

CRITICAL INTRODUCTIONS TO CONTEMPORARY METAPHYSICS

A CRITICAL INTRODUCTION
TO THE METAPHYSICS OF

TIME

BENJAMIN L. CURTIS AND JON ROBSON

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A Critical Introduction to the Metaphysics of Time

**BENJAMIN L. CURTIS AND
JON ROBSON**

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Introduction

The philosophy of time is a central area of contemporary metaphysics and it is not difficult to understand the fascination that many philosophers feel for the subject. Our everyday talk and thought is full of claims about the nature of time. We claim that time passes (or flows), that everyday objects persist through time, that the present is somehow privileged compared to the past and future, that people change as time passes, that the past is fixed in a way in which the future is not and much more besides. Yet, as we will see in later chapters, it is all too easy for attempts to explain these apparently everyday phenomena to lead quickly into confusion and paradox. For this reason philosophers addressing these issues have often been led to sympathize with Augustine of Hippo who famously responded to the question 'what is time?' by claiming that as 'long as no one asks me, I know; but if someone asks me and I try to explain, I do not know' (2001: 271). In this book we aim to provide a comprehensive overview of the most important issues in the area, bringing the reader up to date with the current literature. We cannot guarantee that the reader will have an answer to Augustine's query by the time they reach the end of this book but we hope that they will, at least, have a better understanding of the question.

In Chapter 1 we survey the ancient history of the philosophy of time, from the pre-Socratics to the dawning of the medieval period. Our presentation will be selective, and those views and arguments that bear on the contemporary literature will be highlighted. In particular, the focus will be on the work of Parmenides, Zeno, Plato, Aristotle and Augustine. Our survey of the history of the philosophy of time continues in Chapter 2 where we examine some key figures from the seventeenth century to the beginning of the nineteenth century. Again, our focus will be on those views that bear on the contemporary literature. The main figures discussed will be Descartes, Newton, Leibniz and Kant. In the context of this chapter the debate between those who think that time is a genuine entity in its own right (substantialists) and those who deny this (relationalists) is also introduced.

Chapter 3 focuses on McTaggart's famous 1908 paper 'The Unreality of Time' which is viewed by most contemporary philosophers of time as marking the beginning of the subject in its modern guise. Much of the contemporary literature deals with issues that are raised, either directly or indirectly, by the

argument presented in McTaggart's paper. McTaggart distinguishes between what he calls 'the A series' and 'the B series'. The A-series is an ordering of positions in time in terms of their possession of tensed monadic properties (such as *being in the future*, *being present* and *being in the past*). The B-series is an ordering of positions in time in terms of their standing in tenseless two-place relations (such as *being earlier than*, *being simultaneous with* and *being later than*). His argument (very roughly) is that the A-series is required in order for time to be real, but the A-series is contradictory, so time cannot be real. In this chapter McTaggart's argument will be discussed in detail and some of the main responses to it will be outlined.

Despite the fact that McTaggart's conclusion that time is unreal is often rejected, his argument for that conclusion is generally taken to be important. Some have taken the lesson of McTaggart's argument to be that time consists in the B-series alone (such people are known as B-theorists). B-Theorists believe that all talk about tensed A-properties can be reduced to talk about untensed B-relations, and that time cannot be said to flow in any meaningful sense. Others continue to maintain that time is dynamic and that it does flow in some sense. They either try to make sense of time's flow metaphysically by arguing that the world really does have something like an A-series structure, or take the fundamental lesson of McTaggart's argument to be that we must take tense seriously, i.e. that tensed A-properties are primitive and unanalysable (such people are known as A-theorists). The debate between A-theorists and B-theorists has, however, developed well beyond their respective responses to McTaggart's argument and Chapter 4 centres on the debates between these rival camps.

Chapter 5 addresses a related, though importantly distinct, debate concerning the *ontology* of time. Nearly all contemporary philosophers of time agree that the present time exists but there is substantial disagreement concerning the existence of the past and the future. Presentists believe that only the present exists. Eternalists believe that all times are equally real. Growing block theorists believe that the past and the present exist, but that the future does not. We outline these views and consider some of the motivations for believing in them. The two main views defended in the contemporary literature – presentism and eternalism – will form the main focus of the chapter, and the bulk of it will be taken up with considering objections to presentism, which is usually thought to be the default common-sense position. We also address the claim that the dispute between these two camps is 'merely verbal', and the question of how the so called 'Truthmaker' debate bears on this controversy.

It is often held that while all statements about the past are either true or false, the same does not hold with respect to all statements concerning the future. In Chapter 6 we ask whether this commonly held view is correct, and

consider the consequences of rejecting or endorsing it. We also consider the following questions: (i) Does rejecting this view lead to fatalism? (ii) Can we reject this view and still allow that human beings possess free will? (iii) How does endorsing the view affect the logical systems that we use in our reasoning? (iv) What ontological consequences does endorsing the view have? (v) Is it possible to maintain the view that some statements about the past are also neither true nor false?

