Introduction

In this introduction, I start with a brief description of the structure of the Stoic cosmos that explains how it differs from other cosmic systems in Antiquity. I then describe the main goal of the book and some of the general methodological principles that I follow. Finally, I offer a synopsis of the argument that unifies it.

I.1 The Stoic Cosmos and Other Cosmic Systems in Antiquity

The Stoic cosmos (κόσμος) is a spherical system surrounded by an infinite void. It includes the Earth at its center, made of water and earth, the layer of air that surrounds it and represents its atmosphere, and the larger layer of fire that surrounds the atmosphere and constitutes the heavens. These are inhabited by the planets, including the moon and the sun, and further away by the stars. All celestial bodies are entirely made of a substance named 'ether' (αἰθήρ), a rarefied type of fire that is normally present only in the heavens.[1] The moon marks off the limit between the Earth's atmospheric layer of air and the large layer of ether. The division between the 'sublunary' and the 'supralunary' regions is, therefore, an important one: it separates two materially different realms, even though the two regions interact with one another as we shall see further along, especially in Chapters 1, 2, and 4. In this vein, Sedley offers the following description of the Stoic cosmos: 'Our "world" (kosmos) was seen as a unified structure, with the earth at the centre and/or bottom, strata of water and air above or surrounding it, and the whole ensemble bounded by a spherical rotating outer layer, the fiery heaven.'[2]

[1] See **T1b** in Chapter 1 as well as *SVF* 2.327, 436, 579, 580, 619, 634, 642, 664, 821, and 1050. Earlier uses of the term to denote a form of fire are attested for Anaxagoras (*DK* 59A43 and **T4f** in Chapter 3) and Diogenes of Apollonia (*DK* 64A13). I return to the place, nature, and role of Stoic ether in Section 2.2.

[2] Sedley 2019.

The use of the Greek term κόσμος to denote cosmic order was not invented by the Stoics. It is present, for instance, in earlier physicists such as Anaximander, Heraclitus, and Pythagoras, and also in Plato and Aristotle.[3] In many – though not all – of them, it refers specifically to a geocentric system. There are in fact several similarities between the Stoic cosmos and other geocentric systems of Antiquity. The Aristotelian cosmos, for example, is also divided into a sublunary region containing the Earth and its atmosphere and a supralunary region inhabited by the planets and the stars. And Aristotle's supralunary region is also made of a substance called 'ether' (αἰθήρ). But Aristotelian ether is unlike Stoic ether. For it is not a type of fire but a fifth element totally irreducible to the four sublunary elements.[4] The term 'ether' had also been used by Plato in connection with the matter of the supralunary region. In Plato, it does not refer to some irreducible substance, as in Aristotle, but to a thin form of air.[5] Thus, Stoic ether is closer to Platonic ether even though the Stoics also depart from Plato in holding that ether is not a form of air but of fire. However, there are also other differences, fundamental ones, between the Stoic and the Platonic cosmos and indeed between the Stoic cosmos and any other geocentric system in Antiquity. The most salient difference – the subject of the present book – is that in Stoic cosmology the present cosmos is periodically destroyed and restored. The interruption is due to a 'conflagration' (ἐκπύρωσις), a great fire that completely consumes the sublunary region. This conflagration has its origin in the heavens. It occurs when celestial fire, having consumed all the water from the sublunary region, descends from the heavens, spreads out over the sublunary cosmos, and burns it up completely. At this point, the whole cosmos becomes a large mass of fire that burns until all combustible matter is exhausted. Once the conflagration is over, a new cosmic order is birthed that is identical to the present one. This process is meant to be endless. For the new order is also bound to be destroyed by a conflagration, followed by a new cosmogony and so on *ad vitam aeternam*. In fact, this endless recurrence is also beginningless: it has been ongoing all along from eternity. The present cosmic order is nothing but the repetition of an identical one that has been periodically destroyed and restored infinitely many times in the past.

