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Anatomy and Anatomical Exegesis in Galen of Pergamum

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Anatomy and Anatomical Exegesis in Galen of Pergamum

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This dissertation is a study of the differing explanatory criteria used for the assessment of epistemic medical claims, particularly anatomical claims, in the work of Galen of Pergamum (129-c. 216 CE). It focuses on Galen's use of anatomy and anatomical exegesis to position himself in relation to the various medical sects or *haireseis* active in the Late Roman Empire. Consequent on the emergence of invasive anatomical investigations in the early Hellenistic period (3rd cent. BCE), the explanatory and therapeutic value of anatomical information came to be a defining characteristic of competing medical sects. The Empiricists, who, we are told, were reacting to what they believed was the theoretical promiscuity of other medical thinkers, took their name from their reliance on experience rather than theory, the latter a methodological commitment they attributed to other medical thinkers whom they grouped under the broad category of Dogmatists. This sensitivity to theoretical claims is apparent from the fact that the Empiricists eschewed anatomical dissections, on the grounds that they required analogical moves from structures in corpses to structures in living creatures. If Galen is to be taken at his word, by the second century CE, sectarian disputes between the medical sects had risen to a fever pitch. Galen, who was at pains to make a place for his own

medical beliefs in this debate, stresses the need for explanatory theoretical accounts of the body and things relevant to its biological function but also insists that these theoretical accounts be based in empirical observations. One of the arguments he must overcome is the problem of anatomical analogy, raised by the Empiricists. Galen not only engages with this issue from an abstract point of view but, this dissertation argues, he engages with it through the narrative structure of his anatomical accounts throughout his work and especially in his procedural anatomical handbook, *De Anatomicis Administrationibus*. Historically, this treatise has either been ignored by scholars or studied as a technical treatise that lacks in artifice. This dissertation questions this approach and considers the argumentative role of Galen's anatomical exegesis in the debate over the explanatory value of anatomy in Greco-Roman medicine. It takes as one of its main focuses, Galen's accounts of elephantine anatomy. It argues that these accounts are governed by different norms of assertion, which do not place the same premium on accurate reporting of anatomical detail, from the surrounding anatomical narrative in *De Anatomicis Administrationibus*. To that end, it shows the need for a more nuanced reading of *fachprosa*, such as Galen's anatomical work, than these texts have historically received.

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Chapter One: Introduction

This dissertation is a study of explanation in the work of Galen of Pergamum, particularly as it regards to ancient Greco-Roman anatomical accounts. "Explanation" is to be taken here as broadly construed, ranging over philosophical, medical, and anatomical explanation. The distinction between these last two categories, medical and anatomical explanations, may not be apparent from a contemporary perspective; but, this distinction forms a central theme of this project, which considers the argumentative role that anatomical accounts play in Galen's own theoretical picture of the natural world and in his engagement with rival theorists.

From an ancient Greco-Roman perspective anatomy and epistemic anatomical claims were not uncontroversially a part of medical knowledge.¹ While to some extent one can correlate ancient attitudes to anatomical knowledge with ancient attitudes toward the explanatory value of empirical observation, the relationship between early Greek anatomical accounts and empirical observation is itself quite puzzling. The earliest of these accounts make anatomical claims and frequently emphasize their basis in empirical observation. Despite the argumentative cachet that these sorts of claims appear to have had, there is very little evidence that much, or sometimes any, empirical observation underlaid them. To phrase the puzzle as a question: if claims to an empirical basis were

¹ This distinction between anatomy and epistemic anatomical claims is not meant to be one without a

explanatorily valuable in our earliest anatomical accounts, why did that explanatory value not translate into more systematic empirical investigation of the body?

Starting from our earliest accounts of so-called rational Greek medicine, the Hippocratic Corpus, the explanatory role of anatomical observation in medical epistemic claims is ambiguous. In the Aristotelian corpus and early Peripatos, anatomy acquires far more epistemic warrant in medical knowledge claims and one can begin talking meaningfully if reservedly about anatomical research. By the time of the Hellenistic period, Herophilus and Erasistratus are responsible for tremendous advances in anatomical knowledge. Both are said to have conducted anatomical research into human subjects, and present us with the first strong evidence that we have for dissection and vivisection in the Greek world.

The medical record, however, is frustratingly gappy between the early Peripatos and Galen, active some four centuries later. In fact, Galen is the major source for the exiguous scraps that remain of medical authors between the early third centuries BCE and his own career in the second century CE. Indeed the prominence of his work was also probably one of the primary causes of their disappearance. But there is evidence from the Classical period through the Late Imperial period that anatomical knowledge and research continued to be a point of ideological and methodological contention among medical authors. In fact, differing commitments to the epistemic value of arguments from anatomy and the philosophical positions underlying those commitments are among the central criteria that distinguish the main medical sects or *haireseis* in Galen's own time: Dogmatists, Empiricists, and Methodists.

Chapter one, this introduction, lays out the boundaries of the terrain this dissertation will cover and the breadth of what is meant here by explanation. The chapter limits the scope of the dissertation and attempts to define the overall project. It also provides a narrative of intellectual attitudes toward anatomical information and research from the Classical period onward and, finally, introduces Galen of Pergamum.

Chapter two examines Galen's attitude toward explanatory criteria for medical epistemic claims. It discusses the close relationship and in many cases indistinguishability between philosophical and medical writing among Greco-Roman intellectual authors. This chapter also introduces and discusses the three medical sects active in the second century CE. In particular it discusses their disagreements on the epistemic and therapeutic value of theoretical medical commitments, especially sign-inferences or inferences to things that were not directly observable (*adêla*) from things that were directly observable. Chapter two also argues that Galen's attitude toward explanation *more geometrico* can be read in light of the basis of ancient geometry in land surveyance. This reading adds to rather than challenges the traditional interpretation of Galen's frequent demand that medical arguments take the form of geometric ones, as an example of his commitment to an axiomatic-deductive model of proof and explanation.

Chapter three explores the agonistic context of anatomical demonstrations in the Late Roman period and its roots in earlier Greek medicine. It focuses on the persuasive and explanatory features of Galen's public anatomical displays in his treatise *De Anatomicis Administrationibus*. In particular, this chapter discusses the credentialing effect of these displays on Galen's medical career in Rome and the credentialing function

that his exposition of these displays had in his written corpus. To that end, it examines the theoretical and performative function of Galen's phonation experiments and the argumentative role that these episodes play in Galen's intellectual debates with his medical and philosophical rivals. Of particular importance is the bearing of these demonstrations, for Galen, on a) the question of the physical location of the ruling part or control center of the body, the *hêgemonikon* and b) the question of the degree to which the biological world is structured teleologically. Finally, this chapter shows that certain accounts of anatomical procedures in Galen's work are marked structurally and linguistically in his texts. It argues that these marked episodes primarily serve a polemic function and questions whether they should be taken as adhering to the same norms of assertion as Galen's often decontextualized and more impersonal anatomical accounts, which appear to function primarily to transmit anatomical knowledge.

Chapter four takes up the claims made in chapter three and carefully examines a cluster of these marked descriptions of anatomical procedures in Galen's work, all of which involve Galen's account of elephantine anatomy. It lays out Galen's account of the elephant's trunk and explains the importance to him of the elephant and its trunk as an expression of the teleological structure of the world. Then it proceeds to examine Galen's accounts of two structures that do not exist: the elephant's gallbladder and the elephant's *os cordis* or heart bone. It argues that Galen's three accounts of elephantine anatomy are largely inspired by if not taken wholesale from Aristotle's biological works. It claims that these accounts function primarily to undergird Galen's robust teleological commitments and to argue against a variety of beliefs expressed by a host of intellectual rivals ranging

from the mechanism of Asclepiades and the apparent mechanism of Erasistratus to the qualified teleology of Aristotle himself to other cardiocentrists of Galen's day, such as the Stoics and later Peripatetics.

METHODOLOGICAL AIMS

Throughout this dissertation, I am primarily interested in how authors present themselves and their arguments. I often do not take a hard stance on the historicity of the events I am discussing. Taking a famous example from Galen's own texts, the exile of Quintus from Rome, I would spend little to no time on the question of whether or not Quintus was really exiled from Rome on charges of murdering his patients or whether or not there was a plot to have him poisoned (*Praenotione* XIV 602), for its own sake. I would, however, examine whether or not Galen presents himself as a modern day Quintus and, therefore, as the best physician of his generation, by describing circumstances that surround him in similar terms. I would also take a special interest in how Galen's mention of Quintus functions as a vehicle for his criticism of contemporary Roman doctors, signposted by *philoneikia*, a typical Galenic complaint, as well as charges of witchcraft, *goêteia*. While I remain ultimately agnostic on whether Galen exaggerated or even fabricated the historical events surrounding Quintus' biography, the parallels Galen draws between his own and Quintus' experience are not coincidental and have, at the minimum, some literary aim. This disclaimer has special force in chapters three and four, where I will often question whether the function of certain anatomical

episodes in *De Anatomicis Administrationibus* is primarily to transmit bare anatomical information or to make a more general argumentative point.

CITATION OF GALENIC TEXTS AND TRANSLATION

Before proceeding, it is also necessary to explain the method of citation for Galenic texts adopted in this dissertation. Traditionally, Galen's texts are referred to by their Latin titles. When a work is first mentioned in a chapter, I will include the full Latin title along with the usual abbreviation for that title in parenthesis: for example, *De Anatomicis Administrationibus* (AA). The format for abbreviations is taken from R.J. Hankinson's *Cambridge Companion to Galen* (Hankinson 2008: 391-7). Subsequently, I will adopt the abbreviated title except for cases of emphasis. A further complication, and the reason for this section of the introduction, has to do with pragmatics of Galen's corpus, which is truly immense. By Vivian Nutton's account, Galen's extant works in Greek represent roughly 10% of all surviving Greek literature through 350 CE, the majority of which comprises some 20,000 pages in 22 volumes of the Kühn edition.² For this reason and others, such as the relatively low esteem in which second century Greek authors have historically been held by Classicists and the sometimes esoteric nature of Galen's medical work, a standard method of citation does not exist for Galen's texts.

From 1821-1833, Karl Gottlob Kühn collected the Greek texts of Galen available at the time into 22 volumes containing Greek text, often poorly edited, along with subscripted Latin translations of the named although not necessarily of the printed Greek

² See Nutton (2004: 390 n. 22)

text. Given the lack of any comprehensive alternative, Kühn's edition is the basis for most citations despite its failings. Therefore, for texts that appear in Kühn's massive edition, I adopt a similar method of citation to that found in Hankinson's *Cambridge Companion* (Hankinson 2008: xix-xxi). Galenic texts are cited by way of the abbreviated Latin title, a Roman numeral indicating the Kühn volume in which that treatise is contained, and finally an Arabic numeral indicating the Kühn page in which the reference can be found. So, AA II 240, picks out *De Anatomicis Administrationibus*, which is Kühn volume II and begins on Kühn page 240.

I still refer to the Kühn numbering and pagination in cases where Kühn has been superseded by a later critical edition, such as *De Praenotione*, edited by Vivian Nutton in 1979 as a part of the *Corpus Medicorum Graecorum* (CMG V 8,1). This edition and most other recent critical editions themselves contain marginal references to Kühn's edition, making Kühn a common reference point for all later editions. Hankinson's *Companion* includes more elaborate references, which provide the Kühn reference followed by an "=" then a citation of a later edition. For purposes of this dissertation, the bare Kühn reference suffices. In cases where the Galenic text referenced does not appear in Kühn, I use the pagination of the standard critical edition as indicated by Section II of Appendix I, again in Hankinson (2008: 397). Other references to ancient texts follow the style of abbreviation found in the 4th edition of the *OCD*. Translations, unless otherwise indicated are my own.

HISTORICAL BACKGROUND

Indirect evidence for a medical interest in anatomy and direct evidence of anatomical knowledge can be found in Greek writing in our earliest literary sources, the *Iliad* and the *Odyssey*.³ Machaon and his brother Podalirius, both sons of the then mortal albeit famous healer Asclepius tend to the wounds of Greek soldiers on the battlefields of Troy. Notably both minister to the dying and wounded without recourse to divine intervention, by which rough criterion so-called rational medicine is distinguished from non-rational medicine.⁴ That is to say, the notion of rational medicine, broadly construed, has roots in our earliest Greek texts alongside an at least passive awareness of the superficial structure of the human body. In fact, Aulus Cornelius Celsus, the first century CE author of *De Medicina*, includes both of the brothers in his early genealogy of physicians, at whose head stands the mortal doctor Asclepius in his proem (*De Medicina* 2-3). Even so, there is no evidence in the texts for anything beyond the sort of accidentally acquired anatomical knowledge allowed by the Empiricists.

³ For medicine in the *Iliad* and *Odyssey*, see Daremberg (1865), Lorenz (1976) and Laser (1983). Although the Homeric poems are notoriously graphic in regard to wounds and other physical injuries, they are rather vague with regard to pharmacology and physiology.

⁴ E.g., *Il.* 2. 716-25, 11.514-5, 518, 833 and *passim*. That is not to say, however, that supernatural and divine explanations for medical phenomena are not also evident in the poems. Consider, for example, the famous plague in *Il.* 1, whose divine provenance cannot be explained in terms of dual causation. For the plot to progress, the plague must be caused by Apollo's anger at the treatment of Chryses and must be treated through prayer and purification. See also, *Il.* 5.99ff, 305ff, 447ff, 16.523; *Od.* 20.455-8. In addition, consider the *ιάματα* at Epidaurus, dating from the fourth century BCE, which preserve the case histories of patients seeking divine diagnoses and sometimes treatment. Furthermore, Strabo and Pliny both relate a tradition by which Hippocrates himself learned medicine from the *ιάματα* at Cos before the Asclepion burned down.

Alcmaeon of Croton

A testimonium of Alcmaeon of Croton, active some time in the late 6th or early 5th century BCE, traditionally represents the earliest witness for an account of dissection. In his commentary on Plato's *Timaeus*, Chalcidius credits Alcmaeon with having been the first to work on the anatomy of the eye,

Consequently, the nature of the eye must be shown, about which both a good number of others [have written], and particularly Alcmaeon of Croton, practiced in natural philosophy, who was the first who dared to undertake its removal (*exsectionem*), also Callisthenes, a student of Aristotle, and Herophilus brought to light many [of the following] remarkable [discoveries].⁵

The question of what exact procedure(s) Alcmaeon engaged in is vexed.⁶ The crux of the difficulty involves both what *ex(s)ectio* means as it applies to Alcmaeon's medical activity and how much weight one places on the context surrounding the claim, which might imply extensive anatomical research. In the sentence preceding this quotation, which is not included in *Diels-Kranz*, Chalcidius mentions that both doctors and philosophers examined the joints of the human body after an *exsectio* of the limbs was undertaken for the sake of fully understanding nature when it is healthy.⁷ Furthermore, references that Chalcidius makes later in the text (257ff) to the optic nerves leading from the eyes into the head as well as his description of the optical tunics seem at first glance

⁵ Chalcidius *in Tim.* 256 = DK 24 A 10, demonstranda igitur oculi natura est, de qua cum plerique alii tum Alcmaeo Crotoniensis in physicis exercitatus quique primus exsectionem adgredi est ausus, et Callisthenes, Aristotelis auditor, et Herophilus multa et praeclara in lucem protulerunt.

⁶ For an overview of Alcmaeon and of what can be gleaned from Chalcidius' testimony, see Lloyd (1975).

⁷ Chalcidius *in Tim.* 256 = DK 24 A 10, ad comprehendendam sanae naturae sollertiam artus humani corporis facta membrorum exsectione rimati sunt...

to attribute a fairly robust anatomical awareness of the structure of the eyes and optic nerves to Alcmaeon.⁸ But, it is not difficult to construe this passage as saying simply that these more complex anatomical discoveries were the culmination of a tradition of investigation that began with Alcmaeon and continued through Herophilus.

In his article on the early history of dissection, however, G.E.R. Lloyd argues that the weight of evidence against human dissection at such an early moment in Greek history is overwhelming.⁹ He cites Aristotle's pleas for animal dissection as a legitimate intellectual activity in *PA* 1.5 and his admission in *HA* 494b21 that the internal structure of the human body is at his time unknown and must be arrived at from analogy with the internal structure of animals, as well as Celsus' later archaeology of dissection in the proem to *De Med.* as evidence that any dissection, much less human dissection, was a fairly late arrival to the medical scene. Consequently, Chalcidius' references to human dissection are either mistakenly attributed to Alcmaeon or should be attributed to Herophilus and Erasistratus along with the elaborate description of the structure of the eyes and the optic nerves. For example, the reference to four tunics or membranes (*in quattuor membranis seu tunicis*) strongly evokes post-Herophilean language.¹⁰

⁸ Chalcidius in *Tim.* 256-7 = DK 24 A 10, duas esse angustas semitas quae a cerebri sede, in qua est sita potestas animae summa et principalis, ad oculorum cauernas meent naturalem spiritum continentes; quae cum ex uno initio eademque radice progressae aliquantisper coniunctae sint in frontis intimis, separatae biuii specie perueniant ad oculorum concauas sedes, qua superciliorum obliqui tramites porriguntur, sinuataeque illic tunicarum gremio naturalem humorem recipiente globos complent munitos tegmine palpebrarum, ex quo appellantur orbes. Porro quod ex una sede progrediantur luciferae semitae, docet quidem sectio principaliter, nihilo minus tamen intelligitur ex eo quoque, quod uterque oculus moueatur una nee alter sine altero moueri queat. Oculi porro ipsius continentiam in quattuor membranis seu tunicis notauerunt disparili soliditate; quarum differentiam proprietatemque si quis persequi uelit, maiorem proposita materia suscipiet laborem.

⁹ Lloyd 1975: 116-17

¹⁰ See Lloyd (1975: 119-20)

Human dissection aside, one is left with Chalcidius' claim that Alcmaeon was the first who dared to undertake *exsectio* of the eye. Without further context, the precise nature of the excision involved in Alcmaeon's *exsectio* is opaque. Lloyd (1975: 121-2), argues against the view that Alcmaeon was engaged in more than passive observation of the eye and its orbit. He observes that Theophrastus' reports of Alcmaeon's beliefs concerning the eyes focus on a reduction of them to their elemental constituents. This territory is familiar among pre-Socratic intellectuals interested in the natural world. At least, it is certainly a familiar Peripatetic narrative of pre-Socratic interests in the natural world. However, Theophrastus further attributes to Alcmaeon a belief in conduits or pores (πόροι) connecting the sense organs to the brain,¹¹ which may suggest that Alcmaeon was engaged in dissection.

The argument runs that Alcmaeon's belief in πόροι might have arisen from an awareness of the path of the optic nerve from the eye to the brain inside the skull. As Lloyd (1975: 124) points out, however, it would have been surprising if Alcmaeon had come to believe in the connection of the sense organs to the brain by way of πόροι through the direct observation of nerves extending from those organs to the brain. He would have been unable to detect any such connection between especially the tongue and the brain. And, of course, mere excision of the eye would have revealed only the stub of the optic nerve remaining in the eye's orbit.

¹¹ *De Sensu* 25-26 = DK 24 A5, ὁφθαλμοὺς δὲ ὁρᾶν διὰ τοῦ περὶ ξύδατος. ὅτι δ' ἔχει πῦρ, δῆλον εἶναι· πληγέντος γὰρ ἐκλάμπειν. ὁρᾶν δὲ τῷ στίλβοντι καὶ τῷ διαφανεῖ, ὅταν ἀντιφαίνῃ, καὶ ὅσον ἂν καθαρώτερον ᾖ, μᾶλλον. ἀπάσας δὲ τὰς αἰσθήσεις συνηρτησθαί πως πρὸς τὸν ἐγκέφαλον· διὸ καὶ πηροῦσθαι κινουμένου καὶ μεταλλάττοντος τὴν χώραν· ἐπιλαμβάνειν γὰρ τοὺς πόρους, δι' ὧν αἱ αἰσθήσεις. περὶ δὲ ἀφῆς οὐκ εἴρηκεν οὔτε πῶς οὔτε τίτιν γίνεται. [ἀλλ'] Α. μὲν οὖν ἐπὶ τοσοῦτον ἀφώρικεν.

The evidence supports the view that Alcmaeon was engaged in passive observation of the eye and its orbit in some animal. Chalcidius is both a much later source and his Latin is ambiguous on the crucial question of whether he believed Alcmaeon was engaged in active, intrusive observation of the eye. Given the generally passive character of anatomical observations made subsequent to Alcmaeon in the Hippocratic Corpus, to which we now turn, it seems probable that Alcmaeon was engaged in the same sort of non-intrusive observation that we shall see is typical of pre-Aristotelian anatomical narratives.

The Hippocratic Corpus

A clearer anatomical picture begins to come into slow focus in the middle of the 5th century BCE with the texts that come to us under the name of Hippocrates.¹² These texts, taken together, form the Hippocratic Corpus and range in date from the middle of the Classical to the Hellenistic period (5th-3rd centuries BCE). Given the range of their dates of composition and other factors, such as language use as well as theoretical or doctrinal inconsistencies between treatises, the Hippocratic Corpus obviously contains texts written by a variety of authors, whose identities are for the most part unknown to us.¹³ The Hippocratic texts offer some anatomical description but, on the whole, this

¹² I do not engage the Hippocratic question in this dissertation, as the issue of authorship is really orthogonal to the manner of anatomical narrative in the corpus. For the Hippocratic question, see, e.g., Smith (1979); Lloyd (1991: 194-223); Temkin (1991); and Jouanna (1999).

¹³ Though Aristotle attributes an elaborate description of the circulatory system to Polybus, a disciple and son-in-law of Hippocrates, at *HA* 512b12-513a7. This is the account of the circulatory system that appears in *Nature of Man* 11. Consequently, Galen and others attributed at least portions of *Nat. Hom.* to Polybus. The discovery of the papyrus, dating from the 1st-2nd centuries CE, known as *Anonymus Londinensis* and

information is fairly sparse. It is limited in large part to descriptions of superficial structures of the human body as well as some of the principle organs.¹⁴ Hippocratic claims about anatomical function are largely speculative; the physiological claims one finds in the Hippocratic Corpus seem to be based on little empirical examination and they do not show much concern for it.

The importance of basing claims about the body only on manifest data appears in some of the earliest Hippocratic texts. This incipient notion can be found in the opening lines of *Nat. Hom.*, where, for example, knowledge of the human body, at least of a certain sort plays an important role in medical claims,¹⁵

This account is not well suited for that sort of person to hear, who is in the habit of listening to those who talk about nature (φύσις), at least human nature, any further than how it relates to medicine. For I do not say that human beings are entirely [reducible to] air, fire, water, earth, or any other thing that is not observably present in a human being (ὅ τι μὴ φανερόν ἐστιν ἐνεδὸν ἐν τῷ ἀνθρώπῳ); rather, I leave that to those people who want to talk about those things.¹⁶

thought to be of Peripatetic provenance attributes the first chapters of *Nat. Hom.* to Polybus as well (19.2ff).

¹⁴ See, for example, Jouanna (1999: 310-11), "The Hippocratic physicians were naturally acquainted with the principal organs, such as the brain, the heart, the lungs, the liver, the kidneys, the spleen, and the bladder, all of which were located in the two great cavities separated by the diaphragm, the "upper" cavity and the "lower" cavity. But they did not yet call them organs- this is an Aristotelian concept. They spoke instead of "structures," for they defined these parts of the body more by their form than by their function."

¹⁵ Cf. also *Nat. Hom.* 5.7-10: How could these things [the humors] be alike to one another? Their colors are not the same when looked at and they do not seem the same to the touch, seeing as they are not equally hot, cold, dry, or wet. (Πῶς γὰρ ἂν εἰκότα εἶη ταῦτα ἀλλήλοισιν, ὧν οὔτε τὰ χρώματα ὅμοια φαίνεται προσορώμενα, οὔτε τῇ χειρὶ ψαύοντι ὅμοια δοκέει εἶναι; οὔτε γὰρ θερμὰ ὁμοίως ἐστίν, οὔτε ψυχρὰ, οὔτε ξηρὰ, οὔτε ὑγρὰ). Here, again, the author undergirds his claims regarding the humoral composition of the human body with appeals to empirical evidence, in this case sight and touch.

¹⁶ *Nat. Hom.* 1.1-6, "Ὅστις μὲν εἴωθεν ἀκούειν λεγόντων ἀμφὶ τῆς φύσιος τῆς ἀνθρωπίνης προσωτέρω ἢ ὁκόσον αὐτέης ἐς ἱητρικὴν ἐφήκει, τουτέω μὲν οὐκ ἐπιτήδειος ὁδε ὁ λόγος ἀκούειν· οὔτε γὰρ τὸ πάμπαν ἡέρα λέγω τὸν ἀνθρώπον εἶναι, οὔτε πῦρ, οὔτε ὕδωρ, οὔτε γῆν, οὔτ' ἄλλο οὐδὲν, ὅ τι μὴ φανερόν ἐστιν ἐνεδὸν ἐν τῷ ἀνθρώπῳ· ἀλλὰ τοῖσι βουλομένοισι ταῦτα λέγειν παρίημι.

This language, of what is manifest (φανερών) as opposed to what is hidden (ἄδηλον) dominates the debate regarding the bases for valid inferences in subsequent epistemological debates. And, as in the case of the English word 'apparent', the Greek word φανερόν includes in its semantic range 'something apparent to sensation'.¹⁷

It is clear that in the Classical period the contrast between what is directly observable (to be taken loosely) and what is only indirectly observable had been made and had become a driving methodological distinction for certain medical authors or at least for other intellectuals. *Nat. Hom.* of course proceeds to introduce humors as exemplars of these sorts of manifest features of the body. The impetus to tie epistemic medical claims to empirical observation is clear. The humors, after all, are for the most part observable products of the human body even if they do not play the physiological role in the human body that some Hippocratic and later physicians believe they do.

I have already mentioned the connection between what is apparent (φανερών) and what is visible in Greek closely mirrors the relation between the two terms in English. I mention this observation proleptically, as the connection with visibility is something that will occupy me in my later discussions of Galen's argumentative strategies. For the present, it is enough to note that in these earlier contexts, φανερόν does indicate something either manifest to sensation or to reason *but* the contexts in which the word and the anatomical facts it describes as manifest appear are not peppered

¹⁷ Debates involving distinctions such as these drove many of the medical texts that come down to us from the Classical period. In fact, G.E.R. Lloyd argues that the very shape of Greek medicine in the Classical period is an outgrowth of the philosophical and political debates raging at the time. See, e.g., Lloyd (1979: 242-55), Lloyd (1990: 30-6), Lloyd (1990: 58-67), and *passim*.

with visual language.¹⁸ That is, the Hippocratic accounts (and other pre-Galenic accounts) are not visually rich accounts of anatomical procedures that attempt to situate the reader behind the gaze of the medical author as he practices his craft.

Hippocratic Anatomy

In this vein, it is worth noting how undifferentiated the inner structure of the body was for Hippocratic doctors. The Hippocratic corpus, for example, does not yet distinguish between arteries and veins, calling them both φλέβες, the root word of our modern *phlebotomy*. The ancestor of our term "artery," ἀρτηρία, refers primarily to the windpipe and other bronchial tubes rather than to a subset of the vessels belonging to the circulatory system. Similarly, the Hippocratic corpus does not discriminate between nerves and other sinewy structures in the body, such as tendons and ligaments, all of which fall under the broad category of νεῦρα, again an ancestor of a modern term "neuro-." In short, there is no evidence for the surgical examination of dead human bodies in the Hippocratic Corpus. And, in fact even the general practice of animal dissection during the Classical period seems to have been practiced only rarely. Indeed, the Aristotelian corpus contains the only extant reports of animal dissections that approach being systematic.

¹⁸ The humors in *Nat. Hom.*, for example, are manifest to sensation generally and not necessarily to vision alone. So, for example, the humors not only look different but also feel different at *Nat. Hom.* V.7-10: For how could these things be alike to one another, whose colors not only appear manifestly different when seen but also appear different to a hand touching (them)? For they are not similarly warm or cold nor dry or wet. (Πῶς γὰρ ἂν ἐοικότα εἴη ταῦτα ἀλλήλοισιν, ὧν οὔτε τὰ χρώματα ὅμοια φαίνεται προσορώμενα, οὔτε τῇ χειρὶ ψάυνοντι ὅμοια δοκεῖ εἶναι; οὔτε γὰρ θερμὰ ὁμοίως ἐστὶν, οὔτε ψυχρὰ, οὔτε ξηρὰ, οὔτε ὑγρὰ.)

In his 1992 book on Hippocrates, Jacques Jouanna makes this point alongside the observation that Hippocratic authors could have avoided fairly obvious mistakes in their descriptions of the internal structure of the human body had they engaged in even cursory human dissection as the Egyptians had in ritual contexts.¹⁹ He contrasts this lack of human dissection in ritual contexts with ritual animal sacrifice, where there is concrete evidence that the Greeks conducted at least limited observations of animal anatomy in a sacrificial context, citing for example, Aristotle at *PA* 667b1-7:²⁰

An indication that the heart does not survive affection is that in no ritual sacrifices is this sort of affection seen around it as it is in the cases of the other internal organs. For the kidneys and the liver as well as the lungs also and especially the spleen are often seen to be full of stones, growths, and abscesses.²¹

Despite the availability of animal organs and other internal structures, such as the ones above, for anatomical observations, the authors of the Hippocratic Corpus seem to take very little advantage of animal material that would have been common. This point complicates reductive answers to questions of Greco-Roman inattention to anatomical information gleaned from dissection or necropsy. An answer of this sort is that the Greeks and Romans refused to engage in dissection of human bodies on account of

¹⁹ Jouanna (1999: 308)

²⁰ Cf. also Aristotle *PA* 667b11-13, which explicitly mentions observations, perhaps hypothetical, that can be made when cutting open the corpses of diseased animals albeit in an unknown context, ὅσα δὲ διὰ νόσον καὶ τοιαῦτα πάθη φαίνεται τελευτώντα τῶν ζώων, τούτοις ἀνατεμνομένοις φαίνεται περὶ τὴν καρδίαν νοσώδη πάθη.

²¹ Aristotle *PA* 667b1-7, Σημεῖον δὲ τοῦ μηθὲν ἐπιδέχεσθαι πάθος τὴν καρδίαν τὸ ἐν μηδενὶ τῶν θυομένων ἱερείων ὥφθαι τοιοῦτον πάθος περὶ αὐτὴν ὥσπερ ἐπὶ τῶν ἄλλων σπλάγχχνων. Οἷ τε γὰρ νεφροὶ πολλάκις φαίνονται λίθων μεστοὶ καὶ φυμάτων καὶ δοθιήνων καὶ τὸ ἥπαρ, ὡσαύτως δὲ καὶ ὁ πλεῦμων, μάλιστα δὲ ὁ σπλήν.

religious or moral taboos regarding the body.²² Other explanations for the early Greek apparent lack of interest in animal dissection are either vaguely causally associated with taboo, such as Aristotle's appeal to intellectual curiosity in the face of social attitudes toward dissection at *PA* 645a6-15, or related to the intermittent value placed by many Greek intellectuals on the warrant of empirical observation before the Hellenistic period.²³

Although it seems eminently plausible that Aristotle's account of the organs of sacrificed animals was based either on direct observation or on the accounts of observers, there is no guarantee that these observations were based on direct observation. Consider, for example, the willingness with which some ancient authors present hypothetical examples as actual examples. What is one to make of Plutarch's elaborate account of Anaxagoras' one horned goat, where allegedly Anaxagoras has an ill-omened goat's head split open to prove that its single horn is a natural anomaly rather than a divine one?²⁴

What is to be made of the following example of anatomical discourse in the early Hippocratic treatise *On Joints*? Here the author claims to find himself in a public dispute over whether or not a patient has a dislocation of the humerus. After telling the reader that, because he has never witnessed them, he is agnostic on the possibility of certain dislocations, the upward (ἄνω), outward (ἔξω), and forward (ἔμπροσθεν) dislocations, he explains that he was once publicly ridiculed (ἤχουσα φλαύρως) by both doctors and

²² On the claim that moral or religious taboo was the primary explanation for Greek and Roman avoidance of human dissection see, for example, Edelstein (1967c: 247-301), Lloyd (1973: 75-90), von Staden (1989: 29), von Staden (1992: 225), and Nutton (2004: 119-20).

²³ I take up Aristotle's comments attitudes toward dissection later in this chapter. Chapter two discusses the problem of empirical warrant in epistemic claims at length.

²⁴ Plutarch *Pericles* 3

the public (ἀπὸ τῶν ἰητρῶν ὑπὸ τε τῶν δημοτέων) alike for denying a case of so-called forward dislocation. Finally, he offers the following explanation for the confusion as a hypothetical to the reader,

If someone were to strip the shoulder of its flesh from the arm, and were to expose the part with which the muscle stretches, and expose the tendon across the armpit and clavicle toward the chest, the head of the arm bone would clearly be projecting forward, although it would clearly not be dislocated. For, the head of the arm bone naturally slopes forward while the rest of the arm bone curves outward.²⁵

This passage and its context are interesting for three distinct reasons. First, unlike the authors of other treatises such as *Ancient Medicine* and *Nature of Man*, the author of *On Joints* is remarkably conservative about his own epistemic claims. Rather than assert his expertise by claiming that certain dislocations are not possible on either theoretical grounds or on the grounds that he has not seen them in his practice, the author of *On Joints* makes a qualified claim about their possibility on the basis of his experience.

In the opening line of the treatise, he says that he knows of only one type of dislocation, into the armpit (ὥμου δὲ ἄρθρον ἓνα τρόπον οἶδα ὀλίσθανον, τὸν ἐς τὴν μασχάλην), without denying the existence of the others out of hand. Second, the author gives indirect and very early evidence for the sort of public and agonistic nature of ancient medical practice that typifies Greco-Roman interactions between the physician, the public, and the patient. And finally, this passage shows that the author had to appeal

²⁵ *Artic.* 1.13-19, εἴ τις τοῦ βραχίονος ψιλώσῃ μὲν τῶν σαρκέων τὴν ἐπωμίδα, ψιλώσῃ δὲ ἢ ὁ μῦς ἀνατείνει, ψιλώσῃ δὲ τὸν τένοντα τὸν κατὰ τὴν μασχάλην καὶ τὴν κληίδα πρὸς τὸ στήθος ἔχοντα, φαίνοιτο ἂν ἡ κεφαλὴ τοῦ βραχίονος ἐς τοῦμπροσθεν ἐξέχουσα ἰσχυρῶς, καίπερ οὐκ ἐκπεπτωκυῖα· πέφυκε γὰρ ἐς τοῦμπροσθεν προπετὴς ἡ κεφαλὴ τοῦ βραχίονος· τὸ δ' ἄλλο ὁστέον τοῦ βραχίονος ἐς τὸ ἔξω καμπύλον.

both to reader and to public by way of a hypothetical dissection of the human shoulder. He had no recourse to assumed general knowledge on the part of his audience, whose beliefs were sufficiently developed so as to judge the author's anatomical credentials on the basis of his claims on forward dislocation. Far more importantly he gives no indication that he had recourse to the observations of gathered physicians, to other texts, or to an anatomical model, much less to a corpse.

The murkiness of the anatomical waters in the Classical period is further muddled as the authors of texts in the Hippocratic corpus and later Aristotle do not often explain how they come by the anatomical information that they catalogue; it is difficult to get a sense for the context in which these observations were made as well as the observational methods involved, if the notion of an observational methodology is not anachronistic. Moreover, although there is evidence that Aristotle, at least ostensibly, takes into consideration some sample size for his generalizations, there is not enough contextual evidence in the Hippocratic corpus to suggest that the authors had a method for generalization in mind.

That some Hippocratic authors considered evidence taken from animal dissection persuasive and at least entertained conducting dissections is made most plain in *On the Sacred Disease*, where the author explains the sacred disease, epilepsy, in terms of a humoral imbalance. The account is at least superficially anatomical. But, it appears motivated far more by the author's theoretical commitments to a humoral theory, speaking loosely, than to direct anatomical observation. On this theoretical account an imbalance, excess of phlegm in the brain, causes a blockage in the vessels leading to and

from the brain. This explanation, the author argues, can be demonstrated by observing the brains of animals that have been afflicted by epilepsy,

For the brain is moister than is natural and congested with phlegm so that while discharge is frequent, the phlegm also can no longer be broken down nor can the brain dry; rather it is congested and wet. *Someone would know this fact especially well by way of herd animals that become afflicted with this disease and especially by way of goats: for these are most frequently afflicted. If you cut into the head (of a goat), you will find that the brain is moist, filled with fluid, and smells terrible. And, in this you will clearly know that it is not a god that wracks the body but a disease. And so it is with human beings.*²⁶

This account, which is similar in relevant respects to the hypothetical dissection or surgery of the shoulder mentioned earlier in *On Joints*, differs in an important regard. In *On the Sacred Disease*, the appeal is at least ostensibly to an actual example, the cranial dissection of the so-called epileptic goat.²⁷ Whereas the discussion in *On Joints* presented the dissection of the shoulder in hypothetical terms, the author of *On the Sacred Disease* discusses the dissection of the goat as actual. This point is evidenced both by the context of the passage and by the indicative mood of the conditional's apodosis. The author's use of the second person also, as we shall see in chapter 3, presents the facts as seen by the

²⁶ *De morb. sac.* 11.4-13, ὁ γὰρ ἐγκέφαλος ὑγρότερος γέγονε τῆς φύσιος καὶ πλημμυρεῖ ὑπὸ τοῦ φλέγματος, ὥστε τοὺς μὲν καταρροοὺς πυκνότερους γίνεσθαι, ἐκκριθῆναι δὲ μηκέτι οἷόν τε εἶναι τὸ φλέγμα, μηδὲ ἀναξηρανθῆναι τὸν ἐγκέφαλον, ἀλλὰ διαβεβρέχεσθαι καὶ εἶναι ὑγρόν. Γνοίη δ' ἂν τις τότε μάλιστα τοῖσι προβάτοισι τοῖσι καταλήπτοισι γινομένοισιν ὑπὸ τῆς νούσου ταύτης καὶ μάλιστα τῆσιν αἰξίν· αὐταὶ γὰρ πυκνότατα λαμβάνονται· ἣν διακόψῃς τὴν κεφαλὴν, εὐρήσεις τὸν ἐγκέφαλον ὑγρὸν ἔοντα καὶ ὕδρωπος περίπλεων καὶ κακὸν ὄζοντα, καὶ ἐν τούτῳ δηλονότι γνώσῃ ὅτι οὐχ ὁ θεὸς τὸ σῶμα λυμαίνεται, ἀλλ' ἡ νοῦσος. Οὕτω δ' ἔχει καὶ τῷ ἀνθρώπῳ.

²⁷ The case of the goat is curious, in that a species of goat does exist, known as the "Falling Goat" or more technically the "Myotonic Goat." This breed of goat suffers from a neuromuscular condition, *Myotonia Congenita*, which results in an increased muscular reaction to stimulus and a retardation in muscular relaxation afterwards. This disorder presents as partial or complete stiffening of the limbs and then jerking motions as the muscles slowly relax. The goat's brain is not known to smell badly upon dissection, however.

reader acting as physician as the basis for persuasion. That is, figuring the reader as the practitioner in the text is itself a means by which to include and so to persuade. But the most important point here is that this Hippocratic author treats empirical evidence, in particular empirically acquired anatomical evidence, as explanatorily valuable to the intended audience of *On the Sacred Disease*. Like the author of *On Joints*, what this author considers a crucial part of his persuasive arsenal is appeal to direct empirical evidence by way of anatomy. This evidence need not be empirically accurate or even have been the result of direct observation but the very fact that it is presented as *empirical* evidence shows the strange disconnect between how certain evidence may be privileged for its persuasive value while it does not appear to have been privileged medically or therapeutically. That is, the evidence may have had persuasive value but that value did not motivate these authors to conduct empirical systematic empirical investigations.

It is unclear whether this citation of empirical observation was really meant to describe a repeatable test for theoretical claims or was only one of an assortment of argumentative tools arrayed rhetorically against rival physicians in the Hippocratic texts in which appeals to empiricism are apparent. For example, consider the striking difference between two accounts, both from *Nat. Hom.*. The first forms one of the author's arguments for humors as the constituents of the human body. It follows claims that the humors are always the same both by nature (κατὰ φύσιν) and by convention (κατὰ νόμον), which is a distinction familiar from sophistic debates in the Classical period. The author's first argumentative move is to establish that according to conventional usage, the four humors (blood, phlegm, yellow bile, and black bile) are

distinct in name. The author's second move is to establish how it is that the four humors differ substantively,

How could these things [the humors] be alike to one another? Their colors are not the same when looked at and they do not seem the same to the touch, seeing as they are not equally hot, cold, dry, or wet.²⁸

It is not important whether one humor such as phlegm was noticeably different in temperature to another such as bile. What matters is that the author places persuasive weight on empirically observable qualities, such as relative temperature. The argument must go something like this. First the argument takes as given that (a) things that are substantively the same will (b) appear the same. Therefore, the author concludes that the humors are \sim (a) substantively different (κατὰ φύσιν τὰς ιδέας κεχωρίσθαι) on the grounds that they \sim (b) seem different with respect to appearance and touch. So long as one allows that identity of appearance is a necessary condition of substantial identity, the conclusion follows by *modus tollens* that the humors cannot possibly be substantially alike.

In light of the high premium this argument places on empirical observation, the description of the circulatory system at *Nat. Hom.* 11 is all the more surprising. In this chapter the author outlines one of the earliest extant attempts at describing the human circulatory system. Famously, however, the description does not hold up under even minimal empirical scrutiny. The text, which Aristotle and *Anonymus Londinensis* both

²⁸ *Nat. Hom.* 5.7-10, Πῶς γὰρ ἂν εἰκότα εἶη ταῦτα ἀλλήλοισιν, ὧν οὔτε τὰ χρώματα ὅμοια φαίνεται προσορώμενα, οὔτε τῇ χειρὶ ψαύοντι ὅμοια δοκέει εἶναι; οὔτε γὰρ θερμὰ ὁμοίως ἐστὶν, οὔτε ψυχρὰ, οὔτε ξηρὰ, οὔτε ὑγρὰ.

attribute to Hippocrates' pupil and son-in-law Polybus,²⁹ appears to be motivated by theoretical commitments rather than any empirical observations of the internal structure of the human body.

It has been noted by both ancient and modern commentators that the account of the circulatory system in *Nat.Hom.* fails to mention the heart by name at all.³⁰ Rather it treats the blood vessels of the body as radiating from the head. In addition, the exposition seems driven by a commitment to bilateral symmetry rather than by direct observation of the vascular system.³¹ Given the absence for any evidence of human dissection before the Hellenistic period, this last fact is not surprising. But, the passage also reveals an indifference to or ignorance of analogous vascular structures that could be gleaned from direct observation of vascular anatomy in other animals, gained either by dissection, ritual sacrifice, or even slaughter and dressage.³² What then is one to make of the fact that the author of *Nat. Hom.* appeals here both to anatomical information as an argumentative strategy and yet appears to show no concern for what must have been fairly available anatomical information?

²⁹ Aristotle at *HA* 512b12-513a7 and *Anonymus Londinensis* at 19.2ff.

³⁰ Lesley Dean-Jones, in 'Polybus' Heartless Man', an unpublished piece on this passage, however, argues that given widespread awareness of the heart in the Classical period, even to lay people, it was impossible for Polybus (or if not him, whoever authored this passage) simply not to know of the heart's existence. She suggests that the absence of a direct reference to the heart may reflect Polybus' view of it as a 'crossing place' rather than as a distinct organ.

³¹ See Lloyd (1979: 22). In addition, Lloyd suggests plausibly (158) that contemporary venesectional practice may have played a role in this arrangement of vessels.

³² See, for example, Manuli and Vegetti (1977: 52); Lloyd (1979: 157-8); Smith (1979: 20); Jouanna (1999: 310-11).

Aristotle on the vascular anatomy of Nat. Hom.

A passage in Aristotle, *HA* 513a8-15, represents our earliest extant criticism of this account. His critique is bookended, first by summaries of earlier accounts of the circulatory system and then by his own. Importantly, Aristotle's main criticism of the presentation of the circulatory system in *Nat.Hom.* involves its failure to conduct empirical observations adequately. First he acknowledges the difficulties in observation of the circulatory system in dead animals. Then he explains that these mistakes could have been avoided if his predecessors had undertaken more careful observations. Specifically, he recommends the strangulation of emaciated animals in order to see the blood vessels of the body most clearly.³³

Galen on the authenticity of the vascular anatomy in Nat.Hom.

Galen's account of this passage, from his commentary on *Nat. Hom.* (*HNH*) is far more damning and offers a useful *entrée* into Galen's style of prose as well as his use of Hippocrates to authorize his own medical claims. In fact, although Galen often took great pains to reconcile both the works of Plato and of the Hippocratic Corpus with his own theories, the anatomical shortcomings of this passage drove him not only to consider it spurious but to imagine it was a part of a libelous interpolation as well,

³³ Aristotle adds that those of his predecessors who took pains to document the circulatory system precisely had roughly the same view of it as expressed in the three accounts laid out in *HA*. One mistake that he claims they all had in common was locating the source of the circulatory system in the brain and head rather than in the heart. *HA* 513a9-13, εἰσὶ δὲ καὶ τῶν περὶ φύσιν οἱ τοιαύτην μὲν οὐκ ἐμπραγματεύθησαν ἀκριβολογίαν περὶ τὰς φλέβας, πάντες δ' ὁμοίως τὴν ἀρχὴν αὐτῶν ἐκ τῆς κεφαλῆς καὶ τοῦ ἐγκεφάλου ποιοῦσι, λέγοντες οὐ καλῶς.

In addition, between this and *On the Nature of Man*, something else has been compiled, interpolated by the one who first joined these two little treatises, the work *On the Nature of Man* of Hippocrates himself and *Regimen of Health* of Polybus, into the same one. For at the time when the Attalid and Ptolemaic kings were trying to outdo each other in the acquisition of texts, fraud regarding the attribution and recension of texts began to spring up among those who were bringing back the work of famous authors to the kings for pay. So, since both of these books, *On the Nature of Man* and *Regimen of Health*, are short, someone combined them both into the same book, considering each of them to be negligible because of its shortness. And maybe someone else, or maybe even the same person who first combined them, inserted some things between the two works, which we will now discuss.³⁴

Here Galen goes a step further than rejecting the possibility that a genuinely Hippocratic text was mistaken with respect to a medical issue, even an anatomical one.³⁵ The vascular description is so far off the mark that Galen envisions it may well be the result of greedy booksellers taking advantage of the obsession over renown that drove relations between Hellenistic monarchs, and including spurious pages between two

³⁴ *HNH* XV 108-9: τὸ δὲ μεταξὺ τούτου τε καὶ τοῦ Περί φύσεως ἀνθρώπου διεσκέυασται, παρεγγεγραμμένον ὑπὸ τοῦ πρώτου συνθέντος εἰς ταῦτον τὰ δύο ταῦτα βιβλίδια, τὸ Περί φύσεως ἀνθρώπου τοῦ Ἱπποκράτους αὐτοῦ σύγγραμμα καὶ τὸ τοῦ Πολύβου Περί διαίτης ὑγιεινῆς. ἐν γὰρ τῷ κατὰ τοὺς Ἀτταλικούς τε καὶ Πτολεμαϊκοὺς βασιλέας χρόνῳ πρὸς ἀλλήλους ἀντιφιλοτιμουμένους περὶ κτήσεως βιβλίων ἢ περὶ τὰς ἐπιγραφάς τε καὶ διασκευὰς αὐτῶν ἤρξατο γίνεσθαι ῥαδιουργία τοῖς ἔνεκα τοῦ λαβεῖν ἀργύριον ἀναφέρουσιν ὡς τοὺς βασιλέας ἀνδρῶν ἐνδόξων συγγράμματα. μικρῶν οὖν ὄντων ἀμφοτέρων τῶν βιβλίων, τοῦ Περί φύσεως ἀνθρώπου καὶ τοῦ Περί διαίτης ὑγιεινῆς, εὐκαταφρόνητον ἐκάτερον τούτων εἶναι τις δόξας διὰ τὴν σμικρότητα συνέθηκεν εἰς ταῦτον ἅμφω. καὶ τις ἴσως ἄλλος ἢ καὶ αὐτὸς ὁ πρῶτος αὐτὰ συνθεὶς παρενέθηκέ τινα μεταξὺ τῶν δύο ταυτὶ τὰ νῦν προχειρίζεσθαι μέλλοντα.

³⁵ The speculation at the end of this quotation is eye-catching. Here Galen deploys a number of stock complaints he has about the way in which doctors and authors of his own day manipulate the work of others to undermine their authenticity. In particular, he combines two scenarios that he normally associates with his own writing and the anxieties he expresses about its publication: the insertion of foreign material into another's corpus of work and the fraudulence that results from an obsession with reputation. Cf. *Lib.Prop.* XIX 8-11, the preface to one of Galen's autobiographical works. Briefly, the passage involves Galen's encounter with two men in the *Sandalarium*, who are arguing over the authenticity of a medical text. One man claims that the text is by the famous Galen while the other says that any educated Greek (*pepaideumenos*) should be able to tell that it's a forgery. Galen laments the lack of education in Rome, then explains that these sorts of forgeries are the result of subpar practitioners trying to pass themselves off as Galen in order to sell more of their own books.

Hippocratic texts in an effort to drive up their price. Galen's philological arguments and his interest in authenticity find their roots in the Alexandrian critics a generation after Aristotle's own. This interest in philology, pedigree, and authority of a text not only pepper Galen's own anatomical discussions but also illustrate the importance of the right sort of interpretation one must have of earlier authors as well as the need to correct textual and doctrinal mistakes. This interpolation, in Galen's opinion, should be apparent to serious Hippocratic exegetes, like him. Since, for both conceptual and philological reasons (e.g., the use of σύννοχον, οὐρήματα) he believes that the vascular anatomy of *Nat. Hom.* is spurious.³⁶ Consequently, the author is, as either a sophist or, as Galen alleges is more likely, a shyster (πανούργος) who has appended this passage on anatomy in order to defame the ancient authors of the two texts it attempts to join.

As counterevidence to this vascular description, Galen first brings to bear a list of anatomists from Diocles to his own day, none of whom claim that there are four pairs of blood vessels extending from the brain.³⁷ Sarcastically, Galen comments on how certain mistakes with these sorts of observations are at least imaginable, as in the case of someone who mistakenly counts eight or six hills of Rome. In this case, however, the miscount is so absurdly off the mark that it would be more apt to say that it is like

³⁶ The philological evidence is slight, see *HNH* XV 172-3, where Galen argues that the terms σύννοχον and οὐρήματα are only used by more recent physicians. ὥσθ' ὁ ταῦτα γράψας ἢ τοιοῦτος ἢ σοφιστὴς ἢ πανούργος ἄνθρωπος, ὡς ἔοικεν, παρεγγράψας τὸ ψεῦδος ἕνεκα τοῦ προστρίψασθαι πόγον τῷ παλαιῷ. τοῦ δὲ νεώτερον εἶναι τὸν παρεγγράψαντα ταῦτα καὶ ἢ τοῦ συνόχου προσηγορία τεκμήριόν ἐστιν· οὐδαμῶθι γὰρ οὔθ' Ἱπποκράτης οὔτε τις <ἄλλος> τῶν παλαιῶν τὸν συνεχῇ πυρετὸν ὠνόμασε σύννοχον, ὥσπερ οὐδὲ οὐρήματα τὰ οὔρα, ἀλλὰ ταῦτα ὀνόματα νεωτέρων ἐστὶν ἱατρῶν, ὅσοι τὴν παλαιὰν λέξιν ἠγνόησαν.

³⁷ The list at *HNH* XV 136 includes Diocles, Praxagoras, Erasistratus, Pleistonicus, Philotimus, Mnesitheus, Dieuches, Chrysippus, Aristogenes, Medeios, and Euryphon to which he adds Herophilus, Eudemus, Marinus, Numisanius, and Heracleinus (a contemporary) all as later anatomists.

counting eight Athenian acropoleis. The one who makes this sort of mistake is absolutely ridiculous (γελοῖοτατος ἂν εἴη τις ὀκτώ λέγων ἄνωθεν κάτω φέρεσθαι φλεβας).³⁸ The fact that there was single great vein rather than eight is inescapable, he argues, to anyone who had even the slightest knowledge of anatomy through dissection.³⁹ As Galen gathers a head of steam he writes that this account is like the dream of a fitful drunk.⁴⁰

How, finally, could the man who fabricates these things, like an honest to goodness modern day Prometheus, have overlooked so great an organ as the heart? Indeed, he made no mention of the brain. For it is clear that this [organ] is less noble than the ankles! And beyond all this even is the fact of his blindness regarding the kidneys, to which great veins are carried from the belly. Which veins, having passed them by, he has confected that certain vessels are carried from the lungs to the kidneys. So it is clear from all the aforementioned that he has not also himself misperceived, as some anatomists have mistakenly seen certain things; rather, [it is clear that] he has seen nothing at all. For someone who does not see the greatest things cannot really be said to look at all but not at all to look.⁴¹

³⁸ HNH XV 137, τοῦτο γὰρ ὁμοίον ἐστὶ τῷ λέγειν ὀκτὼ κατὰ τὴν τῶν Ἀθηναίων πόλιν ἀκροπόλεις εἶναι μίᾳ οὔσης μόνης. κατὰ μὲν γε τὴν Ῥωμαίων πόλιν ἐγχωρεῖ τινα φάναι τοὺς ὀκτισμένους λόφους ὑπάρχειν ὀκτὼ, καθάπερ κὰν ἕξ τις φήσῃ· παρ' ἑνὸς γὰρ ἐκάτερος ψεύσεται· εἰ δέ τις ἀντὶ τῶν ἑπτὰ ἑνα εἶναι φήσῃ τὸν ὀκτισμένον λόφον ἢ ἔμπαλιν Ἀθήνησιν ἀντὶ μίᾳ ἀκροπόλεως ὀκτὼ, πολλῷ μᾶλλον ψεύσεται τοῦ παρ' ἑνὸς τάληθες εἰπόντος. ἀναφερομένης οὖν ἀπὸ τῶν κυρτῶν τοῦ ἥπατος εἰς τὰ τοῦ σώματος ἄνω μίᾳ φλεβός, (ἢ, κὰν ἄνωθεν ἄρξηται τις ἀνατέμνειν, οὐκ ἀναφέρεσθαι, ἀλλὰ καταφέρεσθαι λεχθήσεται, μία δ' ὡσαύτως φανεῖται), γελοῖοτατος ἂν εἴη τις ὀκτὼ λέγων ἄνωθεν κάτω φέρεσθαι φλέβας·

³⁹ HNH XV 139, τὸ δὲ τῆς μεγίστης φλεβὸς οὕτως ἐστὶ πρόδηλον, ὥς μήτε τινὰ λαθεῖν δύνασθαι τῶν δυνηθέντων ἐξ ἀνατομῆς τι μαθεῖν, ὡμολόγηται τε πάσιν ἄχρι τοῦ καὶ τοὺς ποιητὰς αὐτοὺς γινώσκειν.

⁴⁰ HNH XV 142, ὅτι μὲν οὖν ἐνυπνίοις μεθυόντων ἔοικεν ὁ περὶ τῶν ἀπὸ τῆς κεφαλῆς εἰς ὅλον τὸ σῶμα καταφερομένων φλεβῶν λόγος.

⁴¹ HNH XV 142, πῶς οὖν εἰς τέλος ἐπελάθετο τηλικούτου σπλάγχνου τῆς καρδίας ὁ ταῦτα διαπλάττων ὥς καινὸς ὄντως Προμηθεύς; οὐ μὴν οὐδ' ἐγκεφάλου μνήμην ἐποιήσατο· δῆλον γὰρ ὅτι καὶ οὗτος ἀτιμότερος ἦν τῶν σφυρῶν. ὑπὲρ ἅπασαν δὲ τυφλότητα τὸ κατὰ τοὺς νεφρούς ἐστιν, ἐφ' οὗς ἀπὸ τῆς κοιλίας μέγισται φέρονται φλέβες, ἃς παραλιπὼν ἀναπλάττει τινὰς ἀπὸ τοῦ πνεύμονος ἐπ' αὐτοὺς φέρεσθαι. δῆλος οὖν ἐστὶν ἐξ ἀπάντων οὐχ, ὥσπερ ἔνιοι τῶν ἀνατεμνόντων παρειδόν τινα, καὶ αὐτὸς οὗτος παρεωρακώς, ἀλλ' ὅλως οὐδὲν ἑωρακώς· ὁ γὰρ τὰ μέγιστα μὴ βλέπων οὐ παραβλέπειν, ἀλλ' ὅλως οὐ βλέπειν ἀληθῶς ἂν λέγοιτο.

With this passage, Galen brings his scathing denouncement of the account of the vascular system in *Nat. Hom.* to a close. After mentioning the author's failure to account for the vessels leading to and from the brain, heart, and kidneys, Galen returns to his earlier point regarding the frequency of anatomical mistakes due to inexperience with dissection. In this case, Galen argues, the mistakes are less mistakes than outright fabrications that reveal a failure to have observed any of the underlying vascular structures in the first place. This point is emphasized later in the commentary when Galen refers to the author as either a villain or a *logiatros*,⁴² a doctor in name only or one who trades only in medical arguments without firm foundations.

One of Galen's underlying assumptions in this tirade against the author of *Nat. Hom.* tracks the theme of this introduction closely. While anatomical claims clearly had explanatory cachet as early as the Classical period, it is unclear how much actual anatomical investigation occurred at the time. Although its surrounding context implies that the author considered knowledge of internal anatomical structures to be a sign of general medical knowledge and competence, its apparent fabrication reveals the paucity of information derived from dissection available before the late Classical period.

Diocles of Carystus

Starting in the 4th century BCE, there is more evidence that direct systematic observation became more common as the basis for anatomical exegesis. Given the scanty remains of the actual texts containing anatomical narratives besides Peripatetic material,

⁴² *HNH* XV 159

however, it is very difficult to say anything substantive about the structure of their ideas or their style. Galen himself suggests that the first anatomical treatise dates to the 4th century, authored by Diocles of Carystus. In this case the evidence is wholly testimonial. In his genealogy of ancient anatomy toward the beginning of AA, Galen says that Diocles authored this first anatomical treatise on account of a need for handbooks, which accompanied a perceived democratization of medicine,

When the art slipped away from the tribe of the Asclepiads and then became invariably worse generation by generation, it became necessary for notes to conserve anatomical theory. Before, not only were anatomical procedures unnecessary but also treatises of this sort, which as far as I know, Diocles was the first to write (and subsequent to him some others of the ancient doctors and many of the more recent ones, whom I've mentioned earlier). For, in addition to other things, the practical benefit of what has been written down in these sorts of treatises has not been made clear. Rather, all things are laid down, both those that possess the greatest benefit for the art and those that add to it in no way at all or only a little.⁴³

This narrative of decline is interesting for a host of reasons. Galen describes the history of medicine in the same terms Homeric and Hesiodic epic customarily describe the human condition.⁴⁴ Consequently, Galen can treat the vacuum of anatomical treatises in the Classical period as an indication of medicine's noble and mythic origins rather than as a sign of the relative novelty of anatomical knowledge as a part of medical knowledge more generally. This treatment, of course, also allows Galen to avoid any incidental

⁴³ AA II 281-2: ἐκπεσοῦσα τοίνυν ἔξω τοῦ γένους τῶν Ἀσκληπιαδῶν ἡ τέχνη, καίπειτα διαδοχαῖς πολλαῖς ἀεὶ χείρων γιγνομένη, τῶν διαφυλασσόντων αὐτῆς τὴν θεωρίαν ὑπομνημάτων ἐδεήθησαν. ἔμπροσθεν δ' οὐ μόνον ἐγχειρήσεων ἀνατομικῶν, ἀλλ' οὐδὲ συγγραμμάτων ἐδεῖτο τοιούτων ὅποια Διοκλῆς μὲν ὧν οἶδα πρῶτος ἔγραψεν, ἐφεξῆς δ' αὐτῷ τῶν ἀρχαίων ἰατρῶν ἕτεροί τινες, οὐκ ὀλίγοι τε τῶν νεωτέρων, ὧν ἔμπροσθεν ἐμνημόνευσα. πρὸς γὰρ τοῖς ἄλλοις οὐδὲ δεδήλωται κατὰ τὰ τοιαῦτα τῶν συγγραμμάτων ἢ χρεῖα τῶν γραφομένων, ἀλλ' ὁμοτίμως ἔρριπται πάντα, τὰ τε μεγίστην παρεχόμενα χρῆσιν τῇ τέχνῃ καὶ τὰ μηδὲν ὅλως ἢ εἰς μικρόν τι συντελοῦντα.

⁴⁴ Cf. von Staden (1999)

criticism of Hippocratic medicine. The master was not unaware of anatomy; it was simply not necessary for him to chronicle the sorts of knowledge he must have taken for granted.

Diocles was a contemporary or near contemporary of Aristotle's, whose writings are all lost except as fragments preserved by much later authors, beginning in the Roman period with Celsus.⁴⁵ Unfortunately, beyond Galen's mention of an anatomical handbook in the passage quoted above, there is very little evidence for the details of Diocles' anatomical activity.⁴⁶ Galen criticizes his anatomy of the female reproductive system for overlooking the growths into the uterus, ἐμφύσεις, and cotyledons (*Ut.Diss.* II 900-6). In addition, Galen mentions Diocles as one of the authors agreeing with Hippocrates (*contra* Galen's forger of the vascular system in *Nat. Hom.*) with respect to the course of the so-called hollow vein (*HNH* XV 135-7).

Aristotle

Regardless of the exact chronological relationship between Aristotle and Diocles, evidence for more systematic direct anatomical observation in the form of dissection first clearly emerges in the 4th century. Aristotle and, after him, Theophrastus and other Peripatetics undertook the massive task of observing and collecting reputable (*endoxa*) accounts of flora and fauna in the Greek world. With Aristotle, one also sees for the first

⁴⁵ For Diocles, see van der Eijk (2000 vol. 1-2), where the principal fragments are collected. For introductory material, see van der Eijk (2000 v.1: vii-x) and (2000 v.2: viii-xxii). There is some controversy over Diocles' exact dates, which does not affect his anatomical views or proximity to Aristotle's work. For this controversy, see van der Eijk (2000 vol. 2: xxxi-xxxviii)

⁴⁶ See van der Eijk (2000 vol. 2: ix)

time examples of second order normative research claims. That is, Aristotle not only catalogues anatomical information but also writes about how anatomical information should be catalogued. Aristotle's interest in catalogues gave rise to his influential taxonomy of animals, into a series of nested classes that subdivided according to characteristics Aristotle considered to be more or less essential and which Galen took over with few modifications.⁴⁷ Aristotle's biological works also represent the first documented interest in systematic direct observation of animals in general,

It remains to talk about the nature of animals, leaving out nothing either dignified or undignified as far as we are able. For even among those animals which are unpleasant to look at, so the Nature that crafted them provides enormous pleasure to those who are philosophical by nature and who are able to discern the causes [of things]. For it would be both irrational and strange if we enjoyed looking at images [of animals] because we are looking at crafted works, such as a painting or a sculpture but we, at least the ones able really to understand the causes [of things], did not delight more in the sight of those constructed by Nature. So, it is necessary not to be disgusted childishly at the investigation of lesser animals as there is something awe-inspiring in all natural things.⁴⁸

This quotation, from *Parts of Animals*, reflects Aristotle's attitude toward direct observation of the natural world, which takes an interest in natural observation for its

⁴⁷ Roughly, the major division is into blooded and non-blooded creatures. These subdivide into viviparous, oviparous, and oviviparous animals along with a special class of creatures that stand between classes, dualizers. I argue in chapter four that the number of digits at the end of animal appendages are also an axis of taxonomical division and that this criterion of differentiation plays an important role in Galen's inferences by analogy across animal kinds in his own anatomical work.

