Introduction

I.1 The "Cosmological Doctors"

On the broadest possible application of the term, we all engage in "cosmology" whenever we step back from the world of everyday experience to talk about what is real, permanent, and universal. When Pericles tells the Athenian assembly that their power may one day diminish, "for all things naturally depreciate" (πάντα γὰρ πέφυκε καὶ ἐλασσοῦσθαι, Th. 2.64.3), or when the Athenians inform the Melians that they will not relent, for the stronger rule the weaker "on all occasions by a natural necessity" (διὰ παντὸς ὑπὸ φύσεως ἀναγκαίας, Th. 5.105.2), these speakers offer "cosmological" explanations in the sense that they account for specific actions or events by appealing to the operation of universal laws. In these two examples, the fall of the Athenian empire and the invasion of Melos are historically defined events, confined to a specific point in time, but they are governed by principles that hold true διὰ παντός (at all times and in all places). The principles underlying these events are "cosmological" in the sense that they present the world as a cosmos, a natural order that is both consistent and universal. The cosmologist observes the orderly progression of nature – the rising and setting of the sun, the waxing and waning of the moon, the changes in the seasons, the rotation of the heavens – and extrapolates from these a more general assumption that all things form part of a natural order, which governs both the world around us and, by implication, our own interactions with that world.

The following study concerns a group of physicians I will call, for lack of a better term, "cosmological doctors." These doctors all lived in the Greek-speaking world during the fifth and fourth centuries BCE. What defines them as "cosmologists" is their attempt to base the art of healing on the first principles of all things in general. The precise nature of their first principles varied greatly depending on the author. Some of these doctors focused on the material elements from which all things are composed. Others

emphasized the fundamental "powers" (δυνάμεις) that govern all things. Many isolated the general patterns that can be found in all corners of the universe, drawing analogies between the macrocosm of the universe and the microcosm of the human body. What unites these thinkers is not the identity of their first principles but their emphasis on the *universality* of such principles. These doctors isolated principles that govern all things in general, and they applied those principles to the everyday practice of treating and preventing disease.[1]

For most students of Greek literature, the best-known example of a "cosmological doctor" is the physician Eryximachus. His speech in Plato's *Symposium* defines *eros* ("love") as a universal power, present "in the bodies of all animals, in the things that grow in the earth, and in practically all that is" (ὡς ἔπος εἰπεῖν ἐν πᾶσι τοῖς οὖσι, 186a). In support of this thesis, Eryximachus constructs what amounts to an argument by induction. He compares the role of *eros* in six crafts (medicine, gymnastics, agriculture, music, astronomy, and divination) in order to show that this principle "extends over everything, both human and divine" (186b) and "has a great, a strong, nay an absolute power" (188d). The Hippocratic treatise *On Breaths* describes *pneuma* ("breath, wind") in similar terms. *Pneuma* is "the greatest potentate in the universe and over the universe" (μέγιστος ἐν τοῖσι πᾶσι τῶν πάντων δυνάστης, 3.2, 6.94 L.), and it is also the "starting point and source" (ἀρχὴ καὶ πηγή, 1.4, 6.92 L.) of all diseases in the sick. *On Regimen* asserts that all animals, including humans, are composed of fire and water. Fire has the "power" (δύναμις) to move all things, water the power to nourish all things, and these two substances are "sufficient in themselves, both for each other and for everything else" (αὐτάρκεά ἐστι τοῖσί τε ἄλλοισι πᾶσι καὶ ἀλλήλοισιν, 3.1, 6.472 L.). Another text, *On Flesh*, presents anatomy in a framework of anthropogony. It begins by dividing the cosmos into the hot, the cold, and the wet, and it then explains how each part of the body, with the aid of the "fatty" (τὸ λιπαρόν) and the "glutinous" (τὸ κολλῶδες), arose from these three substances. Then there is the *Anonymus Londiniensis*, a first-century papyrus that summarizes earlier medical theories, which mentions several Greek doctors with an interest in cosmology. To cite just one example, Philistion of Locri is said to have held that humans are composed of four "forms" (ἰδέαι): fire, air, water, and earth. To each of these forms he