If we look at the Stoic cosmos from this particular angle, it is easy to realize why it is unique in ancient Greek philosophy. This is best

[3] For a detailed discussion of modern scholarship regarding this question, see Horky 2019b.
[4] See Section 3.4. [5] Cf. *Phd.* 111b5 and *Tim.* 58d2.

appreciated when we compare it with the Platonic and the Aristotelian models in connection with cosmic generation and destruction. As in Stoicism, the Platonic cosmos is generated (at least on a literal reading of the *Timaeus*).[6] But in contrast with it, it is indestructible since there is no cause either internal or external for its destruction.[7] In contrast, the Aristotelian cosmos is both ungenerated and indestructible. Aristotle's position against Plato is motivated, among other things, by the general metaphysical principle that it is impossible for what is generated to be indestructible; so, if Plato maintains that the cosmos is indestructible, Aristotle submits, he cannot consistently argue that it is generated.[8]

Why is the Aristotelian cosmos indestructible? One set of arguments that is especially relevant for discussing Stoicism proceeds from the *Meteorologica*. At the end of Book 1 and the first chapters of Book 2, Aristotle argues against Presocratics who contended that the cosmos will be destroyed by a collapse of the sublunary region due to a global desiccation.[9] In opposition to this conception, Aristotle maintained that the sublunary region is perfectly stable with no permanent loss of water. Its overall quantity is constant and secures an equilibrium that lasts forever. In particular, the water cycle is composed of a double stream: one of vapour that flows up to form the clouds and one of water that flows down

[6] The literal reading of creationism in the *Timaeus* begins with Aristotle himself. For Aristotle, see, e.g., *Cael.* 1.12 280a31–32: '[for Plato] the heavens were generated but will nonetheless exist always for the rest of time' [τὸν οὐρανὸν γενέσθαι μέν, οὐ μὴν ἀλλ' ἔσεσθαί γε τὸν λοιπὸν ἀεὶ χρόνον]. The nonliteral interpretation, according to which the cosmos did not begin but has always existed, was already in place at the time of Aristotle (see *Cael.* 1.10 279b32–280a1), advocated by Xenocrates and probably by Speusippus and Crantor although the evidence is not straightforward, for which see Baltes 1976: 18–22, Sorabji 1983: 268–271 and 271 n. 24; and more recently Vázquez 2022. I return to this question in Section 8.2.

[7] See the discussion of the body of the cosmos in *Tim.* 31b1–34b9: there is no external cause for its destruction because there is nothing outside it; and there is no internal cause either because the four elements (fire, air, water, and earth) of which the body is made are united by friendship (φιλία) – and this bond cannot be undone by anything but the demiurge himself, who created it (32b8–c4). We may conjecture that the Platonic demiurge could, in principle, decide to break this bond: But this is something that he could not *really* do given that he is wholly good and that the cosmos is the best possible state of affairs (to break the bond and destroy the cosmos he would have to act against his own nature).

[8] See *Cael.* 1.10–12. For a detailed analysis of Aristotle's criticism of creationism in the *Timaeus*, see Baltes 1976: 10–18. For a recent discussion of the principle that it is impossible to generate what is indestructible, see Fazzo 2023.

[9] I discuss the issue *in extenso* in Chapter 3. Following the practice of the International Association for Presocratic Studies, I use the term 'Presocratics' to denote 'the figures whose fragments and testimonies are collected in Hermann Diels' *Die Fragmente der Vorsokratiker*, edited by Walther Kranz' although as is rightly pointed out by some scholars the term 'Preplatonics' or 'early Greek philosophers (or cosmologists, etc.)' is often more appropriate, for which see Long 1999: 5–10 and Laks 2018: 19–34.

from the clouds back to Earth's surface in the form of rain. Aristotle compares this double stream to a river flowing up and down in a circle (ὥσπερ ποταμὸν ῥέοντα κύκλῳ ἄνω καὶ κάτω). This is a totally closed process. All the terrestrial water that vaporizes is transformed back into water.[10] This aspect of Aristotle's meteorology is perspicuous in the pseudo-Aristotelian *De Mundo*, in which the sublunary region is fully stable because the amount of one element may increase at the expense of another at certain places and times, but none of the four elements overpowers the other three at a global level, and this overall material equality (ἰσομοιρία) preserves harmony and permanence of the whole.[11] This may constitute a Peripatetic reaction to Stoic cosmology and, therefore, a theory that perceived itself as competing with Stoic cosmology. I return to this question at the end of Chapter 3.

