the lungs (*Anat*. 1). • Associated with warmth and heat (e.g. *Carn*. 6, *Liqu*. 2). • "A solid and dense construction" (*Morb. IV 7*).	• Spring of the blood (e.g. *Morb. IV* 7). • Connected to the major vessels (e.g. *Alim*. XXXI, *Morb. IV* 7, Carn. 5). • Draws in breath (*Carn*. 6). • The area of the heart and chest is linked with mental activity in the gynaecological texts and *On the Heart* (e.g. *Nat. Mul*. 32(70), 62, *Mul. II* 15, 92, 94, *Virg*. 1, and *Cord*. 10-11).[418]	Accessibility not addressed, although likely inaccessible for a living patient. The ἕλκος by Xenarchus' heart was soothed through inhaling warmth (*Epid. VI* 7.5), and treatment for ailments that involve the heart (e.g. fluid flooding into the chest region in *Morb. II* 5 and *Virg*. 1) are focused on the stray fluids rather than the 'organ'.	The ἕλκος by Xenarchus' heart (*Epid. VI* 7.5).
Liver (ἧπαρ)			
• "Tender, fleshy, full of blood" (*VM* XXII.61-62). • Contains a significant amount of the body's blood (*Anat*. 1).	• Regularly associated with the body's bile (e.g. *Morb. IV* 2; *Int*. 28; *Prorrh. I* 53). • Identified by some authors as the beginning of the blood vessels (e.g. *Alim*. XXXI, *Morb.Sacr*. VI, *Epid. II* 4.1).	Accessibility not addressed. Treatments of ailments affecting the liver focus on bodily substances rather than the liver itself.	• *Epid. V* 39: Child kicked in the liver by a mule. • *Epid*. *V* 62 = *VII* 31: man struck in (or near) liver by a javelin. The liver is an especially large 'organ' of the chest and thus vulnerable to thoracic damage, especially from penetrating weapons such as swords and javelins. Since it was easier to aim for the chest in general (and likely hit the liver) than it was

[418] Harris (1973), 35f.; Potter (2010), 52-57.

Descriptions	Examples of Roles	Surgical Accessibility (where mentioned)[415]	Associated Injuries/Wounds (where mentioned)
			to hit the heart, injuries of the liver had long been recognised as highly fatal in epic and art well before the inception of the Corpus.[419]
Diaphragm (φρένες)			
• An upper-central thin 'organ' (*Morb.Sacr*. XX) which major vessels run through to traverse the trunk (*Epid. II* 4.1). • Divides the upper and lower cavities (*Acut.(Sp.)* 57). • Attached to the backbone behind the liver (*Anat*. 1).	• Traditionally associated with intellectual activity.[420] In the Corpus the term is only rarely connected with mental activity (or not at all, see *Morb.Sacr*. XX), although we do see in certain treatises the association of mental or cognitive afflictions with 'organs' or substances pressing against or flooding onto the diaphragm (e.g. *Int*. 48 = *Dieb.Judic.* 3).	Accessibility not addressed. Treatments of ailments affecting the diaphragm focus on the substances that have flooded onto the membrane rather than the diaphragm itself.	At the siege of Datum, Tychon was hit in the chest by a catapult, wooden splinters embedded in diaphragm (*Epid. V* 95 = *VII* 121).
Cavity (κοιλίη)			
• An area in which other 'organs' such as the intestines and stomach reside.	• The general and vital area within the body where digestion takes place.	Accessible through incision (*Epid. V* 26).	• Abdominal injuries recorded in the *Epidemics* (see **Appendix B**). • Tears and ulceration of the cavity (*Morb. I* 17).
Intestine (ἔντερον)			
• A symmetrical spiral (*Anat*. 1).	• Key to the digestive process of the body, and where fermentation takes place.	Direct accessibility is not addressed. Treatment is through natural orifices (mouth, etc.) to restore qualitative imbalance that has impeded the	• *Aphorisms* and *Diseases I* both state that the smaller intestine cannot reunite naturally (or be reunited by the

[419] See Lonie (1981), 97, Grmek (1989), 31, Grmek & Gourevitch (1998), 84-86, and Holmes (2010), 131.
[420] Onians (1951) 25, 38; Darcus Sullivan (1995), 36f.

Descriptions	Examples of Roles	Surgical Accessibility (where mentioned)[415]	Associated Injuries/Wounds (where mentioned)
		functioning of the intestine. For wounds, treatment is similarly applied: "give milk and wine in equal proportions" (*Epid. II* 6.13).	physician) if it is severed (*Aph*. VI.XXIV; *Morb. I* 8). • Breath escaping a wound of the intestine (*Epid. II* 6.13).
Bladder (κύστις)			
• "Large and entirely sinewy", and from the bladder grows a channel (the urethra) (*Anat*. 1). • "Implanted with tangled, fine, solid, sinewy vessels" (*Oss*. 14).	• The last receptacle of urine before it is passed out of the body (e.g. *Loc.Hom*. 8, *Prorrh. II* 23, *Int*. 18).	Can be accessed through lithotomy (a surgical procedure that involved an incision through the perineum and into the bladder in order to remove bladder stones that were too large to pass through the urethra), but this procedure was banned by the *Oath* and contracted out to "craftsmen" (*Jusj*. 22-24).[421]	Pelvic trauma is absent from the surviving treatises, but the *Oath* warns not to cut for lithotomies (*Jusj*. 22-24). As Witt notes, lithotomies were "one of the most risky and audacious procedures of elective non-trauma surgery in antiquity, almost certainly causing complications in patients".[422]

[421] Herr (2008).

[422] Witt (2018), 238-240. Fatalities linked to bladder wounds were acknowledged in the Homeric epics, see Grmek (1989), 32, 365 n.96. On modern day deaths related to bladder injuries, see Hakim et al. (2012).

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