Objects persist through time. This much seems clear. There are, however, some radically different philosophical views about what such persistence consists in. In Chapter 7 we consider some of these accounts, focusing primarily on the two most prominent contemporary views: endurantism and perdurantism. According to endurantists objects persist by being wholly present at each time at which they exist, while according to perdurantists objects persist by having distinct temporal parts at each moment at which they exist. In this chapter these two views will be explained and the main arguments for and against each view will be presented. We will also examine a new contender on the scene – the stage theory – and ask how well it stacks up against the traditional views. Finally, we ask whether these debates concerning persistence have any bearing on the controversies concerning the ontology of time which we considered in Chapter 5.

In Chapter 8 we consider some issues relating to our experience of time. The way in which we experience the world is temporal in a number of ways. In this chapter the nature of our temporal experiences will be examined and the metaphysical implications of it discussed. The focus will be on three important and related aspects of our temporal experience: (i) that our experiences seem to have a temporal breadth, (ii) that we seem to experience changes directly and (iii) that our experiences are stream-like – they seem to flow (the first two of these are taken to be aspects of what William James has called ‘the specious present’). Recently, a head of steam has been building around the view that these aspects of our experience have metaphysical implications for both the A-theory/B-theory debate and the presentist/eternalist debate. These recent developments will be outlined.

The possibility of time travel seems to lead to paradoxes. It appears, for example, that if time travel is possible then I can travel back in time and kill my younger self. But, I did not in fact kill my younger self. So, because the past is fixed, I cannot kill my younger self. It seems, then, that the possibility of time travel leaves us with the contradictory result that I both *can* and *cannot* kill my younger self. As such we must, on pain of contradiction, reject the claim that time travel is possible. Paradoxes such as this form the primary focus of Chapter 9. The classic discussion of arguments of this kind – and the main focus of our chapter – is Lewis (1976b). Lewis argues, within an eternalist and perdurantist framework, that the argument above – along

with some other putative paradoxes we consider – fails and that time travel *is* possible after all. The chapter begins with an outline of some arguments against the possibility of time travel before considering Lewis's responses to them. We then consider some more recent developments in the debate concerning time travel. The issue of whether time travel is possible within a presentist or endurantist framework will also be addressed.

Throughout this book we raise a number of objections against various views that appeal to facts about current physics (e.g. the objection that the A-theory and presentism are incompatible with the truth of special relativity's denial of absolute simultaneity). In Chapter 10 we offer an assessment of these objections. We also return to the substantivalism/relationism debate introduced in Chapter 2 and ask how current developments in physics impact upon it. Finally, we very briefly comment on more recent developments in fundamental physics (i.e. on quantum mechanics and quantum gravity).

FURTHER READINGS

As the bibliography for this volume should illustrate, the literature regarding the philosophy of time (both historical and contemporary) is vast. For some key texts in the history of the discipline see the further readings from Chapters 1 and 2. For further readings on other topics, see the suggestions at the end of each chapter. Some influential texts in the contemporary debate worth noting here are Prior (1968/2003), Mellor (1981), Le Poidevin (1991), Hawley (2001) and Sider (2001). We also draw the reader's attention to Oaklander (2008). This excellent six volume collection contains many important papers covering all aspects of the philosophy of time.

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1

The ancient history

This chapter begins our survey of the history of the metaphysics of time. We start in ancient Greece looking at the views of two 'pre-Socratic' philosophers (Parmenides and Zeno) before briefly examining the views of the two giants of Western philosophy: Plato and Aristotle. Finally, we discuss some famous work on the metaphysics of time by the African philosopher and theologian Augustine of Hippo. The works of all of these thinkers are far richer than this brief survey can fully convey and we strongly encourage interested readers to pursue their views further by consulting the further readings.

In this chapter we cover the ancient history of the philosophy of time from its origins in ancient Greece to the beginning of the Middle Ages. As mentioned in the introduction, we do so selectively, focusing upon the most important historical views, and upon those arguments that bear on the themes developed in later chapters. Even with such a delimited scope, however, there is a difficulty in presenting the history of the subject in a short chapter. The views of historical philosophers (and especially the Greeks) are subject to varying and often contradictory interpretations in a way that the views of contemporary philosophers are not. In order to combat this difficulty, we present those interpretations that seem most plausible to us, but note where significant disagreement occurs, and direct the reader to the sources of the disagreement. In this chapter we focus specifically on the work of five key philosophers: Parmenides, Zeno, Plato, Aristotle and Augustine. First, though, we will take a brief look at some of the very earliest discussions of time in Western philosophy.