[1] Of course, it is impossible to know whether all the figures I call "cosmological doctors" were *personally* engaged in the treatment of patients. For the sake of this study, I will use the terms "doctor" and "physician" very loosely to refer to anyone who presents the treatment and prevention of disease as their primary field of interest.

assigned a "power" (δύναμις). To fire he assigned the hot, to air the cold, to water the wet, and to earth the dry (XX.25–37).[2]

This list could be expanded with other known cosmological doctors: figures such as Petron of Aegina, the unnamed opponents of *On Ancient Medicine*, and Polybus of Cos (the presumptive author of the treatise *On the Nature of the Human Being*). Together, they suggest that the Classical period was a time when many Greek doctors were interested in cosmology. It was a time when medical writers were attempting to base the art of healing on a limited number of principles, generalized to the highest possible degree, while asserting that the same "powers" (δυνάμεις) that govern the universe in its entirety are also the "starting point" (ἀρχή) of all changes in the body. As the author of *On Ancient Medicine* succinctly notes, many doctors in this period were attempting to speak or write about medicine "after laying down a foundation for their account" (ὑπόθεσιν αὐτοὶ ἑωυτοῖσιν ὑποθέμενοι τῷ λόγῳ, I.1, 1.570 L.). They were "narrowing down the starting point of the cause [τὴν ἀρχὴν τῆς αἰτίης] of diseases and death for human beings," and making that starting point "the same for all," setting up "one or two" principles like "the hot, the cold, the wet, the dry – or whatever else they please" (I.1, 1.570 L.).

One of the goals of this study is to understand how these cosmological doctors came to be. What led them to adopt such universalizing theories, and what can their theories tell us about the priorities of Greek doctors in the fifth and fourth centuries BCE? These questions are not easy to answer, primarily because the intermixture of medicine with cosmology cannot be attributed to any single, centralized authority. There was no "school" of cosmological medicine, no one thinker to whom all of these doctors were responding. Nowadays, most would agree that an important role was played by the "inquiry into nature" (περὶ φύσεως ἱστορία), the tradition of cosmological speculation that is commonly said to have begun with Thales, Anaximander, and Anaximenes of Miletus in the sixth century BCE. It is now generally agreed that this tradition lent authority and inspiration to the cosmological doctors. The precise nature of its contribution, however, has never been clearly defined.[3]

[2] Such, at least, is the doxographical report. My own reservations about this report can be found in Chapter 1.

[3] The phrase "inquiry into nature" comes from Plato (*Phd.* 96a; cf. *Ly.* 214a–b, *Prt.* 315c, *Phlb.* 59a, *Ti.* 47a), although echoes of this expression can be found in other texts from the Classical period (e.g., Heraclit. DK 22 B123, Emp. DK 31 B110.5, Philol. DK 44 B1, B6, Archyt. DK 47 B1, Critias DK 88 B19.2, E. fr. 910 K, *Dialex.* 8.1, and X. *Mem.* I.1.11, I.1.14). On the cosmological scope of these inquiries, see Long (1999) and Laks (2006: 6–12), both of whom argue that a common goal of these

I.2 Medicine and Philosophy?

In previous treatments of the cosmological doctors, scholars have tended to begin with the framework of medicine's interactions with "philosophy." Under this rubric, the cosmological doctors are presented as either aspiring participants in the "inquiry into nature" or as passive recipients of philosophy's spreading influence. In the third volume of his *Paideia: The Ideals of Greek Culture*, Jaeger (1944: 4–16) exemplifies this approach when he describes a three-stage process of mutual influence between medicine and philosophy: first, philosophy influenced medicine, then medicine philosophy, and finally philosophy and medicine fell in danger of being confused. "It was entirely natural," Jaeger concludes, "that, when the great concepts of natural philosophy were taken over into medicine, its cosmological ideas should enter along with them and disturb men's minds." Jaeger's characterization of cosmology as something that "entered into" medicine can be found in numerous accounts of the cosmological doctors. It has its roots in a modern tendency to distinguish "medicine" from "philosophy," to separate "empirical" doctors, the supposed forerunners of positive science, from their more ambitious, "philosophical" colleagues. As one commentator writes in reference to *On Flesh*, "it is difficult to see that π. σαρκῶν is typically a 'medical' treatise, in spite of its self-description in its first sentence. It is certainly not concerned practically with medicine."[4] Another says of *On Regimen* and *On Flesh* that they were written by "a new type of doctor, a very attractive type, because he tries to achieve *avant la lettre* a kind of symbiosis between positive science and philosophical thought."[5] Many historians have described the cosmological doctors as sophists, "health experts" – anything but real doctors.[6] They were "under the influence of philosophy," following its lead "to so great a degree as to interfere with and destroy the positive scientific outlook."[7] In other words, the cosmological doctors were not just nonmedical; they were *antithetical* to medicine. Jones captures this sentiment when he writes that "During the

