

## Part I

# The History of the Philosophy of Time

COPYRIGHTED MATERIAL



# 1

## Heraclitus and Parmenides

RONALD C. HOY

Once upon a time, two giants of the ancient Greek world expressed contrary views of time – views so fundamental and provocative that they continue to resonate in contemporary debates about the nature of time. Neither Heraclitus nor Parmenides wrote explicit theories of time. Instead, they wrestled with a basic philosophical problem: do our ordinary, “common sense” beliefs accurately represent reality, or do they distort it for the convenience or flattery of mere mortals? Both rejected in harsh terms many common beliefs. Both put forward alternative radical metaphysical views. What makes their claims important for later students of time is that Heraclitus and Parmenides each fastened upon some problematic aspect of the temporality of the world, and they each made what bothered them central to their dramatic rejection of common beliefs. Importantly, they focused on different features of the human experience of time as the source of metaphysical error. In their different ways, they articulated views of time so different and provocative that philosophers and scientists can find themselves still wrestling with the same issues, and, in effect, taking sides. Or so the story has been going for about 2500 years.

### 1. The Given Temporal World of Mortals

Neither Heraclitus nor Parmenides wrote much, and what they did write is challenging: oracular, poetic, and obscure.<sup>1</sup> In the fifth century BC, people made a distinction between the mortal and the divine, but the divine was not primarily transcendent as often later understood. Rather, the divine is immanent, and its primary defining quality is to be *everlasting* (or eternal or immortal). The Greek gods were not transcendent, always nice,

or infallible, but they were usually assumed to be divine in the sense of everlasting or eternal. Humans are mortal and attempt to last for as long as possible, often by trying to understand challenges or forces that are divine. The ancient Greeks were beginning philosophy (and natural science) by beginning to conceive the divine (the eternal) in non-anthropomorphic terms. They began to formulate possible explanations for the cosmos and its changes in terms of the properties of water or fire, for example, without hubristically assuming that water or fire have personalities like humans, or, that their behavior is being directed by a super-person. But this was a start and stop process, and the ancients made frequent use of reference to gods – especially in more oracular and poetic writing. Both Heraclitus and Parmenides did so. But their literary use of gods is not crucial to their philosophical challenges. Even if Greeks believed that Zeus (being eternal) knows more about time than we mortals do, the problems Heraclitus and Parmenides find do not stem primarily from our not being Zeus (from our not being eternal). Rather, they stem from philosophical (or logical) puzzles that challenge common beliefs, ones that mere mortals can discover and try to solve.

To start, we need a brief summary, a brief characterization, of “common temporal beliefs.” Do we have to go back and try to recover the temporal beliefs of the average Greek of 2500 years ago? No. Both Heraclitus and Parmenides were profoundly right about one thing. They both suggested that even after people have been told the truth (i.e., their new radical theories) mere mortals will likely persist in their “two-headed” (or “blind” or “deaf” or “asleep”) beliefs. That is, they will continue the kind of common temporal narrative (or story) with which Heraclitus and Parmenides will each find different faults. If they are right, we should be able to characterize a cluster of common temporal beliefs (common to ancients and moderns) using contemporary idioms. Let’s try.

Evolution has equipped humans with sensory systems able to register their more or less local environment. We can see, hear, and feel what is around us at some time. So we believe things like, “I see the Youghiogheny River.” These sensory systems are useful for coping with present opportunities and dangers, so these deliverances have an imperative character and are indexed with the emphasis, “I see the river *now*,” or, “I see an angry bear *now*.” Evolution has also equipped us with considerable memory capacity and an ability to model (plan for) alternative futures: “This is the same river I fished successfully last year with caddis flies, so if I want to catch fish tomorrow perhaps I should get some caddis flies.” We typically believe there is some determinate (fixed) Past, and some indeterminate and open Future, one that we believe we can influence.<sup>2</sup> We believe that the same objects can be in the past, the present, and the future: “I am the same person that caught fish in this same river last year, and I will be the same person that catches fish in this same river tomorrow (I hope and predict).” Moreover, evolution has biased successful humans with more or less urgent concern about the future: “don’t dwell on the past, the hour is late, we better hurry and get those flies now.”