The key to the Aristotelian model is that celestial bodies impart the heat needed for natural cycles in the sublunary region without consuming any of the sublunary elements and, in particular, without exhausting water and desiccating earth. His own explanation of sublunary heat is that the rotation of the heavens produces friction with the air that occupies the uppermost region of the sublunary region, this friction heats up the air and inflames it and, when this happens, heat is transmitted downwards to the rest of this region.[12] This is the crucial difference between Aristotle and the Stoics, since the latter maintain just the opposite: celestial bodies cause heat *because* they feed on sublunary water, and the desiccation that leads up to the conflagration owes precisely to this phenomenon.[13] As I explain in Chapter 3, different Presocratics had acknowledged that the cosmos is drying out, that celestial bodies consume sublunary water, and that the cosmos will ultimately materially change into fire. These Presocratics, therefore, are a major antecedent of Stoic cosmology. But the Stoic cosmos is also profoundly different from the cosmos of these early thinkers. For the Presocratics fail to draw a clear explanatory connection between these three events. The Stoics, by contrast, do link all three into a single powerful theory. The consumption of sublunary water by celestial

[10] See *Meteor.* 1.9 346b16–347a8. I return to this question also in Sections 2.2, 3.2 and 3.4. The passage is cited in extenso as **T4a** in Chapter 3.
[11] See *De Mundo* 5, 396b23–397a5. For discussion, see Gregorić 2021: 161–167. The authorship of the *De Mundo* is debated in the editorial introduction of Gregorić-Karamanolis 2021. Although the question is not the primary concern of the volume, Gregorić and Karamanolis argue that the *De Mundo* is spurious but that, in doctrine, it follows Aristotle closely.
[12] See *Cael.* 2.7 289a19–35 and *Meteor.* 1.3 340b4–19 and 341a12–28.
[13] See the evidence collected in Sections 2.1–2.

fire *leads to* the desiccation of the sublunary region as a whole, and this desiccation itself *leads to* the conflagration.

I.2 The Goal of This Book and Its Methodology

The Stoic conception of the cosmos, paradoxical as it may seem for a modern reader, stems from a number of theses that the Stoics espoused and that will be unpacked in this book. In fact, my main goal is to understand the philosophical reasons that drove the Stoics to uphold their theories of conflagration, cosmogony, and everlasting recurrence. My two chief claims are, first, that the three theories complement one another to solve specific philosophical puzzles, and, second, that the position taken by the Stoics in each of them is largely conditioned by their position in other areas of their philosophical system, notably, in their physics and their metaphysics.

Regarding the first claim, the interrelation between the three theories is best appreciated if we look at the philosophical puzzles that they raise. To begin, (a) why is it necessary for a conflagration to occur? (b) Why is it followed by the restoration of the cosmos rather than by nothing at all? Furthermore, (c) how is the large mass of fire left by the conflagration transformed in the cosmogony into the differentiated masses of air, fire, water, and earth that constitute the present cosmos? Finally, (d) must the cosmos issued from the cosmogony be identical to the cosmos destroyed at the conflagration, and, if it must, how is this identity possible within Stoic metaphysics? and (e) if the new cosmos is really identical to the old one, and there is no improvement whatsoever, why would the Stoic Zeus – the demiurgical and provident entity that creates and sustains the cosmos – want to destroy the cosmos in the first place? Questions (a)–(c) reveal that the theory of cosmogony is a necessary complement to the theory of conflagration. Given that the cosmos will burn up, the question of whether and how a new cosmos will arise is obviously pressing. And questions (d)–(e) indicate that the theory of everlasting recurrence is itself a necessary complement to the theories of conflagration and cosmogony: given that the cosmos will burn up but rise again, the question of whether and how the new cosmos identical to the old one has to be tackled. The treatment of these closely interrelated philosophical puzzles is what gives logical unity to this book. I address (a) in Chapter 2, (c) in Chapter 4, (d)–(e) in Chapters 5–7, and (b) in Chapter 8. I do not claim that these are the only philosophically important puzzles to which Stoic cosmology gives rise. For instance, Stoic cosmology may lead to significant ethical and existential

puzzles, for example, how should we feel by the fact that the cosmos will be destroyed in a conflagration? Is it a good thing that we will relive again our life an infinite number of times in the future, even if that means that we will suffer the same pains and make exactly the same mistakes? And does our emotional response to this prospect reveal something about the meaning and value of our life? These puzzles are no doubt significant, but I set them aside completely.[14]