investigations was to provide a comprehensive account of "the totality of things" (τὰ πάντα). Sometimes, these inquiries were also associated with the word *kosmos*, the "order" that structures the world in which we live (cf. E. fr. 910 K, X. *Mem.* 1.1.11, Pl. *Grg.* 508a, *Ti.* 27a, and *Phlb.* 29e), although there is disagreement over the precise point at which the word *kosmos* came to mean not just "order" but a "world-order" (for which see Horky 2019). In this study, the phrase "inquiry into nature" will function as a shorthand for all cosmological speculations *except* those produced by the cosmological doctors. It should be stressed, however, that my use of such terminology is primarily a matter of convenience. No sense of unity, differentiation, or self-awareness should be presupposed in my employment of this phrase.

[4] Peck (1936: 62). [5] Bourgey (1953: 124). [6] For the term "health expert," see pp. 206–207.
[7] Miller (1949: 314).

fifth century B.C. philosophy made a determined effort to bring medicine within the sphere of its influence. . . . Medicine was here face to face with a deadly enemy."[8]

More recently, scholars have moved away from this narrative of a single, true "medicine" struggling against its enemies. Instead, it has been pointed out that "medicine" and "philosophy" were fluid concepts in the Classical period, and that any boundary between these two disciplines was liable to be crossed by doctors and philosophers alike.[9] In some cases, we see this overlap between "medicine" and "philosophy" explicitly mentioned in Classical Greek literature. In the *Phaedo*, Plato cites investigations into human physiology as an integral part of the "inquiry into nature" (96a–c). Elsewhere, he refers to Egyptians who study "everything concerning the cosmos down to divination and the art of healing that aims at health" (*Ti.* 24b–c). Aristotle twice notes that investigations "concerning nature" should conclude with the first principles of health and disease, while the best doctors tend to begin their inquiries with first principles derived from philosophy (*Sens.* 436a17–b1, *Resp.* 480b21–30). In *On Ancient Medicine*, the author complains about certain doctors and "sophists" who speculate about the fundamental constitution of human beings (20.1, 1.620 L.). Such speculations, he asserts, are not relevant to medicine but rather "tend towards philosophy, just like Empedocles or others who have written, concerning nature, what a human being is from the beginning, how it originally came to be, and from what it was compounded." By arguing for a clear demarcation between medicine and "philosophy," the author of *On Ancient Medicine* reinforces the idea that, at the time of his writing, such a demarcation did not yet exist. Anyone could give a speech, participate in a debate, or disseminate a text about "nature" (φύσις). The intended audience of such a contribution included both medical practitioners and educated laymen, who were in turn expected to develop their own opinions on whatever was being discussed.

[8] Jones (1923b: xlv). For further designations of philosophy as an "enemy" of medicine, see Jones (1923a: xxiv, 1946: 23–25), Longrigg (1963: 150–155, 2001: 29–33), Ducatillon (1977: 89), and Thivel (1981: 145, 254). Jouanna (1999: 259) picks up on this language of opposition when he writes that "the debate over medicine and philosophy is at the very heart of the Hippocratic Collection as a whole" and that "the essential problem of method that was debated had to do with the relation of medicine to philosophy." Note also Vegetti's (1976: 11) description of *On Regimen* as a work "of non-Hippocratic inspiration" and Mansfeld's (1980a: 347) assertion that "a consistently cosmological brand of medicine is to be found only in marginal treatises of the *Corpus*" – both attempts to separate the cosmological doctors from more "professional" experts in health and disease.