Next, future things (whether events or objects) seem to be in some way “moving” constantly closer to us – or to the Now – or, perhaps it is we and our present that are constantly moving towards them (whatever they are). Whatever, time is commonly thought to be in some way dynamic and asymmetric. Or so it seems to be given in our experience, in both our perceiving and our thinking.

According to such narratives, evolution has enshrined this dynamic temporal perspective in our “ordinary language” or in our “phenomenology.” Our ordinary language, some will say, is irreducibly tensed, marking both linguistic and ontological distinctions between the past, present, and future. And if all human experience (including all knowing) must conform to *a priori*, phenomenological “structures of consciousness,” then this dynamic temporal perspective must be fundamental in some way. These claims are controversial. The point here is simply that the kind of simple temporal beliefs we have been discussing are the same kinds of belief “common mortals” held back in the time of Heraclitus and Parmenides.

There is one more kind of common mortal belief involving time that should be noted. It might not be quite so common since it involves more abstraction. Suppose last year Tom catches three trout in the morning and two in the afternoon. Then the belief, “Tom caught three trout earlier than he caught two trout (on such-and-such a day in such-and-such a year)” will *always* be true, no matter whether or how time “moves.” Suppose there are three bettors who want to wager that on a specific day Tom catches three trout in the morning and two in the afternoon. Suppose the three bettors put their wagers in the form of a “tenseless” sentence: “Tom’s catching three trout by noon is earlier than his catching two after noon on June 3, 2011.” Suppose one of the bettors is a contemporary of Parmenides, one is a contemporary of Tom, and the other is Tom’s great-great-granddaughter (Tom being dead). Do the three bettors make the same wager; do the same facts make their wagers true or false? If you are inclined to think this is so, then you might be inclined to believe that there are some eternal truths *about* the temporal world, for example, beliefs about the earlier-than/later-than relations amongst specific events. In other words, you might be inclined to believe that there are some truths about the temporal world that are not themselves subject to the “movement” of time and for which the distinction between the past, present, and future is irrelevant.<sup>3</sup>

We might be at risk of straying from “common” mortal thoughts about the temporal world. Perhaps many people never consider the eternal character of such earlier-than/later-than beliefs. But it is common knowledge that there are eternal truths that constantly *apply* to the temporal world. The paradigm is mathematics. Whenever you catch three fish and later two fish, you have caught five fish. It seems common knowledge that three plus two equals five, not just now but always.

To review: mortals have a complicated tool kit of “common” beliefs involving time. They believe the same things can exist in the past, present and future, and these different “parts” of time have different characters and imperatives. They believe that time (including the parts of time) in some way “flows,” so that things are constantly changing their relation to a special time called the present, or the Now. Yet they also can recognize that there are some truths – including some truths about time – that are not dependent upon temporal location nor subject to change in time. This package of common understanding of time is what Augustine meant when he famously said:

what in discourse do we mention more familiarly and knowingly, than time? And, we understand, when we speak of it; we understand also, when we hear it spoken of by another. What, then, is time? If no one asks me, I know: if I wish to explain it to one that asks, I know not.<sup>4</sup>

## 2. Heraclitus Embraces the Flux of Becoming, Making It and Its *Logos* Divine

Heraclitus taught a comprehensive philosophy, taking stands in what later would be called epistemology, metaphysics, or ethics. Here we will try to focus on claims that illuminate what he takes to be true about time. But even in his own time, Heraclitus was referred to as “the riddler,” or “the obscure.” Posterity works with fragments of a collection of epigrammatic, poetic, oracular declarations – riddles. During the subsequent 2500 years, Heraclitus has been interpreted in a variety of more or less controversial ways. Depending upon their location in some other philosophical context (in religion or cosmology or ethics, for example) later philosophers have likely made many anachronistic mistakes. It is the large job of scholars specializing in ancient philosophy to track these interpretations and diagnose their mistakes. In this small space, the aim is to try to discern the character of Heraclitus’ “view” of time to see if he foreshadows or provokes later theories. This project flirts guiltlessly with anachronism. It will be a bonus if it helps clarify some of his riddles.

Heraclitus’ work begins with a declaration of success combined with pessimism about being understood:

This *logos* holds always but humans always prove unable to understand it, both before hearing it and when they have first heard it. For though all things come to be [or happen] in accordance with this *logos*, humans are like the inexperienced when they experience such words and deeds as I set out, distinguishing each in accordance with its nature and saying how it is. But other people fail to notice what they do when awake, just as they forget what they do while asleep. (Fragment 1. McKirahan 116.)