As for my second claim, the answers given by the Stoics to the questions I mentioned previously are indeed determined by their physics and their metaphysics. Their theory of conflagration – as will be seen in Chapter 2 – is rooted in their meteorology. For the conflagration is thought to be the result of an irreversible desiccation of the sublunary region, which is itself the result of 'exhalations' (ἀναθυμιάσεις), a meteorological phenomenon that brings along the gradual exhaustion of the bodies of water on Earth. The Stoic theory of cosmogony, as I plan to show in Chapter 4, presupposes a theory of elements. In this theory, the four basic elements – fire, air, water, and earth – change into another by contraction and expansion. Finally, as I claim in Chapters 5–7, the theory of everlasting recurrence holds, in its earliest and strongest version, that there is a complete type-identity between the present cosmos and the cosmos of any other cosmic cycle. This strong identity is needed by the very rationality of the Stoic god. But it is only possible given a metaphysical theory of time, endorsed by the Stoics, in which the passage of time does not necessarily require change in the events that unfold in time, and a metaphysical theory of events in which event-types are not individuated by times.

I am mainly interested in these logical relations within Stoic philosophy. There are, of course, important similarities between the Stoics and earlier philosophers, especially the Presocratics, Plato, and Aristotle. I refer to them often. But I have very little to say about the important question of whether and how their ideas were actually transmitted to the Stoics. For example, I explore Presocratic cosmology in Chapter 3. There I argue, as noted above, that some key ideas in Stoic cosmology go back to the Presocratics in the sense that there is evidence that some Presocratics defended them. But how did they reach the Stoics? Did they? Or should we suppose, rather, that the Stoics arrived at these ideas independently of the Presocratics? Thus, my approach is entirely different from that of

[14] For a discussion of some of these issues in Antiquity, see Sorabji 1983: 174–190. These issues occupy a central place in Nietzsche's theory of everlasting recurrence (see, e.g., Nietzsche 1881: 285 and 341, quoted in the epigraph of the book) recently discussed in Loeb 2018 and 2021.

scholars who do address these issues and are even interested in much more specific ones. For instance, in his seminal paper 'Heraclitus and Stoicism' (1975), Long asks: 'What knowledge of Heraclitus did the early Stoics possess? Was their method of interpretation their own or did it derive from the work of others, especially Aristotle and Theophrastus? Did the Stoics merely twist Heraclitus' views to suit their preconceived needs, or has their interpretation, in some cases, a valid basis in Heraclitus' thought? Above all, why did they take an interest in this remote and extraordinarily difficult thinker?'[15] However crucial these questions are for our understanding of the relation between the Stoics and Heraclitus, or the Presocratics in general, they fall beyond the scope of this book. The same applies to my discussion of Plato in Chapter 7, when I compare his conception of teleological concomitants in the *Timaeus* with Chrysippus' own views on this matter. I do not tackle the question of whether Chrysippus regarded himself as engaging with Plato on this matter. The only moment when I investigate whether the Stoics knew in detail the work of earlier philosophers is in Section 7.5. There, I propose that the Stoic Boethus knew the objections against the destructibility of the cosmos raised by Aristotle in *De Philosophia*. But my discussion is limited to Boethus and to this relatively minor work of Aristotle. I sidestep the general issue of the reception of Aristotle's cosmological and meteorological works in Stoicism and, especially, the issue of whether the early Stoics knew Aristotle and how.