1.1. The pre-Socratics

The philosophy of time begins, as does Western philosophy itself, with the pre-Socratics. The pre-Socratics are those ancient Greek philosophers who lived in the sixth and fifth century BC and who were uninfluenced by the views of Socrates (so, even some of Socrates's contemporaries are known as *pre-Socratics*). What binds them together, and distinguishes them from many earlier thinkers, is their rejection of the view that since the world is governed by the actions of the gods it is ultimately incomprehensible to mere humans. Instead they believe that the world can be understood in terms of intelligible overarching natural principles that explain its operation and features. Unfortunately, little remains of the writings of the early pre-Socratics, and of what does remain, the fragments on time are scant. Nevertheless, it is clear from those fragments that for the early pre-Socratics the concept of time is intimately bound up with the concept of change. In the sole surviving fragment of a work by Anaximander of Miletus (c. 610–546 BC) he expresses the view that everything that comes to be and passes away arises from and falls back into an unchanging substance that he called *to apeiron*. As Anaximander thinks that all changes are constituted by the coming to be or passing away of something, his thought seems to be that for change to occur, there must be something that remains constant underlying those changes, and that anything that changes is necessarily of limited duration. Anaximenes (c. 585–528 BC) similarly held that change requires there to be an underlying unchanging substance, but on the basis of empirical observation, he identified that substance with air. At least some of the surviving passages of the work of Heraclitus (fl. c. 500 BC) suggest that he held a contrary view, namely that there is no constant substance that underlies change, and indeed that nothing ever remains the same for even a limited period. Rather, the passages suggest, everything is in a state of constant flux, continuously changing from one state to another. But other surviving passages suggest that he held a different view, *viz.* that things can remain the same *by* changing. This is one interpretation that is given (by e.g. Marcovich 1967) to a famous doctrine attributed to Heraclitus by Plutarch (45–120 AD):

It is not possible to step twice into the same river according to Heraclitus, or to come into contact twice with a mortal being in the same state. (Plutarch, *B91* in Robinson 1987)

On this interpretation Heraclitus's point here is that rivers and mortal beings are things that remain identical over time despite, or perhaps even in virtue of, the changes that they undergo. If this interpretation is correct, Heraclitus's

point is one of considerable import. We will return to this issue in Chapter 7 where the issue of identity over time (and through change) will be explicitly considered.

1.2. Parmenides

The first philosopher for whom substantial fragments of his writings survive is the late pre-Socratic Parmenides of Elea (fl. c. 450 BC). Of the 800 or so verses of his philosophical epic poem (known now as 'On Nature') around 160 survive as fragments (see Gallop 1984). The most substantial fragment, fragment eight, comes from the first part of the poem ('The Way of Truth') and is 62 verses long. In it Parmenides offers an argument for the conclusion that time does not exist. In giving this conclusion Parmenides places himself first among an illustrious list of philosophers who concluded similarly, including J. M. E. McTaggart, whose argument for this conclusion we will consider at length in Chapter 3. And in fact, properly understood, the argument that Parmenides gives for this conclusion heavily foreshadows McTaggart's. Before coming to the argument, however, it is worth commenting on the nature of the conclusion itself.

As will be seen shortly, Parmenides's conclusion has as a corollary that change is impossible. Both this corollary and the original conclusion are *prima facie* so incredible that it is tempting to dismiss any argument for them before one has even seen their premises. That is, it is tempting to think of any argument with either of these conclusions as having the form of a *reductio ad absurdum*, and thus as constituting an argument against (at least one of) their premises. But to do so would be hasty. The first part of Parmenides's poem where the arguments for the non-existence of time and the impossibility of change are presented is supposed to reveal to us the way that reality *really is*. But Parmenides's poem has a second part ('The Way of Opinion') that is supposed to describe the way that reality *appears to be*. Very little survives of this second part, but what can be gleaned from what does remain is that Parmenides there presents a view of the world – the view of the ordinary folk – that is radically at odds with the conclusions he reaches in the first part. In particular, he presents a view of the world according to which changes occur constantly. Parmenides is thus perfectly aware of how incredible the conclusions of the first part of his poem *seem* to be, but considers this to be no objection. It is part of Parmenides's position that we are apt to fall into error regarding how things are by taking our experiences of how things seem to be too seriously. And he takes his argument for the non-existence of time to show that this is just what happens with our experiences of time and

change. So, it is reasonable to maintain that rejecting his conclusions about how things really are purely on the basis of how things appear to be would be to beg the question against Parmenides. This point is a perfectly general one. If someone offers an argument that is intended to show that things are not really as they appear to be, it is reasonable to maintain that one cannot refute them by appealing to appearances alone. Instead one must either (i) engage directly with their argument, or else (ii) offer a counterargument to the effect that, given that things seem to us to be a certain way, they must really be that way.

It is worth noting, briefly, that whether or not time and change really do exist, the fact that our experiences represent it as existing and as (in some sense) flowing needs to be explained. This raises further questions about precisely *how* our experiences represent time as existing. Do we have direct experiences of time and its flow? Or can our experiences be explained in some other way? We will take these questions up in Chapters 4 and 8, where it will be seen that some think our experiences of time can only be explained if time really does exist and has a certain metaphysical structure.