“*Logos*” is an ancient Greek word that translators rarely translate.<sup>5</sup> Here it can be taken to mean both the general principle or rule (or measure or proportion) according to which all things happen *and* Heraclitus’ words or account of this general principle. Heraclitus claims to have discovered the true *logos*, but he says people will be like the “inexperienced” when they experience his words. Though the *logos* is common (applying to all things, including all people’s experiences), people fail to understand it as they should even when their attention is drawn to it – as though they live in their own dream worlds.

Heraclitus proceeds to offer a dizzying variety of epigrams and oracular riddles covering a wide variety of topics: from war to meteorology to eating and more. Later philosophers are challenged to understand the *logos* that covers them all, and there is no shortage of controversy.

Let’s jump into Fragment 67:

God is day night, winter summer, war peace, satiety hunger; he undergoes alterations in the way that fire, when mixed with spices, is named according to the scent of each of them.<sup>6</sup>

There is some scholarly discussion of what “god” means here. Most point to some immanent “sum of all things” conception. And Heraclitus says that the cosmos is not made by the gods and is the “same for all”:

The KOSMOS, the same for all, none of the gods nor of humans has made, but it always was and is and shall-be: an ever-living fire being kindled in measures and being extinguished in measures. (Fragment 30, McKirahan 1994, 124.)

Notice that the cosmos is uncreated and eternal. For Heraclitus, it is divine. Not worrying, then, too much about the exact sense of “god” in Fragment 67, consider its weaker implication (substituting “the eternal” for “god,” call it 67’):

(67’) The eternal is day night, winter summer, war peace, satiety hunger; it undergoes alterations in the way that fire, when mixed with spices, is named according to the scent of each of them.

We can do more. Fragment 30 refers to the past, present and future, but what makes the cosmos eternal is that it *always is* what it is (an ever-living fire). Let’s try reading (67’) in a way that emphasizes the present as if what is “common” for all mortals and immortals is at least the omnipresence of the present: what is eternal is always what is *now*. So substituting “the always-present” for “the eternal” we get the implied:

(67’’) The always *present* is day night, winter summer, war peace, satiety hunger; it undergoes alterations in the way that fire, when mixed with spices, is named according to the scent of each of them.

We have already seen that “common mortals” believe they *perceive* what is present, what has become Now. *Sensory* forces focus mortals on the present. In this regard, Heraclitus sides with the common. Indeed, we can classify Heraclitus as a pre-Socratic empiricist, a philosopher who puts his trust in the deliverances of sense perception: “All that can be seen, heard, experienced – these are what I prefer” (Fragment 55, McKirahan 1994, 119). Notoriously, though, the perceptual present of humans has a *durational* character. People report they *perceive* as “now,” for example, about a thirtieth of a second of the before *and* after states of moving, changing objects (for example, the streaking of meteors, the flickering of flames). Later, the perceptual present will be called the “psychological” or “phenomenological” present, and it will be contrasted with strict one-dimensional orderings of simultaneity. Some later philosophers and scientists will protest that before *and* after states (or any temporal sequence of states) cannot really *co-exist* in a strict present, so mortal perceptions of the present must be “specious.” The human perceptual present (or experienced present) is a *specious* present.<sup>7</sup> It is important to notice that Heraclitus shows no inclination to worry about *this* problem; this will not be the source of his complaints about mortal understanding. Instead, he *endorses* the reality of the ostensibly given, and struggles to articulate the *logos* he finds in it. What he finds is the *logos* of flux (of transition, of change). So, using anachronistic terms, let’s try to interpret Heraclitus as giving metaphysical priority to what is given (or presented) to mortals in the specious present. “All that can be seen, heard, experienced” involves co-presented transitionings – the *flux* of day night, winter summer, war peace, satiety hunger.

Heraclitus was not the first to notice the regularity of the succession of opposites cited in Fragment 67. He was not the first to notice that human experience is pervaded by tensions between opposites. His epigrams and riddles, though, have driven some

scholars to feel that Heraclitus had some novel doctrine of the “identity” of opposites. (Well, if god is winter and summer, is not winter identical with summer by the transitivity of identity? Isn’t the same then true for all the opposites Heraclitus mentions?) Or they are driven to some interpretation emphasizing the “unity” of opposites (what would satiety be without hunger, peace without war?). Heraclitus’ epigrams are obscure and poetic enough that they can be read in these and other ways. Let’s try to find an interpretation that highlights better the importance of Heraclitus’ view of time, one that does not instantly convict him of absurdity or triviality.