Moreover, the main focus of this book – as its subtitle indicates – is the *early* Stoics. The dividing line between early and non-early Stoicism is not entirely clear, because the very criteria used to classify a Stoic as early are disputed. But Stoicism up until Zeno of Tarsus, the immediate successor of Chrysippus as Head of the Stoa, is generally regarded as early.[16] And, in fact, the book deals mainly with Zeno (of Citium), Cleanthes, and Chrysippus. I should stress, however, that I do not treat 'early' Stoicism as a monolithic doctrine. There is ample ground for treating at least these three philosophers as distinct thinkers that often departed from one another on substantive issues in the field of cosmology. I maintain, in particular, that Cleantes offered an account of the cosmogony sharply different from Zeno's, and that Cleanthes' views on the cohesion of the cosmos differs significantly from Zeno's and Chrysippus' (in Sections 4.4

[15] Long 1975: 38. See also Solmsen quoted in Long 1975: 36–37.
[16] A classic work on the subject is Sedley 2003. See also Frede 1999a and Tieleman 2007. A recent discussion of the issues is provided in Inwood 2022: 1–5.

and 7.4, respectively). In the course of the argument, I allude frequently to other Stoics, and especially to post-Chrysippean Stoics such as Apollodorus, Archedemus, Zeno of Tarsus, Diogenes of Babylon, Panaetius, Boethus, Posidonius, Cleomedes, Cornutus, Seneca, and Marcus Aurelius. But I do so only insofar as their position illuminates that of the early Stoics. Especially, I do not try to reconstruct their own views as a whole. To take an example, in Chapters 2 and 8, I indicate that Panaetius doubted and, according to some sources, denied the conflagration along with other post-Chrysippean Stoics. But I do not seek to connect Panaetius' criticism of the theory of conflagration with his physics and his meteorology more broadly, for which we have some evidence.[17] In the same vein, I note in Section 1.1 that Posidonius and Cleomedes developed many geographical ideas attributed by Stobaeus to Chrysippus. But I do not attempt to reconstruct their geographies as a whole and the relation they bear to their cosmology. Likewise, in Section 5.3, I discuss Chrysippus' theory of the present and his idea that the present may have past and future parts. There I point out that he differs significantly from Marcus Aurelius, according to whom the present is apparently limited to the now. And in Section 6.2, I explain that the evidence we have for Marcus' conception of everlasting recurrence suggests that he modified central aspects of early Stoic theory. But I do not endeavor at any point to connect Marcus' heterodox views to his physics and his ethics more broadly. Equally, I allude often to cosmological theses in Seneca. Some of them clearly have an early Stoic origin. One case in point is the thesis in Section 4.3, that at the start of the cosmogony the only body in existence – other than god and fundamental matter – is a large mass of water. But other cosmological concepts in Seneca do not seem to have an early Stoic parallel, such as the idea of a periodical flood within each cosmic cycle.[18] So Seneca's cosmology, when taken as a whole, departs significantly from early Stoic cosmology. Neither Seneca nor Marcus Aurelius can be simply read off as representatives of an early Stoic view. A full-scale analysis of their cosmologies that brings out in detail their specificity and peculiarity in comparison with early Stoicism is yet to be done.[19] The same is true of the other Stoics mentioned above,

[17] Collected by Alesse under texts 129–140 of Alesse 1997: 129–136.
[18] See notably *NQ* 3.27.1–2 and 3.29.1 (for further references, see Williams 2012: 125 and 125 n. 112). Inwood 2022: 264–265 argues that the idea of periodical floods is an innovation of Seneca.
[19] In the specific case of Seneca, important work on the subject may be found in Inwood 2005, chapters 6 and 8 and Williams 2012. For Marcus Aurelius, see Sedley 2012 and Ponce 2017.

especially those for whom we possess a fair amount of evidence such as Panaetius, Posidonius, and Cleomedes.[20]

Unfortunately, very few texts of the early Stoics are extant and the evidence that we do have is usually thorny. One reason for this is that they were often transmitted through authors that are hostile to the Stoics and that distort their views deliberately to make them appear in an unfavorable light. Two cases in point are Plutarch in **T3a** from Chapter 2 and Alexander of Aphrodisias in **T3c** from Chapter 3. Another reason is that some later authors that report Stoic ideas are sympathetic to them but use their report to express their own views on a subject, without knowing or acknowledging that these views are not exactly those originally advocated by the early Stoics. One example of this is Cicero in **T2a** from Chapter 2. Given these two problems, we must proceed with caution and treat our sources critically when needed.