So what, then, is Parmenides's argument for the conclusion that time does not exist? There is some controversy about this. Parmenides begins by affirming that to think of what is, that it is not, or of what is not, that it is, is contradictory. And to think something contradictory, he argues, is in fact to think nothing at all; it is to try to think something that is literally unthinkable (in Parmenides's terms it is to engage in 'two-headed' thinking that is 'backward turning'). He also affirms that whatever is, can be thought of. And it follows from this that if something is not thinkable, then it must be that it is not the case. He then presents the following (rather obscure) argument:

It never was nor will be, since it is now, all together, one, continuous. For what birth will you seek for it? How and whence did it grow? I shall not allow you to say nor think from not being: for it is not to be said nor thought that it is not; and what need would have driven it later rather than earlier, beginning from nothing to grow? Thus it must either be completely or not at all ... And how could what is be in the future? How could it come to be? For if it came into being, it is not; nor is it if it is ever going to be in the future. Thus coming to be is extinguished and perishing unheard of. (Parmenides, in Kirk et al. 1987: 249–50)

Some (e.g. Matson 1987) take Parmenides's main argument here to be that nothing can come from nothing because all things must have a sufficient cause for their existence. But while it is true that Parmenides does express something like this causal argument here, it cannot be his main argument, for two reasons. First, the argument has no bearing on the future or whether things can go out

of existence, and so does not explain why Parmenides thinks that these things are just as problematic as the past and coming into existence. Secondly, this argument makes no mention of the difficulties that Parmenides thinks arise when we try to think of what is, that it is not, or of what is not, that it is. So it also does not explain why Parmenides places such a heavy emphasis on these difficulties. The most common interpretation of Parmenides's argument does explain both of these things. According to it, the main argument expressed in the passage has something like the following structure:

- (1) To think of nothing is to think of nothing as being something (i.e. to think of what is not, that it is). [Premise]
 - (2) To think of nothing as being something is contradictory, and so is to try to think something that is not in fact thinkable. [Premise]
 - (3) So it is not possible to think of nothing. [From 1 and 2]
 - (4) To think that things come into or go out of existence is to think that they arise from nothing, or that they pass away into nothing. [Premise]
 - (5) So to think that things come into or go out of existence requires that one thinks of nothing. [From 4]
 - (6) So to think that things come into or go out of existence is itself to try to think something that is in fact unthinkable. [From 3 and 5]
 - (7) So it is not possible to think that things come into or go out of existence. [From 6]
 - (8) Whatever is, is thinkable. [Premise]
- Therefore,
- (9) Nothing ever comes into or goes out of existence. [From 7 and 8]

This interpretation (or something very close to it) can be found in Russell (1945), Copleston (1946) and Turetzky (1998), among other places. Note that on this interpretation Parmenides does not argue directly against the existence of time. Rather, the argument is directed against the idea that things come into and go out of existence (i.e. it purports to show that nothing ever changes). Of course, if temporal passage requires change, then the argument does also establish that time does not exist. But it is not obvious that temporal passage requires change, so it at least leaves open the possibility that our world is one in which time passes although nothing ever changes. (The issue of whether this is possible is related to the substantivalism/relationism debate, which we consider further in Chapter 2.)

The major problem with Parmenides's argument, on the above interpretation, is with premise 1. What is it to think that nothing is something? If it is to be contradictory, as premise 2 requires, then it must be to think of nothing as being some *entity* that fails to exist. It is plausible that this is indeed contradictory, because it is plausible that the concept of an entity is just the concept of an existing thing, and of course no existing thing can fail to exist. But now the problem with premise 1 becomes clear. To think of nothing, it is usually thought, is *not* to think that there is some entity named by the term 'nothing' that does not exist. Rather, it is to entertain the simple thought that no entity exists, *viz.* the thought that it is not the case that an entity exists. (Here, an analogy helps. Suppose Smith tells us the following: 'Nobody is coming to the party.' Smith is not telling us that there is a person called 'Nobody' who will be attending the party. Rather, he is telling us that it is not the case that there will be a person at the party.) So premise 1 is false. And moreover, while it is plausible that it *is* contradictory to think there is a non-existing entity named by 'nothing', it is *not* plausible that it is contradictory to think it is not the case that an entity exists. So, there is no way of recovering Parmenides's argument once premise 1 has been rejected.