First, consider an example that is not primarily temporal. Fragment 60 says “The road up and the road down are one and the same” (McKirahan 1994, 122). Is Heraclitus identifying the opposite directions, up the road and down the road? Of course not; if he was hiring a taxi to go down to Samos, he would not accept the opposite. Rather, he is saying that the road that one can take to go up is also the road that one can take to go down. It is the same “venue,” so to speak, that might be full of travelers going different directions. At some level, all travelers know this, but as if “asleep” they might think or say the road they are on is just the one going their way, the one down to Samos (“the highway is *my* way”). If Fragment 60 is deep it is not because it identifies opposites, but rather because it identifies (locates) the venue for opposite journeys, or processes. Is it a hint that we should apply the same kind of analysis to solve other riddles?

Back to Fragment 67 (or 67’). According to the “identity of opposites” interpretation, Fragment 67 is a contradictory identification of opposites. Who would be fooled by this? Would Heraclitus be able to calm or cool the populace (or himself) during a summer heat wave by chanting, “The divine is summer and winter, so summer is winter”? Would he calm them (or himself) during an unpleasant war by saying, “The divine is war and peace, so war is peace”? There is a better, more temporal, way to try to interpret Fragment 67. First, one can try to see in it the championing of universal laws of succession. But even if Heraclitus deserves credit for the insight that such laws might be expressible in terms of “exchanges” for fire (or energy or calories) (Fragment 30), the regularity of such natural cycles was old news even in Heraclitus’ time. So what really might be going on here? The Fragment points to what always is, and gives us pairs of opposites. The translation used here omits the logical connective “and” between the opposites, so there is no compulsion to read (67) as a logical contradiction: the present is [now] day and night, winter and summer, war and peace, . . . . If the logical connective “or” were inserted we would get the trivial: the present is [now] day or night, winter or summer, war or peace . . . . Instead, suppose Heraclitus has used the pairs merely to *point to* the ever present flux ongoing between the pairs. What is eternal (what is divine) is *just* flux (and its *logos*).

It is part of common mortal experience that everything changes and that time does not stop. Heraclitus has declared this (and perhaps a bit more), but what do mortals do? Again, they will act “inexperienced” or “asleep.” At times, they will suppress the truth, “it is *changing* from summer to winter,” and instead they will say dreamily, “it is summer.”<sup>8</sup> Let us suppose that Heraclitus is, in effect, proposing that the present, or more precisely his reification of the specious present, is the *venue* of constant change and that is where divine *logos* is to be found.

At this point, the common mortal might just yawn and protest: “What’s the big deal? Do we need philosophers to remind us that time constantly changes what is – that



reality ceaselessly cycles between opposites. Of course we try to arrest the passage of time! That's why we take pictures; here, do you want to see one of me catching a trout in this river last year?" But Heraclitus is not done. Consider his most famous claim: "You cannot step twice into the same river."<sup>9</sup> A typical response is just to do it: one steps in, steps out, then steps in again. But everyone agrees that rivers are *flowing* bodies of water. Strictly speaking, the collection of water molecules you step into the second time is a *different* collection of molecules. As Fragment 12 puts it "different and again different waters flow" (McKirahan 1994, 122).