I.3 Synopsis of the Argument

In this final section, I present synoptically the argument of the book. Chapter 1 offers an overview of the Stoic cosmos. I concentrate upon four aspects of it that will be important in the subsequent chapters: its specific physical structure, its relation to god as one of its fundamental principles, its relation to god as its seminal principle, and its relation to god as its ultimate necessitating cause, which I call 'theological determinism.' Chapter 2 is entirely devoted to the conflagration. What is the meteorological mechanism that causes it? I also tackle the physical question of how ether consumes the sublunary region. The technical term used by the early Stoics to refer to this consumption is 'absorption' (Harold Cherniss' translation of ἀνάλωσις). To find out what absorption is, I study the elemental theory of the Stoics and, especially, the Stobaeus passage classified by Diels as Fragment 21 of the Stoic Arius Didymus (first century BCE), guided by the influential interpretation that John Cooper has afforded of this fundamental text.[21] I conclude the chapter by addressing the issue of the duration of the conflagration. Is it an instantaneous event? And if not, is it shorter or longer than the ordered period of the cosmos?

[20] A recent study of late Stoicism that includes a detailed analysis of these three authors is Inwood 2022. According to Inwood, Posidonius in particular made substantive contributions to Stoicism offering in many areas theories that compete with those of Chrysippus. One case in point is precisely physics and cosmology: 'Posidonius established a stable synthesis of Stoic physics and cosmology that superseded that of Chrysippus' (2022: 455).

[21] See Cooper 2009.

Chapter 3 discusses the Presocratic antecedents of the Stoic conflagration, which are substantive. As I previously stated, however, my central claim in Chapter 3 is that the Presocratics fail to interconnect three vital ideas: that the cosmos is drying out, that celestial bodies consume sublunary water, and that the cosmos will ultimately materially change into fire. Their interconnection is a Stoic innovation and a distinctive contribution to ancient cosmology and meteorology. I also examine briefly Aristotle's own conception of the role of meteorology in cosmic stability. Chapter 4 is devoted to the cosmogony. The cosmogony is the process by which the cosmos destroyed at the conflagration is restored anew. There was, however, a polemic between Zeno and Cleanthes regarding how this process is structured. According to Zeno, all of the fire of the conflagration changes into water; but according to Cleanthes, some fire remains throughout the cosmogony and indeed throughout the new cosmos. I also consider Chrysippus' position in this polemic.

As I indicated earlier, Chapters 5 – concentrate upon everlasting recurrence. They logically complement the previous chapters: given that the cosmos will burn up but rise again, the Stoics had to tackle the question of whether and how the new cosmos is identical to the old one. The aim of the Chapter 5 is to discuss two fundamental metaphysical problems that affect the theory of everlasting recurrence but that go beyond this theory and concern the structure of time in general: (a) Why is the present cosmos present as opposed to past or future? In general, how is the presentness of a present time to be accounted for? (b) Supposing that the present cosmos is type-identical to the previous cosmos and the next, how can they really occupy different places in time? In my discussion of the latter puzzle, I take issue with scholars who assume – in the wake of Jonathan Barnes in his authoritative work on Stoic everlasting recurrence (Barnes 1978) – that for the Stoics successive times occupied by token events of exactly the same type cannot be distinct. Chapter 6 reviews in detail the Stoic theories of everlasting recurrence and discusses the argument for the thesis that there must be a full type-identity between the events of any two cosmic cycles. Why should this thesis hold true? The argument is based on the Stoic notion of god according to which god's full rationality requires that the token events of each new cosmos be fully type-identical to those of the previous one. An account of the two main heterodox theories of everlasting recurrence is also provided.

The argument of this book ends in Chapter 7 by looking at a paradox – the 'paradox of destruction and restoration.' This paradox arises when we bring together the theory of conflagration and the theory of everlasting