Often unsuccessful arguments are interesting. In diagnosing where they go wrong we can learn something new or important about the subject matter of the argument. But if the interpretation above is correct, then Parmenides's argument is ultimately uninteresting. It is an instance of a fallacy that is (now) well-known, and diagnosing it as such reveals nothing interesting about time. However, despite it being the most common interpretation, it is in fact doubtful that the interpretation above *is* correct. In a somewhat neglected paper Ronald Hoy has argued forcefully that Parmenides's argument has a quite different form (see Hoy 1994: 582–3). Hoy maintains that Parmenides's main argument is supposed in fact to show that common beliefs about the past and the future are contradictory. The argument, so construed, has something like the following form:

- (1) The future is supposed to be where things that do not exist issue from, and the past is supposed to be where things that cease to be go. [Premise]
- (2) But the future and the past are also supposed not to exist. [Premise]
- (3) So the future and the past are supposed both to be, and not to be, which is contradictory. [From 1 and 2]
- (4) What is contradictory is unthinkable. [Premise]
- (5) It is not possible to think of the future or the past. [From 3 and 4]
- (6) What is, is thinkable. [Premise]

Therefore,

- (7) The future and the past do not exist. [From 5 and 6]

That change is impossible now becomes a corollary, which is reached as follows:

- (8) If things come into and go out of existence, there is a future from which they issue, and a past into which they go. [Premise]

Therefore,

- (9) Nothing comes into or goes out of existence. [From 7 and 8]

This argument is much more interesting than the previous one, and raises issues that cannot be so easily dismissed. One might have qualms with premises 4 and 6. (If one thinks something that is contradictory, then one certainly does not have a thought that can be true, but does one really think *nothing at all*? And is it not possible for there to be things that lie outside of human understanding, and thus things that cannot be thought of?) But if the first two premises capture, as they seem to, something about our common-sense thinking about time, then whether premises 4 and 6 are true is relatively unimportant. The point reached at step 3 of the argument is bad enough. If our common-sense conception of time is contradictory, then there is something wrong with it, and it needs to be revised in some way. We will return to the issue of the viability of our common-sense picture of time in various chapters throughout this book, and in particular in Chapters 3, 4 and 5.

1.3. Zeno

Parmenides's student Zeno (often known as Zeno of Elea to distinguish him from a number of other ancient philosophers who share the same name) also put forward a number of influential arguments for the claim that change is impossible. Indeed, some of Zeno's contemporaries seemed to take his views to be little more than echoes of those already expressed by his mentor – most notably Socrates, who is said to have remarked to Parmenides that Zeno has 'written to much the same effect as you but by changing tactics he tries to mislead us into thinking he's saying something different' (Plato 1997: 5). However, rather than focusing – as his teacher did – on questioning the possibility of objects coming into and going out of existence, Zeno focused primarily on denying the possibility of motion. Without doubt his most famous argument for this conclusion – often known

simply as 'Zeno's paradox' – concerns a hypothetical race between the Greek hero Achilles and a tortoise. Max Black outlines the argument as follows:

Suppose Achilles runs ten times as fast as the tortoise, and gives him a hundred yards start. In order to win the race Achilles must first make up for his initial handicap by running a hundred yards; but when he has done this and has reached the point where the tortoise started, the animal has had time to advance ten yards. While Achilles runs these ten yards, the tortoise gets one yard ahead; when Achilles has run this yard, the tortoise is a tenth of a yard ahead; and so on, without end. Achilles never catches the tortoise, because the tortoise always holds a lead, however small. (Black 1951: 91)

Zeno's argument is not, however, intended to demonstrate that the tortoise would win the contest in question but, rather, to show that the very possibility of such a contest leads to paradox. Consider a case where the two race for exactly two hundred yards. Achilles has to cover the full distance whereas the tortoise – thanks to Achilles's sportsmanship in offering it a considerable head start – only has to cover half of it. Still, since Achilles is moving ten times as fast, travelling twice the distance should be no problem and we should expect him to win a comfortable victory. It looks, then, as if we have the contradictory result that Achilles cannot possibly win the race (since he can never overtake his opponent) and that he can win it easily (since he is moving so much faster than his opponent). The moral of this story, Zeno maintains, is that a contest of the kind he describes and, by extension, motion in general is impossible.

What should we make of these claims? Although almost all subsequent writers on the subject have agreed that Zeno's arguments fail, responses to the paradox have been notably varied. Some have taken it to be a piece of obvious sophistry worthy only of derision whereas others classify it as a profound – though ultimately mistaken – contribution to philosophy which has proven invaluable to our understanding of notions such as change and infinity. Bertrand Russell – himself very much in the second camp – famously remarked that.

In this capricious world, nothing is more capricious than posthumous fame. One of the most notable victims of posterity's lack of judgment is the Eleatic Zeno. Having invented four arguments [for the impossibility of motion], all immeasurably subtle and profound, the grossness of subsequent philosophers pronounced him to be a mere ingenious juggler, and his arguments to be one and all sophisms. (Russell 1903/2010: 352)

However, Russell goes on to claim that – caprices of posthumous fame notwithstanding – the recent rediscovery and reappraisal of Zeno's paradox provided 'the foundation of a mathematical renaissance' (ibid.). So, while Russell, ultimately, agrees that the argument is unsound he also believes that careful study of Zeno's work was crucial in developing a number of important nineteenth century advances in mathematics which led to the paradox's ultimate resolution. And this view of Zeno's paradox, according to which it is somehow dissipated by developments in modern mathematics, has become something akin to orthodoxy since the time of Russell's writing (though Alba Papa-Grimaldi (1996) offers an argument against this view). There is, however (as the further readings for this chapter clearly illustrate), no clear consensus as to exactly what the correct mathematical resolution of the paradox is.