Here is where debates about what constitutes the "identity conditions" of rivers begin. If one tries to find some natural object or feature that remains constant, Heraclitus will protest that it too is *really* constantly changing (whether it be the shape of river banks, points of beginning or ending, or . . .). Of course, after 2500 years of reflection we have no *practical* problem identifying and re-identifying rivers: we can work with broadly functional definitions that allow for variations in water flow, contaminants, pH, new dams, or reengineered courses; and we can supplement the work of hydrologists, geographers, and engineers with forensic or legislative decisions (social conventions). Only children in Pennsylvania wonder at the phenomenon whereby when the waters of the Monongahela meet the waters of the Allegheny both rivers disappear, like colliding anti-particles, and create the Ohio River. However, these *pragmatic* or *forensic* points risk missing what, for Heraclitus, might be key to his metaphysics. Let's use modern technology to try to make his point. Today we could monitor the state of water flow (multiple derivatives of its flux, its pH, the shape of banks, etc) at multiple points, second by second (or even more often). We could record all this data and store it (in a cloud) for later retrieval. We could associate each "river stage" with a number. We could devise algorithms for plotting and mapping so that a host of comparisons could be made. We could then decide (depending on our purposes) what track through all this data we want to correlate with the pragmatic (but lazy) "the same river." Here would be Heraclitus' response: what we have recorded is a *history* constituted by *different* stages of flux, a record of different things (different "river"-stages). If what *really* exists, at bottom, is only what exists in the present, then technology has merely corroborated Heraclitus' *perception*, showing us that "what is" at different times is never (strictly) the same. "River"-stage number  $x$  is *not* "river"-stage number  $x + 1$  (nor any other). *Logos*-tutored perception (and technology enhanced science) reveal: what is is flux, not the endurance of identity preserving things! Should we generalize? "No thing endures – the only immortal is flux and its *logos*!"<sup>10</sup>

There are more details, more controversies. By the first century AD, another person called "Heraclitus" says of Heraclitus: "And again he says: 'We step and do not step into the same rivers, we are and we are not'" (Fragment 49a, Guthrie 1962, 490). *We are and we are not?* We are at one time, and at some other time not (since we are mere mortals). But is the implication here that we too are like rivers, that whatever constitutes "a person" in time, in the Now, is never the same?<sup>11</sup>

Heraclitus' tendency is to analyze the *apparent* and *temporary* unity of individual things in terms of more elemental, opposing forces. So what one might think is a stable (peaceful) object, enduring, is really a state of war – indeed, a *flux of war*. His most famous example is the archer's strung bow (see Fragment 51). Leaning against a wall, it looks like a single stable, enduring object. But the string is pulling against the

wood. The bent wood is pulling against the string. Moment by moment, the string and the wood are imperceptibly changing and weakening. Eventually, one will break, and the strung bow will be no more. There were, at times, composite structures, but only because at those times the components were at war. For Heraclitus, war–peace is one of many pairs of opposites, but the opposites are not equal: “It is necessary to know that war is common and justice is strife and that all things happen in accordance with strife and necessity” (Fragment 80, McKirahan 1994, 124). If there are forces for peace (perhaps even an apparent state of peace) they must be opposing (fighting) war, or forces for war – so there is really strife when there is apparent peace (or justice). At bottom, war rules: “War is the father of all and king of all . . .” (Fragment 53, McKirahan 1994, 124). Heraclitus’ flux has become a bit dark. Fire and war are agents of change, and change replaces or destroys “things” in the flux. If “all things are an exchange for fire,” it seems they also must be exchanged back for fire. “For fire will advance and judge and convict all things” (Fragment 66, McKirahan 1994, 124).

Heraclitus’ philosophy is the result of taking a particular view of time *very* seriously. Beginning with the common belief that reality is primarily constituted by what exists in the present, he takes the present to include what is presented in perceptual experience. When he examines what is presented he finds primarily flux, ceaseless change. He finds not only the opposites involved in change, but also the co-presence of these opposites. It does not bother him that such co-presence might, in cases of succession, violate the logic of temporal order. Instead, he is transfixed by the *logos* he *sees*. It does not bother him that his articulation of this *logos* seems to attack the endurance and identity of things common mortals take to persist through time. He pessimistically expects mortals to be “deaf” (or to live in their “dreams”) after hearing his words: “They are at odds with the LOGOS, with which above all they are in continuous contact, and the things they meet every day appear strange to them” (Fragment 72, McKirahan 1994, 117). Does this *logos* make the world too chaotic, too unstable, for “child-like” mortals? Never mind. Heraclitus’ perspective is divine: “The most beautiful KOSMOS is a pile of things poured out at random” (Fragment 124, McKirahan 1994, 122).<sup>12</sup>

### 3. Parmenides (the Opposite of Heraclitus) Rejects Time

One way to classify Heraclitus is to say that he is one of those philosophers (perhaps the first, but not the last) who finds reality veridically given in the temporal flux of perceptual experience *and for whom ordinary-thing language and logic are inadequate to express what is found*. So he resorts to poetry and paradox. He *seems* to embrace contradictions. But the consideration that time (or some aspect of time) is contradictory might give rise to the opposing thesis that time (or some aspect of it) is not real. Enter Parmenides.