⁴⁸ Aristotle *PA* 645a6-15, λοιπὸν περὶ τῆς ζωικῆς φύσεως εἰπεῖν, μηδὲν παραλιπόντας εἰς δύναμιν μήτε ἀτιμότερον μήτε τιμώτερον. Καὶ γὰρ ἐν τοῖς μὴ κεχαρισμένοις αὐτῶν πρὸς τὴν αἴσθησιν κατὰ τὴν θεωρίαν ὅμως ἡ δημιουργήσασα φύσις ἀμηχάνους ἡδονὰς παρέχει τοῖς δυναμένοις τὰς αἰτίας γνωρίζειν καὶ φύσει φιλοσόφοις. Καὶ γὰρ ἂν εἴη παράλογον καὶ ἄτοπον, εἰ τὰς μὲν εἰκόνας αὐτῶν θεωροῦντες χαίρομεν ὅτι τὴν δημιουργήσασαν τέχνην συνθεωροῦμεν, οἷον τὴν γραφικὴν ἢ τὴν πλαστικὴν, αὐτῶν δὲ τῶν φύσει συνεστώτων μὴ μᾶλλον ἀγαπῶμεν τὴν θεωρίαν, δυνάμενοί γε τὰς αἰτίας καθορᾶν. Διὸ δεῖ μὴ δυσχεραίνειν παιδικῶς τὴν περὶ τῶν ἀτιμότερων ζῴων ἐπίσκεψιν. Ἐν πᾶσι γὰρ τοῖς φυσικοῖς ἔνεστί τι θαυμαστόν·

own sake. Aristotle's interest led him not only to observe animals passively but also led him to conduct active investigations of animals. This program of animal dissection represents our earliest reliable evidence for systematic animal dissection in the ancient world. Aristotle's comments on these dissections in the passage above have also been taken to reinforce the belief that animal dissection in the Classical period was uncommon since it implies a general resistance to animal observations, which Aristotle argues the observer should overcome. Elsewhere, in his *Historia Animalium*, while discussing the structure of animals from an external perspective, Aristotle reveals that his method for anatomical claims about human beings was necessarily comparative on the grounds that internal observations of human beings were simply not possible at the time,

Consequently the external, visible, parts have been arranged in this manner, and just as has been said above. They have been both been named exhaustively and are known on account of their familiarity. The internal parts, however, are a different case. For this reason, the [internal] parts of human beings are especially unknown. So, it is necessary that we conduct investigations while referring to the parts of other animals, which have nearly the same nature [as that of the parts of human beings].⁴⁹

This quotation alludes to a vexed question in the history of medicine, the origins of human dissection and the reasons it was not commonly practiced. The question of human dissection and vivisection recurs throughout the dissertation, as its avoidance is famously responsible for some of Galen's mistaken claims about human anatomy (e.g., the so-called *retiform plexus*, the number of tendons in the human hand, the shape of the human

⁴⁹ Aristotle *HA* 494b19-24: Τὰ μὲν οὖν μόρια τὰ πρὸς τὴν ἔξω ἐπιφάνειαν τοῦτον τέτακται τὸν τρόπον, καὶ καθάπερ ἐλέχθη, διωνόμασται τε μάλιστα καὶ γνῶριμα διὰ τὴν συνήθειάν ἐστιν· τὰ δ' ἐντὸς τοῦναντίον. Ἄγνωστα γάρ ἐστι μάλιστα τὰ τῶν ἀνθρώπων, ὥστε δεῖ πρὸς τὰ τῶν ἄλλων μόρια ζῴων ἀνάγοντας σκοπεῖν, οἷς ἔχει παραπλησίαν τὴν φύσιν. Cf. also *HA* 511b13ff., 513a12ff.

rectum, so-called because the rectum of apes is in fact straight while in humans it is not, etc.). In fact, except for a brief period of time in the early Hellenistic period, a generation after Aristotle, there is little evidence that human dissection was practiced at all in the Greco-Roman world.

Hellenistic Anatomy

The efflorescence, even if brief, of human dissection and vivisection in Alexandria during the early third century BCE marks a significant turning point toward systematic direct anatomical observation as a *sine qua non* for medical research. This shift in focus from claims about the human body made either from indirect anatomical observations or by analogy from direct investigation into the bodies of animals can be traced to Herophilus at Alexandria. Born in Chalcedon, about a decade before the time of Aristotle's death in 322 BCE, he is credited with having been the first to make systematic surgical examination of human bodies, both dead and living.⁵⁰ While independent reports bear out the former claim that Herophilus dissected human bodies,⁵¹ the only ancient source for the latter claim, that he also vivisected them, first survives in the proem to Celsus' *De Medicina*,

Furthermore, since pains and various types of diseases arise in the inner parts [of the body], they [the Rationalists] believe that no one who is

⁵⁰ For the life of Herophilus including the uncertainties surrounding his exact dates of birth and death, see especially von Staden (1989: 44-50) but generally von Staden (1989: 35-66).

⁵¹ See, e.g., Lloyd (1975); Edelstein (1967: 247-301) but especially (1967: 285-6) where Edelstein argues for the veracity of ancient testimonia on the basis of the tremendous advances in anatomical knowledge made in the Hellenistic period. Both also argue, persuasively, that the lack of any earlier evidence of human dissection among those authors who might have been expected to mention such evidence, such as Aristotle, strongly suggests that Herophilus not only dissected human bodies but was also the first to do so in the Greek world.

ignorant of these same parts can administer treatments to them. Consequently, [they believe] that it is necessary to dissect the bodies of the dead, and to examine their viscera and their other internal parts; and, [they believe] that Herophilus and Erasistratus did this best of all, who cut into still living criminals received from the kings out of prison and examined those parts that nature had kept shut away formerly while they were still breathing...⁵²

Celsus' comments along with a reference in the second century Christian author Tertullian, represent our most explicit evidence for human vivisection in the Hellenistic period. I will not dwell on the question of vivisection here as it does not bear directly on the topic of this dissertation. It is enough to mention that it was only through systematic dissection and vivisection of living creatures that Herophilus was able to distinguish for the first time the function of sensory and motor nerves. Herophilus and Erasistratus were responsible for a series of striking advances in anatomical knowledge. Jointly, they account for discovering the distinction between the venous and arterial systems, the function of motor and sensory nerves, the valves of the heart, the diagnostic value of the pulse, as well as a wealth of anatomical nomenclature. Both authors are, as many others, primarily preserved in the works of Galen, in the case of Erasistratus often in polemic contexts. And, as we shall see in chapters three and four are often used both as authorities for Galen's own anatomical claims and as rivals whose theories Galen must overturn or at least update.

⁵² Celsus, *De Med.* 23-24: Praeter haec, cum in interioribus partibus et dolores et morborum varia genera nascantur, neminem putant his adhibere posse remedia, qui ipsas ignoret. Ergo necessarium esse incidere corpora mortuorum, eorumque viscera atque intestina scrutari; longeque optime fecisse Herophilum et Erasistratum, qui nocentes homines a regibus ex carcere acceptos vivos inciderint, considerarintque etiamnum spiritu remanente ea, quae natura ante clausisset...

Post-Hellenistic period and the rise of medical sects

The anatomical record goes silent after the Hellenistic period. Correlated with the rise of medical Empiricism, anatomical interest appears to be reduced to doxography. In the 1st century CE, Celsus suggests that anatomical investigations are still a thing of the past and it is not until nearly Galen's own time that they see a resurgence, in the works of Rufus of Ephesus (late 1st century CE) and Marinus (2nd century CE about a generation before Galen). Heinrich von Staden has argued that the correlation between the rise of medical Empiricism and the decline in anatomical studies may even be causal, a result of Empiricist adherence to passive observation in medical contexts.⁵³ Regardless of the reasons for the decline, decline it did. However, when Galen comes on the scene in the middle of the second century anatomical arguments become a centerpiece for his engagement with the medical sects of his day and with his medical predecessors.

⁵³ von Staden (1975: 185-91)

Chapter Two: Intersection between Medical and Philosophical Sectarianism

This chapter will consider Galen's epistemological views with respect to medical knowledge. That is, it asks what constitutes medical knowledge for Galen, in particular what criteria he considered to be justificatory for epistemic medical claims. To that end, I will begin by considering the three schools of medicine whose epistemic claims Galen discusses at greatest length. Galen's criticisms of these three schools, the Dogmatists or Rationalists, the Empiricists, and the Methodists show a set of concerns, against which Galen's own epistemological views take shape. Second, I will outline Galen's overall arguments for the foundations of knowledge claims. Finally, I will lay out how Galen's commitment to empirical data, especially anatomical data, differed from contemporaneous views on evidentiary criteria for medical knowledge. As we shall see, Galen's approach to the question of what constituted justification of medical beliefs formed a substantive sea-change in the use of empirical evidence for medical knowledge.

THE RELATION OF GREEK MEDICINE AND PHILOSOPHY IN THE CLASSICAL PERIOD

Through the Classical period, it is difficult to separate Greek medicine from Greek philosophy. Traditionally, the emergence of Greek philosophy is tracked partly by its expression of a certain causal picture that attempts to explain the natural world. In fact, this is its main criterion of differentiation from other intellectual activities in the Classical period. Greek philosophy, on this account, begins with the disavowal of divine

or mythic causal explanations and a concomitant growth of interest in the investigation of natural or sub-lunar phenomena employing rational and empirical explanations.⁵⁴ It is for this reason (which of course does not exclude others) that the so-called Pre-Socratic philosophers are said both to give rise to and to occupy a distinct branch on the genealogical tree of Greek intellectual history.⁵⁵ Greek medicine follows similar suit; consequently, ancient Greek medicine is usually said, certainly too neatly,⁵⁶ to begin with Hippocrates and the Hippocratic corpus in the 5th century BCE.⁵⁷

This similarity between rationality as the main taxonomical criterion for both ancient Greek philosophy and ancient Greek medicine is not accidental, in part because philosophy and medicine were overlapping fields of study in the ancient Greek world.⁵⁸ One prominent theme among the more philosophical writers of the Hippocratic corpus, which is similar to the tendency for theorizing about the composition of the natural world that Aristotle claims underlies philosophical theories from the 6th and 5th centuries, is an interest in arriving at rational theories of how human beings are constituted (e.g., *De Vetere Medicina*, *De Natura Hominis*, *De Diaeta in Morbis Acutis*, *De Flatibus*, etc.). As

⁵⁴ See, for example, Kirk, Raven, and Schofield (1983: 7-8); Barnes (1979: 3-5)

⁵⁵ The term 'Pre-Socratic' is marked by being both misleading and entrenched. I use it for the latter reason.

⁵⁶ Other medical theorists, such as Alcmaeon of Croton, were certainly active in the early 5th century. Alcmaeon, preserved in Aetius (5, 30, 1= Alcmaeon DK 24B4), is the earliest surviving author to envision health as a matter of balance or equilibrium between opposites.

⁵⁷ For the overall context both of the messiness of this question and of the foundational role of the Hippocratic Corpus for Greek medicine, see (Nutton (2004: 37-71). On the Hippocratic question, Smith (1979) is still the benchmark.

⁵⁸ See Smith (1979), Longrigg (1993), Nutton (2004), *et passim*

Frede notes, from the 5th century onward "philosophers regarded human physiology and pathology as part of natural philosophy."⁵⁹

Beginning most obviously with Aristotle and gaining full steam in the Hellenistic period, a greater interest in the relation of medicine to empirical observation began to make its way into medico-philosophical discourse.⁶⁰ But, throughout the works of these authors, the notion persists that there is some theoretical picture underlying observable phenomena, from and to which one can make inferences with the proper tools.

As different versions of this theoretical picture blossomed, resistance arose to the very notion that health and illness had to be or even could be adequately explained in terms of some underlying theoretical scaffolding.⁶¹ The Empiricists, so-called because of their adherence to experience (ἐμπειρία) rather than theoretical accounts (λόγοι), rejected the notion that hidden entities (ἄδηλα) could be medically explanatory. This rejection was in virtue of the fact that they could not be observed directly and that for the Empiricists direct observation (αὐτοψία) or its adequately verified reports (ἱστορία) was a necessary condition for epistemic claims.⁶² Through their rejection of explanations that involved hidden or non-evident entities, an increasingly formal distinction between these two schools of thought, the Dogmatists and the Empiricists, took shape.

⁵⁹ Frede (1985: xx)

⁶⁰ This tendency is not absent in the Hippocratic corpus. It is, for example, present in *De Vetere Medicina*, *De Natura Hominis*, and *De Morbo Sacro*. I only mean that systematic treatment of the role of observation in philosophy and medicine only really takes flight under Aristotle and the Peripatos.

⁶¹ See, for example, Frede (1990: 229) on the role that mere plausibility had in the emergence of Empiricism.

⁶² See, for example, Celsus, *De Medicina* 27-28 on the incomprehensibility of hidden causes and nature more generally.

By the second century CE, physicians in the Greco-Roman world had come to distinguish themselves from one another generally on the basis of their commitments to just these sorts of broad views. And, by the time Galen comes onto the scene, the disagreements between these various sects or *haireseis* had become entrenched.

MEDICAL SECTS IN THE SECOND CENTURY

Greek medical sectarianism crystallized in the Hellenistic period along with the subsequent ramification of philosophy into schools or sects.⁶³ Although what precisely constituted a medical sect or *hairesis* is not entirely clear, a workable definition for my purposes is a group of practitioners or thinkers with a shared intellectual ideology, along the lines of Nutton's provisional description:

"[a]lmost always, however, the word 'sect' is best interpreted as a shared ideology rather than any official institution and hierarchy. But, as in philosophy, there was no easy means of securing adherence to the doctrine of every sect in every particular, and there were ample opportunities for individual interpretations of the words of one's distinguished predecessors."⁶⁴

⁶³ See, for example, von Staden (1982: 80-81). In particular p. 81, regarding naming conventions for the titles of works (themselves largely an Alexandrian innovation), "Unlike the medical *hairesis* tradition, however, the early philosophical usage is not associated with a substantial body of treatises called 'On *hairesis* x' or 'Against *hairesis* y.' This reinforces the impression that Greek medicine is the more significant early nurturing ground for *hairesis* as a doctrinal group designation. No later than the second century CE, however, *hairesis* also had become a standard term for philosophical 'school'- and for religious 'sect'..."

⁶⁴ Nutton (2004: 147). See also, von Staden (1982: 79-80), "The paucity of testimonia concerning the content of the Alexandrian *hairesis* literature unfortunately leaves us only vaguely informed about what qualifies a group for the label *hairesis* or what qualifies an individual for membership in a *hairesis*. But the evidence suggests that a group with fairly coherent and distinctive theories, with an acknowledged founder (*hairesi-arches*), and with publicly identifiable leaders who articulate (*a*) their rejection of rival theories through theoretically founded polemics, as well as (*b*) their own systematic alternatives, would qualify as a *hairesis*. Unanimity on *all* doctrinal questions is not a requirement..."

By the second century CE three medical sects (*haireseis*) dominated the medical landscape in Rome: the Dogmatists (δογματικοί) also frequently called the Rationalists (λογικοί),⁶⁵ the Empiricists (ἐμπειρικοί), and the Methodists (μεθοδικοί).⁶⁶ Our main witness to the actual therapeutic practice of these three sects is Galen though the joints along which he carves out distinctions between these sects are generally epistemological rather than practical. Various, he testifies to the similarities between competent Dogmatists and Empiricists with respect to treatment. For example, in his propaedeutic treatise on medical sects, *De Sectis*, he makes the following remarks,

They say that the dispute about non-evident things (ἄδηλα) is insoluble, not about the evident (φαινόμενα). For from this starting point each thing, when it becomes evident what sort of thing it is, argues on behalf of those who are telling the truth and refutes those who are not. Empiricists and Dogmatists disagree about innumerable things of this kind while providing the same treatment in the cases of the same illnesses (at least those who have been trained correctly in each sect).⁶⁷

Just as regularly, as in the passage from *De Sectis* above, he makes Dogmatist and Empiricist explanations of medical phenomena the central differentiating criterion that

⁶⁵ The term "Rationalist," with its emphasis on λόγος can be somewhat misleading and I tend to prefer to use the term "Dogmatist" for that reason. The term λογικοί does not arise because the Dogmatists either had or claimed to have exclusive rights to reasoning in their medical practice; rather, it appears to have arisen because their practice involved a *particular* kind of reasoning. They were associated with λόγος, in the sense that they were committed to inference from *a priori* claims about the natural world to treatment and diagnosis of disease. Other medical sects, of course, could and did have a rational method. See, e.g., Barnes (1991: 53 n. 13).

⁶⁶ See von Staden (1982: 77). Cf. Galen, *De Sectis*, I 64-65, 73; ps.-Galen, *De Optima Secta*, I 118; ps.-Galen, *Def. med.* XIX 353

⁶⁷ *De Sect.* I 79 ἀνεπίκριτον δὲ τὴν περὶ ἡ τῶν ἀδήλων ἀνομολογίαν εἶναί φασιν, οὐ τὴν περὶ τῶν φαινομένων. ἐνταῦθα γὰρ ἕκαστον φανέν οἷόν ἐστι μαρτυρεῖ μὲν τοῖς ἀληθεύουσιν, ἐξελέγχει δὲ τοὺς ψευδομένους. τοιαῦτα μυρία πρὸς ἀλλήλους ἀμφισβητοῦσιν ἐμπειρικοί τε καὶ δογματικοί τὴν αὐτὴν θεραπείαν ἐπὶ τῶν αὐτῶν παθῶν ποιούμενοι, ὅσοι γε νόμον καθ' ἑκατέραν τὴν αἵρεσιν ἡσκηγῆται. Cf. also *De Sect.* I. 72-4.

sets the sects at odds with one another and individuates them.⁶⁸ That is, the Empiricists and the Dogmatists had different and incompatible commitments to the justificatory role that so-called ἄδηλα or non-evident causes, entities, and structures could play in claims about medical knowledge. This epistemological conflict and the effects that it had on medical discovery, according to Galen, differentiated the competent Empiricist and the Dogmatist more than practical or observational differences regarding φαινόμενα or evident causes. According to Frede (1990: 225), for example, Empiricists distinguished themselves from Dogmatists in that,

they took the view that knowledge is just a matter of experience (in Greek *empeiria*), whereas the rationalists were so called since they assumed that mere experience, however complex, does not amount to knowledge, that knowledge crucially involves the use of reason (*logos* in Greek, *ratio* in Latin), for example to provide the appropriate kind of justification for our belief.⁶⁹

As Frede notes, shortly after this quotation, quite a bit rides on just what is meant here by reason or inference. The Empiricist did not wholly dismiss reasoned activity with respect to medical diagnosis and treatment. Clearly, any sort of diagnosis and choice of treatment involved some level of reasoned activity, although perhaps not unambiguously from an ancient Greek perspective. What Empiricists disagreed about, to varying degrees, was what sorts of reasoning were epistemically reliable. Low level, informal,⁷⁰ reasoning, and

⁶⁸ See especially *De Sect.* I 65, 96

⁶⁹ Frede (1990: 225)

⁷⁰ See *Comp.Med.Loc.* XIII 362; *Subfig.Emp.* 87, 27

in particular memory,⁷¹ which had bundled into itself a power to form empirical generalizations of the sort that could be congenial to Empiricist epistemology appear to have been generally acceptable to them. Reasoning, of the sort engaged in by Dogmatists, to and from non-evident causes, however, was at best suspect and at worst provided no epistemic warrant at all.⁷²

At the heart of this dispute lie differing commitments both to causal explanations and to non-evident structures or causes. Therefore, *a fortiori*, they differed in their commitments to the sorts of inferences, if any, one can be justified in making both to and from these structures. Galen develops this second point shortly before this passage from *De Sectis* above, where he also reiterates similarities in treatment,

And to speak generally, the Dogmatists and Empiricists use the same treatments for the same illnesses, while they disagree regarding the manner of their discovery (here εὑρεσις). Since, as far as the Dogmatists go, in cases of symptoms manifest in the body there is an indication (ἔνδειξις) of the cause (αἰτία), from which they find a therapy. On the other hand, as far as the Empiricists are concerned there is a reminder (ὑπόμνησις) of frequent and similar observations.⁷³

Galen here, probably oversimplifying the Empiricist position for the sake of emphasizing methodology over actual treatment, stresses the epistemological difference between

⁷¹ On the role of memory in Empiricist epistemology, see generally Frede (1990), the source of the quotation above.

⁷² This is perhaps overstated. See *Subfig. Emp.* 87, for some Empiricists that allow *prima facie* formal reasoning into medical practice (e.g., Heraclides of Tarentum and Menodotus, although the case of *epilogismos* is muddier).

⁷³ *Sec. Int.* I 73, καθόλου φάναι τὰς αὐτὰς ἐπὶ τῶν αὐτῶν παθῶν ἰάσεις οἷ τε δογματικοὶ καὶ οἱ ἐμπειρικοὶ παραλαμβάνουσι περὶ τοῦ τρόπου τῆς εὐρέσεως αὐτῶν ἀμφισβητοῦντες· ἐπὶ γὰρ τοῖς αὐτοῖς φαινομένοις κατὰ τὸ σῶμα συμπτώμασιν ἔνδειξις μὲν τῆς αἰτίας γίγνεται τοῖς δογματικοῖς, ἐξ ἧς τὴν θεραπείαν εὐρίσκουσιν, ὑπόμνησις δὲ τοῖς ἐμπειρικοῖς τῶν πλειστάκις καὶ ὡσαύτως τετηρημένων.

Empiricist approaches to what constitute evidentiary criteria for medical knowledge claims and Dogmatist notions of evidentiary criteria. In effect, this difference lies in the incompatibility between their analyses of how the correct treatment was to be found, the process of discovery (εὑρεσις), and in what terms illness was to be understood.

For the Empiricist, etiological explanations (αἰτία) or explanations that involved non-directly observable structures (ἄδηλα) were anathema.⁷⁴ Rather, the Empiricist depended on correlations (ὑπομνήσεις) between past and present evident phenomena. The Dogmatist on the other hand embraced causal explanations, unobservable structures, and indication (ἔνδειξις) or formal inference involving these sorts of structures.

Dogmatists

The Dogmatists (δογματικοί), also called Rationalists (λογικοί), are so named, Galen suggests, not on the grounds that they were especially good logicians⁷⁵ nor even because they are especially tied to logic⁷⁶ but because they subscribed to beliefs (δόγματα) about the natural world that involved items that were non-evident by nature.⁷⁷ As a preliminary sketch, one can say that the Dogmatists proceeded from the notion that health and disease were to be understood primarily in a theoretical framework of universal claims about the physical world or at least about human bodies. The Dogmatist

⁷⁴ Empiricists also considered "anatomical issues" ἀνατομία (i.e., issues of anatomy and dissection), for reasons that I will detail at greater length subsequently, as belonging to the class of explanations involving non-evidents on the grounds that one could not treat anatomical structures observed in dead bodies as being the same as those structures in live bodies. There are further ethical and operational points that I will discuss subsequently.

⁷⁵ Cf. *Praen.* XIV 605; *Pecc.Dig.* V 71

⁷⁶ See, e.g., *Ord.Lib.Prop.* XIX 52; *UP* III 837; *Pecc.Dig.* V 71; *et passim*

⁷⁷ Cf. Sextus, *PH* I. 13; Galen, *Sect.Int.* I 65; but see, *contra*, *Ars Med.* I 305-6. On the role of logic in medicine before Galen generally, see Barnes (1991: 50-54).

comes to a treatment plan by inference first to and then from certain intelligible but not necessarily observable truths about the nature of the world (e.g., that opposites treat opposites, that certain externals such as location or season were part of a contagion theory of disease, that nothing happens without a cause, etc.).⁷⁸

These claims express certain propositions about the natural world, to which Dogmatists believed one could infer from evident phenomena through a process called 'indication' or ἔνδειξις.⁷⁹ Once those propositions were apprehended, the Dogmatist could in turn deductively infer a treatment plan. In other words, the doctor would arrive at diagnostic facts about the patient and through indication then, in virtue of those facts, produce an effective treatment for the diagnosed illness.⁸⁰

SIGN INFERENCE: INDICATION AND *EPILOGISMOS*

Indication (ἔνδειξις), has its roots in Hellenistic epistemology, where it was a heuristic tool used to discover medically relevant facts and treatments. Indication, in this technical sense, is a sign-inference; that is, indication is an inference from some evident fact, a sign, to some non-evident fact, something ἄδηλον. A paradigmatic instance of this

⁷⁸ The Hippocratic corpus and the Galenic corpus are littered with examples of this notion that opposites cure opposites. See, e.g., *Loc. Hom.*, Galen *MM* X 102-4, 178, 650, 739, *et passim*; Galen often criticizes other doctors, particularly Methodists for failing to take into account circumstantial factors surrounding patients, such as location, season, age, etc. See Galen *PHP* V 389-90 *et passim*. Many of these diagnostically relevant circumstances take their root from the Hippocratic corpus, e.g., *De Aere Aquis et Locis*.

⁷⁹ These sets of examples, such as the environmental ones, as well as others such as the plethora of materially monistic accounts (if Aristotle is to be trusted), put a fine point on why indication could be suspect to Empiricists.

⁸⁰ In passing, it is important to mention that Dogmatists were not necessarily committed to the truth of the same set(s) of medical beliefs, although certain general beliefs are common to them (e.g., that one could infer to non-evident facts about the world on the basis of evident ones. See, for example, Galen *MM* X 17).

sort of inference is an inference from a fact X, that sweat comes out from inside of some body, to an unobservable fact Y, that the skin is porous, whose truth obtains in virtue of X. Consequently, indication picks out not only a kind of conditional but also the epistemic status of its relata, in particular its consequent. Indication is similar to *epilogismos*, which is a similar inferential move from some fact X to Y, where Y is rather another evident fact, although one not necessarily evident at the time.⁸¹

Sextus offers the most detailed surviving accounts of the epistemic status of these relata in *PH* 2.97-99, of which here 97-8,

According to the Dogmatists, of these facts, some are evident and some are not non-evident; and, of the non-evident some are wholly non-evident, some are non-evident at a certain time, and some are non-evident by nature. They also say that *a*) evident facts come from themselves to our knowledge, (e.g., that is daytime); and *b*) those things that are wholly non-evident, that they are what falls fundamentally beyond our understanding, (e.g., that the stars are numerically even); and *c*) those things that are non-evident at a certain time but have an evident nature are those that are non-evident at a certain time to us on account of external circumstances (e.g., for me now, the city of Athens); and *d*) those things that are non-evident by nature are those that have a nature that does not fall under our clear perception (e.g., intelligible pores). For, these are never apparent on their own but, if at all, they could be thought to be apprehended from other facts (e.g., from sweating or something of the sort).⁸²

⁸¹ For *epilogismos* see Sextus, *PH* 2.100-102; Galen *Sec.Int.* I. 78; *Subf.Emp.* 63, 69; Ps.-Galenus, *Def.Med.* XIX 354, *et passim*

⁸² *PH* 2.97-98, Τῶν πραγμάτων τοίνυν κατὰ τοὺς δογματικοὺς τὰ μὲν ἐστὶ πρόδηλα, τὰ δὲ ἄδηλα, καὶ τῶν ἀδήλων τὰ μὲν καθάπαξ ἄδηλα, τὰ δὲ πρὸς καιρὸν ἄδηλα, τὰ δὲ φύσει ἄδηλα. καὶ πρόδηλα μὲν εἶναι φασὶ τὰ ἐξ ἑαυτῶν εἰς γνώσιν ἡμῖν ἐρχόμενα, οἷόν ἐστι τὸ ἡμέραν εἶναι, καθάπαξ δὲ ἄδηλα, ἃ μὴ πέφυκεν εἰς τὴν ἡμετέραν πίπτειν κατάληψιν, ὡς τὸ ἀστέρους εἶναι τοὺς ἀστέρας, πρὸς καιρὸν δὲ ἄδηλα ἅπερ τὴν φύσιν ἔχοντα ἐναργῆ παρὰ τινος ἔξωθεν περιστάσεις κατὰ καιρὸν ἡμῖν ἀδηλεῖται, ὡς ἐμοὶ νῦν ἢ τῶν Ἀθηναίων πόλις, φύσει δὲ ἄδηλα τὰ μὴ ἔχοντα φύσιν ὑπὸ τὴν ἡμετέραν πίπτειν ἐνάργειαν, ὡς οἱ νοητοὶ πόροι· οὗτοι γὰρ οὐδέποτε ἐξ ἑαυτῶν φαίνονται, ἀλλ' εἰ ἄρα, ἐξ ἐτέρων καταλαμβάνεσθαι ἂν νομισθεῖεν, οἷον τῶν ἰδρώτων ἢ τινος παρα πλυσίου.

The two main classes of Sextus' division are into things that are evident to perception and things that are non-evident to perception. Of the second class, he further subdivides these non-evidents into facts that are in no way apprehensible, non-evidents that can otherwise be evident, and the class of non-evidents that is of concern in the debate regarding sign inference between the Empiricists and the Dogmatists (i.e. those non-evident by nature); it is from this methodological commitment to deduction from claims about particulars to non-evident truths that the Dogmatists come also to be known as Rationalists (λογικοί) because of their commitment to an underlying explanatory account (λόγος).⁸³

As a technical term for Galen, "indication" refers to an inferential move from some evident feature of a particular to non-evident features of the class to which the particular belongs, a move that is made without the need of experience. Galen defines therapeutic indication at *MM* X. 126, "[w]e say that indication, so to speak, is a reflection of the consequence. The consequent is also discovered by testing, but not so as to be reflected in the antecedent. And, for this reason, none of the Empiricists says that anything is reflected in anything else."⁸⁴ As a qualification of this sort of definition Galen adds, at *MM* X. 127, "accordingly, the one who sets out to discover what follows from the very nature of the matter, without experience, is making the discovery through indication."⁸⁵ The inferential move is more one from (a) the nature or essence of a particular (ἐξ αὐτῆς τῆς τοῦ πράγματος φύσεως) to (b) a non-evident feature of

⁸³ See n.65, on the potential pitfalls of this association.

⁸⁴ *MM* X 126, τὴν γὰρ οἷον ἔμφασιν τῆς ἀκολουθίας ἔνδειξιν λέγομεν. εὐρίσκεται μὲν καὶ τῆς πείρας τὸ ἀκόλουθον, ἀλλ' οὐχ ὡς ἐμφαινόμενον τῷ ἡγουμένῳ. καὶ διὰ τοῦτο τῶν ἐμπειρικών οὐδεὶς ἐμφαίνεσθαι φησι τῷδε τινὶ τόδε τι.

⁸⁵ *MM* X 127: τὸν τοίνυν ἐξ αὐτῆς τῆς τοῦ πράγματος φύσεως ὁρμώμενον ἐξευρίσκειν τὸ ἀκόλουθον ἄνευ τῆς πείρας ἐνδείξει τὴν εὕρεσιν ἔστι πεποιησθαι.

particulars in that class.⁸⁶ A common example of this sort of inference regards porosity of the human body. From the evident fact, for example, that some particular person is sweating (really the generic fact that people do sweat), the Dogmatist might infer through indication that as a consequence of this generic truth about human beings, that human bodies are porous, a consequence that is itself non-evident.

The Empiricists, on the other hand, resisted certain generalizations about the physical world. They proceeded from the notion that health and disease could only safely be construed in terms of particular instances of disease. They determined the class of disease on the basis of observational similarity rather than some essential definition, which more than likely would have appealed to non-evidents. The Empiricists denied that one could do more than class these diseases as presenting similarly. Generalizations that did not exclusively refer to direct observations were outside the purview of Empirical medicine.⁸⁷ Diseases fell under the same category only insofar as they were the similarly and directly observed. Consequently, the effective Empiricist physician adhered to a regimen of treatment based exclusively on firsthand experience and a canon of case histories.

Crucially, the Empiricist is not engaged in induction, at least not in any formal sense of induction.⁸⁸ The aforementioned inferential move, called *epilogismos*, is still an

⁸⁶ See De Lacy (1991: 293)

⁸⁷ See Frede (1982), Frede (1990)

⁸⁸ I do not intend to use 'induction' here tendentiously. I mean it in a formal sense rather than the sense in which Frede reasonably attaches certain rational activities to memory on the Empiricist account. For example, Frede (1990: 226) regarding how a doctor comes to gain empirical knowledge, "But to assume this is not yet to assume that reason plays no role in our coming to have this kind of experience and the general belief which goes with it. And even less is it to assume that reason never plays a role in our coming

inference from an evident fact (X) to another evident fact (Y). It is just the case that (Y) happens not to be evident *at the time*. For example, consider the case of smoke and fire, where some Empiricists will allow the epilogistic move on the grounds that one has seen a sufficient number of instances of smoke correlated with fire to make the inferential move from the former to the latter in a case where the fire is not apparent, at that moment.

Nonetheless, for the Empiricist, theoretical commitments involving naturally non-evident facts and, in particular, causal explanations were largely seen as a liability. At least for the hardline Empiricist, reference to or inference from things that could not be directly observed were to be wholly eschewed.⁸⁹ And at that, the Empiricist would require certain restrictions on the degree of formality allowed in inference. Experience and case histories provided the physician with a wealth of *comparanda* to which a given particular case could be compared. Upon finding a sufficiently similar case or cluster of cases, the physician would infer that whatever treatments were successful in those cases would likely be successful in the case at hand. This process of *epilogismos* was associative (sometimes ἐπιλογισμός was opposed to ἀναλογισμός, a synonym for indication in the sense of inference to hidden conditions)⁹⁰ and unlike indication purported to rely on no propositional claims involving non-directly observed entities.

to have this kind of experience and the corresponding general belief. To claim this seems to presuppose a particular conception of reason which is different from ours, a conception on which it is not true by definition that anything we would call 'inference' or 'reasoning' will be a function of reason. It rather seems to be a view which attributes some or all functions of reason, to the extent that it recognises them, to memory."

⁸⁹ Cf. Galen *Subfig. Emp.* 82; *Med. Exp.* 95

⁹⁰ See Frede (1990: 232-3)

That is *epilogismos* generates a certain type of knowledge by acquaintance.⁹¹ It could not and did not purport to reveal propositional truths about theoretical entities or even the natural world, on the grounds that knowledge does not range over these sorts of things but only over evident phenomena.⁹²

Empiricists

Our principle sources for medical Empiricism are, as in the case of the Methodists, Galen himself as well as the first century CE Roman author, Celsus, in the preface to his *De medicina*. Besides the references to Empiricism and Empiric doctors scattered throughout his corpus, two Galenic treatises survive whose stated subject is the Empirical school, *De experientia medica* and *Subfiguratio empirica*. Both have been lost in Galen's original Greek; *Subfiguratio empirica* is extant only in the peculiar word for word translation of Niccolò da Reggio while *De experientia medica* survives only in its Arabic translation, both medieval.⁹³ In addition to these, we have Galen's short introductory treatise on the medical sects prominent in his day, *De sectis ad eos qui introducuntur*, in the actual Greek.⁹⁴

⁹¹ Frede (1990: 226)

⁹² See *Sect.Int.* I 77-9; *Subf.Emp.* 7, 8, 63-4, 68-9; *Med.Exp.* 24-5, 29, 135-8, 148-9

⁹³ Niccolò da Reggio was a 14th century Italian physician whose hyper-literal method of translation is sometimes difficult to construe, it so faithfully reproduces its Greek sources that backtranslations to the original from his versions are not only possible but have been attempted.

⁹⁴ All three works, in translation, are collected in Frede (1985), *Three Treatises on The Nature of Science*.

Origins and the Roots of *Haireseis*

Beginning with the Peripatetics in the mid 4th century BCE, there is increasing evidence for doxographical writing about a variety of intellectual disciplines.⁹⁵ In one sense, the emergence of doxographical writing parallels the emergence and succession (διαδοχαί) of heads of schools in the more formal sense, such as the Lyceum and the Academy. In the Hellenistic period, however, the Greek world saw a proliferation or, more precisely, an articulation of medical and philosophical disciplines into a spectrum of schools of thought or sects (*haireseis*).⁹⁶ And, it is in the context of (if not as the impetus for) this Hellenistic ramification that the Empiricists are generally seen to have emerged as a distinct medical movement.⁹⁷

The founder of the Empiricist school is said to have been a student of Herophilus', Philinus of Cos (and sometimes his own student Serapion of Alexandria), some time in the late 3d century BCE. Sadly, none of Philinus' writing survives. Serapion, when not considered the founder as such, is often credited with introducing the "tripod" (τριποῦς), which made a tripartite division of Empiric heuristic methods into (a) eye-witness accounts (αὐτοψία), (b) case histories that could when necessary substitute for those accounts (ἱστορία), and (c) the most tendentious of Empiric heuristic devices, the so-

⁹⁵ A tendency towards doxographical writing can be seen clearly in the prefaces to many of Aristotle's works (e.g., *De Anim.* 1.2, *Phys.* 1.2, and *Meta.* A.3-6). Theophrastus and Eudemus author some of the earliest explicitly doxographical works, on the history of natural philosophers and mathematicians respectively.

⁹⁶ See Nutton (1975), von Staden (1982)

⁹⁷ I do not here engage in discussion on what the precise delimitations of ancient medical and philosophical *haireseis* were. For my purposes, it is necessary only to mention when the doxographical record distinguishes Empiricists as a distinct and nameable group of medical practitioners and theorists.

called "transition from a similar case" (μετάβασις ἀπὸ τοῦ ὁμοίου), more commonly known as transition "to a similar".

The generically empirical characteristics of the school, though, have roots in medicine as early as the 5th century in Alcmaeon of Croton,⁹⁸ the Hippocratic treatise, *On Ancient Medicine* (*De vetere medicina*), and the 4th century rough contemporary of Aristotle, Diocles of Carystus. Near the inception of Greek medicine or at least the inception of its record, the question of the importance of empirical data to treatment is present. Consider the aforementioned Hippocratic treatise *VM*, where the author admonishes the less empirically minded practitioner of medicine,

Certain doctors and sophists say that it is not possible for someone to understand medicine who does not know what a human being is; rather, [they say] that it is necessary that the one who is going to treat human being correctly understand this [what it is to be a human being]. Their argument veers toward philosophy just as Empedocles and the others who, from the beginning, have written about nature: what a human being is and how he first came to be and how he is structured. But I believe that whatever has been said or written about nature by a sophist or a doctor is more germane to writing than to the art of medicine. And, I think that there is no way to know anything clear about nature except from medicine. And it is possible to understand this when one has correctly grasped the whole of medicine. Prior to this, it seems to me to be missing a lot (i.e.,

⁹⁸ Alcmaeon of Croton, for example, is said to have been the first to discover the optic nerve and was a proponent of dissection or at least of empirical investigation; both these claims are attested in Theophrastus' *de Sensibus* 26 = *DK* 24A5. See the discussion earlier in the first chapter of this dissertation. For Alcmaeon's concerns about the limit of human understanding see, for example, Diogenes Laertius, VIII, 83 = *DK* 24B1: Alcmaeon of Croton, son of Peirithous, said these things to Brontinus, Leon, and Bathyllus, "regarding what is not manifest, the gods have clarity about mortal things, but to judge from signs belongs to men" and the following things" (<Ἀλκμαίων Κροτωνιήτης τάδε ἔλεξε Πειρίθων υἱὸς Βροτίνῳ καὶ Λέοντι καὶ Βαθύλλῳ· περὶ τῶν ἀφανέων, περὶ τῶν θνητῶν σαφήνειαν μὲν θεοὶ ἔχοντι, ὥς δὲ ἄνθρωποις τεκμαίρεσθαι> καὶ τὰ ἑξῆς.). Here Alcmaeon contrasts the epistemic clarity (σαφήνειαν) of the gods with the inferential constraints placed on mortals (τεκμαίρεσθαι). In passing, given my mention of Alcmaeon's anatomical interests, it is worth noting a distinction between *empirical* tendencies, which I mean to suggest here, and *Empirical* tendencies, which I do not mean to suggest. This concern over the limits of human knowledge runs counter to the majority of pre-Socratics (see Longrigg 1993:51) although Cf. Xenophanes' own concerns regarding the restrictions of human knowledge.

this search to know precisely what a human being is and how a human being has come about, etc.).⁹⁹

Here, the author of *VM* contrasts two bases for epistemic claims about medicine and the natural world. The first set of claims about medicine is grounded in a general account of the natural world without recourse to the experience of practicing physicians. This objection to overly theoretical accounts, while only implied at the beginning of the passage, is made explicit toward the end, certainly by τοῦτο δὲ, οἷόν τε καταμαθεῖν, ὅταν αὐτέην τις τὴν ἱητρικὴν ὀρθῶς πᾶσαν περιλάβῃ. The warrant for the epistemic claims of *physiologoi*, such as Empedocles, contrasts with the warrant by which practicing doctors make epistemic claims precisely in the causal relationship between theory and experience. These former, sophisticated doctors, distanced with the use of the indefinite τίνες, mistakenly base their claims to knowledge on an account of the natural world from which they derive medical practice rather than basing both their claims to knowledge and their accounts of the natural world on the practice of medicine, that is in the experience of the practicing physician.

That the appeal to empiricism in *VM* is not like later Empiricism is clear in the closing lines of the quotation, where the author writes that knowledge of these non-

⁹⁹ *VM* 20.1-13, Λέγουσι δὲ τινες καὶ ἱητροὶ καὶ σοφισταὶ ὥς οὐκ ἔνι δυνατόν ἱητρικὴν εἰδέναι ὅστις μὴ οἶδεν ὅ τί ἐστιν ἄνθρωπος· ἀλλὰ τοῦτο δεῖ καταμαθεῖν τὸν μέλλοντα ὀρθῶς θεραπεύσειν τοὺς ἀνθρώπους. Τείνει δὲ αὐτέοισιν ὁ λόγος ἐς φιλοσοφίην, καθάπερ Ἐμπεδοκλῆς ἢ ἄλλοι οἱ περὶ φύσιος γεγράφασιν ἐξ ἀρχῆς ὅ τί ἐστιν ἄνθρωπος, καὶ ὅπως ἐγένετο πρῶτον καὶ ὅπως ξυνεπάγη. Ἐγὼ δὲ τουτέων μὲν ὅσα τινὲς εἰρηται σοφιστῇ ἢ ἱητρῷ, ἢ γέγραπται περὶ φύσιος, ἥσσον νομίζω τῇ ἱητρικῇ τέχνῃ προσήκειν ἢ τῇ γραφικῇ. Νομίζω δὲ περὶ φύσιος γινώσκειν τι σαφὲς οὐδαμῶθεν ἄλλοθεν εἶναι ἢ ἐξ ἱητρικῆς. Τοῦτο δὲ, οἷόν τε καταμαθεῖν, ὅταν αὐτέην τις τὴν ἱητρικὴν ὀρθῶς πᾶσαν περιλάβῃ· μέχρι δὲ τουτέου πολλοῦ μοι δοκεῖ δεινὸν λέγω δὲ τὴν ἱστορίην ταύτην εἰδέναι ἄνθρωπος τί ἐστι, καὶ δι' οἷας αἰτίας γίνεται, καὶ τᾶλλα ἀκριβέως.

evident structures may well be possible but only if theories of these sorts are grounded in the right sorts of empirical warrant, namely the practice of medicine (for which see both the quotation above and the preceding line, νομίζω δὲ περὶ φύσιος γινῶναι τι σαφὲς οὐδαμῶθεν ἄλλοθεν εἶναι ἢ ἐξ ἱητρικῆς.).

In the fourth century, Aristotle and his rough contemporary, Diocles of Carystus reveal that the appeal to empiricism in *VM* was not a flash in the pan.¹⁰⁰ I will say more on Aristotle's views of empirical data with regard to knowledge claims later but, at present, it is worth considering Diocles, who echoes some of the views on explanation also present in the Aristotelian account of explanation of first principles in his *Posterior Analytics*. As with most of the other fragmentary medical authors I have and will mention, this fragment of Diocles' is preserved in Galen.

Galen begins his treatise *On the Powers of Foodstuffs* (*Alim.Fac.*) with a brief doxography, in the Aristotelian style, of foods and, in particular, the questions of how and why certain foods affect the body in different ways. The introduction ranges from a compressed discussion of the relative value of deductive explanation to inductive explanations and, finally, the question of whether observations or theoretical concerns are more important with respect to the effects of food on the body.¹⁰¹ In this context, Galen

¹⁰⁰ On Diocles of Carystus, see the discussion earlier in the first chapter. See also van der Eijk (2001), which collects all of the known fragments with commentary. For Diocles' views, in particular the complicated issue of his dates and the resultant relationship of his ideas to Aristotle, see specifically the introductory pgs. xxi-xxxvii.

¹⁰¹ *Alim.Fac.* VI 453-4: So, it is reasonable that most of the finest physicians were keen to examine the powers of food carefully, some saying that these were known to them from experience alone, others who wanted to use reason as well, and even certain others who reckoned that reason was most important of all (εἰκότως οὖν ἐσπούδασαν οἱ πλείστοι τῶν ἀρίστων ἱατρῶν ἀκριβῶς ἐπισκέψασθαι τὰς ἐν αὐτῇ

invokes Diocles as a voice in the debate on whether experience or reason should be the guide in foods and, by extension, in matters of medical explanation,

Diocles, even though a Dogmatist, wrote the following in the first book of his treatise *On Health to Pleistarchus*, ... "Those who suppose it is necessary in each case to cite the reason why something is nutritious, why it is a laxative, a diuretic, or some other such thing, seem to be unaware: first that for practical purposes this sort of thing is frequently unnecessary; second, that many things that exist in some respects seem, by their nature, like certain first principles, so as not to admit of a causal explanation. Additionally, some go wrong when after taking as given things that are unknown, not agreed upon, or not credible, they think they have given an adequate explanation. While it is not necessary to pay attention to people who etymologize in this way or to those who suppose that it is necessary to give an explanation for everything, it is necessary rather to rely on things that have become known from lengthy experience. And, it is necessary to examine the explanation of what admits of one when it is likely that, because of this, what is said will become better understood and credible.¹⁰²

To readers of Aristotle, Diocles' discussion of first principles as explanatorily atomic should be familiar (e.g., *Post An.* 2 and *passim*). For Diocles certain things in the world, such as food, are like these first principles, ἀρχαί, in that they do not admit of causal

δυνάμεις, οἱ μὲν ἐκ τῆς πείρας ἰ μόνης ἐγνώσθαι σφισι φάσκοντες αὐτάς, οἱ δὲ καὶ λογισμῷ προσχρῆσθαι βουλόμενοι, τινὲς δὲ καὶ τὸ πλεῖστον αὐτῷ νέμοντες).

¹⁰² *Alim.Fac.* VI 456: <Διοκλῆς> δὲ καίτοι δογματικὸς ὢν οὕτω κατὰ λέξιν ἔγραψεν ἐν τῷ πρώτῳ τῶν πρὸς Πλείσταρχον Ὑγιεινῶν· αἰτίαν δ' οἱ μὲν οἰόμενοι δεῖν ἐφ' ἐκάστου λέγειν, δι' ἣν τρόφιμον ἢ διαχωρητικὸν ἢ οὐρητικὸν ἢ ἄλλο τι τῶν τοιούτων ἕκαστόν ἐστιν, ἀγνοεῖν εἰκότασι πρῶτον μὲν, ὅτι πρὸς τὰς χρήσεις οὐ πολλάκις τὸ τοιοῦτον ἀναγκαῖόν ἐστιν, ἐπειθ' ὅτι πολλὰ τῶν ὄντων τρόπον τινὰ ἀρχαῖς τισιν ἔοικε κατὰ φύσιν, ὥστε μὴ παραδέχεσθαι τὸν ὑπὲρ αἰτίου λόγον· πρὸς δὲ τούτοις διαμαρτάνουσιν ἐνίοτε, ὅταν ἀγνοούμενα καὶ μὴ ὁμολογούμενα καὶ ἀπίθανα λαμβάνοντες ἱκανῶς οἶωνται λέγειν τὴν αἰτίαν. τοῖς μὲν οὖν οὕτως αἰτιολογοῦσι καὶ τοῖς πάντων οἰομένοις δεῖν λέγειν αἰτίαν οὐ δεῖ προσέχειν, πιστεύειν δὲ μάλλον τοῖς ἐκ τῆς πείρας ἐκ πολλοῦ χρόνου κατανεοημένοις· αἰτίαν δὲ τῶν ἐνδεχομένων δεῖ ζητεῖν, ὅταν μέλλῃ παρ' αὐτὸ τοῦτο γνωριμώτερον ἢ πιστότερον γίνεσθαι τὸ λεγόμενον.

accounts.¹⁰³ Medically, this notion that certain principles are explanatorily atomic reflects empiricist concerns with respect to how the medical practitioner must engage with these otherwise unexplainable items in the world (and later Empiricist concerns that these explanations are even possible). For those things that do not admit of an explanatory account, the physician should not only resist the urge to provide an etiology but should disregard those who do; rather, the physician should rely wholly on well-established experience (πιστεύειν δὲ μᾶλλον τοῖς ἐκ τῆς πείρας ἐκ πολλοῦ χρόνου κατανενοημένοις). Furthermore, for Diocles even when a causal account is possible, it is not always desirable, a sentiment which stands as an early indication of a difference between expressions of theoretical and practical ends in medicine.

These two passages, from the Hippocratic corpus and from Diocles, nearly spanning the breadth of the classical period, reveal perhaps unsurprisingly that although later Empiricists were in large part reacting to a dominant, primarily theoretical, strand of medical practice or exposition throughout the classical period, the questions regarding the possibility or improbability of adequately explaining the natural world that ultimately drove them to establish themselves as a medical sect had roots that reached far into their medical past.

¹⁰³ For a short discussion both of this passage and of this issue, of Diocles' deeper doubts, relative to Aristotle, regarding the possibility of adequate explanations for things in the world, aside from first principles, which are primitive, see Hankinson (1995: 61-3)

The Rise of Medical Sectarianism

While this passage of Diocles suggests a view of medical epistemology that merely places limits on the possibility or practicality of theoretical knowledge in certain cases, the earlier account in *VM* flatly privileged empirical evidence over "accounts" λόγοι. This emphasis on empirical data, however, was neither strongly sustained in subsequent literature nor, although it nodded to part of the Empiricist's program, did it fully anticipate sectarian Empiricism. In fact, von Staden (1982) has argued that the emergence of medical *haireseis* and what he terms "Alexandrian *hairesis* literature" is contemporaneous with and intimately linked to the birth of the Empiricists as a sect in the third century BCE.¹⁰⁴ On von Staden's construal, it is precisely through the example and terms set by Serapion in his *Ad Sectas* that both the Empiricists and the Dogmatists/Rationalists take shape as distinct medical *haireseis*,

By the end of the pre-Christian era the Alexandrian Empiricists and Herophileans therefore had identified themselves or their beliefs- and each other- as distinct *haireseis* and had produced a sizeable corpus of '*hairesis* literature', the main impetus for which continued to be derived from the sharp conflict between the two schools.¹⁰⁵

¹⁰⁴ Von Staden (1982: 78), although it is worth keeping in mind the already growing doxographic tendencies of Peripatetic authors and the influence of schools whose heads had already begun to have successors. It is difficult, though, to make a case either way on the basis of exact chronologies, since all these events were occurring nearly contemporaneously in the late 4th and early 3d centuries BCE.

¹⁰⁵ Von Staden (1982: 79). Cf. *ibid.* p. 78, where von Staden elaborates this point, "[T]he plural *haireseis* [in Serapion's title], probably refers to what later was lumped together as the 'rationalist' or 'dogmatist *haireseis*'. Later Empiricists, perhaps taking their cue from the philosophical Sceptics, labeled all non-Empiricists 'Rationalists' or 'Dogmatists'; but here the plural perhaps still concedes considerable diversity within 'non-Empiricism'- a diversity which later becomes at least partially obscured by the popular but distorting and misleading notion of a single 'Rationalist' *hairesis*. While one cannot exclude the possibility that Serapion used *hairesis* to refer to something other than the distinctive collections of beliefs that characterize certain groups, subsequent uses of the term within the Empiricist 'school'- and, for that matter, in other medical *haireseis*- render this unlikely. There were enough groups to provide Serapion with a plural target: Herophileans, Erasistrateans, Praxagoras and his pupils, and so on."

This conflict, to which von Staden points, is ultimately both a methodological and epistemological one.¹⁰⁶ The Empiricist school, whose core beliefs were more homogeneous than the groups of medical practitioners and writers captured under the more catchall term 'Dogmatist' or 'Rationalist,' took shape in part as a disavowal of two long-standing methodological tendencies in Greek philosophy and medicine.¹⁰⁷ Without lingering on the point this claim should not be taken as excluding all intra-doctrinal disagreements. As I mentioned earlier, the use of 'transition from the similar' (ἡ ἀπὸ τοῦ ὁμοίου μετάβασις τῷ ὁμοίῳ), for example, was a source of methodological contention among Empiricists, on which more shortly.

Before the schism of the Empiricists with the Herophileans, whether the line begins with Philinus of Cos or Serapion of Alexandria, one can trace a marked tendency among Greek philosophers and physicians generally to (a) posit non-evident or non-observable explanatory structures (again the Empiricist's ἄδηλα) in the natural world, both *to* and *from* which one could make inferences and also to (b) privilege those inferences over empirical data (or perhaps it is better to say, not to use that empirical data as a *sine qua non* for those inferences).¹⁰⁸

That is not to say that empirical data were wholly absent from theories propounded by philosophers and medical writers before the Empiricists. In fact, many of

¹⁰⁶ This is not to ignore other considerations that set the Dogmatists apart from the Empiricists, for example, the tension between the growing interest of the Dogmatists to inquire into the nature (φύσις) of the body, health, and illness and of the Empiricists to inquire primarily into what therapies would simply cure the illnesses to which the patients were prone. Differences between therapeutic aims are not, however, a main focus of this paper.

¹⁰⁷ See Frede (1985), Frede (1990), Nutton (2004)

¹⁰⁸ Cf., *Pecc.Dig.* V 66; *Lib.Prop.* XIX 39-40; *et passim*

these inferences to so-called hidden explanatory structures in the world took observations as their starting point, which is not surprising given the importance of evident signs even to indication. Those empirical data, however, were often not an appreciable index of verification for the theories they had inspired.¹⁰⁹ To that extent, empirical data did not tend to play a vital role in the verification of the principles inferred from them. It is in large part against these two positions, (a) and (b), that the Empiricists defined themselves.

Writing in the first century CE, the encyclopedist Celsus offers the following account both of the emergence of Empiricism and an introduction to some of its concerns,

[T]hose who call themselves Empiricists, paronymously from "experience," embrace certain evident causes as necessary. They argue that inquiry into truly hidden causes and natural processes is useless on the grounds that nature is not intelligible. That nature cannot, in fact, be known is patent from the disagreement of those who argue about these issues, since on this matter there is no agreement either among the professors of philosophy or among physicians themselves. Why indeed should someone believe more in Hippocrates than in Herophilus? Why more in this guy than in Asclepiades? If someone wants to follow doctrines, the doctrines of all of them can seem plausible. If [someone wants to follow] treatments, sick people have been brought back to health by all of them.¹¹⁰

¹⁰⁹ See especially Galen's complaints about physicians who ignore available empirical data, as in the aforementioned *Pecc.Dig.* V 66.

¹¹⁰ Celsus, *De Med.* 1.27-9, Contra ii, qui se Empiricos ab experientia nominant, euidentes quidem causas ut necessarias amplectuntur: obscurarum uero causarum et naturalium actionum quaestionem ideo superuacuum esse contendunt, quoniam non comprehensibilis natura sit. Non posse uero comprehendere patere ex eorum, qui de his disputarunt, discordia, cum de ista re neque inter sapientiae professores, neque inter ipsos medicos conueniat. Cur enim potius aliquis Hippocrati credat quam Herophilo? cur huic potius quam Asclepiadi? Si rationes sequi uelit, omnium posse uideri non improbabiles; si curationes, ab omnibus his aegros perductos esse ad sanitatem.

The Empiricists took shape in opposition to what they perceived as a unifying thread running through the epistemological commitments of what could often be an otherwise variegated set of medico-philosophical beliefs and methodologies, in the passage above ranging from Hippocrates to Herophilus and Asclepiades. Revolting against what they saw as an impossible or at least unverifiable interest in so-called hidden causes, Empiricists introduced the terms 'Dogmatist' or 'Rationalist' to pick out other practitioners of medicine in virtue of a narrow set of epistemological commitments.¹¹¹ As a consequence, the terms can run the risk of eliding the many differences between the other beliefs held by those groups of practitioners. 'Dogmatist' and 'Rationalist' pick out a wide range of otherwise heterogeneous schools, while 'Empiricist' or 'Empirical' picks out practitioners in virtue of a single, albeit a major difference in commitment to both the limits of knowledge and the types of warrant that justify it.

Roughly speaking, then, medical Empiricism appears to have arisen as a response to a growing dissatisfaction with the proliferation of theories about the natural world, in particular theories about the human body and human physiology along with the theories on the attendant issues of health and illness. The theorists who held views with regard to non-evident or unobservable features of the world, the Empiricists, and the subsequent doxographical record, called 'Dogmatists' or 'Rationalists'.

The Empiricist's formation as a reaction to this more traditional view in Greek medicine (and certainly in Greek philosophy), namely that underlying and hidden features of the natural world were more primary than *phainomena*, is perhaps explanatory

¹¹¹ On this point, see for example, Tecusan (2004: 7-8)

of their greater internal homogeneity. A version of this view, which I am calling traditional, can be encapsulated in Aristotle's common and pithy distinction between what is logically prior (and therefore more intelligible in one sense) and what is phenomenally prior (and therefore less intelligible although more familiar).¹¹² This distinction takes as its point of difference the point of reference. For Aristotle, propositional knowledge about the world was more intelligible *as such* in that it expressed universal truths about the natural world, while our experience with particulars, on which this propositional content piggybacked, was more accessible *prima facie* to the observer.

I choose Aristotle's view as an example because it is on the whole rather congenial to the role that observation or experience (ἐμπειρία) plays in the acquisition of knowledge. Yet, it still cleaves to the notion that non-evident structures are the principles on which knowledge of the natural world rests. Furthermore, despite the role of experience in knowledge acquisition, it is crucial that the knowledge in question (νοῦς certainly) is still knowledge of first principles (as opposed to ἐπιστήμη that is generally knowledge derived from first principles).

First principles, in the sense that they are non-evident are, themselves, not directly observable through sensation, even if on Aristotle's account they are *apprehended* through νοῦς by way of perception.¹¹³ Moreover, although perhaps less objectionable to the Empiricist, empirical data on this construal does not supply warrant for knowledge

¹¹² For this Aristotelian distinction see *Post.An.*, 71b33; *Nic. Eth.*, 1095b2-4, *et passim*

¹¹³ The issue of ἐπαγωγή in Aristotle is a vexed one. Regardless, the question of whether or not ἐπαγωγή is to be taken as 'induction' or something distinct is not directly relevant to my argument, which is just that even the Empiricists' more empirically minded predecessors did not eschew knowledge of non-evident structures and propositional knowledge of them. For a summation of the controversy and recent bibliography see Barnes (1994:259-271).

claims about those first principles; rather, universals on Aristotle's account are in a sense bundled up in perception. They are already bound up in the observer's observation.¹¹⁴

At any rate, according to Aristotle, although *phainomena* are epistemically and experientially prior to the underlying (and hidden) structures of the natural world, those underlying and hidden structures are logically prior and more knowable than the *phainomena* they undergird.¹¹⁵ Although Aristotle allowed for experience (ἐμπειρία) to serve as a springboard toward knowledge of certain universal truths, it was those truths toward which one should be directed.¹¹⁶

Although Empiricists did differ with regard to the degree to which they admitted theoretical entities and forms of formal inference to their medical theories (on this point, more shortly), they were united in favor of the notion that, in principle, theoretical entities and formal inferences were at best impossible to verify (and so did not offer sufficient warrant for knowledge claims) and at worst detrimental to the pursuit of medicine. Medical Empiricism was a rejection of this view that *phainomena* must be in a

¹¹⁴ Experience (ἐμπειρία) explains how one acquires knowledge of first principle but does not clearly serve as justification for knowledge of them (see *Post.An.* 72b19-24, 76a16-37). Rather, it is through retention of experiences that knowledge of first principles takes hold in the mind.

¹¹⁵ See, for example, *PA* 640a13-16: It seems that we must first begin, even about generation, just as I said earlier first we must take the phenomena around each kind, then we must talk about their causes (Ἔοικε δ' ἐντεῦθεν ἀρκτέον εἶναι, καθάπερ καὶ πρότερον εἵπομεν, ὅτι πρῶτον τὰ φαινόμενα ληπτέον περὶ ἕκαστον γένος, εἴθ' οὕτω τὰς αἰτίας τούτων λεκτέον καὶ περὶ γενέσεως).

¹¹⁶ Cf. *PA* 1.5: Of those things which are, however many exist by nature [we say that] there are (a) those that have neither generation nor destruction at any time and (b) those that are subject to generation and destruction. It so happens that about the former, although they are divine and honorable, we have very few observations (since the things we can investigate about them and the things we can know about them that are apparent to sensation are really very few), while about the latter, those things that are ephemeral (i.e., plants and animals) we have plenty of information for our understanding, since we live along side them (Τῶν οὐσιῶν ὅσαι φύσει συνεστᾶσι, τὰς μὲν ἀγενήτους καὶ ἀφθάρτους εἶναι τὸν ἅπαντα αἰῶνα, τὰς δὲ μετέχειν γενέσεως καὶ φθορᾶς. Συμβέβηκε δὲ περὶ μὲν ἐκείνας τιμίας οὐσας καὶ θείας ἐλάττους ἡμῖν ὑπάρχειν θεωρίας (καὶ γὰρ ἐξ ὧν ἂν τις σκέψαιτο περὶ αὐτῶν, καὶ περὶ ὧν εἰδέναι ποθοῦμεν, παντελῶς ἐστὶν ὀλίγα τὰ φανερά κατὰ τὴν αἴσθησιν), περὶ δὲ τῶν φθαρτῶν φυτῶν τε καὶ ζώων εὐποροῦμεν μᾶλλον πρὸς τὴν γνῶσιν διὰ τὸ σύντροφον).

sense posterior to the hidden features of the world underlying them. Since this view, on the Empiricist's construal, could not be known it was at best immaterial to medical practice.

In response to what they saw as a certain theoretical promiscuity, the Empiricists jettisoned the causal theories of the Dogmatists from their own approach to medicine and adhered, as far as they could, to a practice based solely on observation. They argued that, from a therapeutic perspective, the various and varied theories of non-Empiricist physicians made little difference to the outcome of medical cases.¹¹⁷ Furthermore, from an epistemological perspective, they denied that theories involving appeals to non-evident entities could either be verified or known. And, in what appears to have been at root a desire to provide for a criterion by which to discount certain theories, they forewent etiological theories about the natural world *tout court*.

Hidden features of the world (*adēla*)

As mentioned above, a rejection of the intelligibility or at least the diagnostic utility of unobservable features of the world (ἄδηλα) is a central if not *the* central concern unifying Empiricist objections to so-called Dogmatist theories of the natural world. This rejection of unobservable features has antecedents in much earlier medical writing. As early as the Hippocratic treatise *On Ancient Medicine* (*De vetere medicina*), for example,

¹¹⁷ Although not an Empiricist, see for example Polybius *Hist.* 12,25d for suspicion about the efficacy of Dogmatist theoretical claims.