Although the case of Achilles and the tortoise has proven to be easily the most influential of Zeno's paradoxes, some of his other paradoxes have also drawn significant attention from later philosophers. We will only consider one such paradox here: Zeno's Arrow. Ofra Magidor (2008: 360) presents the Arrow argument as follows:

Let I be an interval of time, in which a flying arrow is in motion.

- (1) Everything is at rest when it occupies a space equal to itself.
[Premise]
- (2) At every instant t contained in I , the arrow occupies a space equal to itself. [Implicit premise]
- (3) At every instant t contained in I , the arrow is at rest at t . [From 1 and 2]
- (4) The arrow is always 'at an instant'. [Premise]

Therefore,

- (5) The arrow is motionless in I . [From 3 and 4]

As it stands there are, no doubt, a number of premises in this argument which strike you as in need of some defence. Why, for example, should we accept that 'everything is at rest when it occupies a space equal to itself' or that the arrow is 'always at an instant'? And there are ongoing debates concerning both how these claims of Zeno's should be interpreted and whether all (or any) of them are defensible. We do not, however, intend to evaluate these claims concerning the Arrow argument and how it is best interpreted here (though see further readings for details). Rather, we mention the argument only to illustrate an important connection with a contemporary debate which we will cover in later chapters. The debate in question concerns whether 'change' of the kind the arrow undergoes – being in one place at one

instant and another at some later instant – is sufficient for genuine change (or genuine motion) or whether something more is required. Zeno clearly favours the latter answer but – as we will see in Chapters 3 and 7 – others have demurred.

1.4. Plato

Plato (428–347 BC) is, of course, a towering figure in the history of philosophy, and his influence on the discipline is perhaps second only to that of his most famous pupil, Aristotle. It is this that justifies a brief treatment of his views on time. However, although much of Plato's work is still relevant today, his writings on time are rooted in an outdated cosmology, and so will be of primary interest to us only insofar as they cast light on the views of those who follow.

Plato's views on time are presented most fully in *Timaeus*, whose main protagonist is a character of the same name. The physical universe, according to Plato, is a realm of appearances that is real insofar as it resembles (in some sense) those objects that are fully real, the unchanging eternal forms. In *Timaeus* the titular character tells a story about how the universe was created by a divine Craftsman, Demiurge, who imposed order on chaos to form the intelligible world in which we live. He supposedly did so by using the eternal forms as a guide, and is said to have created time as part of this undertaking, with time introducing order into the world in virtue of its resemblance to the eternity of the forms. (There is some controversy over whether this is to be taken as expressing Plato's literal view, or whether it is meant to be metaphorical – see Vlastos 1965.) Time is, says Timaeus, 'the moving image of eternity'. In giving this account Plato took himself to reconcile the two views about time that Parmenides took to be contradictory, *viz.* that it both exists and does not exist. Time is real and intelligible, according to Plato, insofar as it resembles eternity, but also has a certain degree of unreality insofar as that resemblance is imperfect.

Plato's view rests on a number of dubious assumptions. The assumption that is most obviously so, of course, is that the universe was created to resemble a realm of eternal forms. But only slightly less dubious is the more general metaphysical assumption that there are degrees of reality. Although a few contemporary metaphysicians (e.g. Smith 2002) demur, the vast majority believe that existence does not come in degrees. Even if we allow that existence comes in degrees, though, it still doesn't engage with Parmenides's argument, at least as we have suggested it should be interpreted. Parmenides's point is that the past and the future, *as they appear to*

us, are taken to both exist and to not exist. And nothing that Plato says has any bearing on this point.

One significant point that can be extracted from Plato's writings on time is his distinctive conception of eternity. It is perhaps most natural to conceive of eternity as an unending period of time. But this is not Plato's conception. The forms are not eternal in the sense that they go on forever. Rather, they have a mode of existence that is unconditioned by time. They are literally timeless and so temporal concepts simply do not apply to them. So the forms are conceived of as unchanging entities not because they happen not to change, but because it makes no sense to suppose that they do change (at least if we take the existence of change to be sufficient condition for the existence of time).

Time is introduced into the universe, we are told, as the moving image of eternity. But in light of the above understanding of eternity, one might be puzzled. Given that the forms are timeless and unchanging, how precisely is time supposed to resemble them? In order to understand Plato's answer to this question, one must first understand that in Plato's view the universe is a great sphere, with the Earth at its centre, that undergoes perfect cyclical movement: the celestial bodies follow a repeating regular pattern, always returning to exactly the same positions. He considers each cycle of the universe to be a basic unit of time, and thus identifies the passage of time with the movements of the celestial bodies. For Plato, this means that time itself moves and undergoes change, just as the celestial bodies do. It also means that time is divisible into parts, or sub-units, which are identified with the sub-cycles of the celestial bodies. But, precisely because the movements of the celestial bodies are perfectly cyclical, there is a sense in which time considered as a whole does not change. Each unit of time is qualitatively identical with every other unit, and so the series of cycles considered as units do not change from one cycle to the next. It is in this sense that time resembles the eternal forms, for Plato.