As the opposite of Heraclitus’ *logos* of perceived temporal flux, it is common to read Parmenides’ *logos* as logic – Parmenides as the champion of fixed, time transcending logic. Ironically, Parmenides’ vehicle for his logic is a philosophical *poem*. In this poem, a goddess offers guidance to a mortal, presumably on a quest for truth. The framework uses the metaphor of apparent “ways” (or paths or routes or roads). The perspective of

the goddess is divine and celestial; the mortal meets her only after traveling in a chariot on a highway in the sky. At first she says there are two apparent routes:

(Rt. 1) It is.

(Rt. 2) It is not.

But then she makes reference to a third:

(Rt. 3) It is, and it is not.

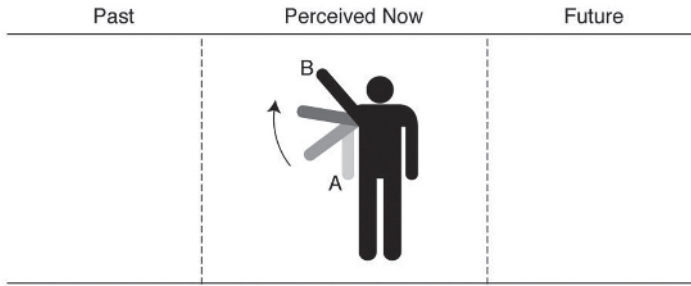
Finally, she warns the mortal about what we might call the Route of Best Mortal Cosmology (Rt. BMC). Though much is controversial, the goddess' main message is clear: Rt. 1 is the *only* route to truth.

Indeed, it is not even clear that routes 2, 3, and BMC are really distinct routes.

Imagine driving on a highway, approaching an interchange, and you see signs announcing the four apparent alternatives: Rt. 1 or Rt. 2 or Rt. 3 or Rt. BMC. The goddess' warning, in effect, is that if you try to take either Rt. 2 or Rt. 3 or Rt. BMC you will come to the *same* end – a dead end. You will have chosen what is really no road at all. You will have to turn back. From the point of view of the goddess, Rt. BMC might be just an instance of Rt. 3, and Rt. 3 might be just an instance of Rt. 2. Like Heraclitus, Parmenides seems pessimistic about mortal understanding: perhaps even after hearing the difference between Rt. 1 and Rt. 2, and after hearing the wonders revealed on Rt. 1 (after hearing Parmenides' *logos*), mortals will still wander like "dazed, indiscriminating hordes" and choose paths that are "backward turning." So perhaps also warning against Rt. 3 and Rt. BMC will help some slow learners.

One of the wonders revealed on Rt. 1, is that what is real ("what-is") is not temporal *at all*. Not only is it uncreated and incapable of "perishing" (so it qualifies as divine in the ordinary Greek sense), it is not subject to any change, to any form of becoming. It is not just that it always exists in the present; more radically, *there is no becoming* – no transition from future to past for it. Parmenides argues that what is has other impressive features, including that it is one (later, the "One"), complete, and homogeneous. This package of wonders is so wonderful that it is a package ascribed to several later metaphysical aspirants: the Atomists' atoms, Plato's Forms, and the monistic gods of transcendent theologies. Here, our concern will be just Parmenides' argument that "what-is" cannot be temporal. Time for some details.<sup>13</sup>

How should we begin to think about Rt. 1, (also variously referred to as "the Way of Truth" or "the Route of Persuasion"). How should we read the solemn and singular, "It is"? Let's try a minimal interpretation and suppose that the "it" initially refers to whatever exists or obtains, whatever it turns out to be or to be like. Then, Parmenides' starting point is the tautology, "whatever exists, exists," or "what-is, is." It would be wrong to complain this is just a tautology because Parmenides goes on to try to show how people unwittingly contradict it (Guthrie, vol. II 14ff.). Indeed, being contradictory is what marks the wrong paths as wrong right from their start: "that it [namely, what is] is not . . . is a wholly indiscernible track" (Guthrie 1962, 13–14). Substituting "what is" for "it" in Rt. 2 gives us, "What is is not," a clear contradiction. Any ostensible thought that attempts to posit that what is is not will fail to take one to Truth: "what