However many have taken a hand to speak or write about medicine, having established a *hypothesis* (ὑπόθεσιν) for their account, either heat or cold or wet or dry or whatever else they want, reducing their principle of explanation (τὴν ἀρχὴν τῆς αἰτίας) for the diseases and death of human beings and laying down the same one or two principles in every case are clearly wrong in much of what they say. And it is especially appropriate to chastise them because they are wrong about a discipline that already exists, which everyone uses in the most important circumstances and whose good practioners and craftsmen everyone honors.¹¹⁸

Peira and Empeiria

Without appeal to non-evident structures in the world, the Empiricist is at pains to justify the choice of one therapeutic plan over another or any therapy at all. They address this issue by appealing to medical experience or test in a loose sense (πεῖρα).¹¹⁹ Experience, for the Empiricists, consisted of two and sometimes three separate heuristic tools *autopsia* (αὐτοψία), *historia* (ἱστορία), and 'transition from the similar' (ἡ τοῦ ὁμοίου μετάβασις). This last tool bears on a point that Galen critically presses Empiricists on generally. Given the stress that Empiricists placed on previous direct observations and reliable reports of others' direct observations, how was the Empiricist to treat cases of illness that were qualitatively different or even significantly different from what was recorded in case histories or what formed part of the physicians personal

¹¹⁸ VM 1.1-6: Ὅκοσοι ἐπεχείρησαν περὶ ἰητρικῆς λέγειν ἢ γράφειν, ὑπόθεσιν σφίσιν αὐτέοισιν ὑποθέμενοι τῷ λόγῳ θερμὸν ἢ ψυχρὸν ἢ ὑγρὸν ἢ ξηρὸν ἢ ἄλλ' ὃ τι ἂν ἐθέλωσιν, ἐς βραχὺ ἄγοντες τὴν ἀρχὴν τῆς αἰτίας τοῖσιν ἀνθρώποισι τῶν νούσων τε καὶ τοῦ θανάτου, καὶ πᾶσι τὴν αὐτέην ἐν ἡ δὺο προθέμενοι, ἐν πολλοῖσι μὲν καὶ οἷσι λέγουσι καταφανέες εἶσιν ἀμαρτάνοντες· μάλιστα δὲ ἄξιον μέμψασθαι, ὅτι ἀμφὶ τέχνης ἐούσης ἢ χρέονταί τε πάντες ἐπὶ τοῖσι μεγίστοις καὶ τιμῶσι μάλιστα τοὺς ἀγαθοὺς χειροτέχνας καὶ δημιουργοὺς.

¹¹⁹ In this context, experience (πεῖρα), of course, evokes the distinction between experience and technical knowledge (τεχνή) made as early as the Classical period by Plato in the *Gorgias*. On the limits of experience, see also Plato, *Meno* 97A-D. The association of each with social class is also present.

experiences? Is the Empiricist not hobbled with respect to the discovery of either treatments for previously unknown diseases or of substantially new treatments for old ones? Galen, for example, cites the cupping glass as an example of such a discovery in *On the Affected Parts*,

So that I may say something in response to the Empiricists, it really isn't possible to discover any of these sorts of therapies [i.e., ones for rare or new diseases] from experience. A man burning up with a very hot fever may find relief every once in a while after taking a desperate drink of cold water. But, this provides the physician a principle of imitation without any rational indication. But the application of the cupping glass did not have a chance development, but arose wholly from rational indication; and neither could the cupping glass itself ever have come about by chance nor, even if someone conceded this point, could it ever have been stuck on someone's head by happenstance, especially in the case of a rare illness.¹²⁰

Transition to a similar case from another is the mechanism by which the Empiricist can at least attempt to answer Galen's objection regarding new or rare diseases.¹²¹ Quite a bit of the epistemological difference between the Empiricist and Galen (as well as the Dogmatists) rides on how the Empiricist cashes out similarity and analyzes the process by which a physician comes to transition from one case to a similar one.

This is not to say, however, that Galen considered Empiricists to be ineffective. We have already seen how it is that Empiricist therapies could be just as effective as the

¹²⁰ *Loc. Aff.* VIII 154-5, οὐδὲ γὰρ ἐκ πείρας, ἵνα τι καὶ πρὸς τοὺς ἐμπειρικοὺς εἶπω, τῶν τοιούτων εὐρησθαι τι δύναται· καυσούμενος μὲν γὰρ ἄνθρωπος ἐν πυρετῷ διακαεῖ ψυχρὸν ὕδωρ ὑπ' ἀκρασίας προσενεγκάμενος ὦνητο μὲν αὐτός ποτε, μμήσεως δ' ἀρχὴν ἰατροῖς παρέσχευεν ἄνευ λογικῆς ἐνδείξεως· ἡ δὲ τῆς σικύας πρόσθεσις οὐδεμίαν ἔχει περίπτωσιν ἡγουμένην, ἀλλ' ἐκ λογικῆς ἐνδείξεως ἅπαντα γέγονεν, μήτ' αὐτῆς ποτε δυναμένης τῆς σικύας αὐτομάτως γεννηθῆναι μήτ', εἰ καὶ τοῦτο τις συγχωρήσειε, κολληθῆναι ποτε τῇ κεφαλῇ κατὰ περίπτωσιν, καὶ μάλιστα ἐπὶ πάθους σπανίου.

¹²¹ See also *Loc. Aff.* VIII 371, where Galen reiterates this challenge to the discovery of treatments to rare or completely unknown illnesses.

best the Dogmatists had to offer. And, in fact, Galen embraces the Empiricists' common complaint about Dogmatist theorizing, namely, that it can lack a basis in observational fact. Galen's sympathies with each of these sects cannot be said, though, to extend to the Methodists, for whom he reserves nothing but contempt and vitriol.¹²²

¹²² On Galen's rhetoric against Methodist doctors, see Nutton (1991: 1-25) and cf. the introduction to Tecusan (2004).

METHODISTS

It has to be said that it is very difficult to determine, with any certainty, what the precise epistemological commitments of the Methodists were. It is known that the sect was not only very popular in Galen's time but also maintained this popularity for some time afterward.¹²³ In fact, Methodism was and continued to be a countervailing school of medical practice that rivaled Galenic medicine from its inception through the early medieval period, at least in the west.¹²⁴ The popularity of the sect, however, is disguised by the paucity of records left by its practitioners.¹²⁵

Evidence for Methodist theories of disease and therapy

Besides Soranus of Ephesus (*fl.* early-mid 2nd cent. CE) and Caelius Aurelianus (*fl.* 5th cent. CE) no extant treatises by Methodist doctors appear to have survived the ravages of history. The vestiges may be even more faded than this, as there is doubt about the exact relationship of Caelius' extant treatises *Celeres passiones* and *Tardae passiones* to Soranus' *Acute* and *Chronic Diseases* (περὶ ὀξείων νοσημάτων and περὶ χρόνιων νοσημάτων). Caelius is generally thought either to be translating or heavily basing his own work on Soranus'.¹²⁶ Consequently, extant Methodism may very well reduce to one

¹²³ See Nutton (2004:188). Galen singles out contemporary Methodists for rebuke such as Statilius Atticus, Marcus Modius Asiaticus, Julian, et al. Caelius Aurelianus, whatever his exact dates, is evidence that Methodism was still a viable school of medicine as late as the sixth century CE.

¹²⁴ Nutton (2004:188)

¹²⁵ See Tecusan (2004:1), "Methodist cures became popular, Methodist ideas influential, yet Methodist medicine was perceived as a threat to the established tradition. The Methodists achieved fame at the cost of an extremely bad press: if they revolutionised medicine, they were certainly silenced by their rivals. For it looks as if the main obstacle to our knowledge resided in their own originality and success."

¹²⁶ See van der Eijk (1999a: 414-428 and 415-6, n.85) and (1999b: 47-56)

author, Soranus, whose opinion is both late and not necessarily representative of the school as a whole.

In addition to the exiguous nature of extant Methodism, there is a further problem with respect to the provenance of the non-Soranic scraps that survive. Although recently Tecusan (2004) has collected the surviving testimonia¹²⁷ about Methodist doctors outside Soranus, a problem of the provenance of these testimonia to the Methodists as well as any potential fragments persists.¹²⁸ Her collection shows that the extant testimonia and fragments are mostly found in the writing of a single source, Galen, who is emphatically not impartial. By her own reckoning, two-thirds of the material on ancient Methodism in Tecusan (2004), which is currently the only compendium of its sort, is culled from the pages of Galen.¹²⁹ Since these testimonia are filtered primarily through this single lens, points of comparison through which to chart or even mitigate Galen's bias are difficult at best. Consequently, our view of Methodism is largely Galen's view of Methodism. And, given the silence of Methodists themselves we must rely on those authors whose bias ranges from the extreme distaste of Pliny and Galen to the muted disapproval of Celsus.¹³⁰

¹²⁷ Tecusan, herself, appears to use the word "fragment" in place of the more usual "testimonium". That is, her volume is a collection of extant testimonia and perhaps some fragments of the Methodist sect. She is explicit in her introduction that her criterion for inclusion in this volume is simply explicit reference to Methodism or Methodists, Tecusan (2004: 21-5).

¹²⁸ At the time of this dissertation's writing, the second and third volumes of Tecusan's work on Methodist fragments have not been published. The second volume is a commentary on the fragments found in the first while the third volume will contain the extant fragments of Soranus.

¹²⁹ Tecusan (2004: 3)

¹³⁰ See Tecusan (2004:1), "[Methodism] looks familiar to us today, but what is known of it makes it extremely remote. The sense of familiarity is due to authors like Celsus or Pliny, or above all Galen, who was intensely preoccupied with Methodism and mentioned it extremely often. But such authors were

Origins and Genealogy

As with other things having to do with the Methodists, the origins of the sect are as obscure to modern scholars as they were to their ancient counterparts.¹³¹ Its roots lie in the corpuscular theory of Asclepiades of Bithynia, now reported only through tendentious sources and often at multiple removes.¹³² Generally, Asclepiades is thought to have been active some time in the first century BCE, although he is difficult to place precisely.¹³³ For our purposes, it is enough to say that he was active some time in the early to mid first century.¹³⁴ So, one can say that the mid first century is a *terminus post quem* for the beginning of Methodism's story.

Galen and the surviving mentions of Asclepiades in Methodist authors are in agreement that the latter was a source for early Methodism although not its founder.¹³⁵ And, even discounting the reputation that Methodists had for heavily criticizing one

equally intensely inimical to it, and the positive information to be sifted from their abuse is disappointingly meagre."

¹³¹ Tecusan (2004) contains all of the available testimonia to date. See also Pigeaud (1991: 7-50), Hankinson (1991: 144-145), Frede (1987b: 1-23), Lloyd (1983: 182-200), and Edelstein (1967: 173-91)

¹³² See, e.g., Galen *MM* X 268-9; 268 for the explicit claim that they are derivative of Asclepiades: Now, this is typical of their stupidity, deriving from the theory of Asclepiades, just as the rest of their beliefs do... (νυνὶ δὲ, τῆς γὰρ τούτων ἐμπληξίας ἐστὶν οἰκείον, ἀπὸ τῆς Ἀσκληπιάδου γεγεννημένον ὑποθέσεως, ὥσπερ καὶ τὰλλα αὐτῶν δόγματα...). See also Vallance (1990:131-143).

¹³³ There is some confusion regarding Asclepiades' dates. See Nutton (2004: 167). Cicero mentions him in *De Oratore*, the setting of which is in 91 BCE, but not again in his letters. If Asclepiades is already established by 91 BCE, it is difficult to follow the succession from Asclepiades to Themison to Thessalus in the mid first century CE. Alternately, if he continued to be active into the 70s-50s BCE, the gap is manageably small.

¹³⁴ Although, and in vein of disagreements regarding Asclepiades' dates, see Rawson (1982), who argues that Asclepiades must have already been dead by the dramatic date of *De Oratore*, making him active in the late second century BCE and perhaps the very early first century.

¹³⁵ See, e.g., Galen, *Caus.Morb.* VII 1-2, 32-33; *Plenitudine* VII 514-15; *SMT* XII 783. Caelius Aurelianus *De morbis acutis* 1.155, 2.52, 3.29; *De morbis chronicis* 1.48, 1.50; see (1990: 131)

another and their own intellectual forbears,¹³⁶ which is consistent with the self-reporting that survives of Soranus and Caelius, the Methodists did not see Asclepiades as one of their own.¹³⁷

Themison (*fl.* first cent. BCE), allegedly a pupil of Asclepiades, is the first known Methodist.¹³⁸ Celsus already distances Methodism of his own time, the first century CE, from the beliefs of Themison.¹³⁹ An uncomfortably large gap separates Themison from Thessalus of Tralles (*fl.* first cent. CE), whom Celsus does not even mention. Galen credits this Thessalus with the foundation of the Methodist school.¹⁴⁰ Soranus of Ephesus, whose *Gynaecia* is mentioned above, comes on to the scene some time at the end of the first century CE (his death is normally placed in the late 130s CE, a short while after the birth of Galen). It is only as late as Soranus that enough material survives to get a sense, even if a potentially unrepresentative one, of what ancient Methodism may have looked like from the inside.

Since Galen is so monolithic a source for Methodism, it is not clear whether Thessalus' approach to medicine was typical of Methodism in general or on its fringes. It is necessary to be cautious when posing the question of what was typical or characteristic of Methodist practice and theory, as it is clear that Methodism was not as homogenous as

¹³⁶ What van der Eijk calls a "constant process of critical revision", van der Eijk (1999: 399). For a list of contemporary as well as some ancient sources for this claim, see van der Eijk (1999: 398, n. 3)

¹³⁷ See, e.g., Soranus *Gyn.* 3.4, regarding Asclepiades' view on the elements and on causation; *Gyn.* 3.29, regarding Asclepiades' treatment of hysteria, where Soranus approaches Galenic derision of other physicians, especially notable are Asclepiades and Hippocrates; *Gyn.* 3.43 not only on his treatment of flux but also on the irrelevance of his diagnostic method.

¹³⁸ For Themison, see Moog (1995) and Tecusan (2004)

¹³⁹ See Nutton (2004:189)

¹⁴⁰ See *MM* X 50-51 *et passim*

Galen might have us believe, although Galen's picture of the Methodists is even more tendentious than that of the Empiricists.¹⁴¹ This caution is underscored by the frequency with which Galen will point up internal disputes between Methodist writers when it suits his rhetorical purposes to do so. Indeed, Soranus reviled Asclepiades and like Celsus considered Themison,¹⁴² who was, beside Thessalus, another possible candidate for the foundation of the sect, to be a closet Asclepiadean.¹⁴³

The picture drawn by Galen and echoed in the anonymous author of *Introductio seu Medicus* claims that Thessalus furthered the doctrines of his own teacher Themison, who had himself broken from Asclepiades earlier.¹⁴⁴ All of the foregoing is to return to this theme of obscurity and emphasize that the doxographical footing surrounding early Methodism is historical quicksand.

Epistemological Commitments

With that caveat already in mind, one must proceed cautiously for a further reason. The Methodists appear primarily as bugaboos in Galen's accounts of them. Galen's criticisms of them are legion. And so it becomes more difficult to say what their therapeutic practice may have been. In *De Sectis*, Galen comes to his explanation of how the Methodists differ from both the Dogmatist and Empiricist sects,

¹⁴¹ See, e.g., Vallance (1990: 132)

¹⁴² Soranus has sharp words for Themison shortly after voicing his disapproval of Asclepiades at *Gyn.* 3.24 and again at 3.42.

¹⁴³ *De morbis acutis* 1.155, 2.232, 3.29; *De morbis chronicis* 1.48, *passim*

¹⁴⁴ *Int.* IV, 684; *MM* X 52-5. For Asclepiades' influence on and relation to Methodism see Frede (1985: xxix) and Vallance (1990: 141)

And the so-called Methodists, for so they named themselves, as though their Dogmatist antecedents did not claim to practice the art with any method, seem to me not only to disagree with the ancient sects as far as their account goes but even so far as to many of the practices of medicine. Indeed, they say that the affected part has no relevance to indication of treatment (nor the cause, nor age, nor season, nor location, nor an examination of the strength, constitution, or disposition of the sick person).¹⁴⁵

For Galen, while the Dogmatists and Empiricists differ primarily with regard to their epistemological claims, they still prescribe similar treatments. The Methodists not only abided by a different understanding of medical knowledge, they also eschewed effective practice. Of course, this last claim is striking given the popularity of the Methodists in the Roman world. And when Galen's account is compared to their surviving medical texts, the Methodists seem far less absurd and far less homogeneous¹⁴⁶ than their Galenic treatment would suggest. This inconsistency argues for a bias on Galen's part, since he is equally content to ridicule their internal disagreements as he is to point up their failed and, in this context, settled doctrines.¹⁴⁷

¹⁴⁵ *Sect.Int.* I 79, Οἱ δὲ μεθοδικοὶ καλούμενοι, οὕτω γὰρ ἑαυτοὺς ὠνόμασαν, ὥσπερ οὐχὶ καὶ τῶν ἔμπροσθεν δογματικῶν μεθόδῳ τὴν τέχνην μεταχειρίσασθαι φασκόντων, οὐ μέγρι λόγου μοι δοκοῦσι ταῖς παλαιαῖς ἀμφισβητεῖν αἰρέσεσιν, ἀλλ' ἤδη καὶ τῶν ἔργων τῆς τέχνης πολλὰ μετακοσμεῖν, οἳ γ' οὔτε τόπον πεπονθότα χρήσιμον οὐδὲν ἔχειν φασὶν εἰς θεραπείας ἔνδειξιν οὔτ' αἰτίαν οὔθ' ἡλικίαν οὔθ' ὥραν οὔτε χῶραν οὔτε τοῦ νοσοῦντος τῆς δυνάμεως τὴν ἐπίσκειψιν ἢ τῆς φύσεως ἢ τῆς ἔξεως αὐτοῦ.

¹⁴⁶ Even a cursory look through Soranus' *Gynaecia* or Caelius' *Tardes passiones* and *Celeres passiones* reveals, through their criticisms of other Methodists, the heterogeneity of Methodist thought regarding treatment and classification; that is to say nothing of Galen's pervasive accusations of internal inconsistency among Methodists and Celsus' own observations to the same effect in the second and first centuries CE respectively. Whether Galen or Celsus are fair witnesses is beside the point. At a minimum they confirm the non-doctrinaire tendencies of our extant texts.

¹⁴⁷ Cf., however, Galen's position expressed in *MM* X 125: Whence, I suppose, arose also the conflict, not insignificant, for their [sc. Thessalus, Asclepiades] followers. In every way, they are at loggerheads about both about the concept of affections as well as their existence. (ὅθεν, οἶμαι, καὶ πόλεμος οὐ μικρὸς τοῖς

The Place of The Methodists in the Sectarian Debate

The Methodist sect appears to have emerged partly in response to both the Dogmatist and Empiricist sects.¹⁴⁸ It eschewed the theoretical elaboration of the Dogmatists while demanding greater theoretical underpinnings for its medical claims than the Empiricists.¹⁴⁹ Since Galen, too, attempts to provide a *media via* between these two sects, the Methodists were natural rivals for Galenic medicine.

Galen, however, restricts his criticisms to their practice and their conception of medical epistemology. The specifics of this epistemology are obscure, though, as both Soranus and Caelius remain largely silent on Methodist beliefs regarding medical knowledge; that is, they do not attempt to give explicit accounts of their epistemological beliefs. Soranus, Caelius, and Methodist critics all allude to general notions of Methodist epistemology that, at least in broad strokes, clearly must have played a foundational role in their approach to Medical epistemic claims. The so-called commonalities, the κοινότητες, the notion of stricture, flux, and the denial both of certain empirical data as well as certain theoretical data are common, for example.¹⁵⁰

Their silence is perhaps due to an expectation of familiarity with Methodist epistemology on the part of the reader. It is equally if not more plausible, however, that Methodist authors, such as Soranus, do not consider the theoretical underpinnings of Methodist practice to be terribly important to their readership. In support of this second

ἀπ' αὐτῶν ἐγένετο κατὰ τε ἄλλα πάντα διενεχθεῖσι καὶ περὶ τῆς τῶν παθῶν ἐννοίας τε καὶ ὑπάρξεως.)

¹⁴⁸ See, e.g., Frede (1982:2)

¹⁴⁹ See Celsus *De Med.* 62; Ps.-Gal. *Opt.Sect.* I 119-131, *et passim*

¹⁵⁰ See, e.g., Celsus *De Med.* 54-55; Soranus *Gyn.* 1.29.3

possibility consider, for example, the closing lines to Soranus' *Gyn.* 1.2, "Since natural philosophy (τὸ φυσικόν) is not useful for our ends, although it is a nice bauble for a learned work, I have excluded it here, keeping for now only to necessary matters."¹⁵¹ This is not to say, however, that these two explanations, an expectation of the reader's familiarity with the outlines of the theoretical background of Methodism as well as a lack of concern for that theoretical background, are mutually exclusive.

Of a piece with the relative lack of importance that Soranus places on theoretical knowledge, Methodist attitudes toward the fundamentals of medical education focused on practical matters. If Galen's accounts are any indication, the pupil was not expected to undergo a time-consuming curriculum and the Methodists were even reputed to have believed that all of medicine could be learned in six months.¹⁵² According to Galen, Methodists took pride in turning the Hippocratic maxim, *ars longa, vita brevis* on its head,¹⁵³

And they rebuke anyone who says, "life is short but the art is long", since quite the contrary, "the entire art is short, and life is long". For if everything falsely assumed is taken away to help the craft and we put an eye to the commonalities (κοινότηας) alone, medicine will no longer be long nor difficult but quick and clear; and, the whole business can be known in six months.¹⁵⁴

¹⁵¹ Soranus *Gyn.* 1.2, τὸν μὲν οὖν φυσικὸν ἄχρηστον ὄντα πρὸς τὸ τέλος, φερέκοσμον δὲ πρὸς χρηστομάθειαν, κεχωρίκαμεν ἐντεῦθεν, μόνον πρὸς τὸ παρὸν ἐχόμενοι τῶν ἀναγκαίων.

¹⁵² See *Dig.Puls.* VIII 770, *MM X* 781, 927

¹⁵³ On parallels between Methodists avowal of shortcuts to medicine and similar philosophical stance (i.e., Cynics) see Barnes (1991: 60 n. 37)

¹⁵⁴ *Sect.Int.* 82.29-83: καὶ τῷ γε βραχὺν [εἶναι] εἰπόντι τὸν βίον, τὴν δὲ τέχνην μακρὰν ἐπιτιμῶσι· τοῦναντίον γὰρ ἅπαν αὐτὴν μὲν βραχεῖαν εἶναι, τὸν δὲ βίον μακρόν. Ἀφαιρεθέντων γὰρ πάντων τῶν ψευδῶς ὑπειλημμένων τὴν τέχνην ὠφελεῖν καὶ πρὸς μόνας τὰς κοινότηας ἀποβλεπόντων ἡμῶν, οὔτε μακρὰν ἔτι τὴν ἰατρικὴν οὔτε χαλεπὴν εἶναι, ῥάστην δὲ καὶ σαφὴ, καὶ μῆσιν ἕξ ὅλην [τάχιστα] γνωσθῆναι δυναμένην.

With Galen's emphasis on the proper and extensive education¹⁵⁵ necessary for medical competence, this emphasis on practicality alone did and must have galled him.¹⁵⁶ The Methodist sect was bound to offend Galen's sensibilities both as a champion of philosophical medicine and as an agitator for the conversion of medicine at Rome to an elite practice, both points that Frede (1982) makes in passing,

Methodism had a great success in Rome. Nevertheless, the aggressive way it was propounded by Thessalus could not but offend the more traditionally minded doctors. When Hippocrates had said that life is short and art long, Thessalus claimed that life was long and art short, a matter of six months. This was a deliberate affront not only to all those who venerated Hippocrates but also to all those who, like Galen, prided themselves on their long and no doubt expensive medical training. It seems fairly clear that Methodism was also felt and presumably meant to be a social threat: a clear medical doctrine to be learned in six months, even by slaves and the poor, who had not the education to master the secrets of philosophy, mathematics, and the whole of learned medical tradition going all the way back to Hippocrates.¹⁵⁷

Galen's outrage and his need to persuade his readership that his attitude toward medicine was far and away superior to the Methodist attitude, however, plays a central role in the preservation of Methodism in his corpus (or at least a version of it) and what appear to be the massive distortions this image of Methodism appear to have suffered at his hands.

It is necessary, then, to tease out what is possible from Galen's reports as well as from what few fragments remain. To that end, I turn to the roots of what we are told Methodism is, which begin with Asclepiades of Bithynia.

¹⁵⁵ For Galen's insistence on lengthy and rigorous study, see, e.g., *Opt.Med.* I 59; *CAM* I 244; *Nat.Fac.* II 179-80; *PHP* V 222, 732-3, 783; *MM* X 39-40; *Pecc.Dig.* V 61-83; *et passim*.

¹⁵⁶ Consider also that Galen frequently places himself, in Aristotelian style, at the head of a long tradition in medicine hearkening back to Hippocrates himself. Given the Methodists' lack of interest in traditional medicine, this too must have galled Galen. Cf., for example, *MM* X 5, 309, 346.

¹⁵⁷ Frede (1982: xxx-xxxi)

Methodist Forerunners, Asclepiades and Corpuscular Theorists

At the root of the Methodist approach to medicine is a corpuscular theory of disease derived ultimately from Asclepiades of Bithynia. Asclepiades appears to have believed that the body consisted of certain particles (ἄναρμοι ὄγκοι), whose nature is itself a matter of some controversy,¹⁵⁸ as well as pores (πόροι).¹⁵⁹ To be healthy, on his account, was just to have free movement of these particles through corporal pores; illness was a result of pores being overly constricted or overly loose and therefore affecting the movement of these particles adversely. Since the cause of illness was the relative stricture of the pores, working to counteract any imbalance in the pores relative to the size of the corresponding particles was a necessary and sufficient condition for restoring the body to health.

Asclepiades' corpuscular theory was itself reminiscent of other ancient theorists who believed in variations on this particular theme: Leucippus, Democritus, and Epicurus all spring to mind. Given the present work's scope, however, it is impossible to do more than briefly mention earlier corpuscular theorists as a background for some other

¹⁵⁸ Briefly, it is not clear what ἄναρμοι ὄγκοι means precisely. They were frangible and so unlike the eponymous ἄτομα of the atomists, precisely in the respect most characteristic of them. Consequently, Asclepiades' ὄγκοι cannot be taken to be quantitatively atomic even if they are in some way qualitatively atomic. Regarding ἄναρμοι, Vallance gives a host of philological reasons for interpreting the adjective as meaning something breakable or in a sense 'disjointed,' into fragments such as θαύσματα for example (see Vallance (1990: 40-42).

¹⁵⁹ For a longer discussion of the nature of Asclepiadean particles, ἄναρμοι ὄγκοι, and the difficulty in determining what precisely they were thought to be, see Vallance (1990): 7-43.

conflicts Galen was fated to have with the Methodists. In particular, atomism was associated with a non-teleological view of the world.¹⁶⁰

Additionally, a corpuscular theory occupied the same functional role in physiology as the traditional Hippocratic humoral theory. That is, both a corpuscular view and a humoral view see health through the lens of some kind of biological balance, on the humoral view a balance whose equilibrium when thrown off-kilter accounts for illness in the body and on the corpuscular view, a balance between stricture and the relative size of the corpuscles passing through them account for the same thing.¹⁶¹

This bare bones account of Asclepiades' theory is intended both to flesh out some of the details of the physiology that Methodists would later commit themselves to as well as to prompt a question: assuming the Methodist's lack of interest in theoretical issues, causation, and commitment issues with unseen biological processes (ἄδηλα), how could Methodists use Asclepiades' corpuscular theory as a starting-point for their own views?

What can be said of Methodist Medical Beliefs

Two core beliefs appear consistently both in what survives of Methodist authors and even in non-Methodists commenting on them: first, the notion that diseases in general shared a certain very limited set of features, whose treatment was sufficient to

¹⁶⁰ See, e.g., Diogenes Laertius 9.31= DK 67A1; Hippolytus *Ref.* 1.13.2= DK 68A40; Simplicius *De Caelo* 242.21= DK 67A14; Galen, *Nat.Fac.* II 26-30; *et passim*

¹⁶¹ See Vallance (1990:10). On this point, it is not necessary for my purposes, to discuss most of the particular differences between Asclepiades' corpuscles and Abderite atoms in too much detail (e.g., frangibility and indivisibility respectively). It is only necessary to show that, at its deepest root, Methodism was anathema to Galen.

cure the patient of his illness.¹⁶² Second, these limited sets of features were classed into three rough categories that took their contours from differing relations between pores (ποροί) and the corpuscles passing through them, arising from some kind of corpuscular theory, likely a version of Asclepiades'.¹⁶³

The Methodists called these classes of shared features κοινότητες, often translated 'commonalities' or 'communities'; these commonalities were divided into three types, running along an axis of relative constriction and taking their structure from a corpuscular analysis of the body: stricture (στέγνωσις), looseness or flux (ῥοώδες or ῥύσις), and a third state (ἐμπλοκή) compounded of the first two states occurring variously in the body.¹⁶⁴

These corpuscles, pores, and consequently those states that are relations between them present a stumbling block for reconstructing a coherent Methodist epistemology. Both corpuscles and pores are paradigm cases of non-evident entities, ἄδηλα, to which Methodists are in principle opposed. Sextus Empiricus, to take an example, includes pores in his list of stereotypically un-experiencable entities in *Adversus Mathematicos*,¹⁶⁵ "Naturally non-evident entities are those which are always hidden and unable to fall

¹⁶² See Vallance (1990: 132)

¹⁶³ An objection that Galen brings to bear often against the Methodists is the paradigmatic status of pores as instances of non-evident (ἄδηλα) features of the world. Their pedigree was indeed old, and is found as early as the Hellenistic period. It is unclear what the Methodist response to this objection might have been, short of either claiming that they were only heuristically committed to something like pores and not ontologically committed to them or claiming that pores were somehow evident to sensation.

¹⁶⁴ See Celsus *De med.* 1.54-5; Soranus *Gyn.* 1.29.3

¹⁶⁵ Pores are part of a larger discussion in Sextus on intelligible entities and the signs by which non-skeptical thinkers, such as the dogmatists, explain inference from those signs. See, *Math.* 8.145-158. Also, *PH* 2.98, 140. For the larger issue of non-evident entities and indication through sign, see Hankinson (1998: 232-233).

under our perception, as for example the intelligible pores and the infinite void thought to be outside the cosmos by certain physical theorists."¹⁶⁶ What then would a Methodist respond to objections that the two bases of their physiology conflict with the epistemological demands they place on medical theory?

There are no extant sources that contain an explanation or justification for these states of relative constriction, which is perhaps due to the inclination among Methodists to avoid any professional affiliation with robustly articulated medical theories even if privately cleaving to a more elaborated theory. It was enough to recognize an imbalance with respect to constriction. That is, for the Methodists, the proof was in the pudding. Any further explanation, as Vallance notes, lay outside the purview of what was relevant to medical *practice*, which was after all the ambit of medicine.¹⁶⁷

It is likely, however, that relative constriction played a role in the Methodist view of illness due to the connection, mentioned earlier, with the corpuscular theory of Asclepiades and, if Galen is to be trusted, Epicureans, and other corpuscular theorists;¹⁶⁸ but, given Galen's efforts to equate Methodists with Epicureans it is difficult to say what the exact relationship may have been.

¹⁶⁶ Sextus Empiricus *Math.* 8.146: φύσει δὲ ἦν ἄδηλα τὰ δι' αἰῶνος ἀποκεκρυμμένα καὶ μὴ δυνάμενα ὑπὸ τὴν ἡμετέραν πεσεῖν ἐνάργειαν, καθάπερ οἱ νοητοὶ πόροι καὶ τὸ ἀξιούμενον ἐκτὸς εἶναι τοῦ κόσμου τισὶ φθισικοῖς ἄπειρον κενόν.

¹⁶⁷ Vallance (1990: 132)

¹⁶⁸ Cf. *Nat.Fac.* II 38-56 and especially 51-52 for a comparison of Epicureans and Asclepiadeans, in which Galen argues that the two sects reject one another effectively. In particular, that Epicureans state the observable facts well but cannot give any reasons for the theories they derive from them, while Asclepiadeans (although Asclepiades has effectively shown the inconsistencies in Epicurus' overall corpuscular theory) fail either to present a plausible theoretical picture or account for the facts.

On that point, Vallance has argued that the connection between the particles of the Methodists, insofar as they were those of their predecessor Asclepiades, and Epicurean atoms is passing or, more likely, adventitious.¹⁶⁹ That is, while both Asclepiades and atomists were material monists, in that they believed that bodies were made up of a single kind of stuff, Asclepiades was not committed (and could not be) to the further constraints that Epicureans and Democriteans placed on the structure of their underlying stuffs, namely indivisibility. In that vein, Vallance emphasizes the frangibility of Asclepiades' *ἄναρτοι ὄγκοι* as distinct from the indivisible particles that populate Epicurean and Abderite accounts of material composition. While Epicurean and Abderite atoms were of some constant dimensions, Asclepiadean corpuscles could result in disease precisely due to an alteration in their shape and size and not, for example, just in virtue of their shape and size.

This etiology is, of course, compatible with but not necessary for Methodist beliefs regarding the so-called commonalities or communities. How relative constriction could come about is a question over and above the notion both that relative constriction is just a matter of fact and that this constriction results in illness. Galen, however, does not engage directly with constriction, arguably as a means to dismiss the Methodists, whom he does not as a group take seriously. Vallance also claims that this distinction is elided by Galen in order to associate Methodists with atomism and by so doing make a caricature of their view of the body's composition,

¹⁶⁹ Vallance (1990: 1-43 but especially 21-43)

Galen was no fool. He must have known that Democritean and Epicurean atomism differed profoundly from Asclepiades' corpuscular hypothesis. After all, he was aware of the fragility of the particles. And in his note at *De elementis* 1.418k he makes it quite clear that he knows that the Democritean atoms are unbreakable 'on account of their hardness' and 'indivisible on account of their size'. He is just as clear about the Asclepiadean corpuscles.¹⁷⁰

Vallance suggests that Galen makes medical simpletons out of the Methodists for rhetorical purposes.¹⁷¹ And, although it is difficult to reconcile the Methodist disavowal of hidden causes with their commitment to the communities and the corpuscular theory underlying them, it is clear from observations like Vallance's above that Galen is playing fast and loose with his rivals. Comparisons between Galen's accounts of Methodist incompetence and what little survives in writing of Methodist practice, by Methodist authors such as Soranus and Caelius, reaffirm this notion.

Soranus' dictum at *Gynecologia* I.2, already quoted,¹⁷² may also explain why the Methodists might remain silent on their own theoretical commitments, however loosely those were taken. Furthermore, their nearly institutionalized tendency toward intra-sectarian criticism can give the impression of inconsistency, where there may simply have been therapeutic debate. Vallance sums up this point nicely,

Methodism was not a homogeneous system, and our first-hand knowledge of it does not extend very far beyond what we can see in Caelius and Soranus. The method of the Methodists was essentially a method of

¹⁷⁰ Vallance (1990: 40)

¹⁷¹ A point brought out throughout the introduction to Tecusan (2004)

¹⁷² "Since natural philosophy (τὸ φυσικόν) is not useful for our ends, although it is a nice bauble for a learned work, I have excluded it here, keeping for now only to necessary matters." Soranus *Gyn.* I.2, τὸν μὲν οὖν φυσικὸν ἄχρηστον ὄντα πρὸς τὸ τέλος, φερέκοσμον δὲ πρὸς χρηστομάθειαν, κεχωρίκαμεν ἐντεῦθεν, μόνον πρὸς τὸ παρὸν ἐχόμενοι τῶν ἀναγκαίων.

treatment, and while all Methodists seemed to have shunned theoretical speculation, they did so to varying degrees.¹⁷³

Consequently, a formal nosology was not necessary on a Methodist construal even if a therapeutic one was. What use, after all, was a classification of diseases when nosological differentia were not causally relevant to treatment? The same can be said for an elaborate taxonomy of symptoms. Except insofar as they might be indicative of a strictural imbalance in the pores of the body relative to the corpuscles passing through them, symptoms bore little medically relevant relation to the underlying cause of the disease.

Consider, for example, Soranus' discussion of inflammation of the uterus,

Inflammation is so-called on account of "growing inflamed" and not as <Democritus> has said, on account of the cause being phlegm. There are many other antecedent causes of inflammation around the uterus but very frequently they are cold, likewise pain, miscarriage, and a poor delivery, none of which contributes to a change of treatment. When the uterus is inflamed, some general signs appear and some particular and indicative of its affected part.¹⁷⁴

Here, Soranus echoes his claim from elsewhere in the *Gynecologia* that the causes of a given disease are not relevant to its treatment, even if they are of interest to the curious practitioner. The notion at work in this passage is that physical disorders will fall into three broad categories. The affected part will be overly constricted, not sufficiently constricted, or there will be a mix of disordered constriction. Ultimately, the reasons for

¹⁷³ Vallance (1990:132)

¹⁷⁴ Soranus *Gyn.* 3.17, Ἡ φλεγμονὴ κέκληται μὲν ἀπὸ τοῦ φλέγειν καὶ οὐχ ὡς ὁ <Δημόκριτος> εἶρηκεν ἀπὸ τοῦ αἵτιον εἶναι τὸ φλέγμα. προκατάρχει δὲ τῆς περὶ τὴν ὑστέραν φλεγμονῆς πολλὰ μὲν καὶ ἄλλα, συνεχέστερον δὲ ψύξις, ὡσαύτως κόπος, ἔκτρωσις φαύλη τε μαίωσις, ὧν οὐδὲν εἰς τὴν ἐξαλλαγὴν συντελεῖ τῆς ἐπιμελείας. μήτρας δὲ φλεγμαινούσης τὰ μὲν κοινὰ παρέρπεται σημεῖα, τὰ δὲ ἴδια καὶ δηλωτικὰ τοῦ πάσχοντος μέρους αὐτῆς.

the disordered constriction are not relevant to treatment; so, the physician need only be concerned with correctly identifying which of the three abnormal constrictions presents itself.¹⁷⁵ Galen variously takes this Methodist lack of interest in causal explanations as a deep methodological inadequacy. He says, for example, that

[t]o suppose that health exists in function and that disease consists in physical conditions or, alternately, that health is in the constitution of the parts while disease is in the injury of functions is worthy of the other Methodists, and especially of Thessalus, the founder (ἀρχηγού) of their idiocy. In fact, nearly all these members of this non-methodical and insane sect say that health, and heartiness, is the stability of natural functions, while disease, and frailty, is not injury of functions but, as far as some go, a certain disposition of the body and, as far as others go, the body being in a certain state.¹⁷⁶

Galen's view of the importance of a causal account in the understanding and therefore the treatment of disease brings us to the role that causation played for Galen, in opposition to Methodist and Empiricist approaches to therapy.

¹⁷⁵ This sentiment is echoed shortly after the passage above at the end of 3.19, on Demetrius of Apamea's analysis of the spread of inflammation, "and we agree on this point, even if what is being sought out makes no difference to the application of local treatment" (καὶ <ἡμεῖς> δὲ τοῦτο συναινούμεν, εἰ καὶ τὸ ζητούμενον οὐδεμίαν ἐξαλλαγὴν ἐπιφέρει πρὸς τὴν χρῆσιν τῶν τοπικῶν βοηθημάτων).

¹⁷⁶ *MM* X 51: τὸ δ' ἐν ταῖς ἐνεργείαις ὑποθέμενον εἶναι τὴν ὑγίαν, ἐν ταῖς διαθέσειν ὑπολαμβάνειν συνίστασθαι τὴν νόσον, ἢ ἔμπαλιν ἐν μὲν τῇ κατασκευῇ τῶν μορίων τὴν ὑγίαν, ἐν δὲ τῇ βλάβῃ τῶν ἐνεργειῶν τὴν νόσον, ἄξιον τῶν τε ἄλλων μεθοδικῶν ἐστὶ καὶ δὴ καὶ τοῦ τῆς ἐμπληξίας αὐτῶν ἀρχηγοῦ Θεσσαλοῦ. πάντες γοῦν σχεδὸν οἱ ἀπὸ τῆς ἀμεθόδου τε καὶ μανιμῶδους ταύτης αἰρέσεως τὴν μὲν ὑγίαν εὐστάθειαν τῶν κατὰ φύσιν ἐνεργειῶν εἶναι φασὶ καὶ ἰσχύν, τὴν δὲ νόσον οὐκ ἔτι βλάβην ἐνεργείας καὶ ἀσθένειαν, ἀλλ' οἱ μὲν διάθεσιν τινα σώματος, οἱ δὲ σῶμά πως διακείμενον.

GALEN'S ECLECTICISM

Education

Galen was born to a wealthy family at Pergamum in 129 CE. His father, Nikon, was a successful architect who undertook to have his son educated in philosophy from an early age.¹⁷⁷ As was fairly standard for the children of the socially elite, Galen was trained in grammar and mathematics; he began to study logic at the age of fourteen and was educated by prominent philosophers of the major philosophical schools of the time starting at the age of fifteen.¹⁷⁸ His so-called eclecticism reflects his early exposure to this philosophical *mélange*, which included study under Academics, Peripatetics, Stoics, and Epicureans.¹⁷⁹ Some time when Galen was between the ages of fourteen and seventeen, Nikon is reputed to have had a dream in which Asclepius appeared to him encouraging that he train his son in medicine, in addition to his training in philosophy.¹⁸⁰ As with philosophy, Galen studied under representatives of the medical sects of the day, first at Pergamum and then after the death of his father in 149 CE, throughout the Greco-Roman world.¹⁸¹

This early training in philosophy instilled in Galen a deep respect for and adherence to logical method in his medical practice, with certain *caveats*. By the second

¹⁷⁷ See Hankinson (2008: 3-4) for a longer discussion of Galen's early education. For standards of education in the Roman period Cf., for example, *OCD* s.v. 'education, Roman.' Children of social elites generally were educated by a *grammaticus*, who would have trained students in letters as well as mathematics, through about the age of twelve and then a *rhetor* through about the age of fifteen.

¹⁷⁸ *Ord.Lib.Prop.* XIX 59

¹⁷⁹ Cf. *Aff.Dig.* V 41-2. Also, see Hankinson (2008: 3).

¹⁸⁰ See *Praen.* XIV 608; *Ord.Lib.Prop.* XIX 59

¹⁸¹ See *Ord.Lib.Prop.* XIX 57-8; *Lib.Prop.* XIX 16-7; AA 217-8. For Galen's time in Egypt see Nutton (1993)

century CE, various philosophical sects (e.g., the Stoics and Peripatetics) had come to disagree with respect to logical method in similarly sectarian ways to those in which the various medical schools had come to disagree, regarding the role of formal inference in the practice of medicine. While the Peripatetics focused primarily on types of logical quantification (e.g., universal, existential), the Stoics focused primarily on connectives (e.g., the conditional, disjunctions, etc.).¹⁸²

Approach to Medicine

Galen's approach to medicine was shaped by his early experiences with philosophical logic. These experiences, however, had left him, as he tells us, dissatisfied both with the inter-sectarian discord and with the inability of logicians to adequately verify the claims they alleged to prove,

So, after entrusting myself to all of the leading Stoic and Peripatetic philosophers of the time, I learned many logical theorems which, once I had examined them for a time, I found to be useless for demonstrations (ἀποδείξεις): very few had been investigated, by the Stoics and Peripatetics, with any practical result (χρησίμως) and very few would allow them to reach their stated *demonstrandum*. Moreover, these theorems were inconsonant (διαπεφωνημένα) with one another and some even contradicted our native intuitions. For all that's holy, if it were up to these teachers, I would have fallen into Pyrrhonian *aporia* had I not mastered geometry, arithmetic, and logic, in which subjects most of all I had been taught to proceed from childhood by my father, who had learned theory from my grandfather and great-grandfather.¹⁸³

¹⁸² Generally on Galen's logical method and its backdrop in the second century see Barnes (1991) and Morison (2008)

¹⁸³ *Lib.Prop.* XIX 39-40, πᾶσιν οὖν τοῖς κατ' ἐκείνον τὸν χρόνον ἐνδόξοις Στωϊκοῖς τε καὶ Περιπατητικοῖς ἐμαντὸν ἐγχειρίσας πολλὰ μὲν ἔμαθον ἄλλα τῶν λογικῶν θεωρημάτων, ἃ τῷ μετὰ ταῦτα χρόνῳ σκοπούμενος ἄχρηστα πρὸς τὰς ἀποδείξεις εὗρον, ὀλίγιστα δὲ χρησίμως μὲν αὐτοῖς ἐξηγημένα καὶ τοῦ προκειμένου σκοποῦ τυχεῖν ἐφιέμενα, διαπεφωνημένα δὲ καὶ ταῦτα παρ' αὐτοῖς ἐκείνοις, ἕνια δὲ καὶ ταῖς φυσικαῖς ἐννοίαις ἐναντία, καὶ νῆ τοὺς θεοὺς, ὅσον ἐπὶ τοῖς διδασκάλοις, εἰς τὴν τῶν Πυρρωνείων ἀπορίαν ἐνεπεπώκειν ἂν καὶ αὐτός, εἰ μὴ καὶ τὰ κατὰ

Galen's complaint regarding the inconsistencies (διαφωνία) between the logical theories of the Stoics and Peripatetics echoes some of the grounds for the Empiricists' rejection of Dogmatist sects as for example in *De Sectis* I 78-79. In that passage, the conclusions that the medical Dogmatists come to, like the arguments of the Stoics and Peripatetics here, may be plausible but are neither proven nor provable, at least not employing their method of argument.¹⁸⁴

Galen's central objection to arguments between Dogmatists, here, is that they did not have a basis for adjudicating between different accounts for their treatments and analyses of the natural world.¹⁸⁵ His response to the argumentative inadequacies he perceives in some of the theorems of the Stoics and Peripatetics is, to a point, similar to the Empiricist response to the proliferation of medical theories without some, in their case empirical, litmus test for truth. Galen makes this point more explicit immediately

γεωμετρίαν ἀριθμητικὴν τε καὶ λογιστικὴν κατεῖχον, ἐν αἷς ἐπὶ πλείστον ὑπὸ τῷ πατρὶ παιδευόμενος ἐξ ἀρχῆς προεληλύθειν ἀπὸ πάμπου τε καὶ προπάμπου διαδεδεγμένῳ τὴν θεωρίαν.

¹⁸⁴ In Galen, forms of διαφωνία and διαφωνεῖν often refer to sectarian disagreements. For similar language with respect to sectarian διαφωνία as a motive for Galen's different approach to demonstration see *MM* X 469, "As I have already said in my treatise *On Demonstration*, after I had been completely buried under the discord (διαφωνία) between most doctors, I turned to evaluating demonstration (αὐτήν), knowing that it was necessary first to be well-versed in the demonstrative method. Having done this for many consecutive years, I subjected each of the doctrines to demonstration in a similar way." (Ὡς γὰρ καὶ τῷ περὶ τῆς ἀποδεικτικῆς εὐρέσεως εἴρηται γράμματι, περιαντληθεὶς ὑπὸ τοῦ πλήθους τῆς τῶν ἰατρῶν διαφωνίας, εἴτ' ἐπὶ τὸ κρίνειν αὐτὴν τραπόμενος, ἔγνω χρῆναι πρότερον ἐν ἀποδεικτικαῖς μεθόδοις γυμνάσασθαι. καὶ τοῦτο πράξας ἔτεσιν ἐφεξῆς πολλοῖς ὑπέβαλλον οὕτως ἕκαστον τῶν δογμάτων αὐτῇ...). For Galen's use more generally, Cf. *Sect.Int.* I 78; *MM* X 35, 53, 469 *et passim*.

¹⁸⁵ Although this objection has as its target competent logicians, Galen also frequently objects to logical incompetence on the part of many physicians and philosophers who pretend to use these logical arguments. This sort of complaint is common in Galen's writing, that not only is the theory held by the target of his attack flawed but also that the target in question fails to understand even this flawed theory (e.g., *MM* X 38, 61-2; *PHP* V 220, and *passim*).

after the quotation above where he offers a type of geometric proof based on empirical evidence as a basis for just this sort of adjudication,

Seeing, therefore, that evident truths (manifest not only to me) were produced in the predictions of eclipses, in the construction of sundials and of water-clocks, and of many other things besides in engineering, I thought it would be better to use this type of geometrical demonstration.¹⁸⁶

All of the examples above, the sundial, waterclock, and cases of engineering, have in common that their function is confirmable through repeated physical observation.¹⁸⁷

Galen is certainly no skeptic with regard to the senses and it is perhaps useful, in this context, to recall the root meaning of geometry (γεωμετρία). Geometry was originally, as the structure of the word suggests, a form of land surveyance.¹⁸⁸ That is, geometrical demonstration, on this construal, is a tool for measuring and quantifying natural phenomena, whose utility was in large part determined by its ability to accurately and repeatedly predict features of the natural world, to function *in practice*.

¹⁸⁶ *Lib.Prop.* XIX 40, ὁρῶν οὖν οὐ μόνον ἐναργῶς ἀληθῆ φαινόμενά μοι τὰ κατὰ τὰς ἐκλείψεων προρρήσεις ὥρολογίων τε καὶ κλεψυδρῶν κατασκευὰς ὅσα τ' ἄλλα [τὰ] κατὰ τὴν ἀρχιτεκτονίαν ἐπινοήθητι βέλτιον ᾗθηεν εἶναι τῷ τύπῳ τῶν γεωμετρικῶν ἀποδείξεων χρῆσθαι.

¹⁸⁷ See *Pecc.Dig.* V 82-83, too lengthy to quote here, for the observational tests Galen recommends for the construction of an accurate sundial. In brief, one creates a sort of waterclock by which to measure the sundial: after a stipulated period of time determined by whatever standard measurement the sundial measures, one observes how much water has leaked from a pierced vessel. After marking the side of the vessel and refilling it, one waits for another unit of that time to pass as measured by the sundial. If after repeated tests of this sort the waterclock and sundial agree, the sundial is accurate. Of particular relevance, here, is Galen's emphasis on repetition the deciding factor of the empirical proof and repeatability as the criterion for success for the sundial (and by extension for medicine).

¹⁸⁸ The earliest attestation of γεωμετρία, for example, is in Herodotus 2.109, in a discussion of Egyptian land surveyance. The sundial and the division of the day into hours also appear in this passage, emphasizing the sort of measurements with which this word was associated. Documentary papyri bear out this primary meaning of geometry even in later Greek (Cf. *PTeb.* 24.42, *POxy.* 499.27 from the second centuries BCE and CE respectively).

Even in its later use, to refer to its eponymous branch of mathematics and the forms of proof found therein, Euclidian geometry was based on certain axioms and common notions that were supposed to be either immediately evident to the senses or immediately evident to the mind. This notion, of immediate evidence to the mind, requires some unpacking. Consequently, It may be useful here to discuss Galen's logical method generally, in order to explain the role that these so-called geometrical demonstrations and geometric axioms play in his overall medical method.¹⁸⁹

Logical Method

Inquiry regarding the discord (διαφωνίας) between practitioners is of great importance, not only for those who are ill to regain their health but also for those who are healthy (clearly as a protector of it) and for those who exercise for good health in order to get it and keep it. Then he added, "and for whatever each person wants," making it clear to us that the problem and its solution extend not only to medicine but also to all the other arts (τέχνας).

The reason why doctors, practicing an art in which it is possible to test by experience (τῇ πείρᾳ... κριθῆναι) whether the remedies used helped or hurt, still make contradictory claims about what helps and what hurts may be baffling. It is not at all baffling that, in philosophy, the majority of disagreements (τῶν διαφωνιῶν) haven't at all been settled, since its subject matter cannot clearly be tested by experience (τῇ πείρᾳ).¹⁹⁰

¹⁸⁹ Cf. *Pecc.Dig.* V 66, on the need to verify theories both on the basis of indemonstrable but evident first principles, such as in geometry, as well as by empirical observation.

¹⁹⁰ *PHP* V 765-6, τὸ περὶ τῆς διαφωνίας, φησί, τῶν τεχνιτῶν σχῆμμα μεγίστην ἔχει δύναμιν οὐ μόνοις τοῖς νοσοῦσιν ἐς ὑγείας κτήσιν, ἀλλὰ καὶ τοῖς ὑγιαίνουσιν, ἐς φυλακὴν αὐτῆς δηλονότι, καὶ τοῖς ἀσκούσιν ἐς εὐεξίην τοῦ σώματος πρὸς τε τὴν κτήσιν αὐτῆς καὶ διαμονήν· εἴτα προσέθηκε “καὶ ἐς ὃ τι ἕκαστος ἐθέλει,” δηλῶν ἡμῖν οὐ μόνον εἰς ἰατρικὴν ἀλλὰ καὶ τὰς ἄλλας τέχνας ἐκτετάσθαι τὸ σχῆμμα καὶ τὴν λύσιν αὐτοῦ. θαυμάσαι γὰρ ἐστὶ διὰ τί τέχνην μετιόντες οἱ ἰητροὶ καθ’ ἣν τῇ πείρᾳ τὰ προσφερόμενα βοηθήματα κριθῆναι δύναται, πότερον ὠφέλησεν ἢ ἐβλαψεν, ὅμως ἐναντιωτάτας ἀποφάσεις ἐποιήσαντο περὶ τῶν ὠφελοῦντων τε καὶ βλαπτόντων. ἐν μὲν γὰρ φιλοσοφίᾳ μὴ πεπαῦσθαι τὰς πλείστας τῶν διαφωνιῶν οὐδὲν θαυμαστόν, ὡς ἂν μὴ δυναμένων τῶν πραγμάτων ἐναργῶς κριθῆναι τῇ πείρᾳ

Engineering, waterclocks, and sundials, whose successful functions are determined observationally, all point to a useful subset of the sorts of premises that Galen accepts as contributing to the soundness of arguments. That is, their proof is in the pudding.¹⁹¹ In this vein, Galen's writing is replete with evidence that he is primarily interested far less in just the validity of argument, as he suggests of some Dogmatists and sophistical doctors, than in their soundness.¹⁹² He consistently shows that he is primarily interested in arguments ranging over and proceeding from features of the world that are able to be judged by experience (τῇ πείρᾳ). Experience, for Galen, not only involves features of the world that are evident to sensation but also features that are evident to cognition, in the way that geometric axioms and common notions can be said to be evident (more on this latter notion, which is one of the features that distinguishes Galen from Empiricists, shortly).¹⁹³

Galen, for example, as suggested by the quotation above shows a conspicuous and explicit lack of interest in many of the questions that frequently peppered philosophical and medical texts preceding him. He variously denigrates any conclusions regarding void, the sempiternity of the world, the corporeality or location of divine entities, the nature of the soul, the faculty involved in the formation of the fetus, etc., as not adequately verifiable and therefore largely pointless from a medical perspective.¹⁹⁴

¹⁹¹ Cf., *Pecc.Dig.* V 69, where Galen describes how one tests sundials, waterclocks, and other mechanical devices against astronomical observations.

¹⁹² Cf. *Pecc.Dig.* V 72-3 on the perils of valid but unsound arguments (among other types of arguments).

¹⁹³ See, e.g., *PHP* V 766-7, 791-5

¹⁹⁴ See *passim* but e.g., *Prop. Plac.* 2; *PHP* V 771 on the generation or destruction of the world, on void, on the corporeality and location of divine beings. *Prop. Plac.* 3 and 7; *PHP* V 763, 766 on the substance of

Warranted Evidence

Let me return now to the geometric example I mentioned earlier. I had said that Euclidean geometry took as its axioms notions that were either evident to sensation or in a sense evident to the mind and that Galen's repeated use of geometric proof as a model for medical argumentation was telling for his own medico-philosophical practice. Galen mentions geometric proofs as a palliative for his disgust with the proliferation of Dogmatist theories and as the means by which he tried to forge a new path in medicine. Given Galen's interest in finding the proper warrant for the premises of medical arguments, it bears some fruit to discuss the basis for geometric principles, at least of the ancient sort.

a) Empirical Evidence

It is not fair to say that Galen considered empirical evidence to be the only satisfactory warrant for knowledge claims, although empirical warrant was sufficient for such claims. Beginning with empirical evidence, however, it *is* fair to say that Galen was not a skeptic with respect to perception.¹⁹⁵ In this respect and others, Galen was fairly consistent with Empiricist doctors of his time. A particularly striking example of his commitment to perception occurs in a longer description of his well-known demonstration of encephalocentrism, which involved the ligation of the recurrent

the soul. *Prop.Plac.* 4, on knowledge of celestial bodies. *Prop.Plac.* 11; *Foet.Form.* IV 700-2 on the formation of the fetus. *Prop.Plac.* 15, on *empsychosis* and *metempsychosis*.

¹⁹⁵ See *Dig.Puls.* VIII 780-6

laryngeal nerve in an effort to show that the brain was the starting point for the nerves involved in voice production,

As you know, Alexander was known to everyone for this weakness [i.e. φιλονεικία), just as he also demonstrated at the time. For, I had just promised a demonstration involving the finest nerves: that there is a hair-like pair of nerves inserted in the muscles of the larynx, on the left side and on the right; and, that in those cases in which the nerves are ligated by a snare or when they are severed, the animal becomes mute while not causing any damage to the animal or to its overall capacity to function. Before I began the demonstration, Alexander said, interrupting me, "Should this be granted to you first, that we must believe in empirical evidence?" Stepping away from them, I left, saying only this one thing, that I was mistaken to think that I had not come before some backwoods Pyrrhonists; otherwise, I would not have come at all.¹⁹⁶

This example, from Galen's treatise *On Prognosis*, involves Alexander of Damascus, a little known Peripatetic, who allegedly objected to or at least questioned the justificatory basis empirical evidence (τοῖς διὰ τῶν αἰσθήσεων φαινομένοις) had for demonstration. In addition to being a vivid example of Galen's fondness for biting satire,¹⁹⁷ the text here is both indicative of Galen's position on skepticism regarding empirical evidence and, in particular, his response to rejections of anatomy as a basis for medical investigation.¹⁹⁸

¹⁹⁶ *Praen.* XIV 628, γινώσκεις γὰρ ὡς ἐπὶ τούτῳ τῷ πάθει πρὸς ἀπάντων καὶ Ἀλέξανδρος ἐγινώσκετο, καθάπερ καὶ τότε σαφῶς ἐδήλωσε. δεῖξιν γὰρ ὑποσχομένου μου νευρίων λεπτοτάτων, ὡς εἶναι τριχοειδῆ συζυγίαν τινὰ τοῖς τοῦ φάρυγγος μυσὶν ἐκφυομένην, τοῖς μὲν ἐκ τῶν ἀριστερῶν μερῶν, τοῖς δὲ ἐκ τῶν δεξιῶν· ἐφ' οἷς βρόχῳ διαληφθεῖσιν, ἢ τμηθεῖσιν ἄφωνον γίνεται τὸ ζῶον, οὔτ' εἰς τὴν ζωὴν τι βλαπτομένον, οὔτ' εἰς τὴν ἐνέργειαν· ὁ Ἀλέξανδρος ὑποτυχὼν πρὶν δειχθῆναι, "τοῦτο πρῶτον," ἔφησεν, "ἂν σοι συγχωρηθῇ, τοῖς διὰ τῶν αἰσθήσεων φαινομένοις πιστεύειν ἡμᾶς δεῖν." ἀκούσας δ' ἐγὼ ταῦτα, καταλιπὼν αὐτοὺς ἐχωρίσθην ἐν μόνον φθεγξάμενος, ὡς ἐσφάλην οἰόμενος οὐκ εἰς τοὺς ἀγροικοπυρρόωνεῖους ἦκειν, ἢ οὐκ ἂν ἀφικνεῖσθαι.

¹⁹⁷ Note the puns on δειξίς throughout the quotation as well as Galen's coinage ἀγροικοπυρρόωνεῖος, which I have translated 'backwoods Pyrrhonists' and which Galen uses variously elsewhere.

¹⁹⁸ This scenario and Galen's response to it are, given Alexander's Peripatetic background, ironically reminiscent of Aristotle's own response to hardline skepticism regarding the reliability of the senses.

This second implication of the Alexander of Damascus passage is equally a dig at Empiricist doctors who rejected anatomy as a viable basis on which to make medical claims. The Empiricist objection to anatomy (notwithstanding their further objection to the cruelty of vivisection) was based both on ethical grounds and on a refusal to consider that anatomical information, obtained from dead bodies, was useful for the treatment of live bodies. As far as they were concerned, it required an unacceptable degree of analogical reasoning, as witnessed by Celsus,¹⁹⁹

For these reasons, that the dissection of the dead is not necessary (even if it isn't cruel, it is disgusting), since most things are changed in dead bodies and that treatment itself shows how much can actually be learned in live bodies.²⁰⁰

Galen expanded the ambit of what counted toward *πείρα* by not only including anatomical training, investigation, and knowledge in it but also by basing his practice in large part on anatomical knowledge. And, given the evidence for the waning of anatomical knowledge and investigation after its heyday in the Hellenistic period, it is no

According to Aristotle skeptics of this sort are little more than plants (ὅμοιος γὰρ φυτῷ τοιοῦτος ἢ τοιοῦτος ἤδη) at *Meta.* 1006a15-16 and, more generally, throughout *Meta.* IV.4). It is possible, and if true amusing, to imagine that Galen is pointing up Alexander's alleged *philoneikia* by having a Peripatetic philosopher object to a fundamental principle of Aristotelian philosophy, the reliability of sensation.

¹⁹⁹ See Mudry (1982:107), "Il est révélateur à ce propos que les empiriques, qui refusent la dissection, n'envisagent pourtant pas d'autre méthode d'investigation anatomique que la connaissance directe." Also, Mudry (1982: 137), "Tout en rejetant catégoriquement la vivisection, les empiriques admettent pourtant que la connaissance de certaines particularités des organes internes, celles qui ne sont pas altérées par l'effet des blessures, peut être utile au médecin (la dissection, qui ne fait connaître que des organes morts, est excluee."

²⁰⁰ *De Medicina*, 44, Ob haec ne mortuorum quidem lacerationem necessarium esse (quae etsi non crudelis, tamen foeda sit), cum aliter pleraque in mortuis se habeant; quantum vero in vivis cognosci potest, ipsa curatio ostendat. More generally, see *De Medicina* 40-44.

surprise that Galen's objections to ignorance of it extended to many Dogmatists as well.²⁰¹

b) Intellectually Primitive Evidence

Galen's dissatisfaction with the medical methods of other thinkers was not restricted to Dogmatists. He is equally biting with regard to the failings he sees in the broad approach of the Empiricists to medical knowledge. While, as far as Galen was concerned, the Dogmatists failed to provide proper justification for their arguments and to give proper weight to empirical observation, the Empiricists failed to accept a class of evidence into their epistemology. Galen treats this class, things that are evident to the mind, as playing an evidentiary role in medical epistemology even if he ultimately does not consider it a part of experience (ἐμπειρία),

The ancient philosophers say that there are two kinds of *phenomena*:

- i) one part, which is consistent with the Empiricists, has to do with things that are known by some sensation (e.g., whiteness and blackness, hardness and softness, hot and cold, and so on;
- ii) another, indemonstrable, part that has to do with those things that come under observation of the intellect in their initial apprehension (e.g., things that are equal to the same thing are equal to one another, and that if equals are added to equals the sums are equal, and if equals are subtracted from equals the remainders are equal). They also say, of this second class, that nothing comes to be without a cause, and that everything comes from

²⁰¹ Cf. *MM* X 169-170, Some of the Dogmatists are like them [sc. Empiricists] even if they don't want to be, however many can't make their way to the natural principles of the bodies by reason. For as I have shown earlier, these also are half-Empiricists, who couldn't understand primitive elements. (ὅμοιοι δ' αὐτοῖς εἰσι, καὶ μὴ θέλωσιν, ὅσοι τῶν Δογματιζινόντων ἐπὶ τὰς φυσικὰς ἀρχὰς τῶν σωμάτων οὐκ ἐνδυνήθησαν ἀναβῆναι τῷ λόγῳ. καὶ γὰρ αὐτοὶ, καθότι πρόσθεν ἐδείξαμεν, ἐξ ἡμίσεως εἰσι Ἐμπειρικοί, οἳ οὐκ ἠδυνήθησαν διαλαβεῖν περὶ τῶν πρώτων στοιχείων).

something, and that nothing comes to be from something that doesn't exist at all.²⁰²

This second class of evidence, things that are evident to the mind, is a *sine qua non* of justification for Galen.²⁰³ The notion that there is a class of things evident to the mind is already present in Platonic discussions of epistemology and more fully worked out by Aristotle, principally in the *Posterior Analytics* (e.g., *Post An* 2).²⁰⁴ I have described the process by which Aristotle believes we come to know some of the members of this class earlier. Empiricists would object to the claim that there are items evident to the mind, on the largely *a priori* grounds that only the senses are reliable truth bearers. That is, this sort of mental grasping or seeing falls into the class of indications (ἐνδείξεις) to which the Empiricists in principle object.