[9] Thivel (1983: 221), Orelli (1998), Craik (1998: 2–3, 2015: xviii, 2018: 218–219), Lloyd (2002), Agge (2004: 13), Nutton (2004: 44), van der Eijk (2005a: 8–14, 2018: 304–307), and Laks and Most (2016b: 298–299). An early expression of this point can already be found in Heidel (1914: 153).

This "fluid-boundary" explanation for the cosmological doctors stresses the sheer openness of intellectual discourse in the Classical period. It explains why Greek doctors were *permitted* to speculate about the cosmos, but it does little to clarify the precise origins, motivations, and methods of the doctors who sought out the first principles of all things. Even if we say that the Classical period saw no clear demarcation between "medicine" and "philosophy," we do little to challenge the modern assumption that "philosophy" is still the most appropriate label for defining cosmological thinking. To cite one recent example, Bartoš (2015) provides one of the most sensible analyses of a cosmological doctor to have appeared in modern scholarship. However, even he separates the "medical" and "philosophical" interests of his subject, observing that the author of *On Regimen*'s "elemental theory may seem obsolete from the dietetic and medical point of view ... but regarding the tradition of philosophical inquiries into nature, it is an appropriate device for explaining natural processes" (98–99). For most historians of ancient thought, "philosophy" remains the preferred category for approaching the systems of the cosmological doctors. The upshot, of course, is that when these doctors are said to combine medicine with "philosophy," it is still generally supposed that they are either undermining the former for the sake of the latter or else creating an amalgam in which the "philosophical" elements can easily be separated from the "medical."

For my part, I prefer to avoid any reference to the cosmological doctors as practicing a "philosophical" brand of medicine. I do not object to this term on the ground that these physicians should not qualify as "philosophers." Instead, I wish to stress that an equation between "cosmology" and "philosophy" oversimplifies what it means to investigate first principles. On the one hand, many participants in the inquiry into nature were devoted cosmologists, by which I mean their primary objective was to understand and describe the universe as a whole. However, cosmology can also be a framework for organizing and explaining *other* sciences, a mode of high-level thinking that elucidates phenomena by referring to the fundamental nature of all things. A doctor might take some principle from his clinical experience (e.g., hot compresses draw fluids from the body), compare that principle with other, nonclinical phenomena (e.g., the sun draws water from the sea), and further generalize it so that it applies not merely to the body but to the universe as a whole (e.g., heat attracts all fluids). If the doctor then applies this new principle to other, related aspects of clinical decision-making, we would say that he is thinking in

"cosmological" terms. That does not mean, however, that the doctor has necessarily departed from a specifically "medical" mode of thought.

By equating cosmology with "philosophy" and by assuming that cosmological speculations are the exclusive purview of "philosophers," we run the risk of ignoring what the doctors themselves might have brought to the table. Furthermore, if we assume that cosmology was simply imported into medicine, we are forced to choose between several unsatisfactory explanations for how the cosmological doctors came to be. It has often been asserted, for example, that the introduction of cosmology into medicine was *unavoidable* given the influence of the inquiry into nature. According to Festugière (1948: xix), "It was inevitable that the physicians of Ionia, in their investigation of the cause of the evils which afflict human nature, would have recourse to the theories elaborated by their compatriots concerning universal Nature." Similarly, Lonie (1981: 56) writes that "Greek speculative medicine could hardly avoid being governed, to a very large extent indeed, by the concepts and the categories of pre-Socratic philosophy," implying that this movement was so transformative that Greek doctors could not help but be swept along with it. Some have attributed the entire phenomenon of cosmological medicine to the influence of one or more participants in the inquiry into nature. In these studies, one commonly finds references to supposed "schools" of cosmological medicine, whether they are Empedocles's "Sicilian school" or even the "Eleatic school" of Parmenides and his followers.[10] It has also been popular to attribute the beginning of cosmological medicine to Alcmaeon of Croton, a shadowy figure who is sometimes presumed to have invented the definition of health as the balance between pairs of opposing powers.[11] One problem with such great-man narratives, of course, is that the works of the cosmological doctors contain widely disparate opinions about the nature of