**Figure 1.1**

is, is” might seem a small step towards Truth, but “what is, is not” is *no step at all* – it is “two headed” and “backward turning.” (Parmenides seems to hold that contradictions cannot be authentic beliefs: if someone claims to believe “P and not-P” don’t they take a step in the direction of P and then take that step back, going nowhere – believing nothing?) Amazingly, it is by rooting out contradictions in merely *ostensible* thoughts that what is is temporal that he reaches the *conclusion* that what is must be atemporal – that time is not real. (Similarly, finding contradictions in ostensible thoughts that what is is created or many or incomplete will lead him to the conclusions that it is uncreated and One and complete.)<sup>14</sup>

To begin to understand what might be contradictory about mortal beliefs involving time, let’s try to apply the goddess’s teaching to Heraclitus’ embrace of time, first to the flux of change ostensibly given in present perceptual experience. Consider the simple case of watching someone quickly sweep his arm from low to high. The movement of his arm takes a fraction of a second, and observers will typically say they saw it move all at once. They will claim to *see* (not deduce) the *motion* of the arm from low to high. Pictorially, see Figure 1.1.

Consider the first position of the arm, position A, at the beginning of the motion. Then consider any other position, B. At the start of motion, A is “what is,” and every other position is “what is not.” But as the motion proceeds, B is what is and A is what is not. If perception gives us motion, A cannot *continue* to be what is (if A continued to be what is, the arm simply doesn’t move). So if the present moment of time is a Heraclitean flux, A is both what is and what is not; and B is both what is not and what is. There are multiple contradictions here, so this seems to be a case of Route 3 mortal belief against which the goddess warns:

[I also hold you back from the way] on which mortals wander knowing nothing, two-headed; for helplessness guides the wandering thought in their breasts, and they are carried along, deaf and blind at once, dazed, indiscriminating hordes, who believe that to be and not be are the same and not the same; and the path taken by them all is backward-turning (KRS 247).

Generalizing, if someone agrees with Heraclitus that *every* moment of time, *every* present, *contains* the *flux* of opposites (if it contains change or motion as presented in what will later be called the specious present), then one is trying to say *both* that the

being of A and B states are the same *and* not the same. Heraclitus' problem is not merely that he has made the mistake of being on Rt. 2 and attempted to say that what is is what is not. He is so dazed he does not realize that he is treating them as the same and not the same; he is so indiscriminating he does not seem even to see the difference between Rt. 1 and Rt. 2. This is what puts him, at this point, on Rt. 3.

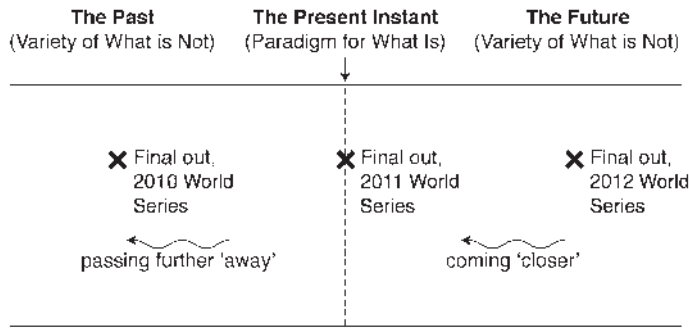
Parmenides' goddess is strict: reality cannot be contradictory. Heraclitus' reality is a temporal flux teeming with contradictions. Therefore, it cannot be real, cannot be what is.<sup>15</sup>

So far I have used Heraclitus' view of time as a kind of straw man, one that is easy to use to illustrate Parmenides' opposition to trying to say what is is not. Actually, Parmenides' skepticism about time is deeper and more general than so far indicated. To feel the full force of Parmenides' rejection, let's take a moment to try to rehabilitate present moments.