Part of the Galenic program for reliable epistemic claims requires not only that one follow the aesthetic phenomena to intellectually primitive evidence but also that, once that has been accomplished, one verify the soundness of resulting arguments by confirmation with empirical observations. For example, consider Galen's description of

²⁰² *MM* X 36, οἱ δ' αὖ παλαιοὶ φιλόσοφοι διττὸν γένος εἶναι φασὶ τῶν φαινομένων, ἐν μὲν, ὅπερ καὶ τοῖς ἐμπειρικοῖς ὁμολογεῖται, τῶν αἰσθήσει τινὶ διαγινωσκομένων, οἷον λευκοῦ καὶ μέλανος καὶ σκληροῦ καὶ μαλακοῦ καὶ θερμοῦ καὶ ψυχροῦ καὶ τῶν ὁμοίων, ἕτερον δὲ τῶν ὑποπιπτόντων νοήσει κατὰ πρώτην ἐπιβολὴν ἀναπόδεικτον, ὥς τὰ τῷ αὐτῷ ἴσα καὶ ἀλλήλοις ὑπάρχειν ἴσα, καὶ ἐὰν ἴσοις ἴσα προστεθῇ, καὶ τὰ ὅλα ἴσα γίνεσθαι, καὶ ἐὰν ἀπὸ ἴσων ἴσα ἀφαιρεθῇ, καὶ τὰ λοιπὰ ἴσα εἶναι. τοῦ τοιοῦτου γένους εἶναι φασὶ καὶ τὸ μηδὲν ἀναιτίως γίνεσθαι· καὶ πάντ' ἐξ ὄντος τινός, ἐκ δὲ τοῦ μηδὸς ὄντος οὐδέν·

²⁰³ See, for example, Hankinson (2008: 167), "In the case of geometry, these will be stipulative (yet self-evident) definitions, plus *a priori* axioms such as those mentioned above. But how is the method to be applied in the case of an empirical science?". These sorts of axioms are also mentioned by me immediately above regarding *MM* X 36 and below in the context of *Pecc.Dig.* V 67. *Pace* Hankinson, it is unclear that to Galen geometry would have been a non-empirical science to the extent that both its definitions and axioms could, according to Galen, be tested empirically even if they could not be directly observed.

²⁰⁴ Cf. *Pecc.Dig.* V 79 *et passim* for Galen's discussion of first principles as necessary to avoid an infinite explanatory or causal regress.

the way in which one can apply this method, common in fields such as engineering or geometry, to medical investigations,

When you find your own method or when you use a method that has been taught to you by someone else and divide the line before you into however many parts you like, the matter will make itself evident to you. It will be rigorously manifest that all the parts divided in this way are equal. And it will also become manifest, by way of empirical observation, that all problems of this kind are discovered with certainty.²⁰⁵

This translation, out of context, does not make clear what sort of phenomena are adequate criteria for confirmation for Galen. In what immediately follows, however, Galen creates a fuller context for the phrase, translated here "on the basis of things that are clearly evident" (δι' αὐτῶν τῶν ἐναργῶς φαινομένων). In the following two chapters, he gives a relatively lengthy example of the successful geometric construction of a circumscribed polygon. At *Pecc.Dig.* V 68 he makes it clear that confirmation of its construction is visually apparent, although Galen is not excluding the confirmation of other proofs through mentally evident evidence. Of a piece with the geometric examples mentioned earlier, Galen proceeds to discuss how this is also the method commonly used in astronomy and 'architecture' (ἀρχιτεκτονία), which he tells the reader includes the engineering of sundials, waterclocks, and other mechanical devices.

Galen endorses the Empiricist's belief in the power of and the need for direct observation and testing, in the sense of *πείρα*, for the epistemic medical claims. He simultaneously echoes the Empiricist's objections to Dogmatist theorizing, on the

²⁰⁵ See *Pecc.Dig.* V 67, ἐὰν γὰρ εὐρὼν μέθοδον ἰδίαν ἢ παρ' ἑτέρου ἢ διδασκασίῃ χρώμενος εἰς ὅσαπερ ἂν ἐθέλῃς μέρη τὴν προτεθείσαν εὐθείαν διορίσῃς, αὐτὸ μαρτυρήσει σοι τὸ πρᾶγμα, φανεῖται τε ἅπαντα τὰ μέρη τῆς οὕτω διαιρεθείσης ἀκριβῶς ἴσα, φανεῖται δὲ καὶ τὰ <λοιπὰ> τοιαῦτα πάντα προβλήματα βεβαίως εὐρημένα δι' αὐτῶν τῶν ἐναργῶς φαινομένων

grounds that it is merely plausible without some empirical evidence with which to underpin such theories. On the other hand, Galen bristles at the limits that Empiricists place on theoretical and causal medical accounts. He does so on the grounds that observation without some organizing principle leaves medical discovery up to chance, which not only cripples medical progress but also is disingenuous (cf. the discovery of the cupping glass and of certain complex drugs, whose utility is not itself a matter of question).

The force of both the cupping glass example as well as the case of complex drugs lies in the improbability of making such complex discoveries wholly on the basis of a concatenation of chance observations. Complex drugs, in particular, have on Galen's construal strongly emergent properties, which are not evident in any one of their ingredients or even in incomplete groupings of those ingredients. Consequently, the Empiricist is at pains to explain how Empiricism, with its adherence to non-experimental observation, can generate these sorts of remedies, whose utility according to Galen they do concede. Additionally, Galen chastises the Empiricists' skepticism with regard to hidden structures, entities, and principles (e.g., anatomy and fundamental physical principles) on the grounds that this skepticism groundlessly proscribes robust tools for diagnosis and the determination of therapy. By taking on board an empirical method for verifying his theoretical claims and explaining those claims through a rational method, Galen attempted to forge a middle path that aimed at a coherent and effective medical practice.

Chapter Three: Galen and Agonistic Anatomical Display

In this chapter I introduce a recurring type of episode in Galen's writing, which I place under the broader category of personal anecdote. After articulating that category into certain types of personal anecdote, primarily case histories and experimental procedures, I examine the argumentative role that anecdotal experimental procedures play in Galen's anatomical treatise, *De Anatomicis Administrationibus* (AA). I argue that these anatomical anecdotes serve primarily as capstones to Galen's anatomical exegesis, targeting rival physicians and intellectuals as well as their medical claims.

I conclude that these capstones are signposted by certain linguistic features that mark them as episodes set aside from Galen's general narrative in AA and that they do not abide by the same norms of assertion as the narrative surrounding them. In order to substantiate this claim, I will first describe the well-known agonistic context both for these anecdotes themselves and for the medical treatises in which they are found. I will discuss some general features of Galen's writing against which I will contrast first the background narrative of AA and then the structure of the personal anecdotes that populate AA. Finally, I will detail how spatio-temporal markers and shifts into the first person flag these episodes for the reader.

GALEN'S ACCOUNTS OF THE INTERCOSTAL NERVE DEMONSTRATION

At AA II 667-8, Galen explains the anatomical procedure involved in approaching the intercostal nerves, those responsible for the motor function of the internal intercostal muscles. These muscles are necessary for phonation. Consequently, severing the motor nerves controlling these muscles destroys phonation in the subject. Galen's explanation of the procedure is consistent with his mode of address and expression throughout the majority of AA. He addresses an unnamed reader in the second person (here singular), includes a rich series of details ranging from choice of instrument to the tactile sensations involved in grasping and separating the intercostal nerve from the intercostal muscle.²⁰⁶ These features of AA are themselves worth commenting on but I will return to them in a subsequent section. Immediately following his general instructions to the reader, Galen adds the following performative instructions,

It is possible for you to do the same thing even if at some point, on your own, you examine the sort of thing that happens to the animal after the nerves are interrupted in this way [by ligation]. *But for making this demonstration (ἐπιδεικνυμένῳ), it is better to prepare a thread placed under all these nerves without having tied [them].* For, in this way, when the animal is struck it lets out a howl, then after tightly binding the nerves with the threads it suddenly becomes voiceless.²⁰⁷

An emphasis on *epideixis* is one of the core features of rhetorical showpieces in works associated with the so-called Second Sophistic. And, although the language of

²⁰⁶ So, for example, the reader should avoid using the smaller hooks (τὸ ἄγκιστρον) used on varices (AA II 667); rather, the operation calls for a hook with a short bend. Galen gives further instructions on the sharpness required of the hook and the structure of its tip.

²⁰⁷ AA II 669, ταὐτὸ μὲν οὖν σοι πράττειν ἔξεστι, κἄν μόνος ἐπὶ σαυτοῦ ποτ' ἐξετάξης, ὁποῖόν τι πάσχει τὸ ζῶον ἐπὶ τοῖς νεύροις οὕτω διαληφθεῖσιν. ἐπιδεικνυμένῳ δὲ βέλτιόν ἐστιν αὐτῷ παρεσκευάσθαι τοῖς νεύροις ἅπασιν λίνον ὑποβεβλημένον ἄνευ τοῦ δεδέσθαι· κέκραγε γὰρ οὕτω παιόμενον, εἴτ' ἐξαίφνης ἄφωνον γινόμενον ἐπὶ τῷ σφιγθῆναι τοῖς λίνοις...

demonstration in Greek does not always distinguish between demonstration as proof (*apodeixis*) and demonstration as display (*epideixis*), even in philosophical authors where one might expect it to do so, the context in and surrounding this passage as well as Galen's own frequently fastidious attention to usage make his choice of expression (ἐπιδεικνυμένῳ) especially marked.²⁰⁸

Without reference to this particular passage, von Staden (1995) argues for this point more generally in the context of Galen's anatomical exhibitions.²⁰⁹ In this light, the contrast Galen draws between preparations for this procedure as an epideictic demonstration and as a solitary exercise (καὶν μόνος ἐπὶ σαυτοῦ ποτ' ἐξετάζης), mirrors the distinction between procedures as they were held in public (δημοσίᾳ), such as the debates mentioned earlier in this chapter, and as they were held in private or in small groups (ιδίᾳ).²¹⁰ And, this distinction is typical of the sorts of debates common to late Roman period intellectual performances. But, although this quotation shows that Galen was attentive to performative elements in his anatomical demonstrations, the explanation he provides for his instructions on the display underscore the degree to which performance was a part of effective anatomical demonstration rather more markedly.

Immediately following the passage above, Galen writes,

²⁰⁸ See von Staden (1995: 53-54) for brief comments on Galen's use of words with the root *deik-* as well as notes. Cf. Hankinson (1991: 15-28)

²⁰⁹ See von Staden (1995: 48-51)

²¹⁰ See von Staden (1995: 53), "A central feature of Galen's self-understanding- a feature he shares with Second Sophistic- accordingly is the distinction between public and private, between public "showing" or "display" or "exhibition" and private rehearsal or instruction, between private anatomical exploration and public dissection or vivisection. Although Galen's anatomical audiences varied in size and expertise, and although at times it is hard to draw a clear line of demarcation between a public anatomical performance and a private one, the important point is that Galen himself insistently deploys the "private/public" distinction as a crucial aspect of his self-construction."

[The procedure] takes the audience's (τοὺς θεατὰς) breath away (ἐκπλήττει), as it seems amazing [to them] (θαυμαστὸν) that phonation is destroyed when tiny nerves in the midriff are ligated. Make sure that in these sorts of demonstrations (κατὰ τὰς τοιαύτας ἐπιδείξεις) your assistants are numerous in order that the loops may be set around all the nerves quickly. If you do not want to release them again, constrict [the nerves] however it pleases you. But, if you also want to release [them] all at once to show (δείξαι) the animal crying out again, for thus the audience is even more amazed (οὕτω γὰρ μᾶλλον οἱ θεαταὶ θαυμάζουσι), slide rings on the loops and constrict them gingerly, for releasing the loops the ring will be useful to you since the so-called "blind knot" is difficult enough to untie. But for the animal to cry out suddenly constrict it just enough, as the nerves are crushed when they are constricted too tightly by the loops surrounding them if the thread is hard while they are sawed open and cut if it is soft...²¹¹

First, the language of this quotation affects an intimate relationship with Galen's reader.

In the procedural context at AA II 667-8 that precedes this passage, Galen keeps his narrative lens focused on a generic operating table. He cautions the reader on the sharpness of the hooks involved in fishing out the intercostal nerves. Too sharp and one runs the risk of severing the nerve, too blunt and one cannot pass the hook through the tissue beneath the nerves. But, there are no contextual details outside the narrow focus of the procedure. So it is with the separation of the nerve from the underlying tissues. The curved needle is threaded beneath the nerve as near the spinal cord as possible so as to paralyze the whole muscle. The reader is even told that this operation can be performed

²¹¹ AA II 669-70, ...τὰ νεῦρα τοὺς θεατὰς ἐκπλήττει· θαυμαστὸν γὰρ εἶναι δοκεῖ, νεύρων μικρῶν κατὰ τὸ μετάφρενον βροχισθέντων, ἀπόλλυσθαι τὴν φωνήν. ἔστωσαν δὲ πλείονες οἱ ὑπηρετούμενοί σοι κατὰ τὰς τοιαύτας ἐπιδείξεις, ἵνα ταχέως ἅπασι τοῖς νεύροις οἱ βρόχοι περιβληθῶσιν. ἐὰν μὲν οὖν μηκέτι λύειν ἐθέλῃς αὐτοὺς, ὅπως ἂν ἦ σοι φίλον, οὕτως σφίγγε. βουλόμενος δὲ εὐθέως λύσαι, καὶ δείξαι φωνοῦν αὐτοῖς τὸ ζῶον, (οὕτω γὰρ μᾶλλον οἱ θεαταὶ θαυμάζουσι,) ἀγκύλας τε κατὰ τοὺς βρόχους ἐπιβάλλε καὶ μετρίως σφίγγε· γενήσεται γὰρ σοι πρὸς μὲν τὸ λύσαι τάχως ἡ ἀγκύλη χρήσιμος, ὥς τό γε τυφλὸν ἄμμα καλούμενον ἱκανῶς ἐστι δύσλυτον, πρὸς δὲ τὸ φωνῆσαι τὸ ζῶον αὐτίκα τὸ μετρίως ἐσφίγγθαι, τὰ γὰρ σφοδρότερον ὑπὸ τῶν περιβληθέντων βρόχων σφιγγθέντα νεῦρα σκληροῦ μὲν ὄντος τοῦ λίνου θάλται, λεπτοῦ δὲ διαπρίεται καὶ τέμνεται...

with either of two instruments: a curved needle (βελόνη) or a pierced hook (ἄγκιστρον διάτρητον). All of these procedural details maintain a level of intimate pedagogy with the reader. Galen's focus remains, however, on the body on which the procedure is performed. Instruments are mentioned insofar as they are mechanically useful. That is, a crucial performative element is absent from his description thus far. But, Galen shifts explicitly from the procedure conducted in private to its public performance,

It is possible for you to do the same thing even if at some point, *on your own*, you examine the sort of thing that happens to the animal after the nerves are interrupted in this way [by ligation]. *But for making this demonstration (ἐπιδεικνυμένῳ)*, it is better to prepare a thread placed under all these nerves without having tied [them].²¹²

Here, Galen evokes an audience that will be suitably amazed by the reader's successful attention to and performance of Galen's instructions. It is to this reader that the anatomical details seen by the greater audience as *thaumata*, the levers behind the curtain, are revealed. This strategy is not uncommon in Galen's writing, of revealing information to the reader either through a character who is established as one of the *cognoscenti* or as in the passage above through contrasting the reader with an audience of the uninitiated.²¹³ In private the procedure is conducted without fanfare while in public

²¹² AA II 669, τὰντὸ μὲν οὖν σοι πράττειν ἔξεστι, καὶν μόνος ἐπὶ σαυτοῦ ποτ' ἐξετάξης, ὁποῖόν τι πάσχει τὸ ζῶον ἐπὶ τοῖς νεύροις οὕτω διαληφθεῖσιν. ἐπιδεικνυμένῳ δὲ βέλτιον ἐστὶν αὐτῷ παρεσκευάσθαι τοῖς νεύροις ἅπασιν λίνον ὑποβεβλημένον ἄνευ τοῦ δεδέσθαι.

²¹³ On which more shortly but cf. *Praen.* XIV 613-8, which is an especially rich example of this strategy in action. In the episode, Galen cures Eudemus the Peripatetic philosopher and also his former teacher, see Nutton (1975: 167) and *Praen.* XIV 613, 624. Throughout the episode, Galen's method is inscrutable to the gathered doctors. He claims to have been accused by Martianus of practicing divination (μαντική at XIV 615) rather than medicine. Finally, when Galen's predictions have proven true Eudemus asks him to explain how he made them. The explanation, Eudemus' approval of Galen's reasoning, the charges of divination, and the general ignorance of other physicians all function to separate out audiences on the basis of their medical knowledge or their capacity for it. The reader as an extension of Epigenes, the implied reader,

certain steps guarantee that the audience is breathless (or more literally, left beside itself). These spectators (θεαταί) are awe-struck (θαυμαστόν) when pressure on the nerves interrupts phonation. Later they are even more amazed that the animal resumes crying immediately upon the relief of that pressure (οὕτω γὰρ μᾶλλον οἱ θεαταὶ θαυμάζουσι). Galen effects this amazement by making the transition from sound to silence and back again as abruptly as possible, for which several assistants acting in concert are necessary. All of these theatrical differences hinge on whether the procedure is held in a more private setting or as a sort of public display or spectacle (κατὰ τὰς τοιαύτας ἐπιδείξεις).

Galen's attention to performative detail is not restricted to the manner in which the intercostal nerve demonstration is to be carried out. He includes, as advice to the reader, the range of subjects best suited for phonation experiments. Elsewhere, Galen relates that the ape is his ideal anatomical analogue for human beings.²¹⁴ But, in the context of public phonation demonstrations, Galen opts for swine rather than primates. In the section of AA relating to experiments on the thorax generally, he explains this choice,

It would be logical to proceed in such a way that someone would render the entire thorax immovable, tying ligations around only the nerves that move its muscles. *You all have seen (ἐθεάσασθε) me demonstrate (δεικνύντα) this very thing to you all often in private (ιδίᾳ) but also in public (δημοσίᾳ).* Indeed, you immobilize the intercostal muscles through the nerves passing into them from the spine in the manner which was described earlier, then the diaphragm when you injure the origins of its nerves similarly. *And you all have seen (ἐθεάσασθε) me demonstrate all*

belongs implicitly to this inner circle, as does Eudemus who acts as the trigger for Galen to reveal his method to the reader. Eudemus, like the reader passes from being the *sort* of person, who is one of Galen's *pepaideumenoi*, to being actually one of them as Galen instructs him.

²¹⁴ In particular, Galen prefers the Barbary ape (*Macaca inuus*) and the Rhesus monkey (*Macaca mulatta*). See Singer (1956: 240 n. 22). Also see Rocca (2003: 67-78).

*of these sorts of things, in particular, often in private and in public (ιδία τε καὶ δημοσίᾳ) on pigs, on account of the fact that an ape is no advantage at all in these sorts of anatomical demonstrations and the spectacle (τὸ θέαμα) is odious. It is not possible to describe clearly, in language, the place where one ought to [separate the skin alone and find the nerves of the diaphragm]. But my account will be useful both as a reminder for those who have already looked on the procedure and as a sort of encouragement for those who have not yet looked on [it].*²¹⁵

Galen's comments on the immobilization of the intercostal muscles and diaphragm contains two references to semi-private and public anatomical displays. The first singles out a demonstration that involves paralysis of the thorax through the ligation of intercostal muscles, while the second picks out the whole suite of phonation displays more generally. The essentially public nature of these demonstrations, both the *idia* and the *demosia*, is clear from Galen's comments on the most useful animal for the procedure. Galen reminds the reader(s) that pigs are more suitable than apes in the whole range of voice demonstrations on the grounds that a) the ape offers no advantage over swine and b) the spectacle (τὸ θέαμα) of the ape is ugly, unseemly, or hideous (εἰδεχθές). His two reasons for the choice of one animal over another are strongly suggested by the content of *b*. The ape's unseemliness in *b* depends wholly on the audience's visceral reaction to the

²¹⁵ AA II 690, Κατὰ λόγον δ' ἂν εἴη διελθεῖν, ὅπως ἂν τις ἀκίνητον ἐργάσαιτο τὸν ὅλον θώρακα, μόνοις τοῖς κινουμένοις τοῖς μύσιν αὐτοῦ νεύροις βρόχους περιβάλλον, ὅπερ οὐ μόνον ἰδίᾳ πολλάκις ὑμῖν, ἀλλὰ καὶ δημοσίᾳ δεικνύντα με ἐθεάσασθε. τοὺς μὲν δὴ μεσοπλευρίους μύς διὰ τῶν ἐπ' αὐτοὺς ἰόντων ἀπὸ τοῦ νωτιαίου νεύρων ἀκινήτους ἐργάσῃ, καθ' ὃν εἴρηται τρόπον· τὸ διάφραγμα δὲ τὰς ἀρχὰς καὶ τοῦτου τῶν νεύρων ὁμοίως κακώσας. ἐφ' ὧν δὲ μάλιστα πάντα τὰ τοιαῦτα δεικνύντα με ἐθεάσασθε πολλάκις ἰδίᾳ τε καὶ δημοσίᾳ, διὰ τὸ μήτε πλέον ἔχειν τι πίθηκον ἐν ταῖς τοιαύταις ἀνατομαῖς, εἰδεχθές τ' εἶναι τὸ θέαμα. λόγῳ μὲν οὖν ἐρμηνεύσαι σαφῶς οὐκ ἔστι τὴν χώραν, ἐνθα χορὴ <...> [δηλῶσαι σαφῶς]. εἷς τε γὰρ τῶν ἤδη τεθεαμένων τὴν ἀνάμνησιν, εἷς τε τῶν μηδέπω μηδὲν ἑωρακότων τοιαύτην ἐπαγωγὴν πρὸς τοῦτον ἢ διήγησις ἔσται χρήσιμος. A lacuna in the Greek text is indicated by the pointed brackets above. Garofalo (1991: 767 and n.84) provides an Italian translation, which I have translated into English, of the Arabic text that supplies the contents of the lacuna.

procedure while *a*, if it is taken as both distinct and paired with *b*, implies that the ape is not apodeictically superior to the pig. So, Galen's use of and advice regarding the use of swine is not relevant on apodeictic grounds, only on epideictic ones, which this distinction between *a* and *b* nicely draws out. And, in fact, Galen expands on this advice in the later books of AA,

I say, then, that for this purpose you must procure either a pig or a goat, in order to combine two requirements. In the first place, you avoid seeing the unpleasing expression of the ape when it is being vivisected. The other reason is that the animal on which the dissection takes place should cry out with a really loud voice, a thing one does not find with apes. Make this experiment, of which I wish to tell you, upon a young fresh animal and afterwards upon old and decrepit ones. For in that way you will discover a remarkable contrast and a great difference between the young and the worn-out animals. But as for what concerns the vivisection itself, it should proceed on both animals in all details after the same fashion (trans. Duckworth).²¹⁶

References to the performative context of the procedures, including their audience, strongly suggest that *ιδίᾳ* not be taken as meaning 'private' in any strict sense.

The distinction between semi-private and public (*ιδίᾳ τε καὶ δημοσίᾳ*) displays form one of the central examples in Heinrich von Staden's articles on the performative context of Galen's anatomical displays, which are themselves only two of a very few publications specifically on the context of these displays.²¹⁷ In particular, von Staden focuses on this distinction between private and public audiences and its relation to the

²¹⁶ AA IX.11.18

²¹⁷ E.g., von Staden (1995a) and Gleason (2009)

display culture commonly associated with elite practice among intellectuals in the second century, often referred to by the somewhat vexed term "Second Sophistic",²¹⁸

Not only the technical terminology used to describe his public performances and the central role of the distinction between 'public' and 'private' in his professional self characterization, but also the larger cultural ideal within which Galen situates his public exhibitions therefore has its sophistic counterpart.²¹⁹

To add to von Staden's observations on the connotations of the terms Galen uses in his distinction, *idia* and *demosia* (ἰδίᾳ τε καὶ δημοσίᾳ), it is worth noting how little the context of the passage quoted above from AA lends itself to a view of *idia* as being in any strict sense "private". The private procedure Galen describes his coterie as attending is still conducted before an audience, albeit a smaller one made up of a more select circle. For example, this excerpt from the passage at AA II 690 quoted earlier, "*You all have seen (ἐθεάσασθε) me demonstrate (δεικνύντα) this very thing to you all often in private (ἰδίᾳ) but also in public (δημοσίᾳ)*",²²⁰ shows that *idia* connotes the exclusivity of the audience rather than the exclusion of any audience at all. And, while there is not enough

²¹⁸ Cf. Whitmarsh (2005), (2001); Swain (1996); Gleason (1995); Anderson (1993), etc. The question of what if anything substantive the "Second Sophistic" means is not material to this dissertation. Von Staden (1995a) and (1997) note the difficulty with the phrase and opts to put the issue of the "Second Sophistic" to one side, as does this dissertation.

²¹⁹ von Staden (1997: 47). Also, immediately following this excerpt, cf. "'Public performance' implies an audience, and this gives rise to the question whether Galen's public audiences were, in his perception or depiction of them, similar to those of his sophistic contemporaries in any respect. Several suggestive affinities with the 'Second Sophistic' emerge from an examination of Galen's remarks about the size, composition, and reactions of his audiences. First, like the sophists, Galen, according to his own testimony, at times performed in front of large crowds. Whether or not such autobiographical remarks about the size of his audience, like other autobiographical comments introduced above and below, are merely self-serving and therefore should be subjected to the hermeneutics of suspicion to which some modern critics tend to subject all remarks in the first-person singular, is not decisive for present purposes, since at issue here is principally Galen's self-presentation and its relation to sophistic self-staging."

²²⁰ AA II 690, ὅπερ οὐ μόνον ἰδίᾳ πολλάκις ὑμῖν, ἀλλὰ καὶ δημοσίᾳ δεικνύντα με ἐθεάσασθε.

evidence to say how large an audience constituted such a semi-public event, Galen's tendency to differentiate between his audiences on the basis of their erudition suggests that these semi-public gatherings were more likely to be made up of an elite audience.

Galen's advice to use swine rather than apes along with his use of the second person plural (ἐθεάσασθε) and a temporal adverb that stresses the implied reader's repeat presence at these demonstrations (πολλάκις) argues that visceral epideictic effects were not a tool Galen used exclusively to make an impression on an unwashed audience. While he avoids using the ape for the affect it may have on the audience, the fact that this is an operative criterion for his choice of subject shows the concern Galen had for the performative dimensions of his anatomical demonstrations. This deep concern is further expressed by his alternative to the ape, the pig, which is itself chosen for dramatic effect. While performing the procedure on a pig avoids the risks that an ape's humanlike expression will disgust the audience, the pig's squealing and dramatic exsanguination are intended to arrest the audience's attention. One might even conjecture that practiced observers were not the norm even in Galen's semi-private demonstrations, since the aesthetic disadvantages of the ape would likely have less effect on an expert audience.

These passages bear on the range of persuasive registers through which Galen communicated. While certain observers, such as the coterie of philosophers and physicians that attend a truncated version of this display in *Praen.*, might have had access to a causally explanatory account of the procedure, it is very probable that these *cognoscenti* were not the only audience members present at public anatomical displays,

certainly the ones conducted *demosia*.²²¹ What, then, of the audience-goers who were in attendance and would not have propositional knowledge of Galen's anatomical proofs?²²² These audience goers are convinced largely by the spectacle of the event, which is again not to say that the *cognoscenti* were immune to Galen's showmanship.

Regardless of the number of attendees present, it is clear from the audience Galen writes into his texts that the audiences in these displays are stratified into layers whose boundaries are determined by the audience-goers' relative cultural education, their *paideia*. Certain elements of the displays are accessibly only to the intellectually elite, the *pepaideumenoi*, while others are accessible to decreasingly educated rings of attendees. Consider, for example, the clever frame by which Galen reveals esoteric prognostic information about the pulse to the reader in *Praen* XIV 617,

And so when I arrived, not waiting for me to sit down, he stretched out his hand then asked me to feel his pulse. And after it was taken, he eagerly asked what I had to say. And, grinning, I said, "What else, other than things are good?" He said, "Tell me specifically what these things are." And I said, "Isn't it enough for you to be happy in what's to come after hearing a general summary (τὸ κεφάλαιον αὐτὸ ἀθρόως)?" "Not in the slightest!" he said, "For I also want to hear a step by step account (τὰ κατὰ μέρος)." "Then listen: this evening you will completely let go the entire morbid condition. After you have let it go, the resolution of all the symptoms connected to it and the ones to come will follow." I also said that the nature maintaining his body had already become active and was at work to expel everything toxic in him, that is in the humors in his body, from his body. "What do you mean that this has been made clear to you by nature? As it obviously didn't tell you these things by speaking, answer

²²¹ Cf. *Praen*. XIV 627 and 629. Present at the aborted demonstration were Boethus, Alexander of Damascus, Adrian of Tyre, and Demetrius of Alexandria. Sergius Paulus, Claudius Severus, and Vettulenas Barbarus join the later demonstration along with, Galen tells us, most of the *pepaideumenoi* in Rome.

²²² For a discussion of the relative size of these performances, see von Staden (1995a) and (1997). He comes to no final conclusions about the absolute size of the audience. The exact number of audience-goers, however, does not fundamentally affect the terms of the discussion.

me. For you know well that I can follow your reasoning (τῷ λόγῳ) better than all these stupid doctors."²²³

As frequently occurs in his writings, Galen initially appears to have worked some medical wonder. The explanation for Galen's prognosis and, encoded in that explanation, the evidence that Galen has a method or account (a *logos*) for his practice of medicine is prompted by Eudemus. In the last line of this quotation, Galen-the-author has Eudemus ask Galen-the-character to divulge the explanation for his prognosis, an explanation that the incompetent and poorly educated physicians present could not hope to comprehend. Later, after Galen has given this explanation, Eudemus applauds him by adding, "you have logically (διαλεκτικῶς) laid out the inferences (συνελογίσω) that led you to a discovery of this prognosis" (XIV 618). That is, even if Galen's method is not apparent to the unwashed, to the truly erudite his method is a clear inferential movement from indicative sign to successful prognosis. Eudemus' role at this point in the story is threefold: prompt Galen the magician to reveal his secrets, be praised implicitly as one of the intellectual inner circle who can comprehend his method, and finally to emphasize the practical and intellectual failings of those doctors present who do not comprehend Galen's method.

²²³ *Praen.* XIV 616-617, ὥς δ' οὖν ἀφικόμεν, οὐδὲ καθίσει με περιμείνας ἐξέτεινε τὴν χεῖρα, κελεύων ἄψασθαι τῶν σφυγμῶν. ἀψαμένου δὲ μετὰ σπουδῆς ἐπυνθάνετο τί ποτε ἀγγέλλοιμι. κἀγὼ μειδιάσας, τί ἄλλο, ἔφην, ἢ ἀγαθὰ; ποῖα, εἶπε, ταῦτα εἰδικῶς μοι φράσον. ἐγὼ δ', οὐκ ἀρκέσει, ἔφην, σοὶ τὸ κεφάλαιον αὐτὸ ἀθρόως ἀκηκοότι χαίρειν ἐπὶ τοῖς ἐσομένοις; οὐδαμῶς, εἶπεν. ἀκοῦσαι γὰρ ποθῶ καὶ τὰ κατὰ μέρος. ἄκουε δὴ· ἀπαλλαγῆση τῇ νυκτὶ ταύτῃ τελέως ἀπάσης τῆς νοσώδους διαθέσεως, ἣς ἀπαλλαγείσης, τῶν τ' ἐπιγενομένων καὶ τῶν ἐσομένων αὐτῇ συμπτωμάτων ἀπάντων ἢ λύσις ἀκολουθήσει. καὶ τοῦτ' ἔφην ἄρτι μοι διὰ σφυγμῶν δεδηλωκέναι τὴν διοικοῦσάν σου τὸ σῶμα φύσιν ἐπεγηγερμένην ἤδη καὶ κινουμένην, ὥς ἐκβαλεῖν ἐκ τοῦ σώματος ἅπασαν οὖσαν ἐν σοὶ μοχθηρίαν τὴν ἐν τοῖς κατὰ τὸ σῶμα χυμοῖς. πῶς οὖν δὴ παρὰ τῆς φύσεως τοῦτο λέγεις σοὶ δεδηλωσθαι; οὐ γὰρ δὴ φθεγξαμένη γε ταῦτ' εἶπε, ἀπόκριναι μοι, πάντως γὰρ οἶσθα παρακολουθήσαντά με τῷ λόγῳ μᾶλλον ἀπάντων τούτων ἰαλέμων ἰατρῶν.

GALEN AND AGONISTIC GREEK MEDICINE

The foregoing sections have laid out some of the performance dimension that Galen hardwires into his anatomical procedures and his accounts of them. Galen is argumentative. Even the casual reader of Galen will quickly come to notice the apparently bilious character of his work. Given the level of agonism present in many Greek medical texts from the Classical period onward *and* given the degree to which authors of Greek intellectual texts in the Late Roman period exhibit similar levels of polemic in their own work,²²⁴ it is unclear how much of Galen's polemic is a product of the generic norms of second century intellectual writing and how much of it is a product of Galen's own attitudes, to the extent that the two questions are distinct. But, none of the above changes the brute fact of Galen's seemingly ever-present polemic.

Although various scholars have commented on Galen as a bellicose author,²²⁵ his aggressive engagement with contemporary and antecedent rivals should on its own warrant no real surprise for readers accustomed to frequent agonistic features of texts in, for example, the Hippocratic Corpus.²²⁶ The degree of Galen's agonism is unusual. And, although it is never wholly absent, Galen varies the intensity of this polemic engagement with his predecessors and contemporaries both from treatise to treatise and from author to author. One telling linguistic marker of this latter sort is Galen's evaluative description of

²²⁴ See, e.g., the work of Lucian especially but also Aelius Aristides, Dio Chrysostom, and Herodes Atticus.

²²⁵ See Nutton (2012: 39-47); (2004: 238-9 *et passim*); (1991); Lloyd (2008: 34-45); Mattern (2008: 7-26, 69-97); Fleming (2000: 255-88); von Staden (1995); (1997); Barton (1994: 147-9 but ch. 3 generally); Temkin (1973); Smith (1979); Singer (1956: xxiii)

²²⁶ Cf., for example, the Hippocratic texts *Nat.Hom.*; *Vet.Med.*; *Morb.Sacr.*; *Art.*; *Flat.*; *et passim*.

a given predecessor as either one of the class of ancients (παλαιῖοι) or one of the class of later (νεώτεροι) and therefore less august intellectuals.²²⁷ In some cases, as in his treatments of Chrysippus, the same author can in one context be marked for abuse and in another context be marked for respect.²²⁸ The tenor of AA is markedly more subdued in its polemic than other Galenic works (cf. *Praen.* or the first two books of *Meth.Med.*); but, the agonistic if not tendentious quality common in ancient Greek medical writing, and generally in Greek intellectual prose, still occurs with some frequency.²²⁹

The agonism of the Greek medical tradition preceding Galen had its roots in sophistic debates from at least the Classical period onward. Intellectuals of the second century CE, in which Galen is mostly active, took this intellectual disputation to a fever pitch.²³⁰ In fact, it is sometimes difficult, if not anachronistic to find a clear line of demarcation between medical and sophistic debates. The haziness of drawing a substantive distinction between medicine and sophistic extends to philosophy as a

²²⁷ Galen's generally positive opinion of his Classical past, especially the past associated with Athens, is of a piece with the Atticizing tendencies of other intellectuals of the second century in particular, regularly discussed under the general heading of second-sophistic antiquarianism. Often his distinction between authors who are παλαιῖοι and νεώτεροι corresponds to our distinction between Classical and Hellenistic authors, although in Galen it is regularly an evaluative not just a temporal distinction. That is not to say, however, that this use represents a wholesale endorsement of anything classical or a rejection of anything Hellenistic. So, for example, Galen is quite critical of the classical atomists for their non-teleological accounts of the natural world. Alternately, he frequently praises the Hellenistic anatomist Herophilus for his anatomical discoveries. Especially in cases where Galen criticizes a classical author or less consistently when Galen praises a later author, he simply does not refer to the classical author as *palaaios* or the later author as *neoteros*. That is, forms of "παλαιός" in Galen's usage as a rule imply a positive evaluation of an author and forms of "νεώτερος" a critical one.

²²⁸ See, Frede (1985: xviii)

²²⁹ For a general statement of this phenomenon in Greek intellectual writing, see Lloyd (1979: 86-98). Lloyd (1979: 246-264 and *passim*) explains this phenomenon as partly consequent on the appearance of professional rhetoricians, whose rise accompanied the emergence the *polis* in the ancient Greek world starting in the 5th century BCE. He explains a correlated phenomenon, the prevalence of authorial self-reference, which he calls Greek "egotism", as a product of this agonistic tendency (see Lloyd 1987: 56-70).

²³⁰ For the classical context, see especially Lloyd (1979: 59-125); for sophistic debate and medicine in the second century see, for example, Gleason (2007); (1995); and von Staden (1995).

socially distinct pursuit, is apparent from the tension between philosophy and rhetoric throughout the Platonic corpus. For example, Philostratus, whose *Lives of the Sophists* also provides the provenance for the somewhat vexed phrase "Second Sophistic" and who was writing at the tail end of Galen's life, treats differences between so-called sophistical rhetoric and philosophy as a matter of method rather than as a matter of substance,

It is necessary to consider ancient sophistical rhetoric as doing philosophy, since it engages in discourse on the same sorts of things as those who do philosophy; but, the philosophers, setting their questions as traps and advancing the minutiae of their investigations say how they do not know things, while the ancient sophist speaks as though he does know.²³¹

That is to say, there was a rich tradition extending from the Classical period through the Late Roman Empire of a close relationship between the practices of medicine, philosophy, and rhetoric. This observation is not itself controversial. It is necessary, however, to flesh it out in order to provide both a historical background for certain characteristic features of Galen's work and a baseline against which to compare innovative argumentative strategies in Galen's writing.

In *Magic, Reason, and Experience* and elsewhere, G.E.R. Lloyd has documented a correlation between the emergence of increasingly systematized Greek rhetoric in the 5th-4th century BCE and growing Greek interest in investigation of the natural world, including the medical works of the Hippocratic Corpus.²³² Lloyd's observations on the

²³¹ VS 481: Τὴν ἀρχαίαν σοφιστικὴν ῥητορικὴν ἡγεῖσθαι χρὴ φιλοσοφοῦσαν· διαλέγεται μὲν γὰρ ὑπὲρ ὧν οἱ φιλοσοφοῦντες, ἀ δὲ ἐκείνοι τὰς ἐρωτήσεις ὑποκαθήμενοι καὶ τὰ σμικρὰ τῶν ζητουμένων προβιάζοντες οὕτω φασὶ γινώσκειν, ταῦτα ὁ παλαιὸς σοφιστὴς ὡς εἰδὼς λέγει.

²³² Lloyd (1979: 86-101) lays out the relation of medicine, the Hippocratic Corpus in particular, with 5th century rhetoric. I do not engage with Lloyd's more speculative accounts of Greek interest in the natural

relation between rhetoric and other intellectual pursuits in the Classical period detail the deep influence that disputative rhetoric had on philosophical and medical authors, as mentioned in greater detail in chapter 1.²³³ After the Classical period, the sectarian debates between Dogmatists and Empiricists bears witness to the persistence of this feature in Greek intellectual thought in the Hellenistic period, for which see chapter 2. And, by the late Roman period, the agonistic character common to intellectual interaction and authorship, already a traceable feature for over five hundred years, was compounded by the antiquarianism of Greek intellectuals in the second century, on which more shortly.²³⁴

Galen is not at all coy about competitive language and metaphor in his work. He is often explicit about intellectual activity as a struggle. Examples of medicine as an athletic *agon* abound in his corpus. Consider, for example, Galen's introductory comments to his treatise *Opt.Med.*, on how the best doctor should also be philosophically trained,

world and non-mythological explanations of it to a byproduct of the emergence of the Greek democracy and the *polis*.

²³³ For the blurred lines between medicine and philosophy leading up to and including the Classical period, see, for example, Lloyd (1968: 78-92), Lloyd (1979: 135, 146-9, *et passim*), Lloyd (1983: 86-110), and Lloyd (1987); Mudry (1982: 63-5); Edelstein (1967); Burnet (1945); *et passim*. For Lloyd on the agonistic quality of Greek medicine generally, see Lloyd (1979: 246-264), Lloyd (1987: 78-108), Lloyd (1990: 130-144).

²³⁴ I intentionally leave aside mention of the 'Second Sophistic' for the moment. Although the phrase makes appearances later in my work, this chapter is concerned primarily with establishing that Galen's anatomical displays have certain performative features in common with other traditionally 'non-technical' or 'literary' texts written in the late Roman Empire. Whether these texts and their authors form a temporal, cultural, or literary movement is not directly relevant to this chapter's discussion of the argumentative strategies that anatomical anecdotes, as *epideixeis*, play in AA. For the 'Second Sophistic' and the debates on its nature and reference (if any), see generally Whitmarsh (2005), (2001); Taplin (2000); Schmitz (1997); Swain (1996); Gleason (1995) and Anderson (1993). Bowersock (1969) sets the stage for these subsequent discussions, although its views on the quality of writing and intellectual culture in the late Roman Empire as primarily derivative and, therefore, second-rate have rightly aged poorly.

Many athletes are afflicted with this sort of thing: although they desire to become Olympic victors, they do not make an effort to act so as to achieve this. This sort of thing also happens to many doctors. For although they praise Hippocrates and consider him first among all [doctors], they do everything but this to make themselves like him as much as possible.²³⁵

This passage highlights the dedication to training Galen expects in the doctor as well as the agonistic context in which the second century physician practices. Laziness and incompetence, for Galen, run rampant among Roman physicians and he often characterizes his contemporaries as suffering from both failings.²³⁶ The prize goes to the physician who has trained assiduously. This notion of a prize, natural in athletic competitions, is imported into medical activity. For Galen, physicians, like athletes, compete in a public arena where there are winners and losers. Nutton has called this transactional and unregulated arena a 'medical marketplace'.²³⁷

It is worth recalling here that in the Greco-Roman world, the physician was not credentialed by anything like a licensing body, a point often made by Nutton.²³⁸ There were no medical schools, in the contemporary sense of an institution that formally educated its students and then endorsed them as keeping to certain medical standards. Nutton's point in Nutton (1992) is that medical authority and legitimacy from the Classical period to the Late Imperial period were largely acquired through displays of

²³⁵ *Opt. Med.* I 53, Οἷόν τι πεπόνθασιν οἱ πολλοὶ τῶν ἀθλητῶν ἐπιθυμοῦντες μὲν ὀλυμπιονίκαι γενέσθαι, μηδὲν δὲ πράττειν ὥς τούτου τυχεῖν ἐπιτηδεύοντες, τοιοῦτόν τι καὶ τοῖς πολλοῖς τῶν ἱατρῶν συμβέβηκεν. ἐπαινοῦσι μὲν γὰρ Ἱπποκράτην καὶ πρῶτον ἀπάντων ἡγοῦνται, γενέσθαι δ' αὐτοὺς ὥς ὁμοιοτάτους ἐκείνῳ πάντα μᾶλλον ἢ τούτο πράττουσιν.

²³⁶ For an extended diatribe against the moral and professional failings of Roman physicians in Galen's day, see *Praen.* XIV.599-603. For the jealousy and the desire for fighting consequent on the competence of other legitimate physicians, see, e.g., *Praen.* XIV.604-6.

²³⁷ Nutton (1992: 15-58)

²³⁸ E.g., Nutton (1992: 26). Cf. also, Edelstein (1967: 65-85).

knowledge, successful engagement with rival physicians, and treatment of patients that was perceived to have been successful. In short, medical authority was partly a function of one's success in the medical marketplace. Victories in this marketplace depend, in part, on the successful treatment of the patient but they are not simply reducible to the patient's health subsequent to treatment. It was necessary for the physician to establish a causal connection between the treatment and its positive outcome and conversely to create a distance between treatment and any negative outcomes.

The physician was sufficiently aware of these demands that medical authors regularly comment on implicit performative criteria by which they are evaluated.²³⁹ That is, the perceived success of any treatment hinged on how the physician was determined, in many cases publicly, to have influenced patient health. It was necessary for the physician to have been *judged* effective. To this end, public diagnosis, prognostication, and treatment with the right sort of account all played a role in the physician's perceived success. Treatment was a competition not only against the disease but also against rival physicians, who in the Greco-Roman world often vied against one another in both public and semi-private arenas for their clientele.²⁴⁰

²³⁹ So, for example, the prescriptive Hippocratic texts *Dec.* and *Prec.*, both of which are generally dated to the Hellenistic period. Anxiety over legitimacy and charlatanry is also a common theme in ancient medical texts, for which see, as a sample, the primary sources: *Nat.Hom.*, *Vet.Med.*; *Sacr.Morb.* See also, for example, Dean-Jones (2003); Nutton (1992); Lloyd (1983); (1979); *et passim*.

²⁴⁰ For the image of the physician contending with disease, cf. *MM* X 612, where Galen is said to butcher a fever against which he is fighting, and *passim*.

PUBLIC DISPLAY

The public nature of many of these contexts cannot be overstated. In the Roman period, intellectuals would engage in open debates on a range of topics, among which were medical issues. Some of these public debates were practical in nature while others were wholly theoretical, although the two categories overlapped in the case of anatomical demonstration, as will be discussed.²⁴¹ The performative or *epideictic* element of these demonstrations is a common feature of intellectual culture of the late Roman Empire and belongs to a cluster of characteristics that appear in Galen's work more generally and in his anatomical accounts specifically (e.g., antiquarianism and the fetishization of Attic prose, agonistic and public intellectual debates, and so on).

Let us consider, for example, a passage in Galen that bears on one of these public intellectual debates (*meletai*). It echoes the failure of many physicians to train adequately, as mentioned in *Opt.Med.* above, and involves the desperate response of certain contemporary Erasistrateans to Galen's arguments for the presence of blood in the arteries in *Art.Sang.*,

Although I (ἐγὼ) had supposed that they would offer no rebuttal (ἀντιλέξειν) to these [refutations] and that they would come to understand the things that they had formerly misunderstood, they show no willingness to do so; rather, just as in wrestling rank amateurs cling to the neck[s] of those who have thrown them and do not permit them to stand upright, since sometimes they do not realize that their back[s] are lying on the ground, in the same way these [Erasistrateans], as they are ignorant of the falls in arguments (ἐν τοῖς λόγοις), do not permit [me] to be free while they turn out some trick or another, always new, ducking and dodging until anyone would leave, disgusted (μισήσαντά) and exasperated

²⁴¹ On the agonistic and public contexts of anatomical displays see especially, von Staden (1995) and Gleason (2007). For medical demonstrations as spectacles, see also Vegetti (1979).

(ἀποδυσπετήσαντα) at their shamelessness compounded with their ignorance.²⁴²

This quotation is of a piece with Galen's attitude toward argument throughout the corpus, although this attitude is not proprietary to him. While the passage is not specifically an example of rival anatomical displays, Galen characterizes his intellectual engagement with the Erasistrateans in terms of athletic struggle. Opponents whose arguments fail to pass muster are intellectually pinned or thrown to the ground. Due in part to lack of experience and often due to their professional failings, these opponents often fail to realize that they have been refuted, as amateur wrestlers may continue to snatch at the necks of the professionals who have already thrown them onto their backs.

Galen's language underscores the identification of argument with *agon*; the Erasistrateans fail to recognize their defeat because they are ignorant of the *falls in arguments* (ἀμαθείς ὄντες τῶν ἐν τοῖς λόγοις πτωμάτων). In some cases, as above, the intellectual incompetence of his interlocutors is compounded by their ethical inadequacies. Galen implies that his opponents' ignorance is willful. The Erasistrateans desperate attempts to avoid a legitimate fall disgust any reasonable opponents with their shamelessness (μέχρι τοῦ μισήσαντά τινα τὴν τ' ἀναισχυντίαν); the shame that the loser ought to feel and whose public exposure is a necessary condition of the winner's

²⁴² *Art.Sang.* IV 717, Πρὸς ταῦτ' ἐγὼ μὲν φόβην αὐτοὺς μήτ' ἀντιλέξιν μηδὲν μαθήσεσθαι τε τὰ κακῶς ἐγνωσμένα. οὐ μὴν ἐθέλουσί γε, ἀλλ' ὥσπερ οἱ παντελῶς ιδιώται παλαισμάτων οὐ γνωρίζοντες κείμενον ἐπὶ γῆς ἐνίοτε τὸν νῶτον αὐτῶν ἔχονται τραχήλου τῶν καταβαλόντων οὐδ' ἐπιτρέποντες ἀναστήναι, τὸν αὐτὸν τρόπον καὶ οὗτοι ἀμαθείς ὄντες τῶν ἐν τοῖς λόγοις πτωμάτων οὐκ ἐπιτρέπουσιν ἀπαλλάττεσθαι καινὰς τινὰς ἀεὶ στροφὰς στρεφόμενοι καὶ παντοίως λυγιζόμενοι μέχρι τοῦ μισήσαντά τινα τὴν τ' ἀναισχυντίαν ἅμα καὶ τὴν ἀμαθίαν αὐτῶν ἀποδυσπετήσαντα χωρισθῆναι.

completed victory is a recurring theme in these bouts. In this case, as elsewhere, Galen implicitly figures the reader as a member of his coterie and as an arbiter, who is drawn into the narrative to judge Galen the winner of a medical contest.

And whereas the simile above emphasizes intellectual incompetence, elsewhere Galen places ethical failure in the foreground. So, for example, the case of an Asclepiadean in *Purg.Med.Fac.*, who Galen claims has run away before submitting himself to Galen's arguments,

At once he seemed to his fellow Bacchants as the sort of man who spoke well and they began applauding him while he made his exit, leaving us behind, clearly knowing I suppose that he was about to be refuted (ἐξελεγχθήσεται). On the following day a book was given to his retinue (χορευταῖς) by us, in which was a refutation (ἔλεγχος) of the things he had claimed so unexpectedly in this way. Nor was that man ever again as convincing to them since he was at a loss (ἀπορῶν) as to how to answer its challenges (τὰ προβεβλημένα) as this here had been written in the book, "Yesterday you dodged our debate (λόγον), making like a competitor (ἀγωνιστῇ) snatching the crown (στέφανον) and fleeing before even competing (ἀγωνίσασθαι), but today you will not escape my refutation (ἔλεγχον); for this little book, which has fallen into the hands of the retinue (χορευταῖς) around you, will follow you. For its argument is something no less for them than for you, for those who did not hear you concede (to me) earlier that..."²⁴³

Galen claims that this interlocutor, like the Erasistrateans of *Art.Sang.*, fails to engage with him sincerely. Unlike the Erasistrateans, it is precisely because this Asclepiadean

²⁴³ *Purg.Med.Fac.* XI 332, παραχρήμα μὲν οὖν ἔδοξε τοῖς θιασώταις ὁ τοιοῦτος εὖ λέγειν καὶ πάντες ἐπεβόων αὐτῷ καὶ δρόμῳ πολλῷ καταλιπὼν ἡμᾶς ἀπηλλάττετο γινώσκων, οἶμαι, βεβαίως, ὅτι μένων ἐξελεγχθήσεται. δοθέντος μέντοι κατὰ τὴν ὑστεραίαν ὑφ' ἡμῶν τοῖς χορευταῖς αὐτοῦ βιβλίου τινός, ἐν ᾧ τῶν οὕτως ἐξαίφνης ἀποτετολμημένων ἦν ἔλεγχος, οὐκέτ' οὐδέποτε αὐτοῖς ἐκεῖνος ἔθ' ὁμοίως ἢν πιθανὸς ἀπορῶν διαλύσασθαι τὰ προβεβλημένα. ταυτὶ γὰρ ἐνεγέγραπτο τῷ βιβλίῳ· χθὲς μὲν ἀπέδρας τὸν λόγον ὁμοίον τι ποιήσας ἀγωνιστῇ τὸν στέφανον ἀρπάσαντι καὶ φυγόντι πρὶν ἀγωνίσασθαι, τήμερον δ' οὐκ ἐκφεύξῃ τὸν ἔλεγχον· ἀκολουθήσει γάρ σοι τοῦτ' ἐν τῷ βιβλίδιον εἰς τὰς χεῖρας ἐμπεσὼν τῶν ἀμφί σε χορευτῶν· οὐδὲ γὰρ ἡττόν τι πρὸς ἐκείνους ὁ λόγος ἐστὶν ἢ πρὸς σε, τοὺς οὐδέποτε μὲν ἔμπροσθεν ἀκηκοότας σοῦ συγχωροῦντος...

knows he is about to be refuted that he steals the prize without having contested for it. In both cases, which are of a type not unusual in Galen's work, debate is figured in terms of a competition in which spectators, both internal and external to Galen's account, observe and join in adjudication. The event is largely public and the opponents strive for a prize, which in medical contexts can range from reputation, to the clientele that can be gained from that reputation, and even to a tangible award.

Let us consider, for example, *Praen.* XIV 641-7, where Galen reports that he was awarded 400 *aurei* for curing the wife of Flavius Boethus. Throughout his corpus, Galen is disdainful of physicians who work for fees. Nutton, commenting on this passage in Nutton (1979: 179-80), first sketches out the sorts of fees that high-end physicians could command in the Roman period, although evidence is more threadbare for the later Imperial period in which Galen writes. As a *comparandum*, consider the thousand drachma wager, to which I will return, made by Galen's *hetairoi* against a rival physician at AA II 642. Quite apart from making the point that these are forbiddingly large sums of money except for the wealthiest of Romans, it is worth addressing the issue of awards in response to a series of questions Nutton asks,

This section on the desire of immigrant doctors for gain and their general unfitness is a major example of Galen's inconsistency. He attacks foreigners who come to Rome, though he is one himself: he criticises their greed for gold, but rejoices in the money he gets from Boethus. *Is this rhetorical nonsense? or a display of thick skinned indifference to the opinions of others? or a sign of Galen's psychological confusion?* In trying to solve this problem, we should not forget that moralising had entered into the writing of autobiography... and such a motif, the revelation of one's own righteousness and virtue, could well have been traditional.²⁴⁴

²⁴⁴ Nutton (1979: 180)

In both the case of the thousand drachmae wager and the four hundred *aurei*, the surrounding competitive context suggests that the amount of money involved or that any money is involved at all is less important than that there is some valuable prize for which medical opponents contend. Hankinson (2008: 23-4) is sympathetic to this point, although Hankinson implies that the relevant explanation for the apparent inconsistency in Galen's attitude toward money has to do with the ends of competition, as for example in Galen's discussion of *eris* in *MM* X 5-7. There, in a clear allusion to the opening lines of Hesiod's *Works and Days*, Galen writes that competition for the sake of truth is healthy while competition for the sake of worldly ends is despicable.²⁴⁵

The degeneracy of the interest of his rivals in competition recurs thematically. Consider *Praen.* XIV 600, which belongs to the diatribe against Roman physicians that begins *On Prognosis*. Before reiterating the precise complaint from *Opt.Med.* I 53, that many physicians desire glory while having an inversely proportional desire for training, Galen charges the physicians at Rome (here he emphasizes the Methodists) with failing to recognize the true reward of medical practice in light of the distractions of money and social influence,

"[b]y all these things, sometimes by pleasing and sometimes by amazing people lacking enough experience for true discernment in these matters, they gain abundant rewards (ἀγαθῶν πολλῶν), so *they* believe; I would rather say that have not [gained] real rewards (τῶν ὄντως ἀγαθῶν) but only those they have falsely taken to be so."²⁴⁶

²⁴⁵ *Works and Days* 11-24

²⁴⁶ *Praen.* XIV 600 ἐκ τούτων οὖν ἀπάντων τὰ μὲν ἡδοντες, τὰ δ' ἐκπλήττοντες ἀνθρώπους ἀπείρους ἀληθινῆς κρίσεως πραγμάτων, ὡς μὲν οὗτοι νομίζουσιν, ἀγαθῶν πολλῶν τυγχάνουσιν,

The language of the sophistic competitions of the second century also peppers the passage from *Purg.Med.Fac.* The Asclepiadean is at a loss (ἀπορών) as to how to respond to the topic of debate proposed to him (τὰ προβεβλημένα). These proposed topics of debate (προβλήματα) are a commonplace of public intellectual competitions in the second century, in which a topic is chosen for the speaker to debate extemporaneously (αὐτοσχεδόν) in front of a crowd (δημοσίᾳ).²⁴⁷ In Galen's work, some of the most frequent topics for public debate are anatomical displays and doxographical exegesis.

ANTIQUARIANISM AS A MEANS TO INTELLECTUAL AUTHORITY

Doxographical exegesis, which was often philological in character, was one form of antiquarianism common to intellectual culture in the high Roman Empire. And Galen was, at least in this respect, representative of his times. His antiquarian interests are manifest not only in his lexicographical works and his frequent comments on Attic style but also in the careful attention he pays to his own usage, which cultivates Atticism without enslaving itself to it.²⁴⁸ Throughout his works references to the past, to intellectual

ὥς δ' ἐγὼ φαίην ἂν οὕτως ὄντων ἀγαθῶν ἄλλων, αὐτοὶ ψευδῇ ὑπελήφασιν. If this passage recalls the famous distinction between being good rather than seeming good, it is intentional. In the opening lines of *On Prognosis*, Galen deploys just that apophthegm, XIV. 599: ἀφ' οὗ γὰρ οἱ τὸ δοκεῖν μᾶλλον ἢ εἶναι σπουδάσαντες οὐ κατὰ τὴν ἰατρικὴν μόνον, ἀλλὰ καὶ κατὰ τὰς ἄλλας τέχνας ἐπλεόνασαν...

²⁴⁷ See, e.g., Gleason (1995), (2009); Swain (1996); Whitmarsh (2005); von Staden (1995a), (1997).

²⁴⁸ See, e.g., Morison (2008), Petit (2012)

antecedents, abound.²⁴⁹ Galen generally refers to earlier authors in order to underwrite his own intellectual authority or to undermine the intellectual authority of his rivals; of course, the two strategies are not mutually exclusive. Hippocrates and Plato are frequent points of reference for Galen. And, while Galen appeals straightforwardly to the authority of both authors in some contexts, in others it becomes necessary for him to reconcile their views with his own in order to maintain a relatively seamless connection with the past.²⁵⁰

Interpretation of the right sort plays as powerful a role in undercutting his rivals as it does in endorsing himself. Interpretation is a competitive act, in which Galen and his contemporaries struggle against one another logically and philologically in order to establish their *bona fides* as interpreters of the past.²⁵¹ And so, one common tactic in Galen's writing is to explain by a critical examination of a contemporary author's work, how he fails to interpret correctly the authorities to whom he appeals. After Galen has made the case that his contemporaries misread the author(s) on whose authority they rely, he then engages in a second examination of that source, intended to show that it is in some way flawed.²⁵² Consequently, his rivals not only fail to interpret their intellectual antecedents correctly but also appeal to predecessors whose beliefs are fundamentally mistaken.

What Galen claims to have been an example of a public exegesis survives as *On Venesection against Erasistratus* (*Ven.Sect.Er.*). In one of his two treatises devoted to

²⁴⁹ References to his predecessors abound. For a short piece on references to other authors in Galen, see Nutton (2009a: 19-34). See also, Smith (1979) and Sluiter (1995: 519-35) for Galen's engagement with Hippocrates.

²⁵⁰ See Smith (1979)

²⁵¹ See, e.g., Brunt (1994); von Staden (1995a), (1997); Lloyd (2008).

²⁵² Cf. Lonie's important article on Galen's use of Erasistratus, Lonie (1964: 426-43)

autobibliography, *Lib.Prop.*, Galen relates the events leading to this exegesis and one of the common mechanisms by which these debate topics might be proposed,

And once while I was speaking on the works of the ancient physicians in public (δημοσίᾳ), the [treatise] of Erasistratus on *On Bringing Up Blood* was proposed (προβληθέντος) to me and a pencil was placed in it according to the custom; and as it pointed to that part of the book in which he deprecates venesection, I said more against him in order that I might upset that self-styled Erasistratean Martialus.²⁵³

This episode is very likely the same as the one mentioned in *Ven.Sect.Er.Rom.*, which means the disquisition, to which he refers in the quotation above, is a version of *Ven.Sect.Er.*²⁵⁴ Regardless, in this passage Galen offers slightly more detail about the context of these debates. They were held daily, in front of a crowd, and involved a proposed question to be resolved. So, this scenario was not an *ad hoc* debate but a regularly planned performance to which speakers could come and deliver extemporaneous lectures. The mechanism Galen reports for determining the anatomical passage to be discussed, inserting a stylus into a book roll, implies that questions were taken somewhat at random. The passage from *Ven.Sect.Er.Rom.* also reveals at least some indirect information on the composition of some of Galen's treatises. Galen mentions that after he gave the speech, his associate Teuthras asked him to repeat the performance to a tachygrapher so that he might have a copy of it while traveling to Ionia.

²⁵³ *Lib.Prop.* XIX 14, καὶ λέγων γέ ποτ' εἰς τὰ τῶν ἱατρῶν τῶν παλαιῶν βιβλία δημοσίᾳ προβληθέντος μοι τοῦ περὶ αἵματος ἀναγωγῆς Ἐρασιστράτου καὶ γραφείου καταπαγέντος εἰς αὐτὸ κατὰ τὸ ἔθος, εἶτα δειχθέντος ἐπ' ἐκεῖνο τὸ μέρος τοῦ βιβλίου, καθ' ὃ τὴν φλεβοτομίαν παραιτεῖται, πλείω πρὸς αὐτὸν εἶπον, ὅπως λυπήσαιμι τὸν Μαρτιάλιον Ἐρασιστράτειον εἶναι προσποιούμενον.

²⁵⁴ Cf., for example, Brain (1986: 105-6) and Mattern (2008: 11)

Galen claims that after he complied, the book leaked out to a wider audience, for which leak neither he nor Teuthras were responsible.²⁵⁵

In *Art.Sang.*, it was precisely the Erasistrateans' shamelessness (ἀναισχυντίαν) compounded with their ignorance that most aroused Galen's exasperation. Similarly, in *Purg.Med.Fac.*, the Asclepiadean attempts to avoid the shame of loss by absconding with the prize on seeing that he cannot win the argument. But Galen will not have it. Even in his absence, Galen's refutation follows him, publicly announcing the outcome of their contest. For Galen it is not sufficient to be in the right, it is necessary that he be adjudicated the victor among the gathered onlookers who partly act as referees. The book he passes along to the Asclepiadean via the latter's *hetairoi* is more for them, after all, than it is for him (οὐδὲ γὰρ ἥττον τι πρὸς ἐκείνους ὁ λόγος ἐστὶν ἢ πρὸς σε...). The spatio-temporal context of the contest is a required ingredient for Galen to claim his prize. That is, the *agon* is held in public (δημοσίᾳ) and judged in part by the gathered audience that has proposed (προβληθέντος) the topic for debate. Galen's response at least has the patina of spontaneity, as the method of selection for the topic of debate precludes a thorough rehearsal. And, in the absence of Erasistratus himself, Galen's refutation is aimed at a surrogate for him, the Erasistratean Martialis.