[10] On the "Sicilian school" of medicine, sometimes also labeled the "Italian" or "West Greek" school to incorporate the Pythagoreans of southern Italy, see Wellmann (1901), Burnet (1930: 200–202), Diller (1938), Bidez and Leboucq (1944), Jones (1946: 10–13), Vegetti (1976: 43–45), Gourevitch (1989), Longrigg (1993: 104–148, 2001: 35–36), Michler (2003), Barton (2005), Sisko (2006), and Primavesi (2009). For the supposed "Eleatic" origin of tracing all diseases back to a single cause, see Littré (1839, vol. 1: 559), followed by Kühn (1956: 33n1); note also Thivel (1981, 1992), who attempts to distinguish a "West Greek" (i.e., Eleatic, Pythagorean, Empedoclean) group of doctors from those who adopted an "Ionian" outlook. On the assignment of the cosmological doctors to the "Cnidian school" of medicine, a debunked categorization once advocated by scholars such as Ilberg (1894), Gomperz (1901: 285–288), and Rey (1946: 420–444), see the bibliographical survey of Thivel (1981: 58–63, 86n233, 154–155).

[11] See Jones (1923a: xi, 1946: 3–6), Wellmann (1929, 1930: 301–302), Kahn (1960: 190), Kudlien (1970: 4–5), Mudry (1982: 60), Longrigg (1993: 48), Jouanna (1999: 262), and Cruse (2004: 34). The one testimony that reports Alcmaeon's definition of health (quoted on p. 36) never actually says that he was the first person to hold this view.

the universe. If these doctors were simply followers of this or that cosmologist, we would expect their systems to have many more details in common. At the very least, we would expect them to engage in similar *forms* of cosmological thinking, but whereas some of these doctors focused on the material elements from which all things are composed, others simply speculated about the fundamental forces that have more "power" than anything else.

Some have suggested that the works of the cosmological doctors were influenced by Zoroastrianism or the Ayurvedic healers of ancient India.[12] These suggestions, like other attempts to emphasize the influence of outside thinkers, are worthy of investigation when limited to particular details, but when they are used to explain entire systems, or even, in some instances, the entire phenomenon of cosmological medicine, they feed into a more general tendency to view cosmological medicine as somehow aberrant and therefore only explicable by pointing to some external origin. Götze (1923: 79) justifies the supposed Zoroastrian origin of *On Sevens* (another work by a cosmological doctor) by observing that this text is "an erratic block in Hellas." West (1971: 385–388), by contrast, stresses that *On Sevens* is "far from being an erratic block," being "put together from parts that very obviously belong in a known tradition of speculation."[13] West further adds that "In approaching the question of non-Greek material . . . we should not think in terms of any direct influence upon the work before us, but at most of the absorption of such material into a certain current of Greek thought at an earlier period." Like other Greek thinkers from the Classical period, the cosmological doctors speculated about the universe in ways that have certain echoes in other cultures. That does not mean, however, that the entire phenomenon of cosmological medicine can be explained by simply pointing to these parallels. Even if we presume the transference of some ideas from one culture to the next, we would still need to explain the conditions that made these ideas attractive to Greek-speaking healers of the fifth and fourth centuries BCE.

Other attempts to explain the cosmological doctors have simply listed all the benefits that come from cosmology: it is comprehensive, precise, persuasive, easy to teach, distinguishes one doctor from another, and so

[12] For example, Götze (1923), Ilberg (1925: 6), van der Eijk (2004), Craik (2015: xxxi), and Matsui and Cornelli (2017: 30n19).