1.5. Aristotle

Aristotle (384–322 BC) presents his account of time in *Physics*. He begins with some brief remarks that suggest that Parmenides's conclusion (i.e. that time does not exist) is true. He says that time is made of two parts, the past and the future. But, he says, the past has been and is not, while the future is going to be and is not yet. So, time is made of two parts, neither of which exists, and so it is reasonable to suppose that time itself does not exist. He doesn't seem to take this problem too seriously, however, as he quickly

moves on from it to give a positive account of what time is. Although there is some disagreement among commentators, the likely explanation for this is that Aristotle takes his positive account of time to dispel the worries that Parmenides raises. Once one gets clear about the nature of time, Aristotle likely thinks, one will see that Parmenides's arguments are confused.

In giving his positive account of time Aristotle first rejects the view that the passage of time can be identified with motion (i.e. the movements of any bodies), and thus rejects Plato's view that the passage of time can be identified with the cyclical movements of the heavenly bodies. He gives a number of reasons for this, but the main one is that distinct bodies undergo distinct motions (the motion of a body is, he says, 'in the moving body' itself), but temporal passage occurs everywhere (and so cannot be in the moving bodies themselves). He nevertheless acknowledges his teacher's wisdom on this matter by endorsing the view that there is an intimate connection – as Parmenides and Zeno would also maintain though for very different reasons – between time and motion, and more generally between time and change. He maintains that all motion, and all change, involves a continuous transition from an initial state (a 'before') to a distinct final state (an 'after'). A continuous transition does not consist of a succession of discrete states that follow one after another. Rather, it consists of an ordered succession of states such that between any two of them there are infinitely many others. Each motion (and change) is thus a transition from a before to an after, and in each transition an object passes through a continuous succession of intermediate states that together constitute the transition as a whole. When we experience any motion (or change), Aristotle further maintains, we are able to assign successive numbers to the succession of intermediate states that constitute it, and thus arrive at a numerical value that numbers the motion (or change). And this, maintains Aristotle, is what time is: 'Time is the number of motion [or change] with respect to before and after.' As it is conscious beings who number things, Aristotle thus seems to endorse the view that time depends for its existence on the operations of conscious beings, and so is in some sense subjective. In addition, although he disagrees with Plato that time can be identified with the motions of bodies, he does seem to endorse the view that all talk about time can be reduced, in some sense, to talk about motion and change. One may suppose, therefore, that he thinks Parmenides's argument for the non-existence of time errs in taking time to be something that exists independently of conscious observers and the motions of bodies.

The core of Aristotle's view described above is that time is a numerical quantity that can be applied to, and thus measures, change. But there is a complication. If, as Aristotle held, changes consist in a continuous succession of states from a before to an after, then in fact it is difficult to see how the

successive states *can* be counted by conscious beings. As was just now mentioned, if changes are continuous, then each is constituted by an infinite number of successive states, so it cannot be that we count each of them. But if we do not count each of them, what is it that we count, and how do we so count them? In answer to this problem Aristotle appeals to what he calls the 'now'. This is a curious concept that serves a double purpose in Aristotle's thinking. Although, as we have seen, Aristotle seems to espouse the view that time depends for its existence upon the operations of conscious observers, he also seems to think of the now as being an independently existing entity that is in one sense unchanging and in another undergoes change. Thought of as an unchanging thing, the now is an enduring present that exists wholly and completely throughout each change's continuous succession of states. Thought of in this way the now plays a similar role to the *to apeiron* of Anaximander, as a constant that underlies change. Indeed, Aristotle maintains that the now cannot itself be in time because it is unchanging. Why is this? Because, he says, if it did undergo change then it would be possible to assign to it some number that measures it. But, as it does not undergo change, this is not possible, and so the concept of time does not apply to it. Nevertheless, Aristotle insists, there is a sense in which the now *does* undergo change. It does so in the sense that it stands in different relations to the changes that it underlies. And it is by so doing that the now divides continuous changes and makes counting them possible.