²⁵⁵ This form of unregulated dissemination of Galen's ideas is a *topos* in Galen's references to many of his own treatises: cf. *Diff.Puls.* VIII 696; *MM* X 458; *Comp.Med.Gen.* XIII 362-3; *Hipp.Ed.* XVIIA 576; *et passim*. I include the Greek for the passage, *Ven.Sect.Er.Rom.* XI 194: συνέβη γὰρ πῶς ἐν ἐκείνῳ τῷ χρόνῳ καθ' ἑκάστην ἡμέραν εἰς τὰ προβαλλόμενα λέγειν ἐν πλήθει. προεβλήθη μὲν οὖν ὑπὸ τινος, εἰ δεόντως Ἐρασίστρατος οὐ κέχρηται φλεβοτομίᾳ. διήλθον δ', ὥς ἔδοξε τοῖς τότε ἀκούσασιν, ὠφελιμώτατον πρόβλημα. διὸ καὶ παρεκάλεσεν ὁ Τεύθρας ὑπαγορεῦσαι μεταλελεγμένα τῷ πρὸς αὐτοῦ πεμφθησομένῳ παιδί. καὶ γὰρ τοὶ καὶ μέλλων εἰς τὴν Ἰωνίαν ἐπιδημῆσαι καὶ ἐξορμήσασθαι πάντως ἔφασκεν ἔχειν αὐτὰ βούλεσθαι. ἐγὼ μὲν οὖν ἐπέισθην τε τῷ ἐταίρῳ καὶ τὸν λόγον ὑπηγόρευσα.

THE AGONISTIC CONTEXT OF ANATOMICAL DISPLAYS

While many of these public intellectual displays were wholly theoretical demonstrations, where the speaker would discourse on a point or engage with an interlocutor without recourse to evidence an audience could *see*, anatomical displays are also attested. Galen refers to these occasionally, primarily to showcase his own anatomical expertise and the corresponding failures of his opponents. And, although he usually does not offer many details on the occasion for these competitions, inscriptional evidence survives for some medical contests that were even state sponsored. So, for example, four different competitive medical events (σύνταγμα, χειρουργία, πρόβλημα, and ὄργανα), which were held yearly at the Great Festival of Asclepius at Ephesus in early to mid second century CE, are attested in the inscriptional record.²⁵⁶ Two of these categories, *problêma* and *cheirurgia*, argue for an existing tradition, in at least Asia Minor, both of adjudicated public surgical demonstrations and extemporaneous medical displays.²⁵⁷ Plutarch, a little over a generation older than Galen, already refers to doctors performing surgical or anatomical procedures in theaters as a means to gain employment.²⁵⁸

Rival physicians and especially rival Roman physicians are a common *bête noire*, who figure prominently throughout Galen's corpus.²⁵⁹ But, even if his prose is especially

²⁵⁶ *I.Eph* 1161-9, 4101b. Knibbe (1982: 136 n. 146) dates the inscription to the mid 130's.

²⁵⁷ See Nutton (2004: 211 and n. 72)

²⁵⁸ Plutarch *Mor.* 71a καλλωπιζόμενον πρὸς τοὺς παρόντας, ὥσπερ οἱ χειρουργοῦντες ἐν τοῖς θεάτροις ἰατροὶ πρὸς ἐργολαβίαν.

²⁵⁹ Cf., for example, *Praen.* XIV 599-605; the first two books of *MM*, against Methodists *MM* X 5-7; *Lib.Prop.* XIX 20-21; et *passim*.

rife with flamboyant criticism of his contemporaries and forebears, it is not clear that an ancient audience would have found this sort of criticism in itself out of place. Prima facie, this claim seems at odds with Galen's own words on the subject in AA and throughout many other texts, where Galen takes pains to assure the reader that he remains steadfastly above the fray, as for example in AA II 449-50. After mentioning Lycus' anatomical ignorance, he writes,

But it is not set before me to refute Lycus or any of my antecedents unless incidentally. For I know that the books of other authors will clearly appear [to be] full of every mistake to everyone who is industrious and eager to discover the truth... He [Lycus] is ignorant of many more of the things that will be stated next, some of which he alone [is ignorant], other things the others along [with him], things which I encourage those who encounter these sorts of writings to judge, becoming eyewitnesses (αὐτόπτας) of anatomical procedures. For I write this work for that reason, so that those who are industrious can teach themselves, if they lack someone to show them the way (τῶν δειξόντων), since my associates (ἐταίροί) who have encouraged me to write this work as a memorandum will be able to remind themselves of what has been taught to them by me without it, unless they turn to idleness. So I will leave off from refuting my antecedents for the sake of completing this account quickly, relating only true facts.²⁶⁰

Some features of this passages are worth lingering over. In particular, I would like to begin with a consideration of Galen's coda to the this quotation, where he says that he will leave off from criticizing (ἐξελέγγειν) his predecessors so that he may complete his

²⁶⁰ AA II 449-50, ἀλλὰ γὰρ οὐ πρόκειται μοι διελέγγειν οὔτε Λύκον, οὔτ' ἄλλον τῶν πρεσβυτέρων οὐδένα, πλὴν εἰ πάρεργον. οἶδα γὰρ, ὅτι παντὶ τῷ φιλοπονοῦντι καὶ τάληθές εὐρεῖν ἐπιθυμοῦντι παμπόλων ἀμαρτημάτων φανεῖται μεστὰ τὰ τῶν ἄλλων βιβλία... πολὺ δὲ πλείω τῶν ἐξῆς εἰρησομένων ἀγνοεῖ, τὰ μὲν οὖν αὐτὸς μόνος, τὰ δ' ἅμα τοῖς ἄλλοις, ἃ παρακαλῶ κρίνειν τοὺς ἐντυγχάνοντας τοῖσδε τοῖς γράμμασιν, αὐτόπτας γιγνομένους τῶν ἀνατομῶν. ἐγὼ γὰρ διὰ τοῦτο τὴν πραγματείαν ἔγραψα ταύτην, ὥστ' αὐτοὺς διδάσκειν δύνασθαι τοὺς φιλοπόνους, ἐὰν ἀπορῶσι τῶν δειξόντων· ὡς οἱ γε παρακαλέσαντες ἐταῖροί με γράφειν αὐτὴν ὑπομνήσεως ἕνεκα, καὶ χωρὶς ταύτης ἀναμνησκειν ἑαυτοὺς δυνήσονται τῶν ὑπ' ἐμοῦ διδαχθέντων αὐτοῖς, εἴ γε μὴ πρὸς τὸ ῥαθυμεῖν ἐκτρέποντο. παραλείψω τοίνυν ἐξελέγγειν τοὺς πρεσβυτέρους ὑπὲρ τοῦ θάπτόν μοι περαινέσθαι τὸν λόγον αὐτὰ τάληθῆ μόνον διηγουμένῳ.

account more quickly by discussing only the things that are true (μοι περαίνεσθαι τὸν λόγον αὐτὰ τάληθῇ μόνα διηγουμένῳ). How is one to take the force of the true things (τάληθῇ), to which Galen will restrict himself, in this quotation? Although it is possible that Galen is admitting here that he sometimes indulges in saying things that he does not believe to be true about his rivals, it is likely that he means to say here that he will restrict himself to matters of anatomical fact alone without reference to the many anatomical falsehoods that his rivals propound. Yet, in AA more generally and even locally, Galen does engage in polemics. Is this because he does not keep to his own interdict against polemics or by his own lights does he not consider himself to be engaging in it, or do his polemics along with a disavowal of them play a role in the structure of his text?

Galen's stated adherence to dealing with anatomical truths alone persists throughout the passage. He enjoins his reader, who is both eager to work hard and eager to discover the truth (τῷ φιλοπονοῦντι καὶ τάληθές εὗρεῖν ἐπιθυμοῦντι), to judge the work of medical authors on their own merits, his own works included, through first hand experience with anatomical procedures. Galen predicts that the many mistakes in the texts of Lycus and other physicians will be apparent without his help (παμπόλλων ἀμαρτημάτων φανεῖται μεστὰ τὰ τῶν ἄλλων βιβλία). The books themselves will make their mistakes plain to any discriminating reader (παμπόλλων ἀμαρτημάτων φανεῖται μεστὰ τὰ τῶν ἄλλων βιβλία). But beyond these manifest mistakes, whoever happens upon these texts should attend anatomical procedures as eye witnesses (αὐτόπτας γιγνομένους τῶν ἀνατομῶν) in order to determine the truth for themselves. Galen closes this passage as he began it, noting that he will forego criticism of his

predecessors except when necessary in service to his stated aim, to enable students to teach themselves in the absence of those who would show them (ἐὰν ἀπορῶσι τῶν δειξόντων). But Galen not only indulges in criticizing Lycus and others in this passage, he appears to do so frequently.²⁶¹ For example, at AA II 469-70, Galen gives the following account,

Those who wrote on the anatomy of the muscles were mistake about this [anterior muscle of the scapula], as they also were about many other muscles, just as also Lycus himself was, some of whose anatomical works are extant in our time. I did not get to see him while he was alive, although I associated with the students of Quintus and was not stopped either by the length of the journey or by the sailing trip. But Lycus was a no-name among the Greeks, when he was alive. Now that he is dead, some of his books, taken seriously, are widely circulated. About his other works, which I have not come across, I am able to say nothing. But, about the anatomical works, at least the ones which I have read so far, I have found they have many mistakes. But, as I said earlier, it is not set before me to refute my antecedents, unless incidentally, but to write only the anatomical procedures in my memoranda, about which Marinus also has written a single large book, unclear in interpretation and defective in observation.²⁶²

²⁶¹ Cf. AA II 227-8, where Galen explains the need for his *De muscolorum dissectione* because Lycus' work on the subject was unnecessarily long and riddled with mistakes; AA II 283, where Galen praises Marinus for his anatomical work while expressing the need to fill in the gaps left by his obscurity and spotty coverage; AA II 343-4, where Galen criticizes Methodists for their lack of interest in anatomy, one of the consequences of which is an increased chance of severing arteries when engaged in surgical procedures. In the same passage, Galen criticizes them for treating only the location of a wound or disease citing the case of a patient who lost feeling far from the location where he had been injured as a consequence of nerve damage; AA II 385-6, on seeing what one wants to see in hasty anatomical procedures; AA II 395-6, on a physician whose lack of anatomical training led him to sever a nerve rendering the patient insensate in a limb; AA II 416-21, on the impractical anatomical interests of some physicians who are more concerned with the pineal gland, the heart bone, and so on. This impractical interest is contrasted with Galen's own interests and his exposition in AA, which Galen says is useful for cotidian surgical procedures; AA II 451, where Galen comments on the consequences of sloppy anatomy, mentioning Lycus as an exemplar of such sloppiness; AA II 634, where Galen mentions yet another physician whose anatomical ignorance resulted in arterial hemorrhage and ultimately the death of the patient as a result of infection. Galen contrasts this ignorance with his own expert skill in excising the sternum of a slave and exposing the heart. According to Galen the slave survived; AA II 636-9, where physicians fail to ligate the pulmonary vein properly. This episode is punctuated by the example of a rival physician whom Galen forces to vivisect ape after ape until he admits he is incompetent. Cf. also, AA II 641-646, 648, et *passim*.

²⁶² AA II 469-70, ἐσφαλμένοι δ' εἰσι περὶ αὐτὸν, ὡς καὶ περὶ πολλοὺς ἄλλους, οἱ τὰς τῶν μυῶν ἀνατομὰς γράψαντες, ὥσπερ καὶ αὐτὸς ὁ Λύκος, οὗ νῦν ἐκομίσθη τινὰ τῶν ἀνατομικῶν βιβλίων,

The account focuses on the ignominy of Lycus' work in his lifetime and of its inexplicable popularity in his death. Marinus is similarly criticized for being obscure and inexhaustive. Galen closes with a final claim that he will forego criticizing his predecessors except incidentally. All of this passage is peppered with comments that function to underwrite Galen's own credibility. He reserves judgment on treatises he has not yet read. He contrasts the treatises available in his own time with the larger body of Lycus' original written work. He underscores his dedication to research, despite the distances involved in conducting it properly. And, finally, he punctuates the passage with his comment that he is not writing for the sake of criticism.

There are a few possible explanations for the apparent inconsistency in these passages and others like it. His alleged change of direction to incidental refutation suggests that he is aware of being engaged in refutation as its own end at other points in his writing. Has Galen simply failed to notice that he continues to be engaged, and frequently so, in the behavior from which he claims to be distancing himself? Is there a cultural gap in which Galen's polemicism would indeed have flattened out from a second century perspective? Or is Galen engaged in an extended form of *praeteritio*, saying that

ὄν οὐκ ἔθεασάμην μὲν ἐγὼ ζῶντα, καίτοι πᾶσι τοῖς Κοίντου μαθηταῖς συγγενόμενος, καὶ μήθ' ὁδοῦ μήκος ὀκνήσας μήτε πλοῦν. ἀλλ' οὐκ ἦν ὄνομα Λύκου παρὰ τοῖς Ἑλλήσιν, ἤνικ' ἔζη· νυνὶ δ' ἀποθανόντος αὐτοῦ βιβλίων τινὰ περιφέρεται σπουδαζόμενα. περὶ μὲν οὖν τῶν ἄλλων, οἷς οὐκ ἐνέτυχον, οὐδὲν ἔχω φάναι, τὰς δ' ἀνατομὰς, ἃς γοῦν ἄχρ' νῦν ἀνέγγων, ἀμαρτήματα ἐχούσας εὗρον πολλά. ἀλλ', ὅπερ ἔφην, οὐ πρόκειται μοι τοὺς πρεσβυτέρους ἐξελέγχειν, ὅτι μὴ πάρεργον, αὐτὰς δὲ μόνας ἐν ὑπομνήμασι γράψαι τὰς ἀνατομικὰς ἐγχειρήσεις, ὑπὲρ ὧν καὶ Μαρίνος ἐν ἐποίησε μέγα βιβλίον, ἀσαφὲς μὲν τὴν ἐρμηνείαν, ἐλλιπὲς δὲ τὴν θεωρίαν.

he will not criticize his rivals for the sake of criticism while doing just that? In his 1991 paper on style in Galen's *MM*, Vivian Nutton has formulated the question as such,

At times his ebullient rhetoric, most notably in *On prognosis* and in Book 1, with its vigorous denunciations of others and its picture of Galen as a saint, a genius and a social celebrity, at home with both peasant and prince, at once arouses suspicion, and any inconsistencies that are found there rightly create doubts. How far is Galen being sincere, how far is he being carried away by his winged words into wildly exaggerated statements?²⁶³

It may be that this text and others like it are simply examples of a sort of generic *praeteritio*.²⁶⁴ Or, it may be that the inconcinnity between his claims of forbearance and his apparent tone arises from the disconnect between us and them, the observers and the actor in this text. Historically, scholars have either not engaged much with this question or have just supposed that Galen was overwhelmingly self-obsessed.²⁶⁵ Determining Galen's character seems uninteresting to me in virtue of the wildly speculative nature of the task. Attempting to isolate points at which Galen's polemic and self-representation operate non-assertorally, however, illuminates the more global argumentative function of passages in Galen's work. So, for example, Galen's polemical stance *vis à vis* cardiocentrists explains in part the length and anatomical detail of his digression into the structure of the heart in chapter 7 of *AA*.

So, I suggest the following provisional assumption. Galen is not so tone-deaf as to say here and elsewhere, in the same breath, that he will stay above the fray while he is in

²⁶³ Nutton (1991: 21)

²⁶⁴ Cf., Lloyd (2008: 34-5)

²⁶⁵ I know of no published work that engages deeply with Galen's style except Caroline Petit's book in progress, *Galien Ecrivain*, which itself has not been published at the time of writing this dissertation.

the thick of it without some reason. If this passage is an example of *praeteritio*, the frequency with which one finds examples of this sort in Galen suggests that *praeteritio* prompts one to ask if this tendency is also found with some frequency in the anatomical treatises and medical texts of other authors. Various treatises in the Hippocratic Corpus are a testament that it is.²⁶⁶ The fact that medical polemics, even if more subdued than in Galen's work, are pervasive in earlier Greek medical texts, is evidence that these polemics are correlated with generic formulae. So, it is worth asking how Galen's self-presentation operates in his texts, especially relative to other Greco-Roman medical authors, rather than reducing his polemical attitudes to a reflection of his self-involved character.

It is fitting, given the importance of anatomy to Galen's success, that an anatomical display provided Galen with his initial entrance into medical practice; in 157, Galen returned to Pergamum after a ten-year *Wanderzeit*, in which he pursued his medical training by seeking out a variety of prominent physicians in the Greco-Roman world. In *On Recognizing the Best Physician* (*Opt.Med.Cogn.*), which only survives in an Arabic translation, Galen reports that on his return he entered into or perhaps even instigated a public surgical competition with other physicians for the post of chief gladiatorial physician of the arena at Pergamum.²⁶⁷ After cutting open the abdomen of an ape and removing its intestines, Galen says that he challenged the other physicians to

²⁶⁶ Cf., for example, *Nat. Hom.* and *Vet. Med.*

²⁶⁷ For Galen's experience as a gladiatorial physician, see Scarborough (1971) generally; see especially 105-111, in which Scarborough provides a brief catalogue of the limited contribution that Galen's surgical experience with gladiators at Pergamum may have made to his subsequent anatomical knowledge.

replace them and suture the ape. Once they failed his challenge, Galen surreptitiously severed some of the ape's veins and again dared gathered physicians to repair the damage; when *they* could not, he did:

Once I attended a public gathering where men had met to test the knowledge of physicians. I performed many anatomical demonstrations before the spectators: I made an incision in the abdomen of an ape and exposed its intestines: then I called upon the physicians who were present to replace them back (in position) and to make the necessary abdominal sutures- but none of them dared to do this. We ourselves then treated the ape displaying our skill, manual training, and dexterity. Furthermore we deliberately severed many large veins thus allowing the blood to run freely and called upon the Elders of the physicians to provide treatment but they had nothing to offer. We then provided treatment, making it clear to the intellectuals who were present that (physicians) who possess skills like mine should be in charge of the wounded. That man was delighted when he put me in charge of the wounded- and was the first to entrust me with their care (trans. Iskandar).²⁶⁸

Although the Greek is lost, the same cluster of elements is recognizable in this episode as in the previous theoretical demonstrations: *agon*, *epideixis*, and shame. Moreover, Galen's approach to these public anatomical displays shows a similar cultivation of spontaneity (αὐτοσχεδιάζειν) frequently found in the writing of late imperial authors, who self-identify as rhetorical or sophistic. While Galen's account of his competition for the position of chief gladiatorial physician emphasizes the unexpectedness of the proposed challenge (in this case it is unexpected by his rivals), comments he makes on

²⁶⁸ *Opt.Med.Cogn.* 9 4-7 = *CMG Suppl.Or.IV*, 103,10-105,19 Iskandar.

preparation for anatomical displays show that their extemporaneity is carefully practiced.²⁶⁹

This formulation is not intended to express a sort of koan. Galen is explicit about the training involved in preparing for extemporaneous or unexpected medical situations and displays. Consider an example from AA illustrating the need for the sorts of preparation necessary for dealing with emergent medical situations. Galen insists on frequent observation of animal bodies in order that, should one come across a human skeleton, the sight is sufficiently familiar for the observer to benefit from the observation,

But if you grow confident through reading only, without being accustomed to the sight of the bones of apes, you will not actually take in nor will you retain the memory of the skeleton of a man if you see it unexpectedly. For, the recollection of perceptible phenomena requires frequent association. And for this reason also we recognize those very people whom we often encounter, but we pass by someone seen once or twice after a while has passed, neither recognizing him at all nor even recalling what he looked like before... For it is necessary to see each of the parts in advance, with no rush, in order to recognize what is seen suddenly, preferably in human subjects but if not, at least in animal subjects fairly similar to a human being.²⁷⁰

²⁶⁹ This preparation for extemporaneous performance had deep and abiding roots in Greek performances. Galen's approach to anatomical performance echoes the "composition in performance" that was typical of Homeric rhapsodes, who deployed an arsenal of practiced episodes and formulae in their public performances of Homeric epic. Cf., Nagy (1996).

²⁷⁰ AA II 223-4 εἰ δ' ἀναγνώσει μόνη θαρρήσεις, ἄνευ τοῦ προεθισθῆναι τῇ θεᾷ τῶν πιθηκείων ὀστέων, οὐκ ἂν οὔτε κατανοήσεις ἀκριβῶς ἀνθρώπου σκελετὸν ἐξαίφνης ἰδὼν, οὔτε μνημονεύσεις. ἢ γὰρ τοι τῶν αἰσθητῶν πραγμάτων μνήμη συνεχοῦς ὁμιλίας δεῖται· καὶ διὰ τοῦτο καὶ αὐτῶν τῶν ἀνθρώπων ἐκείνους τάχιστα γνωρίζομεν, οἷς πολλάκις συνεγενόμεθα, τὸν δ' ἅπαξ ἢ δις ὀφθέντα διὰ χρόνου πλείονος θεασάμενοι πάλιν παρερχόμεθα, μήτε γνωρίζοντες ὅλως, μήτε ἀναμνησκόμενοι τῆς ἔμπροσθεν θέας... ὁρᾶσθαι γὰρ χρὴ πρότερον ἐπὶ πολλῆς σχολῆς ἕκαστον τῶν μορίων, ἵν' ἐξαίφνης ὀφθὲν γνωρισθῇ, μάλιστα μὲν ἐπ' ἀνθρώπων αὐτῶν· εἰ δὲ μὴ, ἀλλ' ἐπὶ ζώων παραπλησίων ἀνθρώπῳ

This passage is aimed at the adventitious anatomical observations made by Empiricists, who eschewed deliberate (and *a fortiori*, invasive) anatomical observations.²⁷¹ The quotation primarily bears on the importance of practiced, deliberate, and comparative anatomical research and the inadequacies of the Empiricist approach to *empeiria*. This friction between Galen and Empiricists is brought to the fore, albeit implicitly, in those cases where Galen attempts to *show* the effectiveness of anatomical knowledge to his readership as well as *tell* the reader of instances in which anatomical knowledge was effective and necessary for medical practice. It is just this inability of the Empiricist to be prepared for emergent medical situations that forms one of the bases for Galen's critique of the Empiricist attitude toward anatomy.

PREPARED EXTEMPORANEITY

The demands that sudden and unexpected medical situations place on the physician's ability to act with quick confidence, however, are required for anatomical display. That is, the practiced ease required of the doctor at work is analogous to the familiarity with the body necessary for a successful anatomical display.²⁷² It is precisely a

²⁷¹ Empiricists occupied a range of epistemic positions on issues such as the degree of theoretical claims to which they were willing to commit, what acceptable instances of *metabasis* were, and even the degree to which anatomical information was useful for medicine. So, it may sound as if it runs the risk of being reductive to say that Empiricists eschewed any deliberate anatomical observations. Given the emphatically passive element in what survives of Empiricist case histories (*historia*) and their principled discomfort with causal explanations, this claim appears representative of the range of Empiricist beliefs. On Empiricists' approach to observation and on their avoidance of deliberate investigations of the human body, see von Staden (1975: 186-92).

²⁷² Cf., AA II 384, where Galen describes the indistinguishability of identical twins to all but those most familiar with them. To those who know the twins well, they are no longer indistinct. Galen often uses these figurative examples regarding familiarity in conjunction with an exhortation for the reader to observe and participate in anatomical procedures *with* Galen, one of Galen's associates, or one of Galen's anatomical texts as a guide to anatomical observation. It is useful to keep in mind the role of AA as a *guide* to

lack of experience with anatomical procedures that leaves Galen's rivals stymied in the passage from *Opt.Med.Cogn.*, quoted earlier. One of the criticisms Galen makes of rival physicians is that they lack practical experience. Indeed, Galen uses the term *logiatros* of certain would-be doctors. The word is often translated to mean something like a doctor in name alone. But the compound, otherwise unattested in this form and only once attested in the abstract, can also levy a more specific criticism, an armchair physician interested in arguments or abstractions rather than in therapy or medical procedures.

Throughout the corpus Galen takes to tasks physicians, like the ones in *Opt.Med.Cogn.*, whose experience is largely the result of "book learning". The tension between Galen's stated purpose in documenting his anatomical procedures and the inadequacy of the written word for medical practice comes up occasionally in Galen's anatomical works. So, for example his comments in the later books of AA, "Whoever does not know this [the number of cranial nerves] is, as the proverbial expression goes, like a seaman that navigates out of a book. Thus he reads the books on anatomy, but he omits inspecting with his own eyes in the animal body the several things about which he is reading."²⁷³ Nor is the sentiment expressed in this passage at all unique among the pieces of advice Galen gives to the would-be physician and reader of AA. Galen frequently offers the reader of AA advice on anatomical *epideixis*. So, for example, his instructions near the beginning of the treatise,

anatomical practice and display that is one or two removes away from personal direction. In this sense the treatise serves as a surrogate for personal instruction. The language of AA, in Galen's anatomical exegeses and personal anecdotes, reflects this surrogacy by situating the reader as a participant in the procedure, looking through the eyes of the anatomist cum author.

²⁷³ AA IX 10.12. Cf., also, AA II 220ff.

It is better that you train in this order (bones, muscles, arteries, veins, nerves, viscera, etc.). *And besides, it is necessary that when performing a public display (ἐπιδεικνύντα) you prepare to expose and to show the part, which has been put before you (τὸ προβληθὲν), as quickly as possible in a variety of ways, in this and some other presentation, as I will teach you.*²⁷⁴

And again a few chapters later,

Now is the right time to say how one should proceed if one wishes to train oneself *and [how to proceed] if one wishes to make a display (δεικνύντα) for someone else*, since we have previously demonstrated (ἐπιδείξαντας) the fraud common to all of those who claim to be anatomists...²⁷⁵

This emphasis on public display goes some way to explain the number of sections of AA whose therapeutic value is questionable but whose *epideictic* value is not. Consider, for example, Galen's discussion of neural anatomy in book IX of AA, his discussion of the recurrent laryngeal nerve in book XI, the gonads and fetus in book XII, and the bulk of books XIV-XV, all of which offer the reader no anatomical information that could be used to treat patients directly in the ancient world.

Maud Gleason has analyzed these anatomical displays as expressions in a second century discourse about power.²⁷⁶ On her account, one explanation for the emergence of this discourse is as an outgrowth of Antonine Roman intellectuals' anxiety over personal

²⁷⁴ AA II 226, γυμνάζεσθαι μὲν οὖν σε τῇδε τῇ τάξει βέλτιον. ἄλλως δ' ἐπιδεικνύντα παρασκευάσαι χρὴ τὸ προβληθὲν ὑπ' αὐτοῦ μόριον ὅτι τάχιστα γυμνώσαι τε καὶ δεῖξαι πολυειδέστερον, ἄλλοτε κατ' ἄλλην ἐπιβολὴν, ὥς διδάξω.

²⁷⁵ AA II 243 Ὅπως δ' ἐγχειρεῖν χρὴ γυμνάζεσθαι τε βουλόμενον αὐτὸν, ἑτέρῳ τε δεικνύντα, καιρὸς ἤδη λέγειν, ἐπιδείξαντας πρότερον ἀπάτην κοινὴν παμπόλων ἀνατομικῶν εἶναι προσποιουμένων...

²⁷⁶ Gleason (2009)

identity and autonomy. Galen's anatomical displays, she writes, tap into this desire for elite intellectuals to think about social boundaries and central authority:

Galen's anatomical demonstrations, particularly his vivisections, were culturally complex events, dense with implicit meanings. They fused the intellectual competition of Second Sophistic performance with the violent manipulation of bodies characteristic of Roman spectacle. Since every disintegrated body draws attention to itself - and to the force that broke its unity apart - where we find disintegrated bodies, we often encounter a discourse about power.²⁷⁷

The main thesis of Gleason's article runs the risk of being reductive although she distances herself from a single socio-cultural function for Galen's anatomical displays. Despite this risk, many of the observations she makes to support her argument are both acute and provide useful comparanda, in virtue of their focus on power dynamics, for the competitive functions of Galen's agonistic anatomical displays. Features of Gleason's overall argument are reasonable, given that dynamics of socio-political power can be a contributing factor to the form cultural expressions such as medical performances may take. But, to the extent that competition traditionally entails winners and losers, power dynamics are hard-wired into it. That is, any sort of activity involving winning or losing entails the sort of hierarchical relationship that can be interpreted through the lens of power.

Galenic anatomical displays and, more generally, anatomical displays in the second century should not be explained homogeneously. These sorts of explanations ignore how overdetermined the explanation(s) for second century anatomical

²⁷⁷ Gleason (2009: 86)

competitions may be (and likely are).²⁷⁸ It is stipulative to suppose that these performances are primarily, even if not *simply*, a reflection of the political relations between different social classes, in terms of a particular power relation between emperor and subject or elite and non-elite in the Late Roman Empire. So, having mentioned that competition, traditionally construed, entails explicit relations of power between for example winners and loser and that explanations for anatomical performance in the second century are likely overdetermined, let us consider another account of Galen's anatomical displays, itself stemming from the power dynamic built into agonistic performances.

Given the frequency of radically invasive procedures in contemporary medical practice, it is perhaps easy to lose sight of how difficult it would have been to put many of these anatomical observations to any therapeutic use in antiquity. What use is Galen's close observation and discussion of the formation of the embryo in an ancient context except to address the question of what organ appeared first in the development of the fetus, a point of contention between himself and the Peripatos? Equally, what practical purpose could a deep knowledge of cardiac and neural anatomy have served, on the whole, except to discredit cardiocentrists and put the physician's knowledge of the body

²⁷⁸ Gleason is aware of this risk. She writes early on that she does not take Galen's anatomical performances exclusively as discourses on power. For example, "I want to make clear at the outset, however, that in exploring this dimension of Galen's anatomical activities, it is not my intention to offer a reductive explanation of them—to say that his public dissections were *only* about power, for example. Clearly Galen's intellectual interest in anatomy was genuine and did not depend on an audience: alone and unobserved on a desert island, he would have dissected whatever came in on the tide (Gleason (2009: 4))." So, I want to take care not to suggest that Gleason's argument *is* reductive, just that its emphasis on political power runs the risk of obscuring other power dynamics far less global in scope. It is my own intention, in this chapter, to use some of the evidence that Gleason amasses while approaching its relevance to the social and literary functions of Galen's anatomical procedures in a more local context.

on display as a means of establishing one's credentials? That is, allowing for some unusual case, the anatomical procedures I have mentioned above could only have functioned as performed displays or as research into bodily function. Anatomical knowledge of the heart and of the brain, for the most part, and particularly at the depth that Galen engages with it would not have had therapeutic application in a medical world in which recovery from open heart or brain surgery was at best very unlikely.²⁷⁹

CREDENTIALING

In various publications, Vivian Nutton has mentioned the absence of any licensing or credentialing body in the ancient Greek and Roman medical world(s).²⁸⁰ He generally makes this point to emphasize the importance that expressions of reputation and experience have for the physician to establish some kind of *bona fides* by which to be distinguished from other medical competitors. A corollary to this observation is that, given a lack of credentialing bodies, very little prevented any person from competing in the medical marketplace, from claiming medical expertise, or from accusing other practitioners of being charlatans.²⁸¹ Anxiety over one's status as a legitimate practitioner is a common theme in Galen's frequent comments about quacks, and charlatans.²⁸²

²⁷⁹ The evidence for trepanation dating as early as the prehistoric period is not evidence for successful invasive procedures on the brain. See Majno (1975: 24-8)

²⁸⁰ Cf. Nutton (1992: 26), (2012: 40-1)

²⁸¹ Dean-Jones (2003) gives a useful overview of the medical charlatan in literature of the Classical period.

²⁸² See, for example, *Praen.* XIV 601-5 where Galen delivers a diatribe against physicians of his day in Rome; *MM* X 5-8, 582, the first two books of *MM* are rife with comments on the quackery of Methodist physicians. Indeed, whenever Galen mentions the Methodists at all he accuses them of charlatanry, often on account of their alleged claim to educate a student medically in under six months. His preoccupation with charlatanry is also apparent in his accusations of *logiatreia* in *Purg.Med.Fac.* XI 339; *HNH* XV 159, *Hipp.Prog.* XVIIIa; *Lib.Prop.* XIX 15, *et passim*

Nutton's original point is right as far as it goes but he does not attempt to map out the paths by which practitioners might establish their medical legitimacy.

A variety of other activities can be understood as satisfying the generic need for practitioners to be invested with some sort of authority. Anatomical displays, which I have been discussing descriptively as an extension of the agonistic tendencies in Greek medicine, were functionally similar to contemporary displays of credentials, such as the conspicuous presentation of medical degrees in a pattern along a frequently viewed wall, the physician's white coat, or the stethoscope now an emblem of the medical profession. Anatomical performances were a display of the practitioner's knowledge and command of the body. Even if the anatomical knowledge commanded by the performer did not have direct therapeutic application, it nonetheless showed that the performer had command over the domain in which disease was found. It is in this context that Galen instructs the reader of AA. For example, let us consider Galen's often quoted directions to that reader on how best to prepare for one of his two demonstrations on the source for voice production.

THE INTERCOSTAL NERVES

This procedure, involving the intercostal nerves, is one of a series whose root purpose for Galen was to argue for the brain as the *hêgemonikon*, the control center or source of volition in the body. Galen refers to this series of procedures repeatedly throughout his corpus, as the voice experiments powerfully demonstrated not only the medical, if not therapeutic, efficacy of anatomical knowledge but also the source of the

voluntary nervous system and therefore of volition.²⁸³ For Galen, these demonstrations are both the cornerstone and crowning achievement of his anatomical and theoretical work.

In brief, the argument that these demonstrations are intended to prove goes as follows. There is some one part of the body, the *hêgemonikon*, which is responsible for volition. In human beings, the *hêgemonikon* must be responsible for speech production, one of the paradigmatically rational activities, in virtue of the fact that voice production is voluntary and speech production adds reason to volition. Wherever it is located, the *hêgemonikon* (*h*) communicates volition to the parts of the body directly through some medium, which has earlier been shown to consist of nerves (*n*). Therefore, by *modus tollens*, if the transmission medium *n* is incapacitated, volition transmitted from *h* should cease. But voice production does not cease when Galen acts on the nerves of the heart.

When Galen interrupts the nerves leading from the brain to the larynx or from the brain to the thorax phonation ceases abruptly. On its own, this only shows that the brain is necessary for voice production but not sufficient for it. Galen proves the latter by un-interrupting the ligated nerves. Upon release, the subject resumes voice production, showing that all other things being equal the activity of the brain through the medium of the voluntary nervous system is necessary and sufficient for voice production. Since cardiocentrism just is the location of volition in the heart, establishing that the brain is the only source for volition establishes that cardiocentrists are mistaken. And, for Galen's

²⁸³ See, AA II 651-706; AA XI.4, 11; XIV.6-8; and UP III 278-281.

purposes, it is crucial that the proof not only follows logically but is also shown to be true through an empirical procedure.²⁸⁴

In some of his versions of the procedure, as above, the agonistic context is far in the background while the epideictic context comes to the fore. Elsewhere, Galen makes it clear that the three voice demonstrations (the interruption of the recurrent laryngeal nerve, the interruption of the intercostal nerves, and the dissection of the intercostal muscles) target cardiocentrists in particular. So, for example, Galen alludes to this suite of demonstrations and their agonistic context in *Praen.*,

I will remind you of the doctors and philosophers who were present at my debate (ἀγώνα) against the Stoics and Peripatetics and some others along with them, going over how it began in detail first so that if you want to distribute this text (τουτὶ τὸ γράμμα) to anyone of those worthy of sharing in these sorts of arguments (λόγων), he may know the progression of the things that happened and [so that] you may not spend all of your free time explaining the number of things done by me through the works of my medical practice, both the dissections (ἀνατομῶν) and the arguments (λόγων) pursuant to them, when I was refuting the invidious doctors and philosophers.²⁸⁵

²⁸⁴ On the need for *peira* or some empirical proof for general medical claims see, e.g., *Pecc.Dig.* V 68; *SMT* XI 459-61; *Comp.Med.Gen.* XIII 376; *Hipp.Med* XVIIb 61-2. Part One of Tieleman (1996) goes through the arguments against cardiocentrism in *PHP* carefully. Cf. also *Temp.* I 588; on the Dogmatists' failure to demonstrate their theoretical claims, see *MM* X 31-2; *MM* X 107, where Galen cites Herophilus' dictum that one should begin with what is observable as though it is primary even if it turns out not to be. On the importance of argument from anatomical observation, see for example *PHP* V 248, "Having promised to give an account in this book about the evident features of the heart, why would I need to take up those arguments which take as the basis for their formulation theories and not what is observed from anatomy?" (ὑποσχόμενος γὰρ περὶ τῶν ἐναργῶς φαινομένων ὑπάρχειν τῇ καρδίᾳ τὸν λόγον ἐν τῷδε τῷ γράμματι ποιήσασθαι, τί ἂν ἔτι δεοίμην ἐφάπτεσθαι τοιούτων ἐπιχειρημάτων ὧν δόγματα μᾶλλον, οὐ τὸ φαινόμενον ἐκ τῆς ἀνατομῆς, ἢ ἀρχὴ τῆς συστάσεώς ἐστιν;). On the four different sources for appropriate premises: perception, experience, technical experience, and what is evident to the mind, see *PHP* V 357-8. All of the premises that Galen admits into legitimate medical argumentation are evident either to sensation directly or are in some sense *a priori*.

²⁸⁵ *Praen.* XIV 626, τῶν δὲ κατὰ τὸν πρὸς τοὺς Στωϊκοὺς τε καὶ Περιπατητικοὺς ἀγῶνα παρόντων καὶ ἄλλων τινῶν ἅμ' αὐτοῖς ἰατρῶν τε καὶ φιλοσόφων, ἀναμνήσω σε πρότερον ὅθεν ἤρξατο διελθὼν ἱν' εἰ καὶ τινῶν τῶν ἀξίων κοινωνίας τοιούτων λόγων ἐθελήσῃς μεταδοῦναι τουτὶ τὸ γράμμα, τὴν ἀκολουθίαν ἅπασαν ἴδοι τῶν γενομένων· καὶ μὴ διὰ παντὸς ἀσχολίαν ἔχῃς αὐτὸς

Among other things, this passage is a representative example of Galen's keen sensitivity to the distribution of his own work, as witnessed especially by the stated motives for writing the autobiographical works *Lib.Prop.* and *Ord.Lib.Prop.* Here, Galen briefly dispels all pretense that *Praen.* is just a letter (τουτὶ τὸ γράμμα) to Epigenes by detailing instructions for the dissemination of *Praen.* to a wider audience of suitable readers for whom these details are specifically intended. Furthermore, in this passage Galen sets the stage, so to speak, for the reader to understand the deep consequences of this demonstration for the views of Galen's rivals in this *agon*, which he mentions was conducted against Stoics and Peripatetics. Of course, this reference alludes to the consequence of the recurrent laryngeal nerve and intercostal nerve experiments in particular, which are powerfully destructive of Stoic and Peripatetic view that the heart was the *hêgemonikon*, the source of nerves and the control center for the human body.

In *Praen.*, Galen relates few details of the voice experiments to the reader. The procedure is described as two separate events, the first contracted to a few lines of text that provide just enough information for the reader to know that the demonstration under discussion involves the recurrent laryngeal nerve,

For, I had promised a demonstration of the most minute nerves, that there was a hair-like pair implanted in the muscles of the larynx, on the left side and on the right side, in the cases of which, when they were ligated with a thread or cut the animal became voiceless although nothing caused damage to its life or to its continued function...²⁸⁶

διηγούμενος ὅσα διὰ τε τῶν ἔργων τῆς ἰατρικῆς τέχνης ἀνατομῶν τε καὶ τῶν ἐπ' αὐταῖς λόγων ἐπράχθη μοι τοὺς φθονεροὺς ἰατροὺς τε καὶ φιλοσόφους ἐλέγχοντι.

²⁸⁶ *Praen.* XIV 628, δείξιν γὰρ ὑποσχομένου μου νευρίων λεπτοτάτων ὡς εἶναι τριχοειδῆ συζυγίαν τινὰ τοῖς τοῦ φάρυγγος μυσὶν ἐμφυομένην, τοῖς μὲν ἐκ τῶν ἀριστερῶν μερῶν τοῖς δ' ἐκ τῶν

The promise in this passage remained unfulfilled. Galen showcases the behavior of Alexander of Damascus, who Galen had hoped would explain to the audience the inferential process (συλλογίσασθαι) by which the demonstration proceeded to its conclusion, that the brain rather than the heart was the *hêgemonikon*. In what Galen refers to as a fit of *philoneikia* (φιλονεικία), Alexander expresses some doubt on the epistemic warrant provided by empirical information.²⁸⁷ At this point, Galen abandoned the demonstration and this skeptical rube (ἀγροικοπυρρωνεῖος), only to return another day when the other elite attendees had suitably reprimanded Alexander.²⁸⁸

δεξιῶν, ἐφ' οἷς βρόχῳ διαληφθεῖσιν ἢ τμηθεῖσιν ἄφωνον γίνεσθαι τὸ ζῶον οὐτ' εἰς τὴν ζωὴν τι βλαπτόμενον οὐτ' εἰς τὴν ἐνέργειαν...

²⁸⁷ *Philoneikia* is a common failing that Galen attributes to other intellectuals, in particular Roman physicians. The word is often translated as 'disputatiousness' or something similar. The relevant connotation, in this and many other Galenic contexts, is that it is one's love of fighting *for the sake of fighting*. Galen often admits to quarreling with other physicians but also characterizes his grudging willingness to quarrel generally as foisted upon him by the exigencies of the moment.

²⁸⁸ This word, ἀγροικοπυρρωνεῖος, is only attested in Galen. It appears twice, here and in *Diff.Puls.* VIII 711. A further question arises with respect to Alexander's skepticism. Galen has already mentioned that despite being an expert in the doctrines of Plato and Aristotle, Alexander inclines towards the Peripatos. The skepticism Galen ascribes to him, if genuine, suggests the more skeptical Academy. There seems to be a great inconcinnity in a Peripatetic who doubts the epistemic warrant of sensation. An answer to this question is not clear to me but it is worth remembering Galen's account of the Asclepiadean from *Purg.Med.Fac.* Is Galen's point here that, on realizing the logical consequences (and Galen has already singled Alexander out as being present to explain the inferential process of the demonstration) of the laryngeal nerve experiment, Alexander jettisoned his commitment to empirical warrant rather than his cardiocentrism? On the identity of Alexander of Damascus, see Nutton (1975: 189 n. 96,7). To sum up Nutton's note briefly, it is unclear if this Alexander is to be identified also as Alexander of Aphrodisias. The Arabic tradition, which is informed both by writings of Galen's lost to us and by work attributed to Philoponus, reports that Alexander of Damascus is Alexander of Aphrodisias. The reasons to doubt the identification have to do with chronology and with the skeptical views Galen puts in the mouth of Alexander. Regarding chronology, Alexander of Aphrodisias did not hold a public chair at Athens at the time that Galen had written early versions of *Praen.*, *AA*, and *UP* (ca. 170s). Nutton thinks this is no reason to doubt the identification, as it is abundantly clear that Galen frequently revised his work (consider also that all three works, *Praen.*, *AA*, and *UP* are known to have existed in two or more versions separated in some cases by more than a decade, cf. *AA II* 234-5). So, the dates of composition for *AA* and *UP* are to a certain degree, fluid. It is more difficult to make sense of the perceptual skepticism Galen ascribes to Alexander. This problem, however, remains regardless of whether Alexander of Damascus is identified as Alexander of Aphrodisias or is a different Alexander who inclined towards the Peripatos. Nutton's point on

Galen's description of Alexander's skepticism at the start of his anatomical demonstration underscores the abruptness with which an intellectual agon could boil over onto a public demonstration, even one that Galen reports was initiated by acquaintances. Galen's abrupt departure from what had shaded into an intellectual competition might evoke similar situations in which Galen criticizes his own interlocutor for leaving the field, as in the case of the Asclepiadean in *Purg.Med.Fac.* XI 332 mentioned earlier. In that case, one remembers that Galen forced his opponent back into contention with him, in a sense, either by sending a tract refuting him or by reporting that he had done so. Galen claims that the Asclepiadean quit the fight because he knew he had lost in advance, but he is just as prone to accuse opponents who fight and flee of sophistry, as in the following case of another Asclepiadean in *Nat.Fac.* II 34-5.

ON THE UTILITY OF THE KIDNEYS, A DIGRESSION

This episode, on the kidneys, is useful for examining some of Galen's rules of engagement in an intellectual contest, which I argue serve a credentialing function. At first blush, it seems as though a hasty departure from the contest is itself a sign of forfeiture but one recalls that one of Galen's criticisms of his forensic opponents generally, as in *Art.Sang.* IV 717, was a failure to properly understand the maneuvers in public argumentation (οὗτοι ἀμαθεῖς ὄντες τῶν ἐν τοῖς λόγοις πτωμάτων). In the case of *Purg.Med.Fac.* XI 332, the Asclepiadean "seemed to his fellow Bacchants as the sort of man who spoke well and they began applauding him while he made his exit, leaving us

chronology seems right to me, although not relevant to my argument. And, I mention a possible strategy for dealing with the second objection above.

behind (καταλιπὼν ἡμᾶς ἀπηλλάττετο), clearly knowing I suppose that he was about to be refuted."²⁸⁹ In the case of *Nat.Fac.* II 34-5, where the question of whether or not there are passages leading from the kidneys into the bladder is under debate, another Asclepiadean quits the contest with Galen with equally disastrous results,

But, in addition to these things, the Asclepiadeans of today try their hands at making a rebuttal, although they are ridiculed by absolutely everyone who at any time happens to be near them whenever they wrangle (ἐρίζωσι) about these things. Thus their sectarian vain-glory (ἡ περὶ τὰς αἰρέσεις φιλοτιμία) is an evil that is difficult to rub off, hard to wash out in these men especially, and more difficult to heal than any lesion. At any rate, one of the sophists (σοφιστῶν) of our day, trained sufficiently in eristic arguments (περὶ τοὺς ἐριστικούς λόγους) and in other arguments too and clever at speaking (δεινὸς εἰπεῖν), if anyone ever was, got into words with me about these matters. He was so shameless in regard to any of these issues I have mentioned that he even tried to say that he was amazed (θαυμάζειν ἔφασκεν) when I allegedly tried to upend clearly manifest matters with my frivolous arguments (λόγοις ληρώδεσιν). "For," he said, "on any day it is clear (ἐναργῶς) to see that any bladders, if one were to fill them up with liquid or air, then after tying off the neck squeeze them on every side, [the bladders] will in no way let anything out but keep everything completely inside themselves. And if in fact there were any substantive and perceptible pathways passing into them from the kidneys, so the liquid would be wholly expelled through those [pathways] when the [bladders] are squeezed just as it passed into them." Saying these things and others of this sort, rounding them off abruptly (ἐξαίφνης) with an unflinching and clear voice, he departed after having leapt up to his feet (ἀναπηδήσας), leaving us (ἀπῆει καταλιπὼν ἡμᾶς) as though we were unable to offer some plausible rebuttal.²⁹⁰

²⁸⁹ *Purg.Med.Fac.* XI 332 παραχρήμα μὲν οὖν ἔδοξε τοῖς θιασώταις ὁ τοιοῦτος εὐὶ λέγειν καὶ πάντες ἐπεβόων αὐτῷ καὶ δρόμῳ πολλῷ καταλιπὼν ἡμᾶς ἀπηλλάττετο γινώσκων, οἶμαι, βεβαίως, ὅτι μένων ἐξελεγχθήσεται.

²⁹⁰ *Nat.Fac.* II 34-5, ἀλλὰ καὶ πρὸς ταῦτ' ἀντιλέγειν οἱ νῦν Ἀσκληπιάδαιοι πειρῶνται, καίτοι πρὸς ἀπάντων αἰετῶν παρατυγχανόντων αὐτοῖς, ὅταν περὶ τούτων ἐρίζωσι, καταγελῶμενοι. οὕτως ἄρα δυσσπότριπτόν τι κακὸν ἐστὶν ἢ περὶ τὰς αἰρέσεις φιλοτιμία καὶ δυσέκνιπτον ἐν τοῖς μάλιστα καὶ ψώρας ἀπάσης δυσισιότερον. τῶν γοῦν καθ' ἡμᾶς τις σοφιστῶν τά τ' ἄλλα καὶ περὶ τοὺς ἐριστικούς λόγους ικανῶς συγκεκροτημένος καὶ δεινὸς εἰπεῖν, εἴπερ τις ἄλλος, ἀφικόμενος ἐμοί ποθ' ὑπὲρ τούτων εἰς λόγους, τοσοῦτον ἀπέδει τοῦ δυσωπεῖσθαι πρὸς τίνος τῶν εἰρημένων, ὥστε καὶ θαυμάζειν ἔφασκεν ἐμοῦ τὰ σαφῶς φαινόμενα λόγοις ληρώδεσιν ἀνατρέπειν ἐπιχειροῦντος. ἐναργῶς γὰρ ὁσημέραι θεωρεῖσθαι τὰς κύστες ἀπάσας, εἴ τις αὐτὰς ἐμπλήσειεν ὕδατος ἢ ἀέρος, εἴτα δήσας τὸν τράχηλον πῆξι πανταχόθεν, οὐδαμόθεν μεθειῖσας οὐδέν, ἀλλ' ἀκριβῶς ἅπαν

In many respects, Galen describes this nameless Asclepiadean in terms similar to the ones he uses to describe himself in his *agon* with Alexander of Damascus. He is a *pepaideumenos*, trained in eristic and a variety of argumentative styles; like Galen, he expresses amazement (θαυμάζειν ἔφασκεν) that his opponent might attempt to overturn what is *manifest* (τὰ σαφῶς φαινόμενα) with specious arguments (λόγοις ληρώδεσιν); he employs the same language regarding the clarity of inferences drawn from empirical observations (ἐναργῶς... θεωρεῖσθαι); and finally, he leaves abruptly (ἀπῆει καταλιπὼν ἡμᾶς) when it seems clear to him that his opponent simply cannot manage an effective argument.

The language, all in a fairly narrow cluster, that describes this Asclepiadean presents him as a mirror image of Galen in similar agonistic contexts. There is a crack in the mirror, however: the inadequacy of his opponent's training. The Asclepiadean's final inference overextends his argument, since he takes it for granted that a given vessel allows or should allow movement in two directions if it allows it in one direction. So, why does Galen make his opponent appear similar to him? One clue lies in the syntax of the Asclepiadean's argument, "εἴ τις αὐτὰς ἐμπλήσειεν ὕδατος ἢ ἀέρος... πέζοι πανταχόθεν". Galen reports the Asclepiadean's speech using the optative in the protasis of this conditional. The choice of optative emphasizes the future *possibility* of this experiment's outcome. Immediately following this quotation, the Asclepiadean maintains

ἐντὸς ἑαυτῶν στεγούσας. καίτοι γ' εἶπερ ἡσάν τινες ἐκ τῶν νεφρῶν εἰς αὐτὰς ἦγοντες αἰσθητοὶ καὶ μεγάλοι πόροι, πάντως ἂν, ἔφη, δι' ἐκείνων, ὥσπερ εἰσῆι τὸ ὑγρὸν εἰς αὐτάς, οὕτω καὶ θλιβόντων ἐξεκρίνετο. ταῦτα καὶ τὰ τοιαῦτα εἰπὼν ἐξαίφνης ἀπταίστω καὶ σαφεῖ τῷ στόματι τελευτῶν ἀναπηδήσας ἀπῆει καταλιπὼν ἡμᾶς ὥς οὐδὲ πιθανῆς τινος ἀντιλογίας εὐπορῆσαι δυναμένου.

that "...if in fact there were any substantive and perceptible pathways passing into them [bladders] from the kidneys, so the liquid would be wholly expelled through those [pathways] when the [bladders] are squeezed just as it passed into them." Galen's Asclepiadean discusses anatomy in hypothetical or counterfactual claims, in sharp contrast to Galen's own habits in discussing anatomical matters. While Galen routinely refers the reader to what can be seen, to what he himself has seen, or to what the reader will see, the Asclepiadean only offers abstract reasons for renal anatomy. Galen's report and the contrast between his own language and the language he ascribes to his opponent figures the Asclepiadean's argument as a thought experiment rather than an actual experiment, one whose future outcome has been predicted by past outcomes on at least analogous structures.²⁹¹ It is also possible to take Galen as implicitly criticizing the implications of the Asclepiadean's experiment, as he explicitly does with Erasistratus' claims about the outcome of his experiment showing that the heart is responsible for the pulsation of the arteries.

This brief episode offers two further implicit criticisms, on which Galen elaborates at *Nat.Fac.* II 36. First, a failure in reasoning: from the fact that some liquid may pass through a channel in one direction, one cannot infer that it can pass through the channel in the opposite direction. So, liquid will not in fact flow back into the ureters as it had flowed out of them (πάντως ἄν, ἔφη, δι' ἐκείνων, ὥσπερ εἰσῆει τὸ ὑγρὸν εἰς αὐτάς, οὕτω καὶ θλιβόντων ἐξεκρίνετο). This closes the episode and makes the point

²⁹¹ I do not intend to use 'experiment' tendentiously here. By 'experiment' I only mean some artificially constructed means of examining a question that attempts to control at least some variables.

against which Galen objects. Second, a failure in investigative method: whenever possible, one should verify a theoretical claim empirically. Galen's segue from his account of the Asclepiadean to his general explanation of the ureters at *Nat.Fac.* II 35 expresses this criticism with characteristic sarcasm, "[i]n this way, those who are slaves to their sects not only know nothing correctly (ὕγιες) but they also do not have the patience to learn (ὑπομένουσι)."²⁹²

Galen points to this two-fold failure in his opponent's reasoning later at *Nat.Fac.* II 35-6, where he criticizes him for his anatomical ignorance and for a concomitant lack of commitment to the heuristic value of teleology (καὶ θαυμάσαι τὴν τέχνην τῆς φύσεως). That is, had the Asclepiadean either been more rigorous in his reasoning or had he bothered to carry out the thought experiment he had hastily described, he would have realized that the fact that urine does not flow back into the ureters does not imply the ureters do not exist but that there is a good reason the flow travels unidirectionally, as Galen goes on to describe subsequently in greater anatomical detail. And, perhaps more importantly, a healthy regard for the teleological structure of the natural world would have prompted the Asclepiadean to expect that the kidneys had a function and seek out an

²⁹² *Nat.Fac.* II 35, οὕτως οὐ μόνον ὕγιες οὐδὲν ἴσασιν οἱ ταῖς αἰρέσεσι δουλεύοντες, ἀλλ' οὐδὲ μαθεῖν ὑπομένουσι. I include "ὕγιες" and "ὑπομένουσι" in the body of the text in order to emphasize the effect of Galen's sarcastic word play as a marker that rounds out his anecdote about the Asclepiadean. The immediate reason for the sentence is a diagnostic summation of his opponent's and more generally opponents' failings. The verb "ὑπομένουσι" plays on the general meaning of the verb and its local meaning in this passage. As the Asclepiadean failed to wait for Galen, so do his opponents fail to wait for learning. Galen's play on "ὕγιες" is more pointed because of the local syntax, which can be taken to mean either that his opponents know nothing about health or have no correct knowledge (ὕγιες οὐδὲν ἴσασιν).

explanation for them.²⁹³ Galen's forensic conduct and the Asclepiadean's are similar; but, whereas Galen leaves confident in the underlying methodological justifications for his victory, his opponent's victory lap is premature. In this case, the Asclepiadean's argumentative, anatomical, and philosophical training are all insufficient for him to distinguish between leaving behind a bested opponent and simply leaving. This is all to emphasize the risk involved in declaring oneself the winner of an intellectual contest prematurely. It is not the departure, as such, that makes the Asclepiadean here and in *Purg.Med.Fac.* lose the competition with Galen so dramatically. Rather, like the Erasistratean of *Art.Sang.*, it is loss compounded with an incompetence so gross as to be unaware that they have lost in the first place.

THE IMPLICIT CONTEST WITH ALEXANDER

After this lengthy digression on the gamble involved in declaring oneself the winner of an intellectual contest through abrupt departure, let us return to the agonistic context of Galen's demonstration of the voice in *Praen.* and his own departure from the contest,

When I heard these things [sc. Alexander's question on the reliability of the senses] I departed leaving (καταλιπὼν) them behind with only a word, namely that I was fooled (ἐσφάλην) when I supposed that I had not come into the presence of some rustic Pyrrhonists (εἰς τοὺς ἀγροικοπυ<ρ>ρων<ε>ίους), otherwise I would not have come at all.²⁹⁴

²⁹³ Underlying Galen's objection is perhaps also an implicit criticism of Asclepiades' corpuscular theory, whose channels (πόροι) and corpuscles may not be, on Galen's construal, structurally complex enough to explain one way motion through channels or vessels.

²⁹⁴ *Praen.* XIV 628-9, ἀκούσας δ' ἐγὼ ταῦτα, καταλιπὼν αὐτοὺς ἐχωρίσθην ἐν μόνον φθεγξάμενος, ὡς ἐσφάλην οἰόμενος οὐκ εἰς τοὺς ἀγροικοπυ<ρ>ρων<ε>ίους ἦκειν, ἢ οὐκ ἂν ἀφικνεῖσθαι. ἐμοῦ δὲ χωρισθέντος οἱ τ' ἄλλοι τοῦ Ἀλεξάνδρου κατέγνωσαν ὅ τ' Ἀδριανὸς καὶ ὁ Δημήτριος, ἐχθρῶς ἀεὶ διακείμενοι πρὸς τὴν φιλονεικίαν αὐτοῦ, πιθανὴν ἀφορμὴν εἶχον ἐπιτιμῆσαι σφοδρῶς.

As in the other instances of abrupt departure that I have quoted, Galen quits the competition with some verb of departure accompanied by a participial form of καταλείπω. As in other cases, the departure is also followed by a final word meant both to explain his absence and to force a victory by his own decree. Unlike his account of the cases of the Erasistratean and Asclepiadeans, Galen figures himself as victorious. He underwrites his own verdict with the acclaim of the audience, which he takes pains to describe in the following paragraph.

Galen tells us that a host of luminaries at Rome were present at this display of the animal phonation. It was organized by Flavius Boethus, the ex-consul and later governor of Syria Palestina. Galen also reports that Alexander of Damascus was present along with Demetrius of Alexandria and Adrian of Tyre, which shows that the variety of attendees ranged from known orators, to philosophers both named and unnamed, and finally to ultra-elite Roman citizens.²⁹⁵

In Galen's narrative, the materials were prepared and the audience already gathered. These two points would have been no mean feat, as displays of this sort could last for days and involved the procurement of various animals, assistants, and the presence of an audience.²⁹⁶ So, when Galen reacts to Alexander's initial question by

²⁹⁵ On Adrian of Tyre and Demetrius of Alexandria, see Nutton (1975: 190-1 n. 96,16 and 96,17)

²⁹⁶ In fact, Galen stresses the duration of the experiment in just this passage at *Praen.* XIV 629, γινομένης δὲ πλείοσιν ἡμέραις τῆς συνουσίας καὶ δείξαντος ἑμοῦ τὴν μὲν εἰσπνοὴν γίνεσθαι διαστελλομένου τοῦ θώρακος, τὴν δὲ ἐκπνοὴν συστελλομένου, δείξαντος δὲ καὶ τοὺς μῦς, ὑφ' ὧν τε διαστελλονται καὶ πρὸς τοῦτό γε τὰ εἰς αὐτοὺς κατεσχημένα νεῦρα, τὴν ἔκφυσιν ἐκ τοῦ νωτιαίου μυελοῦ ποιούμενα καὶ ὡς μὲν ἀβίαστος ἔξω φορὰ τοῦ πνεύματος ἐκπνοὴν ἄψοφον ἐργάζεταιτο, βιαίαν δ' εἶναι τὴν ἐτέραν αὐτῆς γινομένην μετὰ ψόφου, ἣν ἐκφύσῃσιν ὀνομάζομεν·

abandoning the demonstration, the wager he makes is high. As though to reinforce both the stakes and the fact that he had correctly assessed the rules of engagement, Galen not only takes great pains to detail the elite audience present at the demonstration but also narrates at some length the reaction of the intellectuals present,

And after I left, the others reprimanded Alexander; and Adrian and Demetrios, invariably ill-disposed toward his excessive love of argument (πρὸς τὴν φιλονεικίαν), had a credible pretext to rebuke him vehemently. And when this was made known to all of the scholars (τοῖς φιλολόγοις), so many as were in the city of Rome at the time, and to Severus, Paulus, and Barbarus, they all rebuked him vehemently and demanded that the anatomical demonstrations take place with them present, once they had gathered together everyone else however so many were well known in medicine and philosophy.²⁹⁷

This passage finishes Galen's account of the competitive context of the procedure. What follows is a brief and decontextualized account of the procedure itself, without many anatomical details. The agonistic details of this passage, however, are rich. Not only does Galen position himself as an authority on the rules of the contest by referring to the conditions under which he agreed to the competition in the first place, but he also includes the opinions of two well-known orators, Adrian and Demetrios, as guarantees that the wager he made when departing was a winning bet. In passing, Galen also mentions one of the key phrases that indicates his competitor is acting in bad faith, *philoneikia*. He further authorizes his victory on rules of engagement, by acclaim, when

²⁹⁷ *Praen.* XIV 629, ἐπεὶ δὲ καὶ τοῖς φιλολόγοις ἅπασιν, ὅσοι κατὰ τὴν τῶν Ῥωμαίων πόλιν ἦσαν, ἐγνώσθη τοῦτο καὶ τῷ Σεβήρῳ καὶ τῷ Παύλῳ καὶ τῷ Βαρβάρῳ, πάντες οὖν σφοδρῶς ἐπετίμησαν αὐτῷ καὶ παρόντων ἑαυτῶν ἤξιωσαν γενέσθαι τὰς ἀνατομὰς, ἀθροίσαντες εἰς <τ>αὐτὸ τοὺς ἄλλους ἅπαντας, ὅσοι κατὰ τὴν ἰατρικὴν τε καὶ φιλοσοφίαν ἦσαν ἐνδοξοί.

he reports the reactions of increasingly wide circles of audience, the scholars (τοῖς φιλολόγοις) who hear of the event. This report not only adds another level of approval for his departure but also cleverly does double duty: it shows that Galen's victory had become even more public on a local level and in reporting it to his reading audience it manages to reinforce his victory and widen its audience. This last effect is undercored by the final mention of named elite Romans: Severus, Paulus, and Barbarus.

The episode closes with the widest possible circle of acclamation, all those engaged with philosophy and medicine who have been brought to a repeat anatomical performance. By the end of the passage, Alexander's loss is so great that Galen's suite of vocal demonstrations resumes, Alexander himself fades into the background, and with his disappearance and the cessation of the intellectual contest, Galen's language becomes largely unmarked again. That is, references to an audience, additional spatio-temporal linguistic markers such as adverbs, and even a spatio-temporal descriptive context no longer drive Galen's prose outside of an agonistic narrative. To expand on what I mean by marked and unmarked language, let us turn to Galen's account of the intercostal nerve demonstration in AA, where both types of account appear side by side.