[13] On this point, see already Wellmann (1933) and Kranz (1938), both of whom stress the many parallels between *On Sevens* and other Greek descriptions of the cosmos. Compare also Duchesne-Guillemin (1956).

on. Building off of statements from *On Ancient Medicine*, Schiefsky (2005) endorses all of these points while further suggesting that the cosmological doctors could have been responding to outside criticisms that the "art" of medicine does not actually exist, which spurred them to give medicine the "starting point" (ἀρχή) and "method" (ὁδός) that would make it qualify as a genuine "craft" (τέχνη). As we will see, such concern for medicine's status and methods was certainly a contributing factor to the rise of the cosmological doctors. However, a more precise explanation is needed to account for why these doctors would have taken their "starting points" all the way to cosmological principles. As for the idea that cosmology distinguishes one doctor from another, this explanation has been especially popular in modern scholarship, fostered by a heightened interest in the medical marketplace and in the physician's basic need to persuade.[14] I find it difficult, however, to understand how a full-blown cosmology is more persuasive than, say, a detailed theory of human physiology, especially since cosmological principles were notoriously susceptible to differing interpretations and were therefore viewed with suspicion by many people in the Classical period. Cosmologists were parodied in comedy, accused of impiety, and ridiculed for speculating about matters that were invisible, irrelevant, and ultimately irresolvable. If the cosmological doctors were simply looking for more students, more patients, or a higher place in society, why would they select such a controversial framework as "the things on high and under the earth" for presenting their views on disease? It is of course possible, even likely, that the cosmological doctors were interested in propping up both their own reputations and the reputation of their art. Before we factor in such social pressures, however, we need to understand why these doctors considered cosmological principles a viable option in the first place.[15]

The greatest shortcoming in all of these explanations is that they can be made with little knowledge of early Greek medical thought. In fact, they all treat medicine as a blank slate upon which new systems could be imposed. Medicine, of course, was not a blank slate. Greek doctors had their own traditional views on the etiology of disease, and they engaged in elaborate programs of medical inquiry in which they categorized phenomena in terms of commonalities and differences,

[14] For a discussion that emphasizes this explanation, see Chang (2008).

[15] A fuller rebuttal of this explanation will be offered in Chapter 4, where we will further see that many cosmological doctors actually sought to limit the extent to which they speculated about "the things on high" – an observation that does not lend itself well to the claim that these doctors engaged in cosmology primarily because they wanted to impress their patients.

universals and particulars at the same time that they speculated about the universe as a whole. To the best of my knowledge, no one has ever investigated how these preexisting theories and methods of inquiry may have contributed to the rise of cosmological doctors. In our haste to drive a wedge between medicine and "philosophy," we have awkwardly separated the cosmological doctors from the rest of the medical tradition.

I.3 The Scope of This Study

In this study, I will examine the cosmological doctors from a medical point of view. In particular, I will argue that if we want to understand how this phenomenon came to be, we need to consider the changing priorities of medical thinking in the fifth and fourth centuries BCE. By taking this approach, I do not intend to minimize or otherwise downplay the influence of the inquiry into nature on the cosmological doctors. Without a preexisting tradition of cosmological speculation, it is highly unlikely that this development would have ever taken shape. What I am stressing in this study is not that we should completely separate the cosmological doctors from other thinkers who inquired into the nature of all things. Rather, I intend to show that a simple gesture toward the inquiry into nature is insufficient for explaining how these doctors came to be.[16] In recent years, the monolithic edifice of "Presocratic philosophy" has given way to more specialized inquiries into the motivations and methods of individual thinkers. As a result, we are better able to understand how cosmological speculations were not simply a back-and-forth dialectic between self-identified "philosophers" but a multivalent mode of thinking that found reflection in many corners of Greek culture, a phenomenon that involved some fierce intellectual exchanges, to be sure, but that also needs to be placed within a broader range of social, religious, and cultural contexts. This study is a further step in the direction of complicating the old streamlined understanding of the inquiry into nature. It is not an investigation of medicine and philosophy but an exploration of what the cosmos meant to Greek doctors in the fifth and fourth centuries BCE. Along the way, I will of course have many opportunities to draw connections between the cosmological doctors and other thinkers who speculated

[16] On the need to take care when discussing lines of influence between the inquiry into nature and Greek medical texts, see Heidel (1914: 152–154), Jouanna (1992), Orelli (1998), Laks (1998, 2008: 260–262), and Schiefsky (2005: 2–3, 46–55).