One can perhaps illuminate Aristotle's view here by considering some specific change, i.e. an occurrence involving an object that undergoes a transition from an initial state to a final state, passing through a continuous succession of states along the way. At the beginning of this transition the now is related to the initial state of the change, but as the transition takes place the now becomes related to later states in the succession until it ends up related to the final state. More specifically, at each stage of the transition the now stands in a relation to the continuous succession that divides it into two discrete parts – the part that is in the past and the part that is in the future. (It does so by standing as the end-point and start-point of two distinct open intervals whose union is the whole succession.) So, as a change occurs, the now divides the succession of states that constitute it on an ongoing basis, and when we experience a change it is these ongoing divisions that we count, one after another. So, the unchanging now divides those changes that it underlies (which are themselves continuous successions of states) into discrete countable parts. One might be tempted to conclude on the basis of the foregoing that although change is continuous, time is discrete. But Aristotle denies that this is so. He maintains that because changes are continuous, time itself must also be continuous. When we use the now to divide and number changes, we are thus dividing and numbering time itself.

We have explained the main features of Aristotle's view, but it must be admitted that its details remain obscure. (We note that even recent commentators who have given book-length treatments of Aristotle's views on time have fundamental disagreements about how we are to make sense of them (see e.g. Coope 2005 and Roark 2011).) Nevertheless, it is possible to see that Aristotle's view raises questions that many are still attempting to answer today. One such question is whether time, or its flow, is something that depends upon the operations of conscious observers. We will consider this question again in Chapters 2, 3, 4 and 8. Another question is whether time is reducible in some sense to something more basic (as we will see in Chapter 2, Descartes appeared to take this Aristotelian view). We can also ask whether it makes sense to suppose that anything can strictly *endure* through time (i.e. exist wholly and completely at different moments), as Aristotle in places suggests that the 'now', when considered as an entity in its own right, does. We will consider this question in Chapter 7. Although Aristotle denied that the present (i.e. the 'now') is properly thought of as being in time, he certainly thought that the present itself in some sense changes as time passes. The view suggested is that the present moment is just one point (or, a dividing point) in a series of times that run from the past, through the present, and into the future. On this view, the present moment moves along this series as time passes, but each part of the series is just as real as each other. This and related views will be discussed in Chapters 3, 4 and 5. And there is one final important aspect of Aristotle's view that we haven't mentioned in this survey chapter – his views regarding the open future. We will discuss these in Chapter 6 where they will serve as the starting point into our examination of this topic.

1.6. Augustine

Augustine's most famous work, *The Confessions* (Augustine 2001), is also one of the hardest to classify texts in the history of philosophy. The majority of the work takes the form of an autobiographical reflection concerning, among other things, Augustine's conversion to Christianity but it also contains some extended philosophical discussions. The most important of these is found in chapter 11 of *The Confessions* and concerns the nature of time. There are a number of features of this chapter worthy of discussion but we will content ourselves here with noting two points which tie in closely to some of the issues we will discuss in later chapters.

The first of these concerns the puzzle of why God created the world when he did (a puzzle which has clear links to some of the debates between

substantialists and relationists which we will discuss in the next chapter). Augustine and his contemporaries accepted a view according to which God is eternal and has always existed while the universe, by contrast, was caused to exist at some point in the past by divine action. Given this, though, we might reasonably be inclined to ask what God was doing during the infinite stretches of time before he created the universe, and why he didn't create the universe a moment, or a millennia, earlier (or indeed later) than he actually did. It seems as if we must say either that God had some reason for choosing the precise moment at which he created the universe or else that he did not. Yet, neither option looks appealing. If we say that God acted without good reason in choosing the moment he did then this seems to undermine some important theological claims concerning God's wisdom. Surely, an all-wise being would not (indeed could not) act in such a capricious fashion. If we say that God did have some reason, though, then we are faced with the perplexing task of determining what this reason could be. What could possibly make *that* precise moment stand out from the infinity of moments which preceded it as the best time to create a universe?

In deciding how to respond to this challenge Augustine (ibid.: 269) quickly rejects the famous response that God spent his time before creating the universe 'preparing hell for people who ask questions too deep for them' (correctly noting that such a flippant dismissal is unworthy of serious philosophical inquiry). Instead, he suggests that the way in which the problem is set up misrepresents God's relation to time. We should, Augustine thinks, deny that there was any period of time at all (let alone an infinite period of time) before God created the universe (ibid.: 270). Rather, we should hold that the first moment of creation was the first moment *simpliciter*. It was not only the moment at which God created the universe but also the moment when he created time. To say that God is eternal, then, is not – as the hypothetical objector mistakenly supposes – to claim that God occupies an infinite number of past and future times. (Rejecting such a view of divine eternity is exceedingly important for Augustine, not only because it provides a response to the worry we are considering but also because, as we will see below, Augustine takes both the past and future, and their contents, to be unreal. Parts of our ordinary human lives pass into non-existence as time passes but, Augustine claims, such an existence would be unworthy of a divine being.) If we are not to think of God's eternity in terms of his occupying an infinite number of past and future times, though, then how should we think of it? Augustine's answer to this question is rather difficult to decipher and he relies heavily on some rather opaque metaphors concerning God's relationship to time: claiming, for example, that we should say of the different 'moments' of God's existence that they 'abide together at once' and that all times are equally present for him. This view of God's eternity is certainly a puzzling one,