GALEN'S NARRATIVE STYLE

Galen's frequent authorial self-reference and tone, either as a consequence of his polemic or as a factor contributing to it, have been a common focus of scholarship that

discusses features of Galen's narrative style.²⁹⁸ More often than not these discussions amount to aesthetic criticisms of either Galen's character or the character of his prose. That Galen is excessively verbose, digressive, (ant)agonistic, self-involved, and so on. For example, Sabine Vogt writes, "Galen in his pharmacological works... shows off his own experiences of drugs during his career (sometimes in a rather anecdotal and frequently tediously self-praising manner)" (Vogt 2008: 316). Nigel Wilson, in the introduction to his translation of Photius' *Bibliotheca* agrees with Photius' damning estimation of Galen's style and character, "This is an accurate estimation of an author who took great trouble to write accurately and yet offends every modern reader by his loquacious and opinionated manner" (Wilson 1994: 16). Vivian Nutton in his paper on Galen's style in *MM* writes,

Reading the first books of the *Method of healing*, one is constantly reminded of the polemical prefaces of A.E. Housman, which, he said, found purchasers among the unlearned who had heard that Manilius, I, contained a scurrilous preface and hoped to extract from it a low enjoyment. But, however much one might admire Galen's rhetorical skills, which at their worst enliven the Fachprosa of his technical arguments, it must be admitted that they do not immediately enhance his stature as a doctor or as a man, and that at times they only serve to complicate an already complex issue.²⁹⁹

In the same paper, Nutton refers to Galen's style in *MM* as a "rhetoric of hate" and even entertains the notion that "the greater tranquility that old age brings along with forgetfulness" (Nutton 1991: 14) may explain the abatement of Galen's polemic style

²⁹⁸ See, e.g., Petit (2012); Nutton (2012); (2009); Nutton (1991: 9-25) discusses Galen's style in *MM*; Nutton (1979: 59-63) offers a discussion of Galen's Greek style in *Praen.*. Although its title suggests otherwise, Mattern (2008) does not discuss Galen's narrative style in detail. Her discussion of Galen's use of the first person, for example, is limited to pgs. 138-40.

²⁹⁹ Nutton (1991: 14)

after the first book.³⁰⁰ This is not to say that Galen's writing is *not* frequently polemic, a claim which is patently false. Rather, it is to highlight the effect that polemic prose can have on a range of scholars, who go so far as to associate these features of Galen's prose with Galen's person and allow their aesthetic judgments to slide into ethical ones. So, for example, Nutton (1991: 21) moves from Galen's rhetoric to Galen's person, saying "Egocentric, bombastic and self-assertive he may have been, but, to my mind he was no fool."

The reason for this list of complaints about the aesthetic quality of Galen's prose or the quality of Galen's character is to observe the distracting effect that scholarly taste can have on discussions of Galen's prose.³⁰¹ Historically, these sorts of comments represent the primary attentions paid to Galen's narrative style. And, even as some scholars such as Nutton have carefully and fruitfully considered stylistic aspects of Galen's prose, these observations serve to confirm entrenched views of Galen's character or the character of his prose.

To take a recent example, Nutton (2009) attempts to give a measured sense of how frequently Galen overtly inserts himself as an author into his texts by tallying the number of self-references in one of Galen's less known and only very recently edited works, *De motibus dubiis* (*DMD*). These statistics are then compared with two of Galen's near contemporaries, Rufus of Ephesus and Aretaeus. Nutton concludes that his brief survey "strikingly confirms Galen's egocentricity (2009: 61)" and then evaluates this

³⁰⁰ For 'rhetoric of hate', see Nutton (1991: 15)

³⁰¹ Some of these references are taken from Petit (2012: 52-3 n. 10).

conclusion by adding "[t]hat Galen was egocentric is nothing new, although these brief statistics do indicate more precisely the extent of that Galenic failing (2009: 62)." But, Nutton's interest in what these data may reveal about Galen's character, itself a questionable enterprise, obscures what aid the structure of Galen's prose may offer to the reader.

To offer another example, Nutton quotes a passage from Niccolò da Reggìo's Latin translation of *DMD* to emphasize how Galen's "polemical character stands out here even in a text that is avowedly a contribution to a shared problem (2009: 60)." Nutton's analysis of this passage, which is included below, far more usefully describes the tools with which Galen effects an argument, his argumentative strategy than it points to the questionable or at least irritating character of the argument's author.

'Problematical' is what those concerned with anatomy call certain movements in living creatures where we see clearly that a movement is occurring, but either we fail totally to know the part of the body by which it is produced, or, if we know, we have no idea how it takes place. The first question to ask about movements that are absolutely clear is whether they are actions of, or effects on, particular parts. I call 'actions' whatever movements are said to be and are operative and effective, and 'effects' those produced by them on other parts.³⁰²

Nutton highlights Galen's progression from (1) the generic third person plural, *vocant*, in the first line to (2) the first person plurals, *videmus*, *nescimus*, and *ignoramus* that follow and finally to (3) the emphatic first person singular *voco autem*. Although he observes

³⁰² *DMD* I.1-3, <D>ubios motus vocant qui vacant circa anathomiam in quibus quoniam quidem est in animalibus motus evidenter videmus, sed vel omnino nescimus {vel} a qua parte fit, vel hoc scientes ignoramus quomodo fit. Prima igitur inquisitio in motibus qui evidenter apparent est utrum sint actiones musculorum aut fiant secundum passionem. Voco autem actiones quidem quicumque motus operativi et effectivi dicuntur...

that this emphasis on the first person singular is to be expected in a passage that lays out a stipulative terminological point, he also concludes that this pivot to the first person singular in Galen often effects "the impression of an unchallengeable authority. What Galen says must be right, in part because he is Galen, the 'I' (2009: 60-1)." The progression that Nutton observes in this passage should be familiar to readers of AA, where Galen often makes just this sort of move from a descriptive terminological claim to a stipulative and, in some cases, normative terminological claim.³⁰³

Recently, scholars such as Caroline Petit have begun discussing stylistic features of Galen's texts more frequently, for their own sake and as an outgrowth of writing habits in the late Roman Empire without the attendant aesthetic and ethical judgments found in earlier scholarship.³⁰⁴

³⁰³ Galen was sufficiently concerned with systematizing language, especially anatomical language, that he wrote an entire treatise on the subject, *De dissentione anatomica*, which is lost. Cf. AA II 278, 283-85, 422, 600 (where Galen explains that the names for the pulmonary artery and vein should reflect function. And so, the artery is called so because it contains pneuma while the vein is called so because of its own function), IX. 9.9-10.12. See also AA II 235-243 details Galen's approach to medical terminology. In this chapter, he mentions different ways in which previous anatomists had understood anatomical structures, such as what constituted a single muscle. Differences on how to distinguish one muscle from another give rise to different numbers of muscles and tendons (tendons and muscles are themselves not always distinct in Galen's work). And so, disputes on the number of muscles can sometimes be seen largely as terminological disputes. After detailing the methods by which other anatomists come to their muscular taxonomies, Galen endorses a muscular taxonomy based on function rather than placement at AA II 242: The most precise teaching holds these views. It is not at all necessary to criticize those who teach differently, whenever they depart from this teaching a little bit. On the contrary, it is better to do the opposite, whenever we investigate something written by many reputable men, not deviating from the correct teaching by much, to make use of it at first for the sake of not confusing listeners while making a pretense of genuine disagreement. (ἡ μὲν οὖν ἀκριβεστάτη διδασκαλία τούτους ἔχει τοὺς σκοποὺς. οὐ μὴν ἐγκαλεῖν γε χρὴ τοῖς ἑτέροις διδάσκουσιν, ὅταν ὀλίγον αὐτῆς ἀπολείπωνται. τουναντίον γὰρ ἄμεινον πράττειν ἐστίν, ἐπειδὴν ὑπὸ πολλῶν ἀνδρῶν ἐνδόξων εὖρωμέν τι γεγραμμένον, οὐ πολὺ τῆς ἀρίστης ἀπολειπόμενον διδασκαλίας, χρήσασθαι κἀκείνῳ τὴν πρώτην, ἕνεκα τοῦ μὴ ταράξαι τοὺς ἀκούοντας, εἰς φαντασίαν ἄγοντας διαφωνίας.)

³⁰⁴ As, for example, dominates earlier work on the so-called Second Sophistic. I have in mind, for example, Bowersock's famous *Greek Sophists in the Roman Empire*, which contains such anachronistic gems about writing and writers of the late imperial period generally as, (Bowersock (1969: 1), "The quality of the second-century works we possess (and they are many) is not high: they are often over-elaborated

DISCOURSE TYPES AS A HEURISTIC FRAMEWORK FOR GALEN'S STYLE

Petit (2012) uses the work of Caroline Kroon and David Langslow on discourse and discourse particles to interpret Galen's narrative style and what it can reveal about his rhetorical strategies.³⁰⁵ She borrows a set of discursive distinctions from Kroon that, taken together, form a discourse type (e.g., monologue, dialogue, and polylogue).³⁰⁶ This set of distinctions runs along two axes, a so-called monological-dialogal axis and a monological-dialogical axis. The two axes can be seen as distinguishing between discourse on a wide and narrow narrative scope, respectively. The first parameter in each pair describes the number of speakers with "full structural and topical control" of the narrative. Most ancient Greco-Roman medical texts are monological. Briefly, this category can, for our purposes, be reduced to the basic distinction between monologue and dialogue. That is to say, this axis distinguishes between speakers on a wide or global scope in a text. The second parameter in each pair, however, describes the speaker or speakers on a narrow or local scope in a text. So, for example, interlocutors that Galen summons up in a personal anecdote in the larger context of a monological work represent dialogical moves. Kroon introduces a further distinction in the case of texts that are both

productions on unreal, unimportant, or traditional themes. Such works were rhetorical showpieces, whose authors, highly trained in oral presentation, were showmen. Yet this fact does not preclude composition for important persons and occasions. The authors were themselves important men." So also, on Galen himself, Bowersock (1969: 74-5), "The prestige of Galen in educated Graeco-Roman society of the second century was symptomatic... The second century was an age of hypersensitivity in literature and bodily care; the joint efflorescence of an Aristides, a Galen, and a Herodes Atticus was not accidental. By an explicable and almost inevitable evolution the Second Sophistic brought with it a tendency to hypochondria which seems to mirror the excessive refinements of its rhetoric... In the midst of that glorious era [the Antonine period] there *was* a real illness, but Galen could do nothing about it. Unknowingly, he too suffered from it."

³⁰⁵ Cf. Kroon (1995) and Langslow (2000)

³⁰⁶ For these distinctions between discourse types, see Kroon (1995: 109-15). Petit (2012: 58-65) uses these distinctions to discuss Galen's construction or figuring of fictional addressees generally.

monological and monological. In cases where an author does not explicitly introduce a distinct speaker into the text but reports another's speech, or refers to the "communicative frame" in the narrative, or writes as though to an interlocutor but without response, she refers to this discourse as diaphonic.³⁰⁷

Discourse markers, of the sort that Kroon investigates in Latin, occur frequently in Galen's Greek. Caroline Petit, who is interested in Galen's narrative style more generally, sees the frequency of markers such as these as part and parcel of rhetorical habits in second century intellectual authors, citing parallels between Galen and Latin authors self-identifying as sophistic such as Apuleius and Aulus Gellius.³⁰⁸ That is, barring a narrative of decline or the notion of cultural illness such as one finds in Bowersock (1969), it is clear that Galen's egoistic presence, his agonistic prose, and other such habits of his writing can be read in part as features common to literature of his time rather than *just* as reflections of his own or his culture's character, to the extent that this latter notion is even helpful. This is not to say that Galen and his prose are reducible to an assortment of literary features common to authors of the second century. Petit is quick to point out, there is a need for caution in assessing the difference between Galen's prose

³⁰⁷ For Kroon's discussion of these discourse categories as heuristic tools, see Kroon (1995) ch. 5 generally.

³⁰⁸ See Petit (2012: 51), Quelques siècles plus tard, la culture impériale et le mouvement de la << Seconde Sophistique >> ont rendu l'habileté oratoire plus cruciale que jamais, pour les savants en général et donc les médecins: seule une solide formation rhétorique et philosophique permet de donner des conférences publiques à la manière des sophistes, de répondre aux objections soulevées par des confrères ou bien à d'autres accusations publiques, parfois graves, comme l'accusation de magie et de divination. Galien lui-même exprime ses craintes répétées de passer pour un mage, et raconte l'infortune de son maître Quintus, conrroit de quitter Rome, sur la foi d'une accusation de ce genre. On trouve des cas parallèles rapportés par d'autres auteurs de cette époque, comme Apulée et Aulu-Gelle. Le contexte intellectuel agonistique dans lequel évoluent les médecins comme Galien à Rome détermine donc *en partie* l'écriture, et même plus largement l'expression médicale de cette époque.

and the prose of contemporary medical authors. She cites Sextus Empiricus' agonistic and dialogic prose in *Adversus Mathematicos* as a point of comparison. On the other hand, she observes that Soranus, Rufus of Ephesus, and the authors of Pseudo-Galenica all write prose that is fairly distinct from Galen's own.³⁰⁹ Petit conjectures that these similarities may have to do with 'la prétention au discours philosophique de Galien, que l'on peut soupçonner d'un mimétisme (Petit 2012: 69)."

Kroon, in the larger context of a discussion on so-called discourse particles in Latin, details a list of markers for diaphonic discourse, that is conversational features of an otherwise monologal-monological narrative. These include, a) first and second person verbs or pronouns, b) a shift in the default tense of the narrative, usually from past to present, c) metadiscursive expressions (i.e., expressions that do not or do not *just* report ideas but whose use affects interaction with the reader, such as Galen's frequent second person use of verbs of seeing and knowing directed at the reader as questions or instructions), d) expressions of subjective evaluation (e.g., explicit authorial opinion, belief, feeling, etc.), e) the intrusion of questions or instructions that assume an addressee in or outside the local context of the narrative, and f) extraclausular interactional elements such as interjections. This list of markers effects a conversational interaction with the reader of the text. And, a reader of Galen will quickly spot that all of these markers are quite common throughout Galen's work.³¹⁰

³⁰⁹ Petit (2012: 69)

³¹⁰ Kroon (1995: 114-5), on which Petit (2012: 59-61) elaborates with references to specific Galenic usage and texts.

DISCOURSE MARKERS IN *DE ANATOMICIS ADMINISTRATIONIBUS*

Chapter four focuses on the text of AA at greater length, with the aim of using some of the observations regarding discourse markers and diaphonic breaks in Galen's narrative as heuristic tools for interpreting some puzzles in anatomical episodes, in particular Galen's narratives on elephantine dissection. But, before turning to those, it is worthwhile to set the stage for them by discussing other episodes in AA. Although I will begin with a set of general comments, this discussion will largely be limited to those episodes that occur in book VII of AA, which have as a unifying theme an anti-Erasistratean argument.

To pick up on some of Kroon's general indicators of conversational or diaphonic indicators in otherwise monological-monological narratives, AA, like most of the rest of Galen's work, is rife with first person pronouns and verbs. In addition, however, the overall narrative of AA progresses with repeat reference to unnamed second person singular and plural addressees. The treatise begins with an explanation of the circumstances surrounding its own composition, a prefatory move that is not uncommon in Galen's work, especially in the treatises associated with Flavius Boethus, AA, *UP*, and *Praen*.³¹¹ In these opening lines, Galen mentions Boethus as dedicatee. It should not be assumed that he be identified with the unnamed second person singular addressee (AA II 215-6). In addition, he details the somewhat complicated history of AA's composition in at least two stages: first, two books of anatomical demonstrations written as memoranda

³¹¹ For the circumstances surrounding composition, especially tropes in Galen such as composition at friends' behest, see Petit (2012).

(*hypomnēmata*) for Boethus on his assumption of the governorship of Syria Palestina in 165 CE. These memoranda, Galen writes, were not intended for wider circulation as is the general conceit with Galen's *hypomnēmata*. Boethus dies in about 169 CE and, at his death, Galen reports that this first iteration of AA is lost. Second, at the behest of friends, a motive for composition common in Galen's work and perhaps to be read as a *captatio benevolentiae* directed at the reader as well, Galen recomposes and expands the original treatise that is now prepared for wider circulation and includes all that Galen has learned since it was originally written. This second version is to be dated at around 177 CE. Besides the unusual degree of control that this preface exhibits over the production and dissemination of the work, itself a feature that repeats itself in Galen's work, it is notable for its meta-discursive close,³¹² which introduces the first, emphatic, second person address in the treatise doing so in an abrupt shift from a series of past tense verbs to a present imperative, "but the anatomical demonstrations I wrote for Boethus, then, fall far short of those which have been written by me now, not only in their clarity (σαφηνεία)

³¹² So, for example, consider both of Galen's autobiographical works, *Lib.Prop.* and *Ord.Lib.Prop.*. The works themselves are unique as examples of regulation and authorization of one's own written work. For a particularly vivid anecdote that underscores Galen's acute interest in the authentication of his corpus as his own, see *Lib.Prop.* XIX. 8-10, in which Galen discusses an episode near the bookshops of the Sandalarium in Rome, where Galen happens upon two readers debating the authenticity of a book they have in hand, allegedly authored by Galen. One of the two readers, upon inspecting the treatise, declares that it is a fraud on the basis of its un-Galenic title and language. Before digressing into one of his diatribes against the near illiteracy and general intellectual and ethical failures of his contemporaries, Galen praises the man for his education and offers up this experience as justification for writing an autobiographical work. The anecdote is quite rich, as it not only allows Galen to announce his own literary reputation (after all, his Greek is so well-known that it can be recognized by the right sort of reader), but also his general reputation in that counterfeit treatises are penned in his name. Cf. Galen's rejection of the vascular anatomy in *Nat.Hom.*, in *HNH* where he speculates that the counterfeit pages were inserted into the text of *Nat.Hom.* in an effort to make more money from its sale to a Hellenistic king, effectively figuring himself and Hippocrates in the same terms.

but also in their precision (ἀκριβεία). And now (καὶ τοίνυν ἤδη) attend (πρόσεχε) to me as I begin my work (τοῦ λόγου)."³¹³

Immediately following his prefatory remarks and injunction of the reader to attend to the start of his work, Galen deploys an extended simile of the body as an edifice, "As so-called tent poles are to stages and as walls are to homes, so is existence of bones in animals. For the other things are naturally disposed to take their shape from it and to change along with it."³¹⁴ This simile is reminiscent of Aristotle's many artefactual examples of the body and nature and sets the stage for an analogy between the goal-oriented structure of artificially made tools and the goal-oriented structure that Galen is committed to in his strongly teleological view of the natural world.

This opening is followed by Galen's advice to the reader on how best to study human anatomy, starting with his own earlier isagogic osteological treatise, *De ossibus ad tirones* (*Oss.*). Galen's reference to his isagogic work, however, bears with it an injunction that pervades the rest of *AA*: anatomy cannot be learned from books alone. It must be practiced assiduously. And, those who fail do to so are no better than *iatrologoi*

³¹³ *AA* II 218, τότε γοῦν ἐποίησα καὶ τὰς ἀνατομικὰς ἐγχειρήσεις τῷ Βοηθῷ, πολὺ τῶνδε τῶν νῦν μοι γραφησομένων ἀπολειπομένας, οὐ σαφηνεῖα μόνον, ἀλλὰ καὶ ἀκριβεία. καὶ τοίνυν ἤδη μοι πρόσεχε τὸν νοῦν ἀρχομένῳ τοῦ λόγου. One also notes Galen's use of καὶ τοίνυν ἤδη, a relatively rare cluster of words outside of Galen and particularly Attic in its provenance. τοίνυν itself is usually found in Attic prose, see Denniston (1950: 568-9) and, in particular 569: "τοίνυν is, then, essentially an Attic, and colloquial, particle. Being conversational and lively, it is absent from the *Timaeus*, and in Plato, speaking generally, it is much commoner in dialogue than in continuous speech: in about half the Platonic instances it goes with imperative or hortative subjunctive." For καὶ τοίνυν, see Denniston (1950: 578), where the instances cited by Denniston are primarily found in Plato, Xenophon, and Aristophanes. That is to say, this particular word cluster, followed by an imperative, is very careful Atticism in addition to being an example of diaphonic indicators as outlined by Kroon.

³¹⁴ *AA* II 218-9, Ὅποιόν τι ταῖς σκηναῖς οἱ καλούμενοι κάμακές εἰσιν, καὶ ταῖς οἰκίαις οἱ τοῖχοι, τοιοῦτον ἐν τοῖς ζώοις ἢ γε τῶν ὁσίων οὐσία. συνεξομοιοῦσθαι γὰρ αὐτῇ τάλλα καὶ συμμεταβάλλεσθαι πέφυκεν.

or *iatrosophistai*, physicians in name alone.³¹⁵ The opening, along with this injunction, occasions comment on one of the most notable narrative features of AA, Galen's emphatic use of the second person. Consider a non-systematic sample from the first chapter of AA in which Galen begins his actual discussion of anatomical demonstrations, beginning at AA II 243. Here, Galen writes "now is the right time (καιρὸς ἤδη) to explain how it is necessary to proceed both if one wishes to train oneself and if one wishes to make a demonstration (δεικνύντα) for someone else, as I have demonstrated (ἐπιδείξαντας) earlier the common mistake of all those who claim to be anatomists..."³¹⁶

CLOSE READING OF AA II 243-53

In this chapter on the muscles of the forearm, which runs from AA II 243-53 and is not stylistically unusual in relation to AA generally, Galen uses the following second person verbs or pronouns. At 244: ὅψει on the ligaments the reader will see; 245: σοί on what nomenclature one can use; 246: τέμνειν ἐθέλοις on the order in which parts are dissected; 247: ῥαδίως ἐργάσῃ on stripping fibers away with your fingers or a lancet, then κἀνταῦθα μάλιστα πρόσεχε τῷ ἔργῳ... ἔνεστί σοι διττὴν ἐγχείρησιν ποιήσασθαι on attending to the procedure at hand and on the procedural options open to the reader, συναφαιρήσεις and ἀπολύης as the options themselves; 248: ἀποχωρίσης...

³¹⁵ Cf. AA IX.10.12, where Galen writes of this sort of armchair physician: "Whoever does not know this [the pairs of cranial nerves] is, as the proverbial expression goes, like a seaman who navigates out of a book. Thus he reads the books on anatomy, but he omits inspecting with his own eyes in the animal body the several things about which he is reading (trans. Duckworth)."

³¹⁶ AA II 243 Ὅπως δ' ἐγχειρεῖν χρὴ γυμνάζεσθαι τε βουλόμενον αὐτὸν, ἐτέρῳ τε δεικνύντα, καιρὸς ἤδη λέγειν, ἐπιδείξαντας πρότερον ἀπάτην κοινὴν παμπόλλων ἀνατομικῶν εἶναι προσποιουμένων...

πειρῶ instructing the reader on what to do when removing skin from fascia, θεάσῃ τὰ ἀγγεῖα καὶ τὰ νεῦρα instructing the reader on the vessels and nerves that will be seen during dissection of the forearm and indicating how best to deal with attendant structures ἐξαιρήσεις; 249: καὶ σοι καλεῖν ἔξεστιν, ὥς ἂν ἐθέλῃς and again ἔξεστι... προσαγορεύειν on acceptable nomenclature, θεάσῃ on what tendons the reader will see; 250: θεάσῃ on the insertions or attachments that the reader will see in the muscles; 251: κατάσχεψαι instructing the reader to consider the palm carefully, ἀπολύῃς on what happens when the reader destroys the nerve, σφαλείης... εἰ οὐ τέμνεις... ἀλλ'... ἀποτεμείς on how the reader will botch the operation if cuts are not made carefully along with the consequences of the mistake; 252: σαφέστερον δ' ἂν μάθοις... εἰ περιτέμεις on how the reader will learn the function of tendons by manipulating them, ἐγχείρησις ἔστω σοι on the recommended procedure for best manipulating the tendons, ὄψει instructing the reader on what tendons will be seen again; 253: φανεῖται δ' ἀνατέμνοντί σοι on what will be manifest to the reader while conducting the dissection of the ligaments of the forearm.

All told, there are twenty six instances of second person verbs or pronouns, all here in the singular. Verbs involving vision, such as ὁράω, θεάομαι, κατασκοπέω, and even φαίνομαι are common constituting nearly 25% of the finite verbs in this passage.³¹⁷

³¹⁷ A few of these constructions also direct the reader on acceptable usage, as a variation of von Staden's 'nomenclative *ego*', which directs the reader on what Galen considers to be the range of correct medical nomenclature. Galen's comments in this regard are typical of his stated opinions on language throughout the corpus: terminology is unimportant for the most part, so long as it is clear and consistent. To this end, standard Greek (as mediated through Galen, see *Thras.* V 868–9) is ideal except where certain dialects make finer distinctions (e.g., Attic or koinê on occasion) or where technical language makes a distinction with a difference (See *MM* X 44, *Diff.Puls.* VIII 496–7). Cf. *Di.Dec.* IX 788–9, "They [sc. some doctors]

These verbs combine three of Kroon's categories *a* (first/second person), *c* (meta-discursive elements), and *d* (subjective evaluation).³¹⁸ The verbs manage not only to address the reader but also to direct the reader's attention to, depending on one's view of the practical uses of AA, either a real or imagined anatomical procedure. To the extent that these verbs of seeing also tell the reader what will be seen, Galen is constructing what is seen in addition to describing it. Finally, these second person addresses by involving the reader in the procedure that Galen describes and, furthermore, by involving the reader's perception situate the reader (and the reader's perceptions) in the imagined anatomical demonstration.

Although she interprets Galen's second person engagement of the reader with sensory language more radically, Maud Gleason makes a related observation to the one above in passing. She writes about Galen's use of sensory language in the context of his narrative in the following way,

wrangle about meaning although they don't know this following fact: that having abandoned medical matters they are taking up research suitable for dialecticians, grammarians, or rhetoricians. It belongs to dialectic to inquire about the correctness of names and of rhetoricians and grammarians to inquire if a name is standard for Greeks. And some of the doctors do these things also although they understand dialectic, grammar, and rhetoric as much as donkeys understand lyres." (εἴτ' ἐρίζουσι περὶ τοῦ σημαινομένου μακρὰ, μηδ' αὐτὸ τοῦτο γινώσκοντες, ὥς ἀποχωρήσαντες τῶν ἱατρικῶν πραγμάτων ἢ διαλεκτικοῖς, ἢ γραμματικοῖς, ἢ ῥήτορσι πρόπουσαν ἐπαναιροῦνται σκέψιν. διαλεκτικοῦ μὲν γὰρ ὑπὲρ ὀνομάτων ὀρθότητος σκοπεῖσθαι, ῥητόρων δὲ καὶ γραμματικῶν, εἰ σύνηθες τοῖς Ἑλλήσι τοῦνομα. καὶ ταῦτα ποιοῦσιν ἔνιοι τῶν ἱατρῶν εἰς τοσοῦτον ἢ διαλεκτικῆς, ἢ γραμματικῆς, ἢ ῥητορικῆς ἐπαίοντες εἰς ὅσον ὄνοι λύρας.)

Especially to be avoided are distinctions without a difference, as Galen is fond of accusing Stoics of making. For Galen on nomenclature, see Morison (2008: 116-56 but especially 129). Galen is especially concerned with nomenclature and precision in language on the whole, devoting a number of works (mostly lost) to language use. On the subject of Stoic abuse of language, cf. *PHP* V 215-18, against Chrysippus' etymological explanation of *ego*, which is a piece of characteristic Galenic abuse; cf., also *PHP* V 241-48, where Galen accuses Chrysippus, Diogenes, and Zeno of Citium of equivocating by adopting obscure rather than plain and therefore transparent Greek.

³¹⁸ See Kroon (1995: 115)

In fact Galen's insistent use of the second person (you *see*... you cut... you find), combined with his way of walking the reader step by step through various procedures, adds a virtual reality, a 'you-are-there' dimension, to the experience of reading the text. This is a rhetoric of immediacy and involvement, which invites the reader to imagine himself performing acts of violence while simultaneously screening him from their messy consequences. The ancient reader of Galen's *Anatomical Procedures* thus received an affective education in the dispassionate use of physical force....³¹⁹

Gleason's larger point in the article from which this quotation was drawn is that Galen's anatomical demonstrations were, to offer a perhaps simplistic summation, an expression of power that was an outgrowth of second century Roman anxiety with social relations in a stable empire stabilized through the dominant power of the emperor.³²⁰ Gleason's tendency to read Galen's anatomical descriptions in terms of socio-political power relations is outside the scope of this dissertation, which primarily concerns itself with considering Galen's argumentative strategies and this chapter, which is concerned with discussing performative features of Galen's language in *AA* as a prelude to a discussion of the argumentative role of Galen's exotic animal dissections in chapter 4.

Throughout this chapter of *AA*, Galen's self-references are less common than his explicit references to the reader. Furthermore, these references are of a piece. There are

³¹⁹ Gleason (2009: 105)

³²⁰ E.g., see Gleason (2009: 87), "Mapping status distinctions onto physical differences was problematic. One might like to think that free men looked different from slaves, but the bodies of slaves and citizens were simply not different *enough* to stabilise social categories. So, on the macro level, the metaphor by which the body authorises the social hierarchy is always threatening to dissolve and, on the micro level, the metaphor by which the unity of the individual body appears to guarantee integrity of personal identity is also unstable. Writers of the Neronian era used images of the disintegrated body to deconstruct Imperial ideology in the context of civil war, or to explore the paradoxes of personal identity and autonomy that tormented aristocrats under Imperial rule. *The intellectuals of Antonine Rome, who inhabited a more orderly but increasingly stratified society, may have found the systematic violence of vivisection 'good to think with' as regards social boundaries and central control.*"

sixteen self-references, of which twelve are first person verbs or pronouns. These occur at 243: ὅπως οὖν ἡμᾶς ἐγχειρεῖν προσήκει; 244: ὑπὲρ οὗ μικρὸν ὕστερον ἐρῶ σαφέστερον, ἐκατέρωθεν δὲ τῶν εἰρημένων συνδέσμων; 245: ὃν ἔφην ἄμεινον εἶναι τίθεσθαι δύο μῦς, ὥς εἴρηται; 246: ἀκολουθεῖν ἀναγκαζόμεθα καὶ ἡμεῖς ἔνεκα τοῦ μὴ δόξαι καινοτομεῖν, ὑπὲρ οὗ σαφέστερον ἀνεβαλόμην ἐρεῖν; ἔφην; ἀρξώμεθα; ὥς εἶπον; 248: ἔφην; ὑπὲρ οὗ πέπαυμαι λέγων; 250: εἴρηται δὲ ἐν τοῖς περὶ τῶν ὀστέων λόγοις; ὥς εἴρηται; 251: ὥς εἴρηται; 252: ὥς ἔμπροσθεν εἴρηται; 253: περὶ ὧν ὕστερον ἐρῶ.

Nearly all of these self-references are instances of what Heinrich von Staden calls the *ego dispositio*, that is, self-reference as a tool for managing the direction and structure of the overall narrative.³²¹ Repeatedly, in this chapter, Galen refers to how he will begin speaking, what he has said earlier, what he will say later, why he is saying what he is saying, that he is going to stop saying, and so on. These self-references, first person or otherwise, call attention to Galen only in his aspect as anatomical guide. Further markers of the sort that flag Koon's diaphonic discourse abound throughout AA.

For the most part, the conversational features of the text emphasize the reader and the reader's experience of these anatomical procedures as directed by Galen's narrative. To that end, AA is mostly devoid of situational context. That is, the default narrative lacks any spatio-temporal context outside the anatomical part under discussion. Occasionally, Galen widens the scope of his lens to include some performative advice, such as the ideal

³²¹ On *ego dispositio*, see von Staden (1994: 110-11). Von Staden's article focuses exclusively on Celsus' use of the first person but his observations are useful and have already been seen (e.g., Petit (2012).

location in Rome for the purchase of ox heads, the places where the best iron for medical instruments may be found, Norica incidentally, and so on. Frequently, Galen also refers to his relationship with the reader, sometimes a distant one and sometimes an intimate one. In the latter cases, Galen often refers to previous anatomical demonstrations which Galen figures the reader as having witnessed.³²² Similarly, Galen uses the second person to evoke a shared past with the reader, frequently writing such things as, "as you know", "as you have seen many times when *x*", and so on.

Overt polemics, which do occur occasionally in AA are frequently flagged by a host of spatio-temporal markers, on the grammatical level by the prevalence of *ara*, temporal adverbs, changes in tense, and the prominence of first person verbs in the past tense that are clearly not the *ego dispositio* but are situated in some time and place. They are, as the episodes that form the focus of chapter 4 will show, rich in circumstantial details both on the aforementioned grammatical level but also on the broader level of Galen's narrative. To take up the earlier lens metaphor, they are episodes taken with a wider scope lens. They take place *in Rome, in an alleyway, in the morning, yesterday, some time ago*. The audience comes into focus; attendees have names. Galen interacts with them. And so on. In these narratives, which I will call personal anecdotes, there is reason to doubt that the norms of assertion that seem to govern Galen's decontextualized anatomical narratives apply. This consideration will be the focus of the following chapter.

³²² For these instances as instances of meta-discursive features of Galen's narrative, see Petit (2012: 60)

Chapter Four: Galen's Elephant, Anatomy Writ Large

In this chapter, I consider the argumentative role that exotic anatomical exegeses play in Galen's work. In particular, I will focus on Galen's alleged dissection(s) of the elephant. I take two episodes that figure prominently in the text of Galen's *Anatomicis Administrationibus* (AA), first on the gallbladder and second on the so-called heart bone. I also consider Galen's account of the elephantine trunk as an analogue to the human hand in the self-titled *Epode* that closes his theoretical anatomical treatise *De Usu Partium* (UP).

Historians of medicine have traditionally mined these episodes and episodes like them for their anatomical accuracy, for what they can reveal about the socio-cultural context of second century medical practice, and for the light that they can shed on the medical debates that figure so prominently in Galen's description of medical sects in the Roman period. I approach Galen's anatomical accounts of the elephant differently, asking what argumentative role these episodes play in the local context of AA and then in a more global context. I will attempt to show that, where it seems possible to verify whether or not Galen actually conducted dissections or even passive examination of the internal structure of the elephant, the evidence suggests Galen is likely working analogically from oxen, as he does with neural anatomy.³²³ I will argue that Galen's extrapolating

³²³ Galen's anatomical accounts of the brain are thoroughly documented in Rocca (2003), where Rocca shows that Galen's account of the famous retiform plexus (*rete mirabile*), which plays such a central role in Galen's overall physiology, derives from necropsies performed on oxen. Of course, it is also well known that a number of Galen's accounts of human anatomy are ultimately based on the anatomy of animals commonly available to him (e.g., cows, oxen, pigs, sheep, the rhesus monkey, and the Barbary ape). For an

anatomical information from other animals to the elephant provides him with an argumentative tool whose purpose was to buttress his teleological claims at the same time as it undercut rival theorists.

First, I will discuss the significance of the elephant as a powerful subject for anatomical discussion from a technological perspective. That is, I will consider the question: why the elephant? Second, I will discuss the elephant as a point of teleological contention, focusing on Aristotle and the elephantine trunk. Finally, I will characterize Galen's claims about both the elephant's gallbladder and its heart-bone as arguments based on his teleological and encephalocentric beliefs rather than dissection and autopsy.

MAGNIFICATION AND THE ELEPHANT

In the later books of *AA*, preserved mostly in Arabic, Galen offers the reader an ingenious solution to the problem of minute observation in the absence of magnificatory technology,

[f]or we hold it best to investigate and to study the details that are difficult to see in the bodies of large-sized animals, I mean in oxen, horses, asses, mules and others like those. But even in the elephant, let alone any other animal, we have never found arteries at the side of these veins [minute veins, in particular the vein leading to the testicles] (trans. Duckworth).³²⁴

abbreviated list of some of Galen's anatomical claims that are not extrapolated to human beings accurately, see May (1968: 42). For a brief account of Galen's use of non-human subjects and his extrapolation of their anatomy to human beings, see Rocca (2003: 67-76).

³²⁴ *AA* XIII.8 (Simon I.214 = Duckworth (1962: 171)). This is Duckworth's translation from the Arabic edition of the 9th century medical scholar and translator Ḥunain ibn Ishāq, which was itself based on his corrected edition of an earlier Syriac translation. The Arabic text survives in two manuscripts alone (Oxford, Bodleian MS. 158 and London, British Library, Additional Manuscript MS. 23406). These were edited in the very early 20th century by Simon along with a German translation. The translation above is taken from Duckworth's 1962 translation of Simon's Arabic text. For the principles of Duckworth's translation as well as the manuscript tradition, see Duckworth (1962:xiii-xvii).

In lieu of a device that magnifies anatomical structures, Galen resorted to observations of minute structures in larger creatures to infer structures he believed to be analogous in smaller creatures, such as human beings. So, he says in the later books of AA,

[w]e must then try to learn the conformation of that which is hard to observe in any one type of animal, whichever this may be, in other animals where that can be found and thoroughly investigated, I mean those animals in which such details are in their nature larger and more massive than those which in this [smaller] type are hard to see (Trans. Duckworth).³²⁵

Of course, Galen assumes that the structures in the larger creatures are analogous to the structures in human beings but this method and its pitfalls are well known and at least implicitly apparent to Galen himself.

In the context immediately following this quotation, Galen offers his approach to the first cervical vertebra in human beings as an illustration of this point. In human beings and apes, he says, the first and second cervical vertebrae are too small to observe well *directly*. In larger animals, generally larger carnivores, the first and second vertebrae are very large and allow for adequate direct observation, from which Galen believes the structure of these vertebrae in smaller mammals can be inferred. But he justifies this inferential move on the grounds that "the structure of the bodies of animals... resembles the structure of the human body in some degree (AA XV.2, p. 227)." In very small animals, such as insects, Galen cites the sensory organs in the head and their relative position in *all* animals, the thorax, some means of locomotion, and the presence of a system for the evacuation of waste as examples of structures that one can assume across

³²⁵ AA XV.2, p. 228

kinds. Each of these anatomical similarities is explainable in terms of Galen's more general anatomical commitments. Certain items on the list had been defined as essential for animals since Aristotle. So, for example, all animals must digest nutriment and evacuate waste. In addition, animals must be locomotive. Galen's acceptance of these two Aristotelian characteristics of animals explains their inclusion in this list.

Galen's list includes the sensory organs in the head as well as the thorax. Each of these has special significance in his anatomical worldview. The sensory organs are wired to the *hêgemonikon*, which Galen normally places in the head. This faculty or organ (the brain),³²⁶ of course, occupies a tremendous amount of Galen's time and energy throughout the corpus. The thorax, on the other hand, is involved in respiration and contains the respiratory organs. The heart is, for Galen, itself a respiratory organ. Both the heart and the brain are central to Galen's encephalocentrism and his physiology.

Even so, Galen does not always restrict himself to these structural analogies. For example, Galen implies that gallbladders exist across some kinds for reasons teleologically associated with the liver and his humoral theory but he is not committed to the existence of gallbladders across all animal kinds possessing livers and a full complement of humors. Human beings, elephants, and in a sense simians all have a tool-using appendage but it is unclear why, to Galen, all of these do while otherwise similar kinds do not. Some more, however, can be said about Galen's general criteria for

³²⁶ Galen sometimes refers to the brain when discussing the *hêgemonikon* and vice versa, presumably by metonymy.

analogical similarities across kinds. But it is often difficult to have a clear sense of what strict criteria he had, if he had them, for analogical similarities between animal kinds.³²⁷

Indicative of Galen's sensitivity to the danger of analogy, even if his sensitivity was sometimes insufficient and his analogical reasoning misapplied, are his comments on direct observation versus analogical reasoning. They reveal that he strongly privileged direct observation, at least in principle, over analogical arguments in anatomy. So, for example, he adds in the later books of *AA*,

[n]evertheless it is not here my purpose to derive the knowledge of the nature of the things which I wish to understand from analogy; for this is not the aim of anatomy. Rather I am simply trying to give an account of those things which manifest themselves to the eyesight (Trans. Duckworth).³²⁸

There is a clear tension between Galen's commitment to analogical reasoning as a heuristic tool and his commitment to direct empirical observation. Given that the remarks on human anatomy found in *AA* are largely if not wholly based on anatomical information about human beings derived analogically, it is difficult to make sense of Galen's claim regarding direct observation above. In light of the focus of this chapter, which involves Galen's use of analogy extensively, this claim about analogy across kinds requires some elaboration.

For Galen, not all animal kinds are structurally intersubstitutable. For example, Galen advises the reader of *AA* to study the skeletal structure of human subjects if at all

³²⁷ On ancient criteria for analogous structures across kinds, although in regard to taxonomy more than regarding analogical reasoning, see Lloyd (1983) ch.1.

³²⁸ *AA* IX.7, p.4

possible and, failing that, of apes most like human beings. He cautions the reader to avoid apes with elongated jaws and canines.³²⁹ He adds that the reader should, in the absence of apes choose other animals on the basis of their external similarity to human beings.³³⁰ These animals and their differences to human beings are fleshed out at AA II 547-8, where Galen divides the animals analogous to human beings into six classes, which decline in the grammatical sense from man as the default form. These are, in progressive difference from humans, apes (πίθηκοι), bears (ἄρκτοι), carnivores (καρχαρόδοντα), rodents (μῦς), single-hooved animals (μονώνυχα), and finally ruminants (μηρυκάζοντα).³³¹ Galen adds that this schema was anticipated by his anatomical predecessors, who insisted that subjects of dissection should be close to man in nature (αὐτοὶ γεγράφασιν, ἐπ' ἐκείνων ἐξετάζεσθαι τῶν ζώων, ὅσα μὴ πολὺ διεστῶσαν ἀνθρώπων ἔχει τὴν φύσιν). To what ancients is Galen referring and what is the nature of these six classes?

Aristotle is a possible and perhaps probable candidate for this reference. In Aristotle's own classificatory system of so-called blooded viviparous animals, which overlap with mammals as a class, he divides viviparous animals (ζωοτοκοῦντα) into

³²⁹ See, AA II 222, ἐκλεξαι δὲ εἰς τοῦτο τῶν πθήκων τοὺς ὁμοιοτάτους ἀνθρώπῳ. τοιοῦτοι δ' εἰσὶν, ὧν οὐθ' αἱ γέννες προμήκεις, οὐθ' οἱ κυνόδοντες ὀνομαζόμενοι μεγάλοι.

³³⁰ See, AA II 227

³³¹ Also, cf. AA II 429-31, which contains a slightly different list along with a possible textual crux. Singer (1956: n. 83) expresses some unease with rendering λύγες as lynxes. Indeed, it seems out of place in this passage as one might expect lynxes to belong to the class of carnivores. Then again, if the argument above regarding Galen's point in articulating the class of polydactyls, as he has, is true the presence of the lynx in this passage may reflect Galen's lack of interest in anything more than distinguishing human beings from apes and apes from other polydactyls. This is the Greek that contains the reference at AA II 430, ἀπάντων γὰρ τῶν ζώων ὁ ἀνθρώπος ἔχει βραχυτάτην τὴν γένυν ὡς πρὸς τὴν ἀναλογίαν δηλονότι τοῦ παντὸς σώματος, εἴθ' ἐξῆς ἀνθρώπῳ πίθηκος, εἶτα λύγες, καὶ σάτυροι, καὶ πειθ' ἐξῆς κυνοκέφαλοι.

three rough subclasses: four-limbed (τετράποδα), no-limbed, and flying creatures.³³² Aristotle articulates four-limbed creatures, among which human beings are found, into three further subcategories by the number of their digits. These are polydactyls (πολυσχιδῆ), cloven-hooved animals roughly corresponding to ruminants (διχάλα), and single hooved or single toed animals (μόνυχα).

The members of polydactyls includes human beings, apes, and other carnivores. The relevant observation here, however, is the importance of limbs and digits to Aristotle's overall schema; and, by extension, the importance of limbs and digits to the axes along which Galen may determine analogical relationships between kinds. The importance of the hand and its fingers will be emphasized later when this chapter discusses the significance of the elephant and its trunk in Galen's corpus. So, there is good reason to suppose that Galen might have an interest in coopting a taxonomy so congenial to him. But Galen's system is not identical to Aristotle's.

The main point of difference lies in Galen's elaboration of Aristotle's polydactyls into five sometimes inconsistent subcategories:³³³ humans, apes, bears, carnivores, and rodents. The inconsistency in his accounts of these subcategories relative to Aristotle's own taxonomy is perhaps explain by Galen's interest in subdividing polydactyls in the first place: separating humans and apes from one another. Although Aristotle's taxonomical methods sometimes suggest that human beings are the default class from

³³² For a very useful chart that lays out these classes in a single place, see Manuli and Vegetti (1977). For Aristotle's taxonomical principles, see Lloyd (1983) ch.1. Lloyd does not mention difference in digits as a taxonomical criterion in Aristotle's corpus but does go into some detail about Aristotle's methods more generally.

³³³ cf. AA II 429-31, which omits rodents and bears replacing them with the lynx and other apes.

which other animals deviate, in Galen's work the notion of human beings as an ideal class is far more explicit.³³⁴

It is crucial, therefore, when considering Galen's own arguments from analogy to recognize how many degrees away from the human norm the animal under discussion falls. So, for example, Galen argues in various places that the chambers of the heart do not vary from one animal to the next. But he also frequently observes that some animals, such as fishes, have only one ventricle in the heart. The fish, however, does not fall into any of the six classes, which Galen considers structurally analogous to human beings all of which have a four-chambered heart.

Even if, in practice, Galen runs afoul of unwarranted anatomical analogy, his articulation of animals into classes on the basis of their anatomical differences from human beings suggests that, in principle, he was sensitive to the possibility of false anatomical analogy. It is not always clear, however, by what criteria Galen determines relative similarity and dissimilarity to humans. This view on analogy across certain kinds arises from a combination of Galen's thoroughgoing commitment to a robust teleological structure in the world and from brute observation of similarities across kinds such as blooded animals (ἔναιμτοι). In this context, 'robust' is meant to contrast Galen's teleological commitments to Aristotle's, which are weaker in the sense that Aristotle allows for regularly occurring features of the world that are either not teleologically determined or at least not directly so.

³³⁴ The importance of a special status for human beings in Galen's taxonomy also provides further explanation for the frequency with which he writes about the ape as a caricature of a human being throughout his corpus.

This robust teleology of Galen's is explanatory of the theoretical ease with which he makes analogical moves in anatomical contexts. A feature of an ideally structured world is that any given natural structure is *de facto* ideally structured, with certain caveats. Briefly, Galen's organizing principle works to organize the materials already present in the world. It does not appear to be able to create a structured world *ex nihilo*. Consequently, it is constrained by those materials and causal principles that in a sense precede its organizing activities. This notion is not original to Galen. Aristotle's teleological views also suppose certain practical constraints on the structures found in the world, which he calls hypothetically or contingently necessary (ἀναγκὴ ἐξ ὑποθέσεως).³³⁵

Galen and Aristotle both appear to conclude from the claim that all structures of a certain type are end-structured that there is some one end in relation to which each structure is directed. With this conclusion in tow, Galen can say of a given organ not only that it is ideally structured in virtue of the teleological character of the world but also that its structure is *the* ideal structure for the function that organ performs. Consequently, Galen supposes that once he has seen an organic structure perform a function, there will be some structurally and functionally analogous organ present in any other instance where that function is performed.

The risk of false analogy notwithstanding, Galen's approach was perforce comparative, as the dissection of human cadavers was either wholly or largely not

³³⁵ Cf., Aristotle *PA* 639b21-640a10, 642a1-13, and 642a31-b4. See also, Hankinson (1989), which discusses Galen's teleological views as well as the role that hypothetical or material necessity plays in them.

practiced in the second century.³³⁶ This solution elegantly dealt with both the technological and social constraints of his time, for the most part.³³⁷ And, when the need arose to consider especially minute structures writ large, elephants even if rare were the largest available anatomical analogues. In the passage from AA above, Galen makes it plain both that the elephant was a very unusual specimen and that it offered up a level of anatomical amplification far beyond that of his standard fare (e.g., oxen, horses, mules, and asses).

This, then, is a practical reason why Galen would deploy elephantine anatomy in anatomical contexts that required observation of the most minute structures. That is, if one accepts that organs (or at least certain organs) are analogous across kinds of creatures, the anatomical evidence from or about elephants provides Galen with directly observable examples of structures that would hitherto have been hidden (ᾠδηλα) in the more technical sense that one finds in the medical and philosophical debates still current

³³⁶ For claims that some human dissection did take place in the Roman period, see Singer (1956: 244 n.72), which takes Galen's comments (regarding the need to practice extensively on apes in order best to take advantage of the opportunity to dissect a human body should it arise) at AA II 384-5 to suggest that at least occasional human dissection was normal in the second century. Also, see May (1958: 409). In an unpublished paper, Dean-Jones argues partly on the basis of Celsus' account of the epistemological debate between medical sects in the first century that dissection must have been taking place if the arguments regarding its importance to Dogmatists are to be taken seriously (see *De Med.* 23-44). *Contra* this view, see, for example, the later view of May's in May (1968: 40-1), Scarborough (1971), and von Staden (1992: 234-237).

³³⁷ This solution to the problem of magnification has its roots as early as Plato's famous analysis of the soul by means of a larger counterpart, the *polis*, in book II of *Republic* at 368c-369d. Although I am not arguing that Plato's soul analogy was an inspiration for Galen's use of the elephant as an enlarged subject of observation, it is at least worth pointing out that Galen's accounts of the elephant involve minute structures of both the liver and the heart, which are traditionally the locations for *epithumia* and *thumos* in Plato. These organs are of crucial importance to Plato's analysis of the soul as tripartite. The remaining organ, of course, is the brain. As I will argue, Galen's elephantine examples, especially the heart bone and gallbladder examples, are muted attacks against cardiocentrists. Given the importance of the liver and heart to Plato's tripartite analysis of the soul, it is worth remarking that it would be both very clever and tidy for Galen to use a cluster of allusions to the *Republic* in service to a defense of encephalocentrism.

in the second century. Besides their epistemological objections, Empiricists, of course, denied that dissection was *therapeutically* useful on the grounds that dead bodies are functionally different from live ones but that denial does not obviously range over the use of dissection to establish structural anatomical facts. The Empiricist could, of course, deny that organs in live and dead bodies were even structurally analogous. Regardless, however, of the Empiricist's response to these arguments, Galen could hardly have intended these anatomical displays to be convincing to a dyed in the wool Empiricist. Rather, his investigation of structurally analogous but larger anatomical structures cleverly attempts to meet a demand that he himself placed on medical epistemic claims: the empirical confirmation of items of belief.

Elephants had already figured in anatomical descriptions predating Galen, although not apparently as an enlarged analogue for human anatomy. Scarborough, for example, has conjectured that the emergence of anatomical accounts of the elephant in the 4th century BCE were likely a result of Alexander's conquests, which seems plausible even if, as he admits, not certain (1985: 127). Aristotle makes claims about elephantine anatomy in at least three treatises.³³⁸

³³⁸ See Aristotle *PA* 666b17-21; *HA* 506a8-10 and *passim*; *GA* 787b17-19.

THE ELEPHANTINE TRUNK

In the last book of *UP*, Galen recounts the story of his first encounter with an elephant. He focuses on his reaction to the elephant's trunk, which at first seems ungainly and useless to him until he sees that it is prehensile. The episode forms what Galen himself calls an epode to the treatise (ὁ λόγος οὗτος ὥσπερ ἀγαθός τις ἐπῶδός ἐξηγείται (*UP* IV 366)).³³⁹ This last book of *UP*, he says, is like a hymn sung before the altars of the gods. And, in an unusual move for an ancient author, Galen not only refers to this book as a book division but also concludes by naming it: "likening it to [an epode], I have given this treatise *the name* of [epode] *metaphorically*" (ἐκείνῳ τοίνυν εἰκάσας τὸν λόγον τόνδε τὴν προσηγορίαν αὐτοῦ μετήνεγκα (*UP* IV 366)).

The prehensility of the elephant's trunk that concludes *UP* forms a ring composition with the opening of the treatise, which begins with the human hand. And, as in the case of the hand that ushers in Galen's account of the function(ality) of the parts of the body, the elephant's trunk brings the work to a close as a proof of goal oriented structure in the natural world. Curiously, however, Galen's account of the elephant's trunk appears to have been based at least in part on Aristotle's accounts of the elephant's trunk in *HA*, "Elephants have a long and powerful nostril; and it uses [the nostril] as a hand.

³³⁹ *UP* IV 366, ὁ λόγος οὗτος ὥσπερ ἀγαθός τις ἐπῶδός ἐξηγείται. λέγω δ' ἐπῶδόν οὐ τὸν ἐπῶδαίς χρώμενον· ἀλλ' ἴσμεν γάρ, ὡς [ὁ] παρὰ τοῖς μελικοῖς ποιηταῖς, οὓς ἔνιοι λυρικοὺς ὀνομάζουσιν, ὥσπερ στροφὴ τίς ἐστι καὶ ἀντίστροφος, οὕτω καὶ τρίτος ἐπῶδός, ὃν ἱστάμενοι πρὸ τῶν βωμῶν ἦδον, ὡς φασιν, ὑμνοῦντες τοὺς θεοὺς. ἐκείνῳ τοίνυν εἰκάσας τὸν λόγον τόνδε τὴν προσηγορίαν αὐτοῦ μετήνεγκα.

For, unique among animals, it reaches and grabs with it and draws food towards its mouth, both liquid and solid."³⁴⁰

This is an abbreviated version of Aristotle's account in *PA*, which runs from 658b27-659a37. The longer account stresses the prehensile character of the elephant's trunk: "the trunk, as it were using a hand, is the thing with which it bears both dry and wet food to its mouth; and it uses it as if it were a hand (καθάπερ χειρὶ χρώμενος) also when it winds it around branches and pulls them down (περιελίπτων ἀνασπᾶ)."³⁴¹ It also compares the elephant's trunk to the breathing machines used by Greek divers who remain submerged for extended periods of time:

... Nature made the length of their nostrils something of this sort (i.e. a form of snorkel) for elephants. So, if ever they make their way through water, they breathe by raising their nostrils up through the water (ἀναπνέουσιν ἄραντες ἄνω διὰ τοῦ ὕδατος τὸν μυκτῆρα). For, just as I said earlier, the trunk is a nose for elephants.³⁴²

May takes these passages of Aristotle's and their surrounding context as a clear indication that Galen has used Aristotle as a source for the centerpiece of his epode.³⁴³ Scarborough follows suit and asks the further question, "[w]hy has Galen chosen to base his

³⁴⁰ Aristotle *HA* 492b17-21, Τοῖς δ' ἐλέφασιν ὁ μυκτῆρ γίνεται μακρὸς καὶ ἰσχυρὸς, καὶ χρῆται αὐτῷ ὥσπερ χειρὶ· προσάγεται τε γὰρ καὶ λαμβάνει τούτῳ καὶ εἰς τὸ στόμα προσφέρεται τὴν τροφήν, καὶ τὴν ὑγρὰν καὶ τὴν ξηρὰν, μόνον τῶν ζώων.

³⁴¹ Aristotle *PA* 658b35-659a3, Μυκτῆρ γάρ ἐστιν ᾧ τὴν τροφήν προσάγεται, καθάπερ χειρὶ χρώμενος, πρὸς τὸ στόμα, τὴν τε ξηρὰν καὶ τὴν ὑγρὰν, καὶ τὰ δένδρα περιελίπτων ἀνασπᾶ, καὶ χρῆται καθάπερ ἂν εἰ χειρὶ.

³⁴² Aristotle *PA* 659a11-15, ...τοιούτον ἢ φύσις τὸ τοῦ μυκτῆρος μέγεθος ἐποίησε τοῖς ἐλέφασιν. Διόπερ ἀναπνέουσιν ἄραντες ἄνω διὰ τοῦ ὕδατος τὸν μυκτῆρα, ἂν ποτε ποιῶνται δι' ὑγροῦ τὴν πορείαν· καθάπερ γὰρ εἵπομεν, μυκτῆρ ἐστιν ἢ προβοσκὶς τοῖς ἐλέφασιν.

³⁴³ May (1968: 725 n.3), in particular, viz., "[i]n spite of his obvious first-hand experience, also spoken of in *AA* 619-20, Galen has chosen to base this account of the elephant's trunk on Aristotle..."

description of the anatomy and function of the elephant's trunk upon Aristotle?"³⁴⁴ And while May does not include what exactly in these passages makes it clear that Galen has based his account in *UP* on them, Scarborough does appeal to excerpts of the two Aristotelian tracts, which I have mostly included above.³⁴⁵ He does not lay out what precisely the correspondences are but, from his quotations two points emerge. First, the trunk is like a hand; and second, it is used to breathe when the elephant is submerged in water.

I agree that Galen's account of the elephant's trunk in *UP* may draw from other sources and that Aristotle is at least one of them. But, I think that two further observations may make this claim more convincing. These passages, which follow, are the relevant section from the so-called Epode in *UP*,

1. At any rate, let me detail what I felt when I first witnessed (ἐθεασάμην) the elephant. This will be apparent to those who have seen the animal already and for those who have not seen, this will not be at all difficult if they apply their mind to what they are about to read... this thing [the trunk] seemed bizarre and useless to me when I first witnessed it (ἐμοὶ θεασαμένῳ). But when I saw (εἶδον) the animal using it, just as a hand (ὥσπερ χειρὶ), then it did not appear useless any longer as the function of the part was linked to the function of the action. For the usefulness of a part becomes plain in the midst of its use in action (φαίνεται). The elephant manipulates everything with that part at the end (of the trunk), enfolding what it grabs, even the smallest coins, which it then gives to those who are seated on it by stretching the trunk up to them. For this is how they call this aforementioned part.³⁴⁶

³⁴⁴ Scarborough (1985: 129-30 & notes).

³⁴⁵ Cf. Scarborough (1985: 129), "Shrewd reasoning by analogy, as well as careful reading of Aristotle's texts on comparative anatomy, led Galen to generally accurate conclusions about the elephant, even though 'dissections' might not have been performed. Therefore, one can be suspicious also of the purported 'dissections' of various exotic animals and birds as listed..."

³⁴⁶ *UP* IV 348, ἐγὼ γοῦν, ὅπερ ἔπαθον, ὅτε πρῶτον ἐθεασάμην ἐλέφαντα, διηγῆσομαι, τοῖς μὲν ἑωρακόσι τὸ ζῷον ἐτοίμως νοηθησόμενον, ὅσοι δ' οὐκ εἶδον, εἰ πρόσσχοιεν τὸν νοῦν τοῖς λεχθησομένοις, οὐ πάνυ χαλεπῶς... τοῦτ' ἐμοὶ θεασαμένῳ τὸ πρῶτον ἔδοξεν εἶναι περιττόν τε καὶ

In passage (1) Galen primarily uses verbs of seeing to tell the reader about the elephant: when he first witnessed its trunk (πρῶτον ἑθεασάμην), how useless it appeared (ἐμοὶ θεασαμένῳ), and how he saw its function (εἶδον). As the passage progresses, his language becomes more ambiguous but it still seems to describe visual acts: that the part was not useless became clear (ἐφάνη) and then its use became apparent (φαίνεται). Finally in passage (1), Galen simply describes the elephant's ability to hand coins to its riders. Galen does not say whether this information comes to him from firsthand experience, anecdote, or some source, but there may be a connection to *HA*.

There is a textual crux at *HA* 497b29 but the undamaged part of the line begins with a description of how the elephant brings food to its mouth with its trunk. The following line is corrupt but reads something about the elephant driver (τῷ ἐλεφαντιστῇ) and possibly handing him something with the trunk (ἀνορέγει ἄνω) before it trails off. And, although the tail end of the line is corrupt, the dative (τῷ ἐλεφαντιστῇ) is at least clearly in the manuscript tradition and, by my lights, the sense is clear that something must have been handed up to the elephant's rider given the context. This is hardly conclusive but does have the same structure as Galen's account in passage (1). The trunk is observed to function as a hand. It enfolds and draws things in. It hands things to its riders.

ἄχρηστον. ἐπεὶ δ' ἐνεργοῦν αὐτῷ τὸ ζῶον εἶδον ὥσπερ χειρὶ, τότε οὐκέτ' ἄχρηστον ἐφάνη, συναφθείσης τῷ τῆς ἐνεργείας χρησίμῳ τῆς χρείας τοῦ μορίου· διὰ μέσου γὰρ τοῦ κατὰ τὴν ἐνέργειαν χρησίμου τὸ τοῦ μορίου χρήσιμον φαίνεται. ὁ γοῦν ἐλέφας ἐκείνῳ τῷ μορίῳ κατὰ τὸ πέρας ἅπαντα μεταχειρίζεται περιπτυσσομένῳ τοῖς λαμβανομένοις ἄχρη καὶ τῶν σμικροτάτων νομισμάτων, ἃ καὶ τοῖς ἐπικαθεζομένοις αὐτῷ δίδωσιν ἀνατείνων τὴν προνομαίαν ἐπ' αὐτούς· οὕτω γὰρ ὀνομάζουσι τὸ προκείμενον ἐν τῷ λόγῳ μόριον.

2. And when I learned (προσεπυθόμην) that whenever the animal wades through a deep river or lake and its body is completely submerged it breathes through the trunk after extending it upwards, not only did I come to know (ἔγνων) that nature was provident because it fashions every single part of the animal but also because it teaches the animal how to use the parts. A fact that I pointed out at the beginning of this whole treatise.³⁴⁷

In passage (2) Galen says that he has come to know nature's providential character through what he has learned about the elephant's trunk (προσεπυθόμην). Gone is any indication of what Galen has seen firsthand. In this context, Galen's use of πυνθάνομαι suggests that this information comes to him from some source. Passage (2) should recall *PA* 659a11-15. The passage from *UP* not only offers the same vivid example of the elephant breathing through its extended trunk while underwater, but also serves to illustrate the same teleological point about the part.³⁴⁸ Here the verbal similarities are stronger. The elephant wades into water, extends its trunk upward into the air, and uses the trunk to breathe.

Galen's examples of the elephant's trunk are reducible to two functions: hand and breathing apparatus.³⁴⁹ These functions are illustrated by (1) manipulating everything

³⁴⁷ *UP* IV 349, ἐπεὶ δὲ προσεπυθόμην, ὅτι, κάπειδ' ἀνὰ ποταμοῦ βαθέος ἢ λίμνης ὁδοιπορῇ τὸ ζῷον, ὥς ἤδη κατακρύπτεσθαι πᾶναυτοῦ τὸ σῶμα, τὴν προνομαίαν ταύτην ἀνατείνον εἰς ὕψος ἀναπνεῖ δι' αὐτῆς, ἔγνων οὐ μόνον τῷ κατασκευάζειν ἅπαντα καλῶς τὰ μέρη τοῦ ζῷου προνοητικὴν τὴν φύσιν, ἀλλὰ καὶ τῷ διδάσκειν αὐτὸ τὴν χρῆσιν αὐτῶν, ὅπερ ἐδείχθη μοι καὶ κατὰ τὴν ἀρχὴν ὅλης τῆς πραγματείας.

³⁴⁸ Galen's description of the tip of the trunk that engulfs then grabs coins seems similar in important respects to Aristotle's description of the trunk handing things to its rider(s). Of course, the similarity may be due to the routine nature of the behavior under description rather than some allusion to Aristotle. That is, elephants use their trunks to manipulate things, they feed themselves with their trunks, and pass things with them. In the aggregate, given Galen's appropriation of Aristotle's account of the elephant in passage 2 and elsewhere I think that his account is at least shaped by Aristotle's.

³⁴⁹ Aristotle includes a further example of the elephant using its trunk as a hand, to rip up trees, at *HA* 497b29.

with the trunk and handing things to riders and by (2) breathing while submerged in water after extending it up into the air. Hankinson, in his 1988 article, 'Galen Explains the Elephant', which examines the role of the elephant's trunk in Galen's philosophical beliefs, has argued that in the Epode it is emblematic of Galen's zero-sum teleological commitments and what he calls the "no redundancy assumption", that the world is structured with and only with the parts necessary for a given function.³⁵⁰ I would like to hold on to Hankinson's main thesis, that the episode of the elephant's trunk in *UP* is an expression of Galen's teleological commitments and add something to it, which takes its genesis from two passing comments in the same article. The first involves Aristotle's weaker teleological commitments (1988: 137-8). The second is the observation that elephants seem to attract quite a bit of anecdotal attention, which he conjectures may be due to their unusual size (1988: 138 n. 9) and to their rarity (1988: 148 n. 28).

Regarding the second point first, it is important to keep in mind the following important point made earlier. The elephant's size is, for Galen, a crucial factor in his use of it as an anatomical example. It is not or at least not only because of the awe that the creature's size inspires but because of what that size can *show* when combined with anatomical argument from analogy to those who are witnessing an anatomical display of it, in person or in print.

³⁵⁰ Hankinson (1988: 146) and (1989: 225) formally lay out Hankinson's explanation of what I am calling Galen's zero-sum teleological commitments. In brief, the argument is that there will be no superfluities in nature if there is a benevolent and skillful creator. There is such a creator therefore there are no superfluities, which is to say that the world is very strongly teleologically structured. For the related "No Redundancy Assumption" and its corollary" the Principle of Creative Economy, see his (1988: 153-4).

Galen concludes his example of the elephant trunk with an account of what he discovered after dissecting it,

(3) But later, when I saw (ιδών) that it was pierced at the tip and when I learned (ἐπιμαθὼν) that the animal breathes through these holes as sorts of nostrils, I came to know (ἔγνων) quite clearly that the part was also useful for this [use]. And when an elephant died, after cutting (ἀνατεμών) open the two channels, which stretch from the very orifices to the base of the part, I discovered (εὗρον) two terminus points, as in us; one went so far as the brain itself and the other passed through into the mouth. I was even further amazed (ἐθαύμασα) at nature's craftsmanship.³⁵¹

In the larger context of Galen's Epode, one notes that Galen's language at least sometimes reveals that he has taken some care in distinguishing between his endorsement of views he has encountered through *historia* and views he has come to endorse on the basis of *autopsia*. This care can be seen, for example, in the previous passage at *UP* IV 349, where Galen distinguishes between what he claims to have seen and what he only claims to have found out (προσεπιθύμη).³⁵² As emphasized by the Greek included in key places above, one can see that for the most part Galen's account of the anatomy of the trunk (3) is autoptic, as is the majority of passage (1) further above. Passage (2), on the other hand, relates what Galen has learned through *historia*. There he has learned

³⁵¹ *UP* IV 349, ὅστερον δὲ καὶ ὡς τέτρηται κατὰ τὸ πέρας ἰδὼν, ἐπιμαθὼν δὲ διὰ τῶν τρημάτων τούτων οἷα μυκτῆρων ἀναπνεῖν τὸ ζῶον, ἔγνων δηλονότι καὶ κατὰ τοῦτο χρήσιμον ὑπάρχον τὸ μορίον. ἐπεὶ δὲ καὶ τεθνεώτος ἐλέφαντος ἀνατεμών ἄχρι τῆς ῥίζης τοῦ μορίου τοὺς ἐκ τῶν τρημάτων ἀνατεινομένους πόρους εὗρον αὐτῶν ὁμοίως τοῖς ἐν ἡμῖν διττὴν τελευτήν, μίαν μὲν εἰς αὐτὸν ἀνήκουσαν τὸν ἐγκέφαλον, ἑτέραν δ' εἰς τὸ στόμα συντετρημένην, ἔτι καὶ μάλλον ἐθαύμασα τῆς φύσεως τὴν τέχνην.

³⁵² To my knowledge the earliest comment on Galen's language in this passage is May (1968: 725 n.3). Hankinson (1988: 148-50) fleshes out May's observation. He interprets Galen's language as evidence of his eclectic or syncretic epistemological views on medical methodology. He takes this passage as being sympathetic to Empiricist views without the added skepticism regarding anatomy and analogy.

(προσευθύμη) but not necessarily seen that the elephant breathes while wading through deep water.

What Galen comes to know (or perhaps comes to be confirmed in) by a combination of *autopsia*, *historia*, and if it is not too precious *anatomia*, is ultimately that nature is demiurgic in a very robust sense and that the elephant's trunk is structurally analogous to the human nose. This last observation involving analogy is an important point of contact between Galen's account of the elephant's trunk, his curious account of the gallbladder, and the so-called heart bone, the latter two of which I have yet to discuss. As we shall see, these other two accounts that involve the internal structure of the elephant are far more problematic than the account of its trunk, which Galen primarily describes from an external and non-invasive perspective. These two further accounts also make far plainer Galen's engagement with Aristotle on anatomical issues as influenced by teleological commitments.

THE GALLBLADDER

Mnesitheus of Athens, a rough contemporary of Aristotle, wrote a treatise or tract on elephantine anatomy, for which the only testimony is a passage in Galen,³⁵³

All blooded animals possess all of these organs (i.e., alimentary), not just the six classes;³⁵⁴ and they all possess a liver. And whichever (animals) have a liver, these also, in all cases, have a spleen and bile ducts. But not all of these animals have a gallbladder, which draws off yellow bile, attached to [the liver]. Those who have written on all [animals], which they say do not have [a gallbladder], do not tell the truth either. Just as [is the case with] Mnesitheus on the elephant, since this animal has a gallbladder attached to the liver, which is analogous in size to the entire organ. And there is a single position for the animals that have a gallbladder in every case, in the largest lobe of the liver.³⁵⁵

Galen's claim at the outset of this quotation is an example of the sort of argument that his robust teleology allows him to make regarding certain organs generally. In this case, blooded animals, in virtue of being blooded animals, all perform certain biological functions (e.g., respiration, digestion, hematopoiesis, and the resulting production of humors, etc.). Where functions are the same, Galen argues that the organs performing those functions will also be the same. Consequently, he can say of all blooded animals

³⁵³ Very little is known about Mnesitheus of Athens, except that he was active in about the 4th century BCE. Galen mentions him elsewhere and notably remarks that in his time there were no medical experts more expert than him (*MM* X 3). The claims about the elephant that Galen ascribes to him here are mirrored in Aristotle *HA* 506a30-b4. It is unclear whether one of the two authors influenced the other or this information is derived from an independent source. On Mnesitheus, see Bertier (1972), which contains a collection of the testimonia. For this testimonium, see p. 225.

³⁵⁴ For Galen's six classes of animals: humans, apes, bears, carnivores, rodents, single-hooved animals, and ruminants, see *AA* II 547-8 and the discussion on the six classes earlier in this dissertation.

³⁵⁵ See *AA* II 569, Ἄπαντ' οὖν ταῦτα πᾶσι τοῖς ἐναίμοις ὑπάρχει ζώοις, οὐ μόνοις τοῖς ἔξ γενέσιν. ὑπάρχει δ' αὐτοῖς καὶ τὸ ἥπαρ ἅπασιν. οἷς δ' ἥπαρ ἐστὶ, τούτοις καὶ σπλήν ἐστὶ πάντως, καὶ πόροι χοληδόχοι. κύστις δ' οὐ πᾶσιν ἐπ' αὐτῷ πέφυκεν, ἀθροίζουσα τὴν πικρὰν χολήν. οὐ μὴν οὐδὲ ἀληθεύουσιν οἱ γράψαντες ἐπὶ πάντων, οἷς οὐκ εἶναι φασιν αὐτὴν, ὥσπερ καὶ Μνησίθεος περὶ ἐλέφαντος. ἐστὶ γὰρ καὶ τούτῳ κύστις ἐπὶ τοῦ ἥπατος, ἀνάλογον ἔχουσα τὸ μέγεθος ὄλῳ τῷ σπλάγγνῳ. καὶ θέσις γε μία τοῖς ἔχουσιν αὐτὴν ζώοις ἐστὶ διαπαντός, ἢ κατὰ τὸν μέγιστον τῶν λοβῶν τοῦ ἥπατος.

that they have alimentary organs, a liver, spleen, and bile ducts consequent on the fact that they digest food. The phlegm that results from digestion is produced in the stomach; blood is produced in the liver, as well as black and yellow bile.³⁵⁶

This passage mentions an unnamed group of authors (οἱ γράψαντες) who made false claims (οὐδὲ ἀληθεύουσιν) about all animals. And, although Galen names Mnesitheus, Aristotle also mentions the elephant and its lack of gallbladder at *HA* 506b1-3, in a longer section on the various animals that do and do not possess gallbladders from *HA* 506a21-b25, "the elephant also has a liver without a gallbladder attached, although when a cut is made around the place where a gallbladder is attached in those who have one, a little or a lot of bilious fluid flows out."³⁵⁷ It is very likely that Galen would have read this passage, given the time he devotes in *AA* generally to engaging with Aristotle on biological issues and the time he devotes specifically to Aristotle's description of the heart and elephantine heart elsewhere in *HA*. And, given Galen's engagement with Aristotle in the other cases I discuss in this chapter, I believe that Galen has Aristotle's account in mind in this quotation above.³⁵⁸

³⁵⁶ I will return to this point shortly. Galen gives a brief account of the production of the four humors and the organs responsible for their purgation at *At.Bil.* V 140, δέδεικται δὲ ἡμῖν ὁ μὲν τοῦ φλέγματος χυμὸς ἐκ τῶν φλεγματικῶν ἐδεσμάτων κατὰ τὴν πρώτην ἐν τῇ γαστρὶ πέψιν γενόμενος, ὥσπερ ὁ πικρόχολός τε καὶ ὁ μελαγχολικός ἐν ἥπατι, μεταβάλλων τε κατὰ τὴν ἐν τούτῳ πέψιν καὶ ὁ φλεγματικός εἰς αἷμα καὶ διὰ τοῦτο μηδὲν γεγὼς ἴδιον ὄργανον εἰς κάθαρσιν τοῦ φλέγματος, ὥσπερ αἱ τε κύστεις ἀμφοτέραι καὶ ὁ σπλήν, αἱ μὲν τοῦ τε πικροχόλου καὶ τῶν ὀρρωδῶν περιττωμάτων, ὁ δὲ σπλήν τοῦ μελαγχολικοῦ χυμοῦ. τὸ μὲν γὰρ ἐν τῇ γαστρὶ γεννώμενον συναναφέρεται τοῖς εἰς ἥπαρ ἀναδιδόμενοις ἐκ τῶν ἐσθιομένων τε καὶ πινομένων χυμοῖς, ἅμα δὲ τούτοις πεττόμενον αἷμα γίνεται· τὸ δὲ ὑπολειπόμενον ἐν τοῖς κατὰ τὴν γαστέρα χωρίοις ὑπὸ τῆς καταρροῦς ἐξ ἥπατος εἰς αὐτὰ χολῆς ἀπορρυπτόμενον ἐκκρίνεται διὰ τῆς κάτω γαστροῦς

³⁵⁷ Aristotle *HA* 506b1-3, Ἔχει δὲ καὶ ὁ ἐλέφας τὸ ἥπαρ ἄχολον μὲν, τεμνομένου μέντοι περὶ τὸν τόπον οὐ τοῖς ἔχουσιν ἐπιφύεται ἡ χολή, θεῖ ὑγρότης χολώδης ἢ πλείων ἢ ἐλάττων.

³⁵⁸ For Galen's access to and likely reading of Aristotle's biological works, see Moraux (1985: 327-44). It is, of course, possible that Galen simply misattributed this account of the gallbladder to Mnesitheus on the

As it turns out, Aristotle and Mnesitheus are correct. The elephant possesses no gallbladder.³⁵⁹ So, has Galen simply made an observational error? If so, why does it matter? It is difficult to give an answer to the first question with any certainty. But, it seems unlikely for the following reasons. The elephant's liver, which would be attached to the gallbladder, is immense. Aristotle, in fact, singles out the elephantine liver for its size, claiming that it was four times the size (τετραπλάσιον) of the liver of an ox.³⁶⁰ In an average African elephant, of the sort that would have been available in the Roman world, the liver weighs an average of 40.5kg/90lbs in cows and 63.5kg/140lbs in bulls;³⁶¹ this organ is effectively the size of a human being. As Scarborough has argued, there is no structure analogous in size that may counterfeit for a gallbladder attached to the elephant's liver. He writes that "the bile duct is rather wide and long and displays a large duodenal ampulla (a terminal bile pouch), certainly a clear indication of a different structure and arrangement that one might perceive with a true gall bladder (1985: 127)."

If Galen had observed the truly gargantuan size of an elephantine liver, surely he must not only have expected to see a gallbladder but, as he says, a gallbladder of equally immense proportions (ἀνάλογον ἔχουσα τὸ μέγεθος ὅλῳ τῷ σπλάγχνῳ). But, again,

basis of some similarity with Aristotle's. Given the exiguous nature of Mnesitheus work, it is impossible to gauge how (un)likely it would be for Galen to have mistaken his work with Aristotle's.

³⁵⁹ See, Fowler and Mikota (2006: 301); Sikes (1971: 100)

³⁶⁰ See Aristotle *HA* 507b37-508a2, Καὶ τὰ σπλάγχνα ἔχει παραπλήσια τοῖς ὑείοις, πλὴν τὸ μὲν ἥπαρ τετραπλάσιον τοῦ βοείου καὶ τᾶλλα, τὸν δὲ σπλῆνα ἐλάττω ἢ κατὰ λόγον. I am not suggesting that Aristotle was precisely measuring the liver in the case of either the elephant or ox, just that the massive size of the elephant's liver is not only unsurprising from a modern point of view but also from an ancient one with which Galen is known to have been acquainted. This is all to say that Galen, like Aristotle, had every reason to *expect* the viscera of the elephant to be massive and, at that, more massive than the viscera of an ox by a significant amount. This expectation, in Aristotle, is underscored by the close of his sentence regarding the spleen, which is smaller than the other organs in accordance with reason (κατὰ λόγον).

³⁶¹ See Sikes (1971: 99)

why does this matter? Regardless of whether Aristotle and Mnesitheus were right and also right for observational reasons, it is certain that Galen was mistaken about the elephant's gallbladder *and* seems likely that this mistake derived from a complete lack of observation rather than observational error. This last point, given its implicit conflict with Galen's criticisms of the many anatomists, who fail to generalize from observations or to make firsthand observations, prompts the reader to wonder what to make of this episode, and others like it that involve the elephant.

One explanation for this phenomenon is that magnification of minute structures in smaller creatures by observation of them in larger creatures elegantly solves a technological problem. This solution is not only elegant but, so long as it holds, argumentatively powerful. For that reason alone, it is tempting to say that Galen uses the elephant as an argumentative reveal. But, this sort of magnification depends on a close analogy between animals for its effectiveness, a close analogy that is also important to Galen for teleological reasons. It is crucial for Galen's comparative anatomy that organs, wherever they exist, are analogous to one another across kinds. If magnification is an argumentative motive for Galen's interest in elephantine anatomy, it is all the more important that the elephant be organically analogous to human beings in the relevant respects.

Of course, Aristotle did not need to engage with most of these worries. He was not a humoral theorist and his teleological commitments were not nearly so

thoroughgoing as Galen's.³⁶² One consequence of this difference in their teleological commitments is that, as mentioned earlier, for Galen structural analogies can and perhaps *must* be made much more forcefully than for Aristotle. Among the six classes of animals that Galen believes are analogous to human beings, he is committed to organic analogy across kinds. Aristotle, on the other hand, takes the absence of the gallbladder (*PA* 676b26-33) in certain blooded creatures as evidence that the gallbladder (or bile) is a residuum at *PA* 677a11-19,

But the gallbladder (χολή)³⁶³ is in all likelihood either a residuum or a waste product, as occurring in any other body; so, the gallbladder [is probably] a residuum (περίτωμα) attached to the liver and serves no purpose (οὐχ ἔνεκά τινος) just like what accumulates in the belly and in the intestines. Sometimes nature uses even leftovers (περιπτώμασιν) for some benefit but it isn't necessary to seek out the purpose in everything on these grounds. Rather, while some things are by necessity, many things occur on account of these.³⁶⁴

In the quotation above, Aristotle refers to the gallbladder as a residuum, a περίτωμα. In Aristotle's biological works more generally, a residuum is some structure or product that is consequent on a teleological structure even if it cannot itself be said to be so-structured. In other words, a residuum is a left-over or by-product that results from a goal oriented activity and need serve no purpose outside this context. As, for example, in the passage

³⁶² See Hankinson (1989) and von Staden (1997a)

³⁶³ Given the locution, ἡ ἐπὶ τῷ ἥπατι χολή, I take χολή to refer to the gallbladder, attached to the liver, rather than to bile. Cf. Galen at *At.Bil.* V 147: ἡ ἐπὶ τῷ ἥπατι κύστις. I do not mean the translation to be tendentious. If Aristotle does mean bile rather than the gallbladder, it will not change his belief in the superfluity of the organ, which would itself be the receptacle for a humor that is superfluous.

³⁶⁴ Aristotle *PA* 677a11-18, Ἀλλ' ἔοικεν ἡ χολή, καθάπερ καὶ ἡ κατὰ τὸ ἄλλο σῶμα γινομένη περίττωμά τι εἶναι ἢ σύντηξις, οὕτω καὶ ἡ ἐπὶ τῷ ἥπατι χολή περίττωμα εἶναι καὶ οὐχ ἔνεκά τινος, ὥσπερ καὶ ἡ ἐν τῇ κοιλίᾳ καὶ ἐν τοῖς ἐντέροις ὑπόστασις. Κατάχρηται μὲν οὖν ἐνίοτε ἡ φύσις εἰς τὸ ὠφέλιμον καὶ τοῖς περιπτώμασιν, οὐ μὴν διὰ τοῦτο δεῖ ζητεῖν πάντα ἔνεκα τίνος, ἀλλὰ τινων ὄντων τοιούτων ἔτερα ἐξ ἀνάγκης συμβαίνει διὰ ταῦτα πολλά.

above where Aristotle likens the gallbladder to the feces that accumulate in the stomach and intestines.³⁶⁵ Galen's account of the elephantine gallbladder should not simply be reduced to a false analogy arising from his teleological commitments out of hand. Galen's need for magnification and anatomical analogy may also explain his insistence that the elephant possesses a gallbladder. More importantly, Galen's objections to Aristotle's account of the gallbladder point to the range of rivals against whom he inveighs, targeting as they do on even hints of non-teleological mechanism. Furthermore, as we shall see shortly this episode illustrates well Galen's ability to attack multiple targets at once, some directly and some indirectly.³⁶⁶

Elsewhere Galen writes more on the gallbladder. He accepts that the gallbladder does not in fact occur in all animals which have a liver, with at least some qualification.³⁶⁷ The qualification I have in mind here depends on the criteria Galen uses for determining the degree of structural similarity between kinds. It seems clear that one such criterion is the level of taxonomic generality under discussion. So, for example, blooded and non-blooded creatures, on this analysis, will differ structurally from one another far more than kinds under the category of blooded will differ from other members of that class. Viviparous, oviparous, and oviviparous kinds might exhibit greater structural differences from one class to another than the kinds under any one of these

³⁶⁵ In this context, it is useful to recall the general constraint that both Aristotle and Galen place on their organizing principles. Although the world is teleologically structured, the materials out of which the world is organized are themselves haphazard or, if that is too strongly put, simply a brute fact about the world. Aristotle treats certain products of teleological activity as the necessary but useless remainders of the interaction between goal directed structure imposed on the available materials in the world.

³⁶⁶ I take this point up later when discussing von Staden's notion of "surrogate targets" in Galen's work.

³⁶⁷ See the passage quoted earlier at AA II 569. See also the account of Aristotle's classification of animals earlier in this dissertation. Cf. Manuli and Vegetti (1977) and Lloyd (1983) ch. 1.

three classes differ between themselves. So, the six classes would differ structurally far less from one another than they might from, for example, birds. If this interpretation of Galen's taxonomical methodology is correct, then one should expect far more similarity between humans and apes than between humans and elephants, as the former pair is an even further sub-class of viviparous animals, polydactyls, while the latter are single-hooved animals.

This attempt to reconstruct Galen's approach to taxonomy is an attempt to address, proleptically, a puzzle raised by another passage in Galen on the absence of the gallbladder in certain animals. In his short treatise on black bile, Galen mentions that the pigeon does not possess a gallbladder in an argumentative context similar in both structure and tone to the aforementioned gallbladder episode in *AA*,³⁶⁸

[t]hose people are absurd who think, on the grounds that there is no organ that stores black bile somewhere in the body (as the gallbladder attached to the liver [is an organ that stores] yellow bile), that this fact is evidence that black bile, the humor, does not at all exist in very healthy bodies. For then they would have to agree that there is no phlegm in us just as [they would have to agree that] there is no yellow bile in pigeons. For [pigeons] do not have a gallbladder attached to their liver, just as certain other animals do not.³⁶⁹

³⁶⁸ At present, the only translation of *On Black Bile* into English is Grant (2000), which seems to distort this passage strangely.

³⁶⁹ *At.Bil.* V 147, γελοῖοι δέ εἰσι καὶ τοῦ μηδὲν εἶναι περὶ τὸ σῶμα περιεκτικὸν μελαίνης χολῆς ὄργανον, οἷον ἢ ἐπὶ τῷ ἥπατι κύστις ἐστὶ τῆς ξανθῆς χολῆς, ἡγούμενοι τεκμήριον ὑπάρχειν τοῦτο τοῦ μηδὲν εἶναι ἐν τοῖς ἀκριβῶς ὑγιαίνουσι σώμασι τὸν μελαγχολικὸν εἶναι χυμὸν. οὕτω γὰρ οὐδὲ τὸ φλέγμα συγχωρήσουσιν ἐν ἡμῖν εἶναι, καθάπερ οὐδὲ ἐν ταῖς περιστρεαῖς τὴν ξανθὴν χολήν· οὐ γὰρ ἔχουσι τὴν ἐπὶ τῷ ἥπατι κύστιν, ὥσπερ οὐδ' ἄλλα τινὰ ζῶα.

This quotation begins very much like the gallbladder episode in *AA*.³⁷⁰ Both take as their starting point an unnamed group, which Galen has picked out for special opprobrium. In this case context suggests that Galen is arguing against a spectrum of anti-humoralists, in particular Erasistrateans whom he claims deny the existence of black bile or at least of black bile as a non-pathological fluid in the body.³⁷¹ The argument here proceeds by *modus tollens*, by which Galen shows that an organ for the storage of a given humor is not a necessary condition for the production of that humor. If it were, he argues, they would have to concede that humans do not produce phlegm and pigeons do not produce yellow bile.

In an instance of what von Staden has called a 'surrogate target', Galen's criticism of Erasistratus becomes more pointed when one considers it along with Aristotle's comments on the elephant, the gallbladder as a useless organ, and yellow bile as a residuum, with which Galen is engaged.³⁷² That is, given Galen's polemic promiscuity, there is no reason to suppose that this argumentative move is directed at a sole target. For

³⁷⁰ The pigeon does not belong to the six anatomical categories that Galen believes possess strictly analogous organs to human beings, which offers a possible explanation for why the pigeon need not be organically analogous to human beings. This explanation may be unsatisfactory but it is not clear what else can explain this apparent discrepancy in Galen's expectations with respect to the existence of organs in some animals. See earlier discussion.

³⁷¹ Cf. *At.Bil.* V 105, where Galen cites Asclepiadeans, Erasistrateans, and Methodists as some of the most captious opponents of humoral theory. Most of the rest of *At.Bil.* is aimed at Erasistrateans in particular. Galen's account of Erasistratus' views on humors is tendentious. Although Erasistratus did not believe in the same humoral view as Galen, which was itself a version of the humoral view expressed in *Nat. Hom.*, it is not at all clear that he rejected humoralism *tout court*. See, e.g., Nutton (2004: 134-5).

³⁷² See, von Staden (1997a: 197), "Refracted through the prism of Galen's radically comprehensive teleological perspective, any limited teleology is likely to appear non-teleological. At times it is hard to avoid the impression that, on this point at least, Galen uses Erasistratus as a surrogate target, i.e., that although Galen's teleological cannons are explicitly aimed at Erasistratus, they are tacitly trained on the Aristotelian versions of teleology."

example, consider Aristotle's argument for the universal presence of the heart among blooded animals in *PA*,

Consequently the heart exists in all blooded animals. The reason for this fact was also mentioned earlier. For it is clear that it is necessary for blooded creatures to have blood. *And it is necessary that a vessel exist since blood is a fluid, for which reason it appears that nature fashioned veins.* And it is necessary that there be a single source of these veins (for as is possible, one is better than many); and, the heart is the source of the veins.³⁷³

First, and in passing, this quotation lies very near the section of *PA* in which Aristotle discusses the heart and the animals whose hearts contain heart bones, to which I will return in the next section. More immediately, this passage makes precisely the argument against which Galen argues in *At.Bil.* above. The argument is simply the contraposed form of 'if there exists some fluid *f*, then there must be a container *c* that contains *f*'. This form of the argument would fit the Erasistratean position, against which Galen is arguing in *At.Bil.*. This attack then can serve equally as an indirect attack against Aristotle, motivated by the cardiocentric claim that follows it. Finally, it may simply be an argument incidentally common to both Aristotle and the unnamed γελοῖοι, who clearly include Erasistrateans, of *At.Bil.*

But with von Staden's surrogate target in mind, consider where Galen takes Erasistrateans and to a lesser extent Erasistratus to task for what he sees as conflict

³⁷³ Aristotle *PA* 665b11-16 καρδία μὲν οὖν ἅπασιν ὑπάρχει τοῖς ἐναίμοις· δι' ἣν δ' αἰτίαν, εἴρηται καὶ πρότερον. αἷμα μὲν γὰρ ἔχειν τοῖς ἐναίμοις δῆλον ὡς ἀναγκαῖον, ὑγροῦ δ' ὄντος τοῦ αἵματος ἀναγκαῖον ἀγγεῖον ὑπάρχειν, ἐφ' ὃ δὴ καὶ φαίνεται μεμηχανῆσθαι τὰς φλέβας ἢ φύσις· ἀρχὴν δὲ τούτων ἀναγκαῖον εἶναι μίαν (ὅπου γὰρ ἐνδέχεται, μίαν βέλτιον ἢ πολλὰς), ἡ δὲ καρδία τῶν φλέβων ἀρχή.

between their teleological commitments and their views on residues (περιπτώματα), at *Nat.Fac.* II 78-80. He sums up this criticism at *Nat.Fac.* II 78, where he writes,

But, wisest of men, Erasistratus himself used to posit that nature was a craftsperson and providential for animals; but he also used to say that bilious fluid (τὸ χολώδες ὑγρὸν) was completely useless (ἄχρηστον) for all animals. Both these things are not consistent with one another.³⁷⁴

Although there is no consensus on Erasistratus' theoretical commitments, von Staden has argued that Erasistratus is likely to have held a teleological view of the natural world that was compatible with mechanistic explanations, taken over from Aristotle, Theophrastus, and possibly Strato of Lampsacus.³⁷⁵ Further, von Staden emphasizes that the "historiographical prism" through which Galen viewed other intellectuals who espoused teleological beliefs less thoroughgoing than his own often resulted in accusations that they were producing purely mechanistic accounts dressed up in teleological clothing. This accusation is precisely the one at the heart of Galen's arguments against Erasistratus

³⁷⁴ *Nat.Fac.* II 78, ἀλλ', ὃ σοφώτατοι, προνοητικὴν τοῦ ζώου καὶ τεχνικὴν αὐτὸς ὁ Ἐρασίστρατος ὑπέθετο τὴν φύσιν. ἀλλὰ καὶ τὸ χολώδες ὑγρὸν ἄχρηστον εἶναι παντάπασιν τοῖς ζώοις ἔφασκεν. οὐ συμβαίνει δ' ἀλλήλοις ἄμφω ταῦτα. Cf. *Ven.Sect.Er.* XI.158, which repeats the same language regarding provident and artisanal nature: θαυμάσεις μὲν γὰρ τὴν φύσιν, ὡς τεχνικὴν τε ἅμα καὶ προνοητικὴν τοῦ ζώου...

³⁷⁵ On the teleological views of Erasistratus and Erasistrateans generally, see von Staden (1997), in which von Staden proposes that Erasistratus' may have had teleological views compatible with mechanistic explanations (see especially p. 505-6). The upshot of von Staden's account, for purposes of this dissertation, is that teleological commitment for Galen is something of a zero-sum proposition (p. 197-99). Galen, therefore, is likely to be undercutting both the Erasistrateans and Peripatetics in the gallbladder episode. For an older account that sees teleology and mechanism as exclusive, see Lonie (1964) but specifically Lonie (1964: 441 n.53). Briefly, Lonie argues that the Erasistrateans of Galen's day if not Erasistratus himself might be said to maintain an immanent teleology, which unlike Galen's own, was not intelligently purposive. Lonie believes that this view may ultimately trace back to Strato's Peripatos rather than Aristotle's and is, in a sense, a view of structure as reducible to necessity (ἀναγκή) rather than an intelligent engineer (νοῦς). Lonie resolves the apparent conflict between Strato's traditionally mechanistic view of nature and the immanent teleology that Galen and the Erasistrateans ascribe to Erasistratus by way of Stoic influence in the second century.

and Erasistrateans on black bile in *At.Bil.* as well as his criticism of Erasistratus in *Nat.Fac.* above.

Besides pointing to the blurry distinction between Erasistrateans and Peripatetics in polemic contexts where Galen chooses to attack his rivals anonymously, the upshot of the passage in *At.Bil.* is to show that the gallbladder is not one of the organs to whose existence Galen is committed across kinds in *all* blooded animals, although its ought to be found in the six classes of animals that Galen thinks are suitable anatomical analogues for human beings. And so, *a fortiori*, Galen is not committed to the existence of the gallbladder in the elephant on the *same* teleological grounds that form the basis for his commitment to other organs performing the sorts of functions essential to the general class of blooded animals.³⁷⁶ Consequently, accepting that the gallbladder does not occur in the elephant does not threaten to undermine his robust teleology as such. It does, however, make anatomical arguments about human beings on the basis of the elephant more questionable.

But given that Galen seems to be basing his own account of the elephant's liver and gallbladder on Aristotle, although Aristotle mentions it only to comment on its absence, why does Galen differ in this one regard? Why argue for the presence of an immense organ that was not there, in Aristotle's account or in the elephant itself? The elephant ought not only to be analogous to human beings with respect to its viscera but

³⁷⁶ So, for example, see AA II 569, where Galen says that all blooded creatures must possess the alimentary organs, the liver, spleen, and bile ducts, but not a gallbladder: Ἄπαντ' οὖν ταῦτα πάσι τοῖς ἐναίμοις ὑπάρχει ζώοις, οὐ μόνοις τοῖς ἑξ γένεσιν. ὑπάρχει δ' αὐτοῖς καὶ τὸ ἥπαρ ἅπασιν. οἷς δ' ἥπαρ ἐστι, τούτοις καὶ σπλήν ἐστι πάντως, καὶ πόροι χοληδόχοι. κύστις δ' οὐ πᾶσιν ἐπ' αὐτῷ πέφυκεν, ἀθροίζουσα τὴν πικρὰν χολήν.

also possess viscera suitably larger than human ones. Aristotle's description of the elephant's viscera, if true and to the extent that it does not maintain these analogies, undermines Galen's use of it as an ideal anatomical enlargement of human viscera.

This last point involves magnification as I have already discussed but it also involves a concomitant feature of Galen's approach to the magnification of organs in relation to an increase in animal size, as mentioned for example in the quotation from AA XIII.8, with which I began this section. Galen's claims regarding organic analogy, when those organs satisfy functions performed across kinds, are far stronger than Aristotle's. Insofar as organs are ideally structured for the functions that they perform, Galen is committed to the claim that where such a function is to be performed in nearly all cases the organ performing that function is also, barring the very rare exception, *the* organ to perform that function.³⁷⁷ Galen points to his observation when he says in *UP*,

But just as Homer put into verse the self-moving constructs of Hephaestus and his bellows, which as soon as the master gave the command, 'pour[ed] forth its well-tempered, manifold blast', and those golden handmaidens that moved on their own like their creator. So it is as far as I am concerned. And understand that in the body of an animal there is nothing that is either without function (ἀργὸν) or motion (ἀκίνητον); rather, that all the parts perform (ἐνεργοῦντα) a well-tempered, manifold function (ἐνέργειαν) in conjunction with a suitable structure (μετὰ τῆς

³⁷⁷ Hankinson (1989: 224-7) makes the case for reconciling Galen's commitment to a deep directed teleology with available empirical counterevidence. In short, Hankinson argues that Galen can be 'carried away by his own rhetoric.' The upshot of this qualification is that Galen's demiurge, in this respect like Plato's, is constrained by available materials. In addition, Galen's demiurge is capable of making mistakes, albeit rarely. Therefore, as a methodological rule, one should expect to be able to analyze a given part functionally while accepting that there will be very rare cases in which things go wrong: "[y]ou don't have to show, heroically and implausibly, that this world is absolutely the best of all logically or conceptually possible worlds; you simply have to establish that it's pretty nearly the best of all causally possible worlds (225)."

πρεπούσης κατασκευής), since the creator has granted certain divine faculties (δυνάμεις) to [the parts].³⁷⁸

Once again, not only are organs analogous across certain kinds, they *ought to be* on the specific grounds that they are ideally or appropriately structured (μετὰ τῆς πρεπούσης κατασκευῆς).³⁷⁹ For a given function there is a single or a small group of structures that can do the job. And, in this case, the scaling size of animals from human to elephant brings along with it a scaling need for organs as support systems.³⁸⁰ Therefore, the gallbladder, to the extent that in Galen's view it is responsible for bile storage and to the extent that, for teleological reasons it is ideally suited for bile storage, must be attached to the elephant's liver as a smaller version must be attached to the human liver. If, as I have argued, Galen is using a modified form of Aristotle's classification of animals and if structural similarity increases as taxonomic generality decreases, then it is not surprising that Galen would see the elephant as an organically enlarged version of human beings. Aristotle's claim that the elephant does not possess a gallbladder, then, is not only teleologically suspect but also observationally so.

³⁷⁸ UP III 268-9, ἀλλ' ὥσπερ Ὁμηρος ἐποίησεν αὐτοκίνητα τὰ τοῦ Ἡφαίστου δημιουργήματα καὶ τὰς μὲν φύσας εὐθὺς ἅμα τῷ κελεῦσαι τὸν δεσπότην “παντοίην εὐπρηκτον αὐτμὴν ἐξανείσας”, τὰς δὲ θεραπαίνας ἐκείνας τὰς χρυσὰς ὁμοίως αὐτῷ τῷ δημιουργῷ κινουμένας ἐξ ἑαυτῶν, οὕτω μοι καὶ σὺ νόει κατὰ τὸ τοῦ ζῴου σῶμα μηδὲν ἀργὸν μηδ' ἀκίνητον, ἀλλὰ πάντα παντοίην εὐπρηκτον ἐνέργειαν ἐνεργοῦντα μετὰ τῆς πρεπούσης κατασκευῆς θείας αὐτοῖς τινὰς δυνάμεις τοῦ δημιουργοῦ χαρισαμένου

³⁷⁹ As with Aristotle, Galen believes that goal orientation has as its target a single end. As far as I know, neither Galen nor Aristotle considers the possibility that there could be multiply realizable ends, none inferior to the other and with no realizable end superior to them.

³⁸⁰ This point figures strongly in my analysis of Galen's reasons, taken over largely from Aristotle, for the presence of an *os cordis* in the elephant's heart.

It is also necessary to consider the gallbladder's role in bile storage is also necessary to consider. Teleological commitments aside, Galen was a humoral theorist. Since he locates the storage of yellow bile in the gallbladder, the presence of the organ in smaller blooded animals and absence in larger ones would be difficult to explain when taken in conjunction with the Galen's notion of a *scala naturae* that exhibits larger viscera in larger animals. But, recognizing that the gallbladder was not present in certain larger animals (e.g., members of the six classes of viviparous animals) runs the risk of admitting that the gallbladder was not functionally and structurally ideal for its task. Both horns of the dilemma are pernicious for Galen.

In addition, Galen's criticism of anonymous authors in *AA*, anonymous as it is, allows him to implicitly attack a range of contemporaries without explicitly criticizing Aristotle (e.g., Peripatetics, Erasistrateans, and Stoics). The same polemic that operates in his account of the elephant's gallbladder is systemic in Galen's accounts of the elephant's anatomy.³⁸¹ That Galen is engaged in a polemic against Aristotle and others does not, however, show that he did not perform necropsies on elephants or at least on an elephant. Whatever role this episode is playing as a polemic device, does it suggest that Galen has made a mistake in his observation of the elephant, or is it enough to make a case that Galen is using anatomical examples of which he has no firsthand knowledge to defend certain anatomical commitments? Let us consider another example, also involving the elephant.

³⁸¹ This observation is especially pronounced in Galen's account of the *os cordis* but is also a feature of his explanation of the elephant's trunk, which although it praises Aristotle for his commitment to teleological explanation, implicitly criticizes him for a qualified teleology.

THE HEART

Galen describes the *os cordis*, the heart bone, as a part of his general discussion of the heart in two treatises, *AA* and *UP*. And, in both treatises, he either writes or implies that this bone or a structure functionally similar to it is found in the hearts of all blooded animals.³⁸² Book 7 of *AA* contains Galen's larger account of the respiratory organs, which one recalls, include the heart as well as the lungs and arterio-venal system as it relates to the elaboration and distribution of *pneuma* in the blood. Interposed between his discussion of the vessels of the heart and the chambers of the heart, Galen tells the story of a recently slaughtered elephant and the heart bone he discovered in its heart. The story is an *exemplum* of the progressive density of the *os cordis* and serves as a capstone to his criticism of inadequately trained anatomists.³⁸³

³⁸² It is worth mentioning, to avoid some confusion regarding chronology, that both *Anatomical Procedures* and *De Usu Partium* have complicated "publication" histories. The latter text was begun ca. 165 CE. Its first books were given to Flavius Boethus on his departure from Rome to Syria Palestina. Galen halted work on the text until the early 170s, then sent the remaining books to Boethus in Syria Palestina shortly before Boethus' death. The chronology of *Anatomical Procedures* is more complicated. In our *AA* Galen reveals that this text is a third version. The first version was dedicated to Flavius Boethus, at that time governor of Syria Palestina, and was lost upon his death some time in the 170s CE. Galen refers to this version as *hypomnēmata* (ὑπομνήματα), which he classes as a set of more informal notes or memoranda written up for himself or his close associates. The second version of *AA* was written up sometime after Boethus' death and before the fire at the Temple of Peace in 192 CE, which fire also claimed at least half of that version. This version appears to have been written for a wider audience. Finally, the version that survives is whatever survived the fire along with Galen's reconstitution of the pieces lost in 192. Both texts reference one another but it is not always clear which version of *AA* Galen is mentioning in *UP*. For my purposes, this complication just means that it is difficult to make arguments about the relative chronology between episodes in each text and, therefore, about the influence of one text on the other. It is clear, however, that the two texts are closely related, following one another in the order of anatomical exposition and in many episodes, such as the heart bone, compressing or expanding the same account.

³⁸³ I will say more on personal anecdotes, such as the *os cordis* episode. Briefly, Galen closes sections of his text with them, as he himself suggests in passing at the end of his account of the slave of Maryllus at *AA* II 634 where he says, "[l]et these few details, out of the many, stand as an incidental account, indicating the usefulness of the treatise lying before them to those who have a clue." (ταυτὶ μὲν οὖν ἀπὸ πολλῶν ὀλίγα κατὰ πάρεργον εἰρήσθω, τοῖς νοῦν ἔχουσιν ἐνδεικνύμενα τῆς προκειμένης πραγματείας τὴν χρείαν.). Book 7 contains three of these anecdotes, each a vivid account of a Galenic view triumphant over rival views. The first is his demonstration of the *os cordis* in the elephant, which I will discuss below (*AA* II

Cardiac Structure

Before returning to this general point, that even practiced anatomists like Marinus and thinkers like Aristotle are capable of overlooking anatomical structures that are apparent to Galen and his associates, he digresses into an anecdote about the presence of the heart bone in larger animals,

Likewise, the bone in the heart, which [people] think exists in large animals and not even in all of those, does exist in all the rest although it is not precisely a bone in all of them but cartilage. For, it is generally as follows among all animals: the valves, which as I said are called tricuspid and the source of the arterial vessels, are attached to a substance. It is in all cases hard, although not hard to the same extent in all animals. For in the small animals it is slightly cartilaginous, in the bigger animals it is genuinely cartilage, and in sufficiently large animals it is a bone-like cartilage. Indeed, to whatever degree the species of animal is rightly said to be large, to that degree is the cartilage a bone-like substance; and, in the largest species where most of it [consists] of [this] bone-like substance, it is appropriate to call it a cartilaginous bone rather than a bone-like cartilage, since what is produced in these animals is no longer precisely cartilage but a neuro-cartilaginous body. It is not surprising that among small animals it is completely imperceptible to those who are inexperienced in anatomical matters, when it often eludes them in the cases of even the bigger animals.³⁸⁴

619-22). The second is his successful removal of the portion of a slave's sternum in contrast with the compounded failures of an inexperienced physician that led to the death of the patient (AA II 632-34). And the last episode, which runs from AA II 641-650, closes book 7 contains *four* smaller vignettes all of which involve gangs of Galen's *hetairoi*, the humiliation of his opponents, and a review of Galen's experiments showing that arteries do not contain blood and that pulsation is maintained, although not initiated, by the tunics of the arteries. The three episodes are distinct from the rest of book 7 in that they all not only involve Galen in the first person but are also personal anecdotes whose situational contexts are carefully elaborated and put a point on Galen's impersonal first person narrative.

³⁸⁴ AA II 618-619, καὶ γὰρ οὐκ καὶ τὸ κατ' αὐτὴν ὀστοῦν, ὃ τοῖς μεγάλοις ζώοις ὑπάρχει νομίζουσι, καὶ τοῦτοις οὐ πᾶσιν, ἐν πᾶσι μὲν ἐστὶ καὶ τοῖς ἄλλοις, οὐ μὴν ὀστοῦν πᾶσι γε ἀκριβῶς, ἀλλὰ χόνδρος. ἔχει γὰρ ὧδε τὸ σύμπαν ἅπασι τοῖς ζώοις· οἳ θ' ὑμένες, οὓς ὀνομάζεσθαι τριγλώχινας ἔφην, ἢ τε τῶν ἀρτηριωδῶν ἀγγείων ῥίζα πρὸς οὐσίαν ἡρτῆται, σκληρὰν μὲν πάντως, οὐ μὴν ἐν ἅπασί γ' ὁμοίως σκληρὰν. ἐν μὲν γὰρ τοῖς μικροῖς ἀτρέμα χονδρώδης ἐστίν· ἐν δὲ τοῖς μείζουσιν ἀκριβῆς χόνδρος· ἐν δὲ τοῖς ἰκανῶς μεγάλοις χόνδρος ὀστώδης. καὶ ὅσῳ γ' ἂν ἡ τὸ τοῦ ζώου γένος ἀξιολογώτερον τῷ μεγέθει, τοσούτῳ πλέον ὀστώδους οὐσίας ὁ χόνδρος ἐπικέκτῃται. καὶ κατὰ γε τὰ μέγιστα, ὅπου τὸ πλέον αὐτοῦ τῆς ὀστώδους οὐσίας γίνεταί, προσήκει καλεῖν αὐτὸν τῆνικαῦτα χονδρώδης ὀστοῦν, οὐ χόνδρον ὀστώδη. ὃ περιφύεται γὰρ ἐπὶ τούτων τῶν ζώων, οὐδὲ χόνδρος ἔτι ἀκριβῶς ἐστίν, ἀλλὰ νευροχονδρώδης σῶμα. θαυμαστὸν δ' οὐδὲν ἐπὶ τῶν μικρῶν

This passage from *AA* engages directly with Aristotle's own account of the heart in so-called blooded animals at *PA* 665bff, where his claims regarding the ventricles of the heart can also be found.³⁸⁵ In *PA*, Aristotle mentions that the hearts of oxen and horses contain bones while other animals including the elephant, whose dissections also Aristotle reports, do not.³⁸⁶ The function of the heart bone, according to Aristotle, is as a support or scaffolding for the heart (ἐρείσματος χάριν ὅστων ὑπεστι) by analogy with the function of the skeletal system as a support system for the body more generally.³⁸⁷

Galen criticizes Aristotle on two grounds, one implicit and one explicit. Implicitly, he takes Aristotle to task for a lapse in his adherence to a deeply teleological view of anatomy because although Aristotle shares Galen's commitment to functional and, therefore to a certain degree, structural analogy across animal kinds, this shared commitment does not move Aristotle to suppose that the elephant had a heart bone. How is it, after all, if the *os cordis* is a support structure for the heart, that a larger heart will not require a harder support? Explicitly, he pairs Aristotle's strange claim that the hearts of larger animals possess three ventricles³⁸⁸ with Aristotle's and his contemporaries'

ζώων ἀγνοεῖσθαι τελέως αὐτὸ τοῖς ἀγυμνάστοις περὶ τὰς ἀνατομὰς, ὅπου γε καὶ κατὰ τὰ μείζω λανθάνει πολλάκις αὐτούς.

³⁸⁵ The word that Aristotle and Galen use is *κοιλία*, which means more generally "chamber." These chambers correspond to our modern ventricles in the heart, as the atria were not seen as true chambers but as antechambers, thus "atria." See also Siegel (1968: 32-3).

³⁸⁶ See Aristotle *PA* 666b18-19, ἔστι δ' ἀνόστεος πάντων ὅσα καὶ ἡμεῖς τεθεάμεθα, πλὴν τῶν ἵππων καὶ γένους τινὸς βοῶν.; also, cf. *HA* 506a9-10

³⁸⁷ Aristotle *PA* 666b18-21, ἔστι δ' ἀνόστεος πάντων ὅσα καὶ ἡμεῖς τεθεάμεθα, πλὴν τῶν ἵππων καὶ γένους τινὸς βοῶν. τούτοις δὲ διὰ τὸ μέγεθος οἷον ἐρείσματος χάριν ὅστων ὑπεστι, καθάπερ καὶ τοῖς ὅλοις σώμασιν.

³⁸⁸ Galen does not consider the possibility that Aristotle's claim about the number of chambers in the heart depends on a classificatory difference, a charity which he appears to grant in the case of Herophilus who

claims regarding the presence of a bone in the hearts of larger animals, at AA II 618, "which things [structures in the heart] it is better to examine when the heart has been removed from the animal and especially in a large animal. For all these things are the same, as there is no difference in animals according to size, as Aristotle supposes erroneously."³⁸⁹ Aristotle's mistake regarding the ventricles cannot but caution the reader about his claims regarding the *os cordis* and by extension about Aristotle's cardiocentrism.

Galen invokes the story of an elephant recently slaughtered in Rome, the narrative of which will be considered in a subsequent section. The elephant's carcass provides an opportunity for examining a usually minute structure, proportionally magnified by the size of the creature in whose body it is found. He makes this assumption in passing and on teleological grounds, as evidenced by comments in both AA and UP.³⁹⁰ After narrating

considered the auricles to be chambers of the heart and, so, numbered the chambers at four. Cf. AA II 624-5, "It will also be said that the auricles of the heart are outside its chamber. If anyone, as Herophilus, considering these [the auricles/atria] as parts of the organ [the heart], further increased the number of orifices, he appears to disagree in this respect also with Erasistratus and with us, as we have said that there are, in all, four orifices of the four vessels in the heart. (εἰρήσεται δὲ καὶ ὅτι τὰ τῆς καρδίας ὅτα τῶν κοιλιῶν αὐτῆς ἐκτὸς ἐστίν. εἰ δέ τις αὐτὰ μέρη τοῦ σπλάγχνου θέμενος, ὥσπερ Ἡρόφιλος, ἐπὶ πλεον ἐξέτεινε τὸν ἀριθμὸν τῶν στομάτων, καὶ ταύτῃ δόξει διαφωνεῖν Ἐρασιστράτῳ τε καὶ ἡμῖν, εἰρηκόσι δ' τὰ πάντα εἶναι στόματα τῶν κατὰ τὴν καρδίαν ἀγγείων τεττάρων.).

³⁸⁹ AA II 618, ἅπερ, ὡς ἔφην, ἄμεινον ἐξηρημένης τοῦ ζώου τῆς καρδίας ἐπισκέπτεσθαι, καὶ μάλλον ἐπὶ μεγάλου ζώου· πᾶσι μὲν γὰρ ὡσαύτως ὑπάρχει, μηδεμίᾳ διὰ μέγεθος ἐν αὐτοῖς γιγνομένης διαφορᾶς, ὡς Ἀριστοτέλης οἶεται..

³⁹⁰ In AA II 622, for example, Galen suggests that a single observation of a structure, the heart bone, could provide the structure's function, a functional analogue of which he was confident existed in all animals possessing a heart. Although in AA two of Galen's assumptions for the nature of the *os cordis* are implicit or at least only suggested (e.g., that nature does nothing without purpose is implied at AA II 622), he expresses both assumptions in UP. In order to follow, this argument requires:

a) a teleological assumption, something for example like the notion that nature does nothing without purpose (cf. Aristotle PA 661b24-5; IA 704b15; and *passim*). This assumption gives the *os cordis* that Galen claims to have found a function. It is implicit in AA but made explicit in UP III.502, where Galen refers to Aristotle's own account of the heart bone as a sort of structural support for the ligaments in the heart.

his discovery of the heart bone in the elephant, Galen explains how the discovery was predictable on analogical grounds. Galen underscores the dangerous consequences of observational failure by showing that his rivals not only fail to see the heart bone in smaller animals but also fail to see it even in the case of an animal as large as the elephant, assuming that the *os cordis* will be analogously absent in larger creatures too.

Key to unraveling this passage is, I think, Galen's admission that the *os cordis* is something that he came to believe in on teleological grounds before he came to believe it on empirical ones. At AA II 622, toward the end of his narrative on the elephant's heart bone, Galen says that while his predecessors were agnostic on the place and even the presence of the *os cordis*, he undertook an investigation and claimed to have found a heart bone at the roots of the valves and vessels of his subject's heart,

For example, I swear by all the gods that I have later seen many things not at all visible to me earlier. And so it is in the case of the heart bone, which I tried to find on my own by cutting the organ into little pieces, since I had not heard from my teachers where [the heart bone] lay or even if it was present in all animals. This way seemed to me to be the most certain for undertaking my investigation. But when I found the roots of the valves attached to it and the sources of the arterial vessels, I was first persuaded that out of necessity nature as an engineer strove toward that end in all animals. Afterwards, I was also persuaded through empirical examination itself (τῆς πείρας), once I tracked down the sources of the aforementioned parts.³⁹¹

b) not only that functional analogues will be found across kinds of animals but also that they will be structural analogues is explicit at *UP* III 503 and implicit at *AA* II 619.

c) Bearing on the second assumption, Galen must assume that these functional structures must vary in proportion to certain variations of the animals in which they are found. Although he states this assumption in both *UP* and *AA*, at III.503 and II.619 respectively, the only argument for the claim appears to be an appeal to the intuition at *UP* III.503 that since the hardness of the *os cordis* exists for the sake of stabilizing ligaments, the bigger the heart the bigger will be the ligaments, and so the foundation to which they attach must be harder in a similar way.

³⁹¹ *AA* II 621-2, ἐγὼ γοῦν ἐπόμνυμι τοὺς θεοὺς πάντας, ὥς πολλὰ τῶν ἔμπροσθεν οὐδ' ὅλως ἐωραμένων μοι κατείδόν ποθ' ὕστερον. καὶ τοιοῦτ' ἔστι τὸ κατὰ τὴν καρδίαν ὅστον, ὃ μήθ' ὅπου ὑπόκειται, μήτ' εἰ πᾶσι τοῖς ζώοις ἔστι, παρὰ τῶν διδασκάλων ἀκούσας, ἐπεχείρησα μὲν αὐτὸς

Presumably, the subject of this dissection was an ox, as it was both a very common subject of Galen's anatomical investigations, common enough in ritual sacrifices, cooking, and one of the only animals dissected by him that is also known to contain an *os cordis*. Galen mentions that this discovery is what first convinced him that nature strove, out of necessity (ἀναγκαῖον), for something like a heart bone as an end in all animals (ἐν ἅπασιν τοῖς ζώοις... ἐστοχάσθαι τούτου τοῦ σκοποῦ). It was only afterwards (μετὰ δὲ τοῦτο) that he was persuaded by empirical examination (δι' αὐτῆς τῆς πείρας). There is some question as to the precise nature of what Galen sees as teleologically necessary in the hearts of blooded animals, since the subject of the clause "ἐν ἅπασιν τοῖς ζώοις... ἐστοχάσθαι τούτου τοῦ σκοποῦ" is implicit.

In the context of this account, it seems plain that he thinks some sort of anchor or scaffolding is necessary for the valves and vessels that lead out from them. To this sort of structure he gives or accepts the given generic name, "the bone in the heart" (τὸ κατὰ τὴν καρδίαν ὀστούν). Otherwise, it would be difficult to reconcile this passage with his nearby discussion of the proportion between the hardness of the *os cordis* with the size of the animal whose heart it is found in at AA II 618. I believe that this last point regarding the proportional hardness of the *os cordis* cannot for Galen be separated from his commitment to the presence of a structural support at the base of valves in the hearts of

ἐξευρεῖν, εἰς μικρὰ μόρια κατατέμνων τὸ σπλάγχχον· ἀσφαλέστατος γὰρ οὗτος ὁ τρόπος ἐδόκει μοι τῆς ζητήσεως ὑπάρχειν. ἐπεὶ δ' ἅπαξ εὖρον ἀνηρημένους εἰς αὐτὸ τῶν θ' ὑμένων τὰς ῥίζας καὶ τῶν ἀρτηριωδῶν ἀγγείων τὰς ἐκφύσεις, πρῶτον μὲν ἐπέισθην, ὡς ἀναγκαῖόν ἐστιν ἐν ἅπασιν τοῖς ζώοις τὴν τεχνικὴν φύσιν ἐστοχάσθαι τούτου τοῦ σκοποῦ· μετὰ δὲ τοῦτο καὶ δι' αὐτῆς τῆς πείρας ἐπέισθην, ἀκολουθῶν ταῖς πρῶταις ἐκφύσεσι τῶν εἰρημένων μορίων.

blooded animals. Consequently, I think that the aim at which nature as an engineer necessarily aims, for Galen, is at a structural support whose hardness is relative to the size of the creature in whose heart it is found. This commitment to the scaling hardness of the *os cordis* is also what leads Galen to suppose that the elephant in fact possesses an *os cordis* when it does not.

This anecdote has as its introduction an implicit criticism of what Galen sees as Aristotle's teleological shortcomings. Aristotle had argued, on teleological grounds, for the presence of a structural support at the core of the heart in all animals.³⁹² Galen's criticism goes as follows: given that the heart has at its core some stabilizing structure to which the arterial vessels attach, this sort of structure should exist in all animals with a heart. Since there are bones in oxen and horses, as Aristotle also observes, and smaller animals have less bony structures at the core of their hearts, larger animals will have bonier cardiac cores than smaller animals. That is, the degree of hardness in the structure is proportionate to the size of the animal.

Therefore, on teleological grounds alone one should be able to infer a heart bone in the elephant without recourse to observation. In fact, Galen mentions that he was so predisposed although his teachers of anatomy denied its existence in all animals and he

³⁹² Cf. *UP* III 502-3, where Galen agrees with Aristotle's assessment of the function of the *os cordis* and reiterates the need for a bonier core at the center of larger animals' hearts. His reasoning regarding the relation of the size of an animal and its heart to the hardness of the structural support at the core of the heart is laid out in detail here: "And so every heart has some hard structure in the same place, which is present in all animals for the same purpose. And the fact that larger [hearts] require this sort of structure is not at all strange, for a large heart possesses a harder structure, suitable as an attachment for the ends of ligaments and as a foundation for the whole heart." (πάσα δ' οὖν ἔχει καρδία κατὰ τὸν αὐτὸν τόπον οὐσίαν τινὰ σκληρὰν ἕνεκα τῶν αὐτῶν χρειῶν ἐν ἅπασιν τοῖς ζῴοις γεγενημένην. τὸ δὲ τὰς μείζονας σκληροτέρας δεηθῆναι τῆς τοιαύτης οὐσίας οὐδὲν θαυμαστόν· εἰς τε γὰρ τὸ τὰς ἀρχὰς τῶν συνδέσμων ἀσφαλέστερον ἀνήθῃαι καὶ εἰς τὴν ἔδραν ὅλης τῆς καρδίας ἐπιτηδειότερόν ἐστι τῇ μεγάλῃ τὸ σκληρότερον.)

was himself unable to find it in various animals.³⁹³ The context for this criticism can be better found in *UP*, where Galen mentions the elephantine heart bone as well but emphasizes its functional role in the body rather than whether or not it is manifest in observations.

And since there is also found a certain bone at the top of the heart in large animals, it would also be reasonable not to overlook its function. And perhaps the function mentioned by Aristotle is right. He said that it was a sort of support (στήριγμα) and a foundation for the heart and for that reason is found in the large animals. For clearly it would be reasonable that a large heart hanging in a large chest would also require this sort of part.³⁹⁴

So far, Galen is in agreement with Aristotle. But, he argues, Aristotle fails to see the consequences of the teleological argument he has correctly made. It is not enough that the size of the animal *explains* the presence of the heart bone. Rather, the size of the animal *requires* the presence of the heart bone in order for Aristotle's offered explanation actually to be explanatory. That is, Aristotle has it right insofar as his account proceeds from the notion that the heart's structure entails a certain function but Aristotle fails to see that the heart's function also entails *that particular* structure. And, so, Galen offers the

³⁹³ See AA II 622, where Galen says that he became convinced of the existence of the heart bone first on theoretical grounds then later on empirical grounds: "When once I discovered that the roots of the valves and the outgrowths of the vessels were attached to it [the heart bone], I was first convinced it was necessary that in all animals a structuring nature had striven for this end. After this, I was also convinced through empirical observation (πείρας), when I followed the outgrowths of the aforementioned parts." (ἐπεὶ δ' ἅπαξ εὗρον ἀνηρημένας εἰς αὐτὸ τῶν θ' ὑμένων τὰς ῥίζας καὶ τῶν ἀρτηριωδῶν ἀγγείων τὰς ἐκφύσεις, πρῶτον μὲν ἐπέισθην, ὡς ἀναγκαῖόν ἐστιν ἐν ἅπασιν τοῖς ζώοις τὴν τεχνικὴν φύσιν ἐστοχάσθαι τοῦτου τοῦ σκοποῦ· μετὰ δὲ τοῦτο καὶ δι' αὐτῆς τῆς πείρας ἐπέισθην, ἀκολουθῶν ταῖς πρῶταις ἐκφύσεσι τῶν εἰρημένων μορίων.)

³⁹⁴ *UP* III 502, Ἐπεὶ δὲ καὶ ὅστων εὗρίσκεται τι κατὰ τὴν κεφαλὴν τῆς καρδίας ἐν τοῖς μεγάλοις ζώοις, εὐλογον ἂν εἴη καὶ τὴν ἐκείνου χρεῖαν μὴ παρελθεῖν. ἔστι μὲν οὖν ἴσως καὶ ἡ ὑπ' Ἀριστοτέλους εἰρημένη λόγον ἔχουσα. στήριγμα γάρ τι καὶ οἶον ἔδραν εἶναι φησι τῆς καρδίας αὐτὸ καὶ διὰ τοῦτ' ἐν τοῖς μεγάλοις ζώοις εὗρίσκεισθαι. δῆλον γάρ, ὡς ἐν μεγάλῳ θώρακι μεγάλην καρδίαν αἰωρουμένην εὐλογον ἦν δήπου καὶ τοιοῦτου τινὸς δεηθῆναι μορίου.

following correction, which I also think provides a strong motive for his claim in the elephant anecdote,

But it would be better said as follows: Nature attached the ends of ligaments to cartilage or to cartilaginous bone. She was not about to overlook the ligaments in the heart, seeing as the membranes at the openings of the vessels are of this type, nor the tunic of the arteries, which is similar to a ligament in the nature of its material. Rather, she also attached the ends of all these to this cartilaginous bone, as I have shown in my *Anatomical Procedures*. In large animals the bone is cartilaginous, in very small animals it is a neurocartilaginous structure. *And so every heart has some hard structure in the same place, which is present in all animals for the same purpose. And the fact that larger [hearts] require this sort of structure is not at all strange, for a large heart possesses a harder structure, suitable as an attachment for the ends of ligaments and as a foundation for the whole heart.*³⁹⁵

This iteration of the heart bone, the *os cordis*, illuminates both Galen's strong commitment to structural analogies that arise from teleological explanations of the natural world as well as the effect that this commitment has on his writing. So far this discussion has centered on the theoretical reasons for Galen's account of the heart, which diverges in slight but significant ways from Aristotle's own account. It also differs significantly from what Galen is likely to have observed. Of course, Galen may simply have seen a structure that he expected to see in an actual elephant's heart. Sikes, for

³⁹⁵ UP III 502-3, κάλλιον δ' ἂν ἦδε λέγοιτο. πανταχοῦ τῶν συνδέσμων τὰς ἀρχὰς ἢ φύσις ἢ εἰς χόνδρον ἢ εἰς ὅστον ἀνάπτει χονδρῶδες. οὐκ οὐδὲ τῶν κατὰ τὴν καρδίαν συνδέσμων, ἐκ τούτου γὰρ τοῦ γένους εἰσὶν οἱ ἐπὶ τοῖς στόμασι τῶν ἀγγείων ὑμένες, ἀλλ' οὐδὲ τοῦ χιτῶνος τῶν ἀρτηριῶν, ὁμοίου συνδέσμου τὴν τοῦ σώματος οὐσίαν ὄντος, ἥμελλον ἀμελήσειν, ἀλλὰ καὶ τούτων ἀπάντων εἰς τοῦτο τὸ χονδρῶδες ὅστον ἀνήψε τὰς ἀρχὰς, ὡς ἐν ταῖς Ἀνατομικαῖς ἐγγειρήσεσιν ἐδείκνυμεν. ἐν μὲν οὖν τοῖς μεγάλοις ζῷοις ὅστον ἐστὶ χονδρῶδες, ἐν δὲ τοῖς πάνυ μικροῖς νευροχονδρῶδες τι σῶμα. πάντα δ' οὖν ἔχει καρδία κατὰ τὸν αὐτὸν τόπον οὐσίαν τινὰ σκληρὰν ἕνεκα τῶν αὐτῶν χρειῶν ἐν ἅπασιν τοῖς ζῷοις γεγεννημένην. τὸ δὲ τὰς μείζονας σκληροτέρας δεηθῆναι τῆς τοιαύτης οὐσίας οὐδὲν θαυμαστόν· εἰς τε γὰρ τὸ τὰς ἀρχὰς τῶν συνδέσμων ἀσφαλέστερον ἀνήφθαι καὶ εἰς τὴν ἔδραν ὅλης τῆς καρδίας ἐπιτηδειότερόν ἐστι τῇ μεγάλῃ τὸ σκληρότερον.

example, believes that Galen may just have been describing a case of advanced coronary sclerosis that he mistook for a heart bone in an older elephant.³⁹⁶ But this seems unlikely, as Sikes suggests by the cluster of circumstances she mentions as necessary for this conclusion. Furthermore, Galen not only has powerful theoretical motives for describing an *os cordis*, made out of bone, in the elephant's heart but the structure and language of the episode is marked differently from Galen's general anatomical narrative.

These markers suggest that this episode plays a different narrative role in *AA*. His account of the heart bone is interesting in part because of what it reveals about the role that narrative plays in an author whose medical treatises are often considered to be technical and, consequently, lacking in artifice. This notion of technical writing runs the risk of anachronism or, in the anthropological terms appropriated by Lloyd, runs the risk of seeing Galen's writing in observers' terms rather than in the terms of the historical actors.³⁹⁷ Up to this point, I have held off discussion of the actual episode in order to lay out the groundwork for the theoretical context surrounding the heart and its structure across animal kinds. Now, I turn to the narrative episode in which Galen discusses his examination of the elephant's heart and how he observed the heart bone itself.

THE ELEPHANT

By all accounts the elephant was the largest land animal known to Galen. And, in *AA*, it serves as a terminus point not only for animals with respect to their size but also

³⁹⁶ See Sikes (1971: 218)

³⁹⁷ For this distinction between actors' and observers' terms and the context relevant to ancient medicine and more broadly to writing traditionally called 'scientific', see Lloyd (1992).

for the hardness of the *os cordis*.³⁹⁸ This scaling increase in hardness or in density with respect to size figures prominently in both the accounts in *AA* and *UP*. As in the case of its gallbladder, Galen's account of the elephant's heart in *AA* is explicitly intended to offer up structures normally so minute as to be hidden (ᾠδηλα), at least in smaller animals, for direct observation in an analogous and enlarged context. Galen's account of the heart bone in *UP* does not mention the elephant but I believe it is likely, given the parallels between it and the account in *AA*, either that the two are accounts of the same episode differing in their compression or that the two accounts have influenced one another throughout the complicated editing history of the texts that contain them.³⁹⁹ For example, at *UP* III 446 Galen mentions *AA* II 618-22. Among other cross-textual references, Galen also mentions at the start of book 7 (*AA* II 590) that he has detailed the theoretical (i.e., teleological) background of the structure of the respiratory organs in *UP* books 6-7. While in book 6 of *UP* (III 439) he alludes to the method of dissection he recommends at *AA* II 626-32.

Galen makes a similar claim regarding the identity of the structure of the heart across kinds in *UP* as he does in *AA*. In *UP* III 442-3 he cites both the mouse and the sparrow as the lower limit of smaller animals while he places the ox at the upper limit of larger animals rather than the elephant,

³⁹⁸ Cf. *AA* II 624, where Galen cites the elephant and the lark as constituting the upper and lower limits, respectively, of non-imaginary animals in size: "[f]or it is necessary that you know well that even if it were some air-breathing animal bigger than an elephant or smaller than the crested lark, the structure of its heart would be similar to theirs; and it is not better to say similar but rather the same in form." (εὖ γὰρ εἰδέναι χρή σε, καὶν ἐλέφαντος ἢ τι μεῖζον, ἢ κορυδαλοῦ μικρότερον, ἐξ ἀέρος ἀναπνέον, ὁμοίαν αὐτοῖς εἶναι τὴν κατασκευὴν τῆς καρδίας· ἄμεινον δ' οὐχ ὁμοίαν, ἀλλὰ τὴν αὐτὴν κατ' εἶδος εἰπεῖν.)

³⁹⁹ On the history of the two texts, see note above. Cf., however, the following parallels.

The largest horse has the precisely the same cardiac structure as the smallest sparrow, even if you should dissect a mouse or an ox and even if, of animals, there were yet some other either smaller than a mouse or larger than an ox, the number of its ventricles would be equal and the rest of the structure of the heart would be the same.⁴⁰⁰

This section of the dissertation focuses primarily on his account of the examination of an elephant's heart bone in *AA*, which is more detailed than the account of it in *UP*. In particular, it further develops the notion that Galen uses the elephant as a tool for magnification and considers some of the polemic features of his account of the bone in *AA* that are superfluous to his stated project of describing human anatomy impartially.⁴⁰¹

I take these features to be of a piece with Galen's comments on the gallbladder in the previous section, with an eye to Galen's use of the elephant as an argumentative tool against rival theorists, in this case Aristotle and cardiocentrists more generally. In this vein I also draw attention to the language which Galen uses in the *os cordis* episode, which I believe marks it as different from the anatomical descriptions surrounding it.⁴⁰² Acknowledging this difference makes room for a reading of certain anatomical episodes

⁴⁰⁰ *UP* III 442-3, τὴν αὐτὴν γὰρ ἀκριβῶς ἔχει κατασκευὴν καρδίας ἵππος ὁ μέγιστος ἐλαχίστῳ στρουθῷ, καὶ εἰ μὴν ἀνατέμοις καὶ νεὶ βοῦν καὶ εἴ τι τῶν ἄλλων ζώων ἢ μικρότερον ἔτι μυδὸς ἢ μείζον βοός, ἅπασιν αὐτοῖς ὁ τ' ἀριθμὸς ἴσος ὁ τῶν κοιλιῶν ἢ τ' ἄλλη κατασκευὴ τῆς καρδίας ἢ αὐτή.

⁴⁰¹ See, for example, *AA* II 449-50, on which more shortly, where Galen writes that he will eschew discussion of the many false claims of his rivals in order to more closely cleave to his subject matter, actual anatomical facts and structures (e.g., περιβαίνεισθαι τὸν λόγον αὐτὰ τάληθῆ μόνῃ διηγομένῳ).

⁴⁰² For a fairly recent and very brief statement of the varieties of ancient medical style as well an example of the generic expectations of modern scientific writing, see Nutton (2009: 57-8). Also see von Staden (1994a: 103-4), on the tendency of ancient accounts of technical subjects, as those subjects are defined more or less from a contemporary perspective, towards more explicit authorial self-reference as well as the growing depersonalization of those texts post-17th century. On the tendency for self-reference in ancient medical and philosophical literature in particular, see Lloyd (1987: 58-70).

in Galen's work, particularly ones involving spectacular or public displays, as *exempla* that may not be governed by the same norms of assertion as other less contentious tracts in AA.

THE OS CORDIS

As a brief background on the heart bone, the *os cordis* is a bone found in some mammals, mostly ruminants, between the aorta and atrioventricular openings, near the meeting point of the interatrial and interventricular septa.⁴⁰³ This area of the cardiac skeleton is more generally called the fibrous trigone (*trigona fibrosa*), which is an area of tough connective tissue. Galen and Aristotle both appear to have observed the fibrous trigone and Galen even seems to have observed a variety of tissues of which it can consist (e.g., fibrocartilage, hyaline cartilage, and in ruminants bone).⁴⁰⁴ Given his regular and frequent use of ruminants for anatomical research, Galen must also have been well acquainted with the *os cordis* of the ox and sheep. The cardiac skeleton of the elephant, however, does not possess an *os cordis*.⁴⁰⁵ The human heart does not either. Furthermore, there is no obvious fibrous structure in the elephantine heart that appears like an *os cordis*, which looks to the naked eye like a section of a ring made of bone and, in the ox

⁴⁰³ See James (1965: 362-3), which is the source I have seen cited for the *os cordis* generally. Incidentally, James includes a functional assessment of the bone that conjectures three possible accounts of its use, all three of which are consistent and even similar with Galen and Aristotle's (1965: 363).

⁴⁰⁴ See Gopalakrishnan, Blevins, and Van Alstin (2007: 518). Cf. Galen's account of the scaling density of the *os cordis* and even his terminology, which at least *prima facie* maps on to contemporary terminology, at AA II 619 (e.g., νευροχονδρῶδες, χόνδρος, and ὀστούν).

⁴⁰⁵ For the absence of the *os cordis* in the elephant see Bartlett (2006: 317) drawing on (1969:1-104). See also Sikes (1971: 123).

is only centimeters in length.⁴⁰⁶ The absence of the *os cordis* from the elephantine heart has gone unnoticed among classicists and historians of medicine.⁴⁰⁷

I mention these features of the *os cordis* as it is presently understood, in order both to create an image of the structure under discussion and in order to underscore just how much Galen and Aristotle, by our lights, knew about the structure and function of it. Given this amount of experience with the structure, what is it that Galen claims to have seen in his dissection of the elephant at AA II 619-22? More importantly what is the function of this structure in Galen's extended polemic against rival physicians in his overall discussion of the human heart here?

CARDIAC ANALOGUES, THE OX

On the first point, quite a bit about this passage suggests that Galen did in fact extrapolate the *os cordis* from something like an ox to humans and mammals in general, which underscores the purpose of asking why Galen might extrapolate to the elephant at

⁴⁰⁶ The *os cordis*, especially in exotic animals, is difficult subject on which to find information. For general information about the heart bone, see James (1965). For information on the *os cordis* in the elephant, see Sikes (1971: 218), which actually refers to Galen's necropsy of the elephant and conjectures that what he observed was a case of advanced coronary sclerosis. Against this view, Dr. Dennis Schmitt, a professor of Agriculture at Missouri State University and the Chair of Veterinary Services and Director of Research with the animal stewardship department of Ringling Brothers and Barnum and Bailey Circus, has told me in personal correspondence that there is no likelihood of mistaking any fibrous structure in the elephant's cardiac skeleton for a genuine *os cordis*, as seen for example in oxen, sheep, and other ruminants, which Galen is known to have dissected and on which he is even known to have based large parts of his anatomical exegesis in AA. Cf., for example, his anatomy of the brain and retiform plexus (*rete mirabile*), on which see Rocca (2003).

⁴⁰⁷ So, for example, Scarborough (1985: 130), who writes "[t]he texts in Greek and Arabic show that Galen had seen an elephant's heart, obtained its heart bone, but that he had probably not dissected an elephant's liver since he gave the animal a gall bladder, contrary to Aristotle and his most likely source, Mnesitheus of Athens."

all.⁴⁰⁸ As I have mentioned already, Galen's own comments regarding the subjects for his dissections and Rocca's work on the brain in Rocca (2003) both serve as strong support that Galen made analogical claims from the anatomy of oxen, sheep, and goats, all of which possess an *os cordis*, to human beings.⁴⁰⁹ In fact, the retiform plexus of the ox is the structure that Galen extrapolates mistakenly to human beings in order to explain neural physiology. In addition to its size, the ox was easily obtainable in Rome, as Galen mentions when advising the reader of *AA* to use them as subjects for anatomical procedures on the brain: "[o]x brains suitably stripped of most of the parts of the cranium are commonly sold in big cities."⁴¹⁰

Siegel (1968) goes so far as to argue that Galen dissected the hearts *only* of oxen, as far as I can tell, on the grounds that his description of the chamber of the heart accurately describes the auricle of the ox but not the atria of the human or other chordates.⁴¹¹ And, although I suspect that Siegel's claim is too extreme, the fact that Galen's description of the auricles is of the ox's auricle furthers my own view that Galen has figured the elephantine heart in terms of the large heart familiar to him, that of the ox.

⁴⁰⁸ I go into greater detail on these reasons below but, briefly, Galen is known to have extrapolated from animals elsewhere. The ox is a favorite anatomical subject of his. The heart bone does not exist in the elephant but does exist in the ox. And, finally, Galen's accounts of the elephant elsewhere in his corpus seem largely if not wholly derived from other authors, such as Aristotle.

⁴⁰⁹ The ox was not an accidental subject for Galen's investigations into the brain in all likelihood, as Rocca has argued (2003: 71-3). Not only was it easily available, see *AA* II 708, but it was also the largest non-human brain on which Galen could operate.

⁴¹⁰ *AA* II 708, ἔτοιμοι δὲ τοῦ πᾶν ἐν ταῖς μεγάλαις πόλεσιν ἐγκέφαλοι βόειοι πιπράσκονται τῶν πλείστων τοῦ κρανίου μερῶν γυμνοί.

⁴¹¹ Siegel (1968: 34), "Only in the ox heart, which Galen exclusively studied, both *venae cavae* appear to terminate in the right atrioventricular valve without forming an atrium. Since Galen never stated that he dissected a human heart, we should not consider his description of the relation between auricle, *venae cavae*, and right ventricle as erroneous, as we so often read."

Harris (1973) argues against Siegel while obliquely addressing the issue in his analysis of Galen's discussion on the position of the heart at *UP* VI 416.⁴¹² Although he dismisses Siegel's claim that the ox was the only animal whose heart Galen dissected, his analysis of Galen's account of the position of the heart is based on the notion that Galen's exposition of cardiac anatomy is derived from animal dissections, namely monkeys.⁴¹³ Scarborough (1985) generally argues that Galen's dissection of the elephant is suspect for a host of reasons, to which I will return and which support my argument that Galen's account of elephantine anatomy is based primarily if not wholly on analogy with a large ruminant.

Finally, returning to the theme of magnification, in both *AA* and *UP* Galen makes the same claim about the identity of the structure of the heart across kinds differing in size.⁴¹⁴ But, he mentions the ox as the largest available animal in *UP* and the elephant in *AA*. At *AA* II 624 the upper and lower limits of Galen's scale are the elephant and the lark, while at *UP* III 442-3 the upper and lower limits are the ox and the sparrow or mouse respectively. Given the close relationship of the two texts and the preceding arguments, Galen's substitution of the ox for the elephant as the largest animal known to him in his hypothetical about the scaling size of viscera across kinds suggests that the elephant in *AA* is standing in for the ox in *UP*.

⁴¹² Harris (1973: 270 n. 1), "Dr. Siegel... insists that Galen's description of the heart is based exclusively on that of the ox, which for some reason known only to himself he believes 'he exclusively studied'; but the anatomical reasons given for this statement seem to me to be far from convincing."

⁴¹³ See Harris (1973: 269-70) referencing Daremburg's extensive note to his translation of *UP*: Daremburg (1854: 383ff).

⁴¹⁴ I.e., that the structure of the heart will remain the same if one takes even an imaginary animal bigger than the largest animal *X* and smaller than the smallest animal *Y*.

THE OS CORDIS IN *DE ANATOMICIS ADMINISTRATIONIBUS*

At AA II 619, Galen claims that minute structures are easy for those inexperienced in anatomy to overlook. The *os cordis* is just such a structure and Galen strongly implies here that debates about its existence are due to the observational inadequacies of his opponents when he writes, "[i]t is not at all strange for those untrained (ἀγυμνάστοις) in anatomy to fail utterly to recognize [the heart bone] in cases of small animals, given that even in larger animals [the heart bone] frequently slips by them."⁴¹⁵ As earlier, Galen turns to an enlarged version of the structure under discussion in a larger animal.⁴¹⁶

In the cases of ancient witnesses to cardiac anatomy, such as Aristotle, Galen writes that these sorts of mistakes are to be expected given the paucity of anatomical knowledge in the past generally (at AA II 621).⁴¹⁷ Although he does not say so explicitly, when Galen mentions the unnamed tyros (ἀγυμνάστοις) at AA II 619 and Aristotle as another anatomical tyro, albeit a forgivable one, he suggests that anatomical mistakes made by the ancients (παλαιοί) more generally can be seen as a consequence of the relatively primitive state of anatomical knowledge of the time.⁴¹⁸ The same excuse cannot be made for those who fail to practice anatomy, in Galen's present.

⁴¹⁵ AA II 619, θαυμαστόν δ' οὐδὲν ἐπὶ τῶν μικρῶν ζώων ἀγνοεῖσθαι τελέως αὐτὸ τοῖς ἀγυμνάστοις περὶ τὰς ἀνατομὰς, ὅπου γε καὶ κατὰ τὰ μείζω λανθάνει πολλάκις αὐτούς.

⁴¹⁶ So, for example, AA XV.2 pgs. 227-8; but especially 227, "[w]e must then try to learn the conformation of that which is hard to observe in any one type of animal, whichever this may be, in other animals where that can be found and thoroughly investigated, I mean those animals in which such details are in their nature larger and more massive than those which in this [smaller] type are hard to see."

⁴¹⁷ As also evidenced, Galen says here, by Aristotle's belief that the hearts of larger animals possessed three ventricles. I will say more on Aristotle and his views on the heart shortly.

⁴¹⁸ Although it is not inconsistent with it, this argumentative move contrasts starkly with Galen's narrative of decline earlier in AA, where he writes that truly ancient anatomists had no need for writing. It was only after medicine became more democratized that it was necessary to codify anatomical experience, which

This reference to the heart bone in smaller and larger contexts should recall Galen's comments on his method of investigation that I have discussed as his solution to a problem of magnification earlier when discussing the gallbladder. Here too, magnification plays a crucial role in Galen's anatomical demonstration, as the bone, like any other structures open to analogical study, should be proportionately more apparent in larger creatures. Although rather long, it is necessary I think to quote the passage in full,

And why do I mention the larger? Indeed, after an elephant was slaughtered recently (ἔναγχος) in Rome many doctors gathered together for its dissection to determine whether the [elephant's] heart possesses one or two apexes and two or three ventricles. *And, even before its dissection, I insisted that the structure of its heart would be found to be the same as in all the other animals that breathe air, which became clear when [the heart] was opened. I also easily found the bone in the heart along with my associates when I inserted my fingers.* But those who were untrained assumed that not even the elephant's heart contains a bone, expecting to find that what was unobservable [to them] in the cases of other animals [would also be unobservable] in the large one. So, I was about to show it to them but I stopped the demonstration when my associates, laughing, begged me not to conduct a demonstration for people whom they saw as insensate on account of their ignorance of the region. *After the heart was removed by Caesar's cooks, I sent one of my associates, trained in these matters, to ask the cooks to let him excise the heart bone. And so it happened, even now it is beside me. It is massive in size and induces in those who see [it] a state of wide-eyed disbelief that a bone so huge eluded these doctors.* So even the biggest structures in animals elude the untrained and it is not at all unbelievable that Aristotle both was mistaken about many other anatomical matters and thought that the heart had three ventricles in large animals nor ought one to be surprised that as he was untrained in anatomical matters he stumbled regarding the discovery of

was lost as it was popularized. This narrative simultaneously maintains Hippocrates as the ultimate medical authority while allowing Galen to criticize subsequent ancients. See, AA II 281-2 "When the art slipped away from the tribe of the Asclepiads and then became invariably worse generation by generation, it became necessary for notes (ὑπομνημάτων) to conserve anatomical theory. Before, not only were anatomical handbooks (ἐγχειρήσεων ἀνατομικῶν) unnecessary but also treatises (συγγραμμάτων) of this sort... (ἐκπεσοῦσα τοίνυν ἔξω τοῦ γένους τῶν Ἀσκληπιδῶν ἡ τέχνη, καί περ διαδοχαῖς πολλαῖς αἰεὶ χείρων γιγνομένη, τῶν διαφυλασσόντων αὐτῆς τὴν θεωρίαν ὑπομνημάτων ἐδέηθησαν. ἔμπροσθεν δ' οὐ μόνον ἐγχειρήσεων ἀνατομικῶν, ἀλλ' οὐδὲ συγγραμμάτων ἐδεῖτο τοιούτων·)

structures. And it is appropriate to excuse him, since those who have dedicated their entire lives to this pursuit, as Marinus, were apt to make many mistakes. What is one to think would happen to those who pursue it all of a sudden and to those who are convinced by things that they do not see at first with the result that they no longer look to try their hands at it a second time.⁴¹⁹

First, and as a clarificatory matter, Galen writes in the first text I have italicized for emphasis above that hearts are structurally and functionally analogous across creatures that breathe air, which are themselves coextensive with blooded creatures.⁴²⁰ These viscera that are, for Galen, identical across species are *structurally* identical although the viscera need not be identical in all respects, as is obvious from Galen's belief in the proportional relation of organ size to animal size. So, for example, in AA II 619, he reasons that although the heart bone is in a certain sense identical across kinds, it is not so

⁴¹⁹ AA II 619-621, καὶ τί λέγω τὰ μείζω; μεγίστου γοῦν ἐλέφαντος ἑναγχος ἐν Ῥώμῃ σφαγέντος, ἡθροίσθησαν μὲν ἐπὶ τὴν ἀνατομὴν αὐτοῦ πολλοὶ τῶν ἱατρῶν ἕνεκα τοῦ γινῶναι, πότερον ἔχει δύο κορυφὰς ἢ μίαν ἢ καρδίαν, καὶ δύο κοιλίας ἢ τρεῖς. ἐγὼ δὲ καὶ πρὸ τῆς ἀνατομῆς αὐτοῦ διετεινόμεν, εὐρεθήσεσθαι τὴν αὐτὴν κατασκευὴν τῆς καρδίας ταῖς ἄλλαις πάσαις τῶν ἐξ ἀέρος ἀναπνεόντων ζώων· ἅπερ ἐφάνη καὶ διαιρεθείσης. εὗρον δὲ ῥαδίως καὶ τὸ κατ' αὐτὴν ὅστον, ἅμα τοῖς ἐταίροις ἐπιβαλὼν τοὺς δακτύλους. οἱ δ' ἀγύμναστοι μὲν, ἐλπίζοντες δὲ εὐρίσκειν, ὥς ἐν μεγάλῳ ζώῳ, τὸ μὴ φαινόμενον ἐπὶ τῶν ἄλλων, ὑπέλαβον οὐδὲ τὴν ἐλέφαντος καρδίαν ἔχειν ὅστον. ἐγὼ δ' ἐμέλλησα μὲν αὐτοῖς δεικνύνειν, τῶν δ' ἐταίρων γελόντων ἐφ' οἷς ἐώρων ἀναισθήτους ἐκείνους διὰ τὴν ἄγνοιαν τοῦ τόπου, παρακαλεσάντων δὲ μὴ δεικνύνειν, ἐπέσχον τὴν δεξιὴν. ἀρθείσης μέντοι τῆς καρδίας ὑπὸ τῶν τοῦ Καίσαρος μαγείρων, ἔπεμψά τινα τῶν γεγυμνασμένων ἐταίρων περὶ τὰ τοιαῦτα παρακαλέσοντα τοὺς μαγείρους ἐπιτρέψαι τὸ κατ' αὐτὴν ὅστον ἐξελεῖν· καὶ οὕτως ἐγένετο. καὶ παρ' ἡμῖν ἐστὶ νῦν, οὐ σμικρὸν μὲν ὑπάρχον τῷ μεγέθει, θαυμαστὴν δὲ παρέχον ἀπιστίαν τοῖς ὁρώσιν, εἰ τηλικούτον ὅστον ἐλάνθανε τοὺς ἱατρούς. οὕτως ἄρα καὶ τὰ μέγιστα τῶν ἐν τοῖς ζώοις μορίων λανθάνει τοὺς ἀγυμνάστους. καὶ θαυμαστὸν οὐδὲν, ἄλλα τε πολλὰ κατὰ τὰς ἀνατομὰς Ἀριστοτέλῃ διαμαρτεῖν, καὶ ἡγεῖσθαι, τρεῖς ἔχειν κοιλίας ἐπὶ τῶν μεγάλων ζώων τὴν καρδίαν. ὅτι μὲν οὖν ἀγύμναστος ὢν ἐν ταῖς ἀνατομαῖς ἐσφάλῃ περὶ τὴν τῶν μορίων εὕρεσιν, οὔτε θαυμάζειν χρὴ, καὶ συγγινώσκειν αὐτῷ προσήκει. ὅπου γὰρ οἱ τὸν ὅλον ἑαυτῶν βίον ἀναθέντες τῇ θεωρίᾳ ταύτῃ, καθάπερ ὁ Μαρίνος, ἡμαρτον πολλὰ, τί χρὴ νομίζειν συμβαίνειν τοῖς ἐξαίφνης μὲν ἐπ' αὐτὴν ἐλθοῦσι, πεισθεῖσι δ' οἷς πρῶτον οὐκ εἶδον, ὥς μηκέτι ἐπιχειρήσαι δεύτερον ἰδεῖν;

⁴²⁰ One recalls that, for Galen, the heart was an organ of respiration dependent on the movement of the thorax for its own activity. And so, when Galen talks about the class of air breathing creatures, those creatures will have a heart, which is involved in the elaboration of blood.

materially, saying that, "by however much the kind of animal is unusual in its size, by that degree does the cartilage acquire a bony structure."⁴²¹

When Galen mentions the heart bone here and elsewhere, it is important to keep in mind, as a point of terminological use, his comments immediately after those above. These refer to a dense substance at the junction between the aorta and the aortic valve (the tricuspid), "the valves, which I said are called tricuspid, and the base of the arterial vessels (aorta) are attached to a structure, in every case [a] hard [structure] but not hard to the same degree in all animals."⁴²²

It is clear from this passage and the subsequent context that Galen believes that some bone or an equivalent structure lies at the core of every heart, varying in hardness but nonetheless present in some form.⁴²³ But Galen refers to this structure as a bone (ὀστούν) found in every animal's heart elsewhere. Galen simply uses the phrase 'the bone in the heart' (τὸ κατὰ τὴν καρδίαν ὀστούν) here as a name rather than as a description. That having been said, it is also clear that in the case of the elephant he means the phrase descriptively, as a bone rather than some functional equivalent.⁴²⁴

⁴²¹ AA II 619, ὅσῳ γ' ἂν ᾗ τὸ τοῦ ζώου γένος ἀξιολογώτερον τῷ μεγέθει, τοσοῦτῳ πλέον ὀστώδους οὐσίας ὁ χόνδρος ἐπικέκταται.

⁴²² AA II 619, οἳ θ' ὑμένες, οὓς ὀνομάζεσθαι τριγλώχινας ἔφην, ἢ τε τῶν ἀρτηριωδῶν ἀγγείων ῥίζα πρὸς οὐσίαν ἤρτηται, σκληρὰν μὲν πάντως, οὐ μὴν ἐν ἅπασί γ' ὁμοίως σκληράν.

⁴²³ That the structure varies in density in direct relation to the animal's size is explicit in the later context of AA II 619, quoted variously in the next few pages.

⁴²⁴ Cf. AA II 618, καὶ γὰρ οὖν καὶ τὸ κατ' αὐτὴν ὀστούν, ὃ τοῖς μεγάλοις ζώοις ὑπάρχειν νομίζουσι, καὶ τοῦτοις οὐ πᾶσιν, ἐν πᾶσι μὲν ἐστὶ καὶ τοῖς ἄλλοις, οὐ μὴν ὀστούν πᾶσι γε ἀκριβῶς, ἀλλὰ χόνδρος. ἔχει γὰρ ὧδε τὸ σύμπαν ἅπανι τοῖς ζώοις.

The first italicized text underscores that Galen expected to see the *os cordis*, proper, first on teleological grounds and only later after direct observation,⁴²⁵

And, even before its dissection, I insisted that the structure of its heart would be found to be the same as in all the other animals that breathe air, which became clear when [the heart] was opened. I also easily found the bone in the heart along with my associates when I inserted my fingers.⁴²⁶

The second italicized passage, to which I will return, serves no heuristic purpose in the text. At that point, where Galen reports that one of his *hetairoi* has brought the *os cordis* back to him, he has already reported both his expectation of its discovery and its discovery through direct observation (εὗρον δὲ ῥαδίως καὶ τὸ κατ' αὐτὴν ὀστοῦν, ἅμα τοῖς ἐταίροις ἐπιβαλὼν τοὺς δακτύλους),

After the heart was removed by Caesar's cooks, I sent one of my associates, trained in these matters, to ask the cooks to let him excise the heart bone. And so it happened, even now it is beside me. It is massive in size and induces in those who see [it] a state of wide-eyed disbelief that a bone so huge eluded these doctors.⁴²⁷

This last point on Galen's expectations, which occurs after Galen has brought his account of the elephant's *os cordis* to a close, suggests a likely explanation for certain oddities in his account of the elephant's heart bone that he deploys ironically as evidence for his

⁴²⁵ Cf. AA II 621-2, which I will discuss in detail below. The relevant point, however, is that Galen generalized from one observation to all animals on the grounds that nature is an ideally organizing principle.

⁴²⁶ AA II 620, ἐγὼ δὲ καὶ πρὸ τῆς ἀνατομῆς αὐτοῦ διετεινόμεν, εὐρεθήσεσθαι τὴν αὐτὴν κατασκευὴν τῆς καρδίας ταῖς ἄλλαις πάσαις τῶν ἐξ ἀέρος ἀναπνεόντων ζώων· ἅπερ ἐφάνη καὶ διαιρεθείσης. εὗρον δὲ ῥαδίως καὶ τὸ κατ' αὐτὴν ὀστοῦν, ἅμα τοῖς ἐταίροις ἐπιβαλὼν τοὺς δακτύλους.

⁴²⁷ AA II 620-1, ἀρθείσης μέντοι τῆς καρδίας ὑπὸ τῶν τοῦ Καίσαρος μαγείρων, ἔπεμψά τινα τῶν γεγυμνασμένων ἐταίρων περὶ τὰ τοιαῦτα παρακαλέσοντα τοὺς μαγείρους ἐπιτρέψαι τὸ κατ' αὐτὴν ὀστοῦν ἐξελεῖν· καὶ οὕτως ἐγένετο. καὶ παρ' ἡμῖν ἐστὶ νῦν, οὐ σμικρὸν μὲν ὑπάρχον τῷ μεγέθει, θαυμαστὴν δὲ παρέχον ἀπιστίαν τοῖς ὁρώσιν, εἰ τηλικούτον ὀστοῦν ἐλάνθανε τοὺς ἰατροὺς. οὕτως ἄρα καὶ τὰ μέγιστα τῶν ἐν τοῖς ζώοις μορίων λανθάνει τοὺς ἀγυμνάστους.

contemporaries' failure to make careful and accurate anatomical observations. This digression on the elephant begins with the point that physicians generally believe a heart bone exists in some but not all animals. It ends when Galen says at AA II 62 these physicians that are so unpracticed at dissection and unfamiliar with observation that they are unable to identify the bone even when it is most apparent in the largest available specimen, the elephant. How could they be expected to identify it and its functional analogues in smaller animals?

The expressed reason for his digression from the description of the vessels and valves of the heart, which precede this episode, is to issue a corrective for a lack of anatomical training among doctors. Inadequate training, for Galen, often arises from a fundamental failure to understand the importance of empirical observation for epistemic medical claims.⁴²⁸ These two points are apparent from the opening of the digression, where Galen cites the position against which he will argue: namely, that a bone exists in the hearts of some but not all large animals (ὅστούν, ὃ τοῖς μεγάλοις ζώοις ὑπάρχειν νομίζουσι, καὶ τούτοις οὐ πᾶσιν).⁴²⁹

⁴²⁸ See AA II 618; but also cf. *Opt.Med.*, which contains numerous iterations of this complaint. *Opt.Med.* I 54 mentions anatomical ignorance explicitly. See, however, *Opt.Med.* I 53 for a flamboyant denouncement of medical ignorance more generally, "Many athletes are afflicted with a sort of thing, although they desire to become Olympic victors, they do not make an effort to act so as to achieve this. This sort of thing also happens to many doctors. For although they praise Hippocrates and consider him first among all [doctors], to make themselves like him as much as possible they do everything but this."

(Οἷόν τι πεπόνθασιν οἱ πολλοὶ τῶν ἀθλητῶν ἐπιθυμοῦντες μὲν ὀλυμπιονίκαι γενέσθαι, μηδὲν δὲ πράττειν ὡς τούτου τυχεῖν ἐπιτηδεύοντες, τοιοῦτόν τι καὶ τοῖς πολλοῖς τῶν ἱατρῶν συμβέβηκεν. ἐπαινοῦσι μὲν γὰρ Ἱπποκράτην καὶ πρῶτον ἀπάντων ἡγοῦνται, γενέσθαι δ' αὐτοὺς ὡς ὁμοιοτάτους ἐκείνῳ πάντα μᾶλλον ἢ τοῦτο πράττουσιν.) This complaint is common throughout Galen's work. Cf., for example, *Opt.Med.* I 53-63; I; *Protr.* I 1-39; *Lib.Prop.* XIX 9-10; *Ord.Lib.Prop.* XIX 49-54.

⁴²⁹ AA II 618, καὶ γὰρ οὖν καὶ τὸ κατ' αὐτὴν ὅστούν, ὃ τοῖς μεγάλοις ζώοις ὑπάρχειν νομίζουσι, καὶ τούτοις οὐ πᾶσιν, ἐν πᾶσι μὲν ἐστὶ καὶ τοῖς ἄλλοις, οὐ μὴν ὅστούν πᾶσί γε ἀκριβῶς, ἀλλὰ χόνδρος.

The passage gives no more information about who holds this position besides what can be said from Galen's various references to the doctors present at the time, that they are contemporaries of his and what is known from Aristotle's texts on the heart bone. Although it is clear that Galen means 'bone' (ὀστοῦν) to refer rigidly to a supportive structure in the heart here, there is no reason to suppose that Aristotle meant bone (ὀστοῦν) as anything except descriptively. That is, as Galen introduces the term earlier in the text, Aristotle need not disagree with him. There are two claims that Galen might be making: first, that all large animals contain a "bone" in their hearts, by which he means a supportive central structure that happens to be a bone in animals of certain kinds; second, that all large animals contain a bone in their hearts.

In his own account Aristotle does suppose that some structure will serve as a supportive junction, although it is only bone in some cases, which is consistent with Galen's view as far as things go on the first interpretation.⁴³⁰ Aristotle denies that there is an actual bone in the elephant's heart but need not (and probably would not) deny that some similarly supportive structure ought to be found at the juncture of the aorta and tricuspid. That is, the point of conflict lies in Galen's belief that density of structure varies with size. A point Aristotle shows sympathy with but does not, for him, warrant comment when he describes the absence of a bone in the elephant's heart. In the later context of this passage, Galen ascribes this denial to contemporary Roman physicians generically (or at least the untrained physicians present at this scene). He also ascribes to

⁴³⁰ See Aristotle *PA* 666b17-21, discussed below.

them, by implication, either the Aristotelian view that the heart in larger animals may consist of three chambers or some doubts as to whether or not this view was mistaken.⁴³¹

This later suggestion picks up Galen's criticism of Aristotle that began the episode, as a bookend, which is one of the features of this passage that sets it aside stylistically from Galen's otherwise dispassionate account of anatomical structures in much of the rest of *Anatomical Procedures*. At AA II 618, Galen segues from a discussion of the coronary arteries and the number of ventricles in the heart, first to Aristotle's views on both subjects, then to the heart bone, about which Aristotle discusses elsewhere in his biological works.⁴³² Setting aside the two passages from *HA* and *GA*, which simply say that a heart bone can be found in oxen and horses or in bulls, respectively, it is worth setting out the context for Aristotle's account of it in *PA* in order to flesh out the view against which Galen is arguing.⁴³³ A cluster of similarities, and Galen's direct reference to Aristotle, suggest that Galen is referring to this passage from *PA* while laying out his own accounts of the *os cordis* in *AA* and *UP*.

⁴³¹ Cf. AA II 620

⁴³² Aristotle discusses the *os cordis* at *PA* III.4 as well as in passing at *HA* II.15 and *GA* V.7.

⁴³³ In *HA*, Aristotle mentions the *os cordis* in passing at *HA* 506a7-10, "[e]xcept that in the case of oxen there is something peculiar in the heart, although not [in] all of them, as there is a kind of ox which has a bone in the heart. And the heart of horses also contains a bone." (πλὴν ἐν τῇ καρδίᾳ ἰδιόν τι ἐστὶν ἐπὶ τῶν βοῶν· ἔστι γάρ τι γένος βοῶν, ἀλλ' οὐ πάντες, ὃ ἔχει ἐν τῇ καρδίᾳ ὀστούν. ἔχει δὲ καὶ ἡ τῶν ἵππων καρδία ὀστούν.) In *GA* 787b15-19, Aristotle explains the presence of the heart bone in oxen by arguing that the ox has a very sinuous heart and because of the need for a tendon to attach itself to bony substances, there is a bone at the center of its heart: δηλοῖ δὲ τοιαύτη τὴν φύσιν οὕσα ἡ καρδία τῶν βοῶν τῷ καὶ ὀστούν ἐγγίνεσθαι ἐν ἐνίαις αὐτῶν· τὰ δ' ὀστά ζητεῖ τὴν τοῦ νεύρου φύσιν.

THE *OS CORDIS* IN ARISTOTLE

Aristotle's account of the heart in *PA*, after introducing its subject matter, pivots to the appearance of the heart and other internal organs in newborn animals at 665b8 (ἐν τοῖς νεογνοῖς). I mention newborn animals to show that Galen has this passage in mind in his own discussion of the *os cordis*. In addition, this passage immediately precedes the passage in *PA* (665b11-18), where Aristotle claims that all fluids require vessels. If one recalls, this claim is the one that Galen ridicules in *At.Bil.* (V 147) when he also mentions that pigeons lack gallbladders. This reference along with the evidence that follows, suggests strongly that Galen had these pages of *PA* in mind while structuring the *os cordis* episode in *AA*.

Although Galen does not mention newborns in this context in *AA*, in *UP* he discusses animals still *in utero* as a coda to his account of the heart bone. After discussing the material composition of the heart and one of its primary functions, to be the source and a central vessel for blood in the body (*PA* 665b10-21), Aristotle engages with thinkers who believe the brain is the source of blood vessels (*PA* 665b28ff). Then he returns to observations of the heart in embryos (ἐν τοῖς ἐμβρύοις), which along with other arguments about the centrality and primacy of the heart make an implicit case for cardiocentrism.

This progression leads Aristotle to explain how the observed position of the heart in other animals, central, differs from that of human beings, off-center.⁴³⁴ His discussion

⁴³⁴ Cf. *De Respir.* 478b3; *HA* 507a. Galen's accounts of the position of the heart differ in *UP* and *AA*, where in the one case he claims that the human heart lies in the center of the chest and in the other that the

includes the seemingly disparate case of the heart in fish, in which the apex of the heart seems to point toward the head.⁴³⁵ Galen takes up this peculiar aside along with a discussion of the double apex of the heart in larger animals at AA II 624-625.

These similarities, when taken along with Galen's explicit mention of Aristotle's views on the heart bone in both *AA* and *UP*, are evidence that Galen had this very passage in mind while constructing his own accounts of the heart bone. His reference to this section of *PA*, here and elsewhere (e.g., *At.Bil.* V 147), also makes a very strong case that this section was a point of engagement for him against Aristotle's account of the heart. That Galen engages with Aristotle on the heart is not at all surprising. These connections, however, make the case that the *os cordis* episode is not just a corrective of Aristotle's views on the *os cordis* in the elephant but also, by extension, a means of undercutting Aristotle's views on the heart more generally. That is, the more work Galen does to undermine Aristotle's beliefs about the heart, the more Galen collaterally undermines Aristotle's cardiocentrism.

Returning to Aristotle's account of the *os cordis* proper, Aristotle describes what must be the *chordae tendineae*, with respect to the center of the heart itself and the need for some sort of buttress at its core. Of course, it is unlikely that he was describing the *chordae tendineae* as support cables for the tricuspid, as those valves had not yet been identified as such. This identification would have to wait another generation, for

right ventricle is off-center. This discrepancy between the two texts is presumably the result of Galen's changing views on the subject and the unusual editorial process both texts underwent.

⁴³⁵ Cf. *HA* 507a2ff, where Aristotle explains that the heart in fish is centered, as it is in other animals, if one considers that in most animals the chest is oriented forwards while in fishes the head is oriented forwards.

Erasistratus. So although Aristotle does not identify the valves in his account, he does explain them as structural supports for the heart analogous to the body that contains it,

The heart has a number of tendons (νεύρων), and this is reasonable as the motive impulses (κινήσεις) proceed through [its] contracting and relaxing. Consequently, it needs this sort of service (τοιαύτης ὑπηρεσίας)⁴³⁶ and strength. And the heart, just as I said also earlier, is a sort of animal in those who have it.⁴³⁷

In part because he was aware that the heart beats non-voluntarily, although not aware of the reasons why, and in part because of the associations he makes between the heart and sensation, Aristotle writes about the heart as though it is in certain structural respects like a living body.⁴³⁸ The simile is close enough to allow for a powerful and real entailment. A consequence of having a metaphorical body for Aristotle is that the heart must have a skeleton at its core.⁴³⁹ If the metaphor holds, one might expect such a structure at the core

⁴³⁶ It is worth observing that this word ὑπηρεσία generally refers to the groups of rowers, who power a trireme. The image is lost in translation but in this context is informative. The bank of rowers strains to aid the heart in contraction and then relaxation. By extension, they require some sort of brace to aid them in their efforts. This brace is, of course, the heart bone mentioned below. Aristotle does not explicitly come to the conclusion that all hearts, in virtue of possessing these straining νεύρα, require an underlying structural support. His argument regarding the function of the νεύρα in the heart, however, make a structural support functionally necessary, which Galen makes explicit in his own account in *UP*.

⁴³⁷ Aristotle *PA* 666b13-17, ἔχει δὲ καὶ νεύρων πλήθος ἡ καρδία, καὶ τοῦτ' εὐλόγως· ἀπὸ ταύτης γὰρ αἱ κινήσεις, περαίνονται δὲ διὰ τοῦ ἔλκειν καὶ ἀνιέναι· δεῖ οὖν τοιαύτης ὑπηρεσίας καὶ ἰσχύος. Ἡ δὲ καρδία, καθάπερ εἵπομεν καὶ πρότερον, οἷον ζῶν τι πέφυκεν ἐν τοῖς ἔχουσιν.

⁴³⁸ Cf. Aristotle *PA* 666a19-24, Not only does it seem that this is so by way of reason but also by way of sensation. For it is clear that the heart, of all the parts, is in motion from the start in embryos, like an animal, since it is an engine of growth. Evidence of the aforementioned is the fact that all blooded creatures possess [a heart]. For, it is necessary for them to have a point of blood production. (Οὐ μόνον δὲ κατὰ τὸν λόγον οὕτως ἔχειν φαίνεται, ἀλλὰ καὶ κατὰ τὴν αἴσθησιν· ἐν γὰρ τοῖς ἐμβρύοις εὐθέως ἡ καρδία φαίνεται κινουμένη τῶν μορίων καθάπερ εἰ ζῶν, ὥς ἀρχὴ τῆς φύσεως τοῖς ἐναιμίσι οὖσα. Μαρτύριον δὲ τῶν εἰρημένων καὶ τὸ πᾶσι τοῖς ἐναιμίσι ὑπάρχειν αὐτήν· ἀναγκαῖον γὰρ αὐτοῖς ἔχειν τὴν ἀρχὴν τοῦ αἵματος.)

⁴³⁹ Cf. Aristotle *PA* 654b27-32, Flesh surrounds the bones, fastened by thin and fibrous sinews. The skeleton is for the sake of [the flesh]. For just in the way that sculptors who are sculpting an animal out of clay or some other wet substance set up some sort of solid body as a support or mold around [a support], in the same way nature builds an animal out of flesh. (Περὶ δὲ τὰ ὅσα αἱ σάρκες περιτεφύκασι,

of the hearts of all blooded animals. Aristotle is quick, however, to point out that only the very largest hearts contain bones, such as the ox and horse,

[the heart] of all [animals], even the ones that we have examined, is boneless, except for horses and a certain kind of ox. And, on account of their size, these [animals] possess a bone [in their heart] as a support (ἐρείσματος χάριν), just as also whole bodies do.⁴⁴⁰

This quotation shows that Aristotle, like Galen, believes that the *os cordis* is a bone precisely due to the size of the animal possessing it, although some analogous structure will support the beating heart more generally. Aristotle offers no explanation elsewhere for how this belief can be reconciled with the absence of the bone in the elephant, which is one of the sources of contention between him and Galen. But Aristotle does not necessarily need to offer an explanation for his observations on the *os cordis*. After all, although Aristotle's teleological views incline him to the view that the heart and heart bone be structured in a useful fashion, his views admit of occasional structures that exist for no reason, such as the gallbladder.⁴⁴¹

The *os cordis* is not such a structure, however. Aristotle has explained the heart bone exists in some animals on account of their size. That is, if an animal possesses a

προσειλημμένοι λεπτοῖς καὶ ἰνώδεσι δεσμοῖς, ὧν ἔνεκεν τὸ τῶν ὀστέων ἔστι γένος. Ὡς περὶ γὰρ οἱ πλάττοντες ἐκ πηλοῦ ζῶον ἢ τινος ἄλλης ὑγρᾶς συστάσεως ὑφίστασι τῶν στερεῶν τι σωμάτων, εἴθ' οὕτω περιπλάττουσι, τὸν αὐτὸν τρόπον ἢ φύσιν δεδημιούργηκεν ἐκ τῶν σαρκῶν τὸ ζῶον.)

⁴⁴⁰ Aristotle *PA* 666b17-21, Ἔστι δ' ἀνόστεος πάντων ὅσα καὶ ἡμεῖς τεθεάμεθα, πλὴν τῶν ἵπων καὶ γένους τινὸς βοῶν· τούτοις δὲ διὰ τὸ μέγεθος οἷον ἐρείσματος χάριν ὀστοῦν ὑπεστί, καθάπερ καὶ τοῖς ὅλοις σώμασιν.

⁴⁴¹ Certain structures, for Aristotle, may not only exist for no purpose but even to the detriment of the creature possessing them (e.g., the antlers of deer at *PA* 663a8-12 are more of a hindrance to the deer than a help).

heart bone it will be a large animal; but, it does not follow from this claim that being a large animal is itself a sufficient condition for the presence of a heart bone.⁴⁴²

This quotation from *PA* expresses three points with which Galen engages in his own account. First, Aristotle claims that most hearts do not contain a bone, although the hearts of a few do. In those cases, the presence of the heart bone is explained by the great size of the creature but it does not follow that every great sized creature must have a heart bone. Compare *AA* II 618, where Galen ascribes a version of this view to a group of unnamed thinkers. Second, that the presence of this bone is explained by the size (διὰ τὸ μέγεθος) of the animals. And, finally, that this bone *functions* as a cardiac support (ἐρείσματος χάριν) by analogy with the skeletons of the body as a whole.

The last two points may explain, in part, why Galen feels the need to correct Aristotle, as Galen's more thoroughgoing teleological views seem to commit him to scaling close structural parity between the heart and the creature possessing it. So, by Galen's lights, it is both the case that every creature with a heart bone must be huge and that every huge creature must have a heart bone. So, contra Aristotle, Galen's commitments to structural symmetry have him argue for a bone in the elephant's heart. In regard to the first point, however, it is worth noticing that Aristotle does not claim that the hearts of all animals possess a bone, although he remains silent on whether or not they must possess some other sort of foundational support analogous to it.⁴⁴³ Aristotle's

⁴⁴² This, in fact, seems to be the case with the *os cordis* in ruminants.

⁴⁴³ On Galen's exploitation of other authors' silences as indicating a tacit denial of a claim, see von Staden (1997: 195-96), especially (p. 196), "This [referring to Erasistratus] is similar to other instances in which Galen infers an elaborate negation or negative theory- here '*in vain* the spleen, *in vain* the omentum, *in vain*

silence is relevant here because Galen appears, in his own account, not just to fault Aristotle for believing the elephant has no heart bone but also for failing to cleave to his own teleological commitments. That is, Galen faults Aristotle for not concluding that the elephant's heart must contain a bone in virtue of its size and the structural demands this size should place on the heart's support system.

Aristotle passes from the heart bone to the ventricles or perhaps the chambers of the heart, another anatomical feature that he believes differs in relation to the size of the body of a creature. Briefly, it appears as though Aristotle claims that the number of ventricles of the heart ranges from one to three depending on the size of the animal (*PA* 666b22-667a6). This claim is difficult to explain observationally. That is, if Aristotle meant to describe what were taken by later anatomists to be the right and left ventricles, it is unclear what structure(s) he was taking to be the three *κοιλίαι* of large animals. Given his claim that the number of ventricles is proportional to the size of the animal, it is difficult to untangle the knot by supposing a taxonomical difference as in the case of the atria, which were generally not seen in antiquity as distinct *chambers* of the heart but rather as the expanded terminal points of the venae cava and the pulmonary vein.⁴⁴⁴ And, of course, that is precisely the criticism that forms the starting point for Galen's discussion of the heart bone generally and his personal anecdote on the slaughtered elephant specifically.

the renal arteries, *in vain* numberless other things'- from an author's silence or putative silence on a given point."

⁴⁴⁴ See, for example, Harris (1973: 98). The account is somewhat anachronistic but comprehensive.

In this context, is important to point out that the term commonly translated as "ventricles," κοιλίαι, means "chambers" (although originally "hollows"). Translating them as ventricles reflects the modern identification of the κοιλίαι with two of the four chambers of the heart rather than the ancient Greek notion that the heart was divided into two chambers (κοιλίαι).⁴⁴⁵ This view of Aristotle's on the κοιλίαι of the heart in large animals, which appears to have no straightforward explanation, is the springboard from which Galen, who did take Aristotle to mean the ventricles, proceeds not only to criticize Aristotle but also other physicians of his own day for both their observational and methodological failures.⁴⁴⁶

THE *OS CORDIS* IN GALEN, TELEOLOGICAL EXPLANATION

Turning back then to the structure of Galen's account, I had mentioned earlier that it took for its starting point a reference to Aristotle's description of the chambers of the heart mentioned above in which Aristotle claimed that the hearts of larger animals may possess three κοιλίαι while those of smaller ones possess one or two.⁴⁴⁷ This critique is

⁴⁴⁵ This translation is itself an interesting heuristic tool that both clarifies and obscures. Although "ventricles" accurately conveys the structures to which κοιλίαι refers, it also obscures the common Greek view of cardiac structure by implying an atrio-ventricular distinction that would have been alien the ancients. On a side point, Aristotle (and Galen) are correct that there are creatures that possess only one ventricle. These are generally cold-blooded, including amphibians and some reptiles (not, however, crocodiles or alligators). This fact, however, does not directly correlate with size.

⁴⁴⁶ On the controversy surrounding the chambers of the heart in Aristotle, see the overview provided by Harris (1973: 121-133). Briefly, there is no consensus on what to make of this puzzle. Solutions range from supposing that Aristotle was simply mistaken regarding the number of ventricles or was motivated by a need for a single source (ἀρχή) of blood and volition, to attempts to locate what his third chamber may have been.

⁴⁴⁷ See Garofalo (1991: 663 n.53) and references *contra* Singer (1956: 251 n.155), who believes that Galen's reference is to the number of vessels in the heart. Garofalo's reading that Galen's dispute with Aristotle is over the number of chambers in the heart rather than over coronary vessels seems right, "Galeno allude al numero di ventricoli non ai vasi come pensa Singer, nota 155." After all, the context both

flanked by language that emphasizes the importance of direct observation and the results of it, which to Galen are manifestly obvious,

It is better to examine (ἐπισκέπτεσθαι) these things, as I said earlier, once the heart has been removed from the animal, even more so in the case of a large animal. For [things] obtain similarly for all animals and there is no difference among them on account of size as Aristotle supposes (οἶεται). But, the sight (ἡ θέα) is more fully visible (σαφεστέρα) in large hearts.⁴⁴⁸

Throughout this brief segue into his digression on the heart bone, Galen contrasts what Aristotle supposes erroneously, implied by his use of οἶεται as it connotes error, with the much clearer appearance (ἡ θέα... σαφεστέρα) that one would get if one directly examined (ἐπισκέπτεσθαι) the heart itself. This sort of language is common in Galen, who frequently tells the reader that his claims are not only manifest to reason but also often visually manifest to those who possess the right sort of training and disposition.⁴⁴⁹

CLARITY OR 'ENAPTEIA

Galen's emphasis on visual language is hardly surprising given the role that perception, along with reason, plays for his epistemology as one of the two guarantors of

before and after this passage involves Aristotle's unusual claim that the heart in larger animals has three ventricles.

⁴⁴⁸ AA II 618, ἄπερ, ὡς ἔφην, ἄμεινον ἐξηρημένης τοῦ ζώου τῆς καρδίας ἐπισκέπτεσθαι, καὶ μᾶλλον ἐπὶ μεγάλου ζώου· πᾶσι μὲν γὰρ ὡσαύτως ὑπάρχει, μηδεμῶς διὰ μέγεθος ἐν αὐτοῖς γυγνομένης διαφορᾶς, ὡς Ἀριστοτέλης οἶεται. σαφεστέρα δ' ἡ θέα κατὰ τὰς μεγάλας ἐστὶ καρδίας. In passing it is worth drawing attention to what features Galen believes must be identical across kinds. For example, gross structural features (e.g., the number of cardiac chambers, the number of organs, the types of organs) must remain the same among animals analogous to human beings. Galen is less committed to the identity of material features across kinds (e.g. the material out of which a certain structure like the *os cordis* is constituted). This, at any rate, is the best explanation I can offer for the criteria by which Galen insists on sameness across kinds.

⁴⁴⁹ See, e.g., *Opt.Med.* I 53-63; I; *Protr.* I 1-39; *Lib.Prop.* XIX 9-10; *Ord.Lib.Prop.* XIX 49-54 *et passim*.

truth.⁴⁵⁰ For Galen, premises have to be manifest (ἐναργής) either to sensation or to reason. And so, by emphasizing both through his argument and through his pervasive use of verbs of perception, that, unlike his opponents, his own observations are clearly perceptible Galen advances his own position while undercutting theirs. I would like to emphasize here that, by his argument and his diction, I mean that in addition to the argument it expresses, Galen's choice of language presents a picture to the reader of how vision and sensation underwrite epistemic medical claims. That is, I am claiming that when Galen writes that the sight or image is clearer (σαφεστέρα δ' ἢ θέα) this visual language evokes the role that sensation plays in epistemic claims.

This contrast between what is not perceived and what is sensible and therefore manifest, in both senses of the word, is noticeable here when Galen says what Aristotle believes (οἶεται) versus what he himself describes as the clear facts presented to an eyewitness of a heart separated from the body. It underscores the overall trajectory of Galen's digression on the *os cordis*. That is, Galen, as I will bring out shortly, presents the heart bone case as an example of how epistemic anatomical claims should take their warrant from careful empirical observation, observations which by Galen's lights Aristotle has clearly failed to make or at least make properly. Moreover, by holding up to observational criticism Aristotle's account of cardiac chambers as scaling in number proportionately to the size of animals, Galen also undercuts one of his *bêtes noires*,

⁴⁵⁰ See, e.g., *Opt.Doc.* I 48-9; *Temp.* I 590; *PHP* V 722-3; *MM* X 36-7; *HNH* XV 152 *et passim*.

Peripatetic and Stoic cardiocentrism.⁴⁵¹ How can one be confident, after all, in Peripatetic claims about the sovereign role of the heart if their observations about its basic anatomy are transparently false?

THE *OS CORDIS* IN GALEN, PERSONAL ANECDOTE

Galen's account of the heart bone, which is very difficult to explain if taken as simply a case study in dissection, is just such an example of the role that exaggeration and even invention can play in Galen's development of philosophical and medical points. The technical treatise is a genre of the observer, with no exact ancient equivalent. And, while a modern reader might have certain expectations about literature written about subjects considered technical, there is no obvious reason to suppose that Galen or his contemporaries would have had similar expectations. In fact, economy of speech, standardness of style, the avoidance of anecdote and personal commentary are not pervasive features of ancient medical treatises and certainly not of the Galenic corpus, even in procedural descriptions.⁴⁵²

The general point of Galen's digression is to reiterate a frequent complaint of his against the practice of rival physicians. He laments that, too often, physicians make claims without recourse to observation. For him these physicians are alternately

⁴⁵¹ This debate occupies Galen throughout his corpus. In particular, he devotes most of his treatise, *PHP* to a defense of encephalocentrism, as he ascribes it to Plato and Hippocrates, against the cardiocentrism of the Stoics and Peripatetics. For his experiment on the recurrent laryngeal nerve, which is intended to show that the brain is the source of volition rather than the heart, see *Praen.* XIV.625-630; *UP* III 570-585; IV 278-281; *AA* XI 101-109, 131-134, 255-269; cf. *AA* II 661-90 for the related experiment involving the destruction or ligation of the intercostal nerves. Walsh (1926), on Galen and the recurrent laryngeal nerve remains useful. For recent discussions of the debate between encephalocentrists and cardiocentrists, see Hankinson (1991); Tieleman (1996: 38-65).

⁴⁵² On these points, see von Staden (1994a); Hine (2009); and Nutton (2009).

unobserving or unobservant, depending on whether Galen has it in mind to characterize them as incompetent or uncommitted to observation as a fundamental criterion for epistemic claims. Consequently, on the grounds that they do not base their claims on a firm foundation of empirical examination (πεῖρα),⁴⁵³ Galen criticizes these sorts of physicians, whom he calls armchair physicians or physicians in name only (λογίατροι), as prone to reckless generalizations about medical and anatomical matters.⁴⁵⁴

The language with which Galen recounts the elephant anecdote is markedly different from the language he uses elsewhere in *AA*, where he describes procedures more generally. The anecdote begins, for example, with a break from the generic second person narrative that dominates book 7 up to that point where Galen pivots from the claim that inexperienced anatomists cannot see minute structures since they cannot see them even in larger creatures. Galen's answer to a question put into the voice of the reader, "larger do I say?,"⁴⁵⁵ introduces a series of expressions that place the reader in a situational context, which is largely absent from the otherwise situationally neutral narrative surrounding it.

⁴⁵³ The word πεῖρα should not necessarily be taken to consist in something like experimentation or a well-defined form of trial, although the word is often generically translated as "test," "trial," or "experiment." All three of these translations can suggest a degree of standardization and rigor that is misleading. Even a cursory look at the LSJ entry for πεῖρα gives a sense of its breadth. See, in particular LSJ I.1-2 for its range of expression regarding experience.

⁴⁵⁴ The vivid word λογίατρος is only attested six times in the Greek corpus. All six of these instances appear in the Galenic corpus (*Lib.Prop.* XIX 15, *MM* X 582, *Purg.Med.Fac.* XI 339, *HNH* XV 159, and twice in *Hipp.Prog.* XIII B 258). It is doubtful that this word is a Galenic coinage, however, as the abstract noun, λογιατρεία, is a *hapax legomenon* already attested in Philo of Alexandria (*De congressu eruditionis gratia* 53.2). It is telling, however, that this λογιατρεία is found in the context of Roman medical charlatans.

⁴⁵⁵ *AA* II 619, καὶ τί λέγω μείζω;

Galen's general narrative involves second person address and even detailed directions to the reader, as if present. The narrative lacks time, place, and situational context. The heart bone anecdote, on the other hand, not only breaks sharply with the preceding narrative from its inception but also places the reader in a time (ἔναγχος) and place (ἐν Ρώμῃ) immediately afterwards. Galen places himself in that context as a character in the anecdote as well as its narrator, relaying to the reader what he says to the doctors present rather than addressing the reader directly as he does elsewhere.

The narrative mirrors the claims he makes earlier. But rather than restating them, it demonstrates those claims through the unfolding events of the anecdote. The right sort of philosophical training is necessary for doctors, as is demonstrated by Galen's belief, at that time, that the elephant would possess a heart bone before it was examined. Lack of training results in an otherwise avoidable failure to make anatomical observations, as Galen and his associates easily find the heart bone with their fingers while the other doctors present gape blindly. Unlike other anecdotes, in this one Galen's *hetairoi* persuade him not to compete with his rivals and finally he demurs. The demonstration is left for the reader. After the heart is taken away by Caesar's cooks, the heart and its heart bone is laid open on a table, now available for all to see. Both are found both through Galen's philosophical training and observational skill. As a coda to the anecdote, Galen exclaims that passersby who now look on the bone are mystified that anyone could have been so insensate so as to have missed this immense structure to begin with. And, with that, Galen redirects the reader to the contextually neutral narrative that otherwise dominates AA.

Conclusion

The purpose of this dissertation has been to consider different modes of explanation in the work of Galen of Pergamum, in particular anatomical explanation and the explanatory role that anatomical episodes play in Galen's presentation of his theoretical commitments. To that end, I have questioned the use of the generic lens through which Galen's anatomical writing is often read, as "technical treatises". In light of the fact that the technical treatise was not an ancient genre of writing, I have argued that it is anachronistic to judge Galen's work on subjects associated with the genre of technical treatises by generic norms that would not have been meaningful in an ancient context. This reading of Galen's anatomical work has led to an evaluation of certain anatomical episodes as medical artifacts or as steps in the progression of the history of medicine. I have tried to show that Galen's anatomical work, even where it appears most neutral, retains a great deal of the agonistic structure that pervades medical writing in the Greco-Roman world. His use of anatomical episodes as pieces in an agonistic contest is not surprising given Galen's repeated calls for an empirically grounded theoretical framework for medicine, which straddles the methodological divide between the Empiricists and Dogmatists of his day.

In chapter two, I laid out the terms of the epistemological debate between Empiricists and Dogmatists. In particular, I pointed to the controversial role that anatomy played in their epistemic medical claims. The focus of chapter one was to reconsider Galen's injunction that medical proofs must proceed, when possible, as geometric proofs do. Traditionally, this injunction and Galen's frequent comments about how geometry

saved him from becoming an unrepentant skeptic have been interpreted as references to proof in a *more geometrico* or by way of the axiomatic-deductive system, whose invention is often attributed to the ancient Greeks. I argued that this interpretation may incompletely account for Galen's interest in geometry as a model for medical claims. I adduced the context for many of these references to geometry as well as the practice of land surveyance, *geometria*, in order to argue that Galen also intends to base medicine in principles abstracted specifically from empirical observation, in the way that ancient geometry purported to abstract spatial relations from observations in the real world.

In chapter three I tracked some of the polemic structure in Galen's anatomical writing. There I made the case that Galen's anatomical writing acts as a surrogate for participation in anatomical demonstrations, placing the reader beside Galen as a practitioner through its frequent use of second person address and deictic language, such as spatio-temporal adverbs, particles, and visual language. I discussed how anatomical procedures and their transmission textually function as an effective credentialing device in a world where formal credentialing did not exist. Finally, in chapter three I introduced Petit's use of discourse markers as a heuristic tool for examining certain unusual anatomical episodes in Galen's *De Anatomicis Administrationibus*.

These episodes formed the main thrust of chapter four, in which I consider Galen's various references to elephantine anatomy. These episodes, I argue, are but for the points at which Galen puts polemical pressure largely derivative on other authors' accounts of the elephant. Rather than see Galen's use of the elephant as dishonest fabrication, it is worthwhile to consider them as correctives through which he inveighs

directly against contemporary rivals and indirectly against his predecessors, in the vein of Lonie's 1964 article on Erasistratus and Aristotle.

In this last chapter, I show that these episodes involving the elephant are not only agonistic in nature but are also marked, in the case of the *os cordis* episode, by deictic features that set them aside from the surrounding anatomical narrative. The point of this demarcation, I conclude, is to signpost that the episodes are capstones intended to communicate biological and medical principles abstracted from the preceding narrative. So, for example, the *os cordis* functions as an *exemplum* of the importance of anatomical research, the unreliability of cardiocentric theorists, and the anatomical inadequacies of Aristotle and second century Stoics and Peripatetics. I have argued that these episodes are of a piece and that their direct targets and, in von Staden's coinage "surrogate targets" can be tracked in the local textual context and, in cases where the episodes recur in Galen's work, in their global textual context. The upshot of this investigation has been to show that Galen engages in sophisticated polemic argumentation in his anatomical treatises and to examine how he does so. The episodes I have carefully considered mostly come from AA chapter 7, which contains a series of further capstone episodes targeting Erasistrateans. It remains to consider the structure of those episodes as well as Galen's use of anatomical accounts elsewhere in his corpus.

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Vita

Luis Alejandro Salas was born in Miami, Florida. He enrolled at St. John's College in Annapolis, Maryland in the fall of 1994 where he majored in Philosophy and the History of Mathematics and Science; he earned his B.A. in Liberal Arts there in 1998. He later earned an M.A. in Classics at Rutgers, The State University of New Jersey in 2003. Then he enrolled at The University of Texas at Austin, where he earned an M.A. in Philosophy in 2012. Far more importantly, he is the father of a happy, talkative, and inquisitive little girl as well as the husband to an incomparable wife. He was also at one time a well-practiced dancer.

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This dissertation was typed by Luis Alejandro Salas.