As noted above, Heraclitus' view of time can be seen as an attempt to take what will later be called the "specious present" (or the "psychological" present) as the true present (i.e., as non-specious). Why not rescue the present (and time) by simply admitting that the experienced present is specious? So, in reality, states (times) that are successive are not really co-present, even if they are somehow co-presented via some strictly present cognitive representing. Thus, arm-in-position A is what is *before* arm-in-position B is what is. Really, arm-in-position A is *in the past* when arm-in-position B is present. In this way, it might be suggested, we could at least avoid the contradiction of saying that state A is what is and what is not at the same time ("in the same Now"). This modification seems to require that the real present is a *strict* present, one in no way embodying any pseudo-durational flux *during which* motion and change are accomplished.<sup>16</sup> If the present can be cleansed of contradictions (if instants of time can be so cleansed), can we not then view time as simply the passage of (strict) times from the future to the present and then into the past? In this way, can we believe reality is temporal without wandering onto Rt. 2?

Or are we still "two headed" and "backward turning"? It will depend upon how we understand temporal passage (or Becoming). Recall from the above survey of common mortal beliefs about time, some of the metaphysical distinctions implicit in these beliefs. There are future events (or things) that do not exist yet, and we can make true predictions (or bets) about them. When future events become present, then they actually exist. But as soon as they become present they slip into the past, a region where their existence becomes a shadow of its former self. Yet, we can continue to express true propositions about them. So we have the "mortals'" picture of time shown in Figure 1.2.

This diagram is simple, but it needs some commentary. It is an attempt to picture truth conditions for what is actually true at that special time when the last out of the 2011 World Series happens. Obviously, that event is later than the last out of the 2010 World Series, which is (then) in the past. Obviously, it is earlier than the last out of the 2012 World Series, which is (then) in the future. Simply having a region for past things and a different region for future things does not, however, capture the common belief that there is something dynamic about time – that future things are getting closer to becoming actual, and that past things are becoming further away from what is actual. So, we have added the wiggly arrows to indicate the direction of this coming to be, or "passage." The arrows also indicate the ephemerality of what is present. In the diagram,

**Figure 1.2**

the arrows seem to attribute the dynamism (the flow) of time to objects or events, as if they are moving to the left. Another way to picture the flow is to reify the frame, Past–Present–Future, and to slide this whole structure to the right (then the arrows would point in the opposite direction). This might be a better picture of what our brains seem to do. But here the main issue concerns the two-headed character of things in the picture, and either reading will work.

Now, if you have been listening to the goddess you can probably already see what she is going to reject. Listen some more:

It [what is] never was nor will it 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 to 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 the nothing to grow? Thus it must be completely or not at all . . . And the decision about these things lies in this: it is or it is not. But it has in fact been decided, as is necessary, to leave the one way unthought and nameless (for it is no true way), but that the other is and is genuine. 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. (KRS, 249–50.)

Commentators are sometimes content to read Parmenides here as simply objecting to there being a time when “nothing,” or a void, would be what is if there is either a time when reality comes into being (“birth”) or a time when it is “extinguished.” However, merely to worry about “nothing” is to miss the generality of Parmenides attack on *all* coming to be and perishing of *whatever* it is that is what is (which might, for all mortals know, include the much disrespected void) (Hoy 1994, 576–82). It is to miss Parmenides attack on time as becoming – the time pictured in Figure 1.2.

Try the following as a goddess-inspired attack on time as pictured above:

(1) To try to think of what is becoming, is to try to think there is some past (to precede what becomes), and, it is to try to think there is some future (from whence what becomes issues) – that is, it is to try to think the past and future are part of what is.



- (2) But mortals also say the future is what is not (or what is future is what is not).
- (3) So, to try to say or think there is some future (or to think of what is as future), is to try to affirm both what is said to be what is and what is said to be what is not (namely, the future).
- (4) It is impossible (and forbidden) to think what is is not (or, what is not is).
- (5) Therefore, no future is really thinkable.
- (6) Since what is must be thinkable, there can be no future.
- (7) Similarly, mortals also say the past is what is not (or, what is past is what is not).
- (8) So, again, to try to think there is some past (or to try to think of what is as past) is to try to affirm both what is said to be what is and what is said to be what is not (this time, the past).
- (9) This is impossible, therefore there can be no past.
- (10) Therefore, there can be no becoming (or coming to be or genesis) of what is.
- (11) Similarly, for what is to perish (or cease to be what is) what is must come to be past.
- (12) But there is no coming to be (10), and there is no past (9).
- (13) Therefore what is cannot perish.
- (14) "Thus coming to be is extinguished and perishing unheard of."

Looking back at Figure 1.2, what the goddess has done is erase the labels "The Past (a variety of what is not)" and "The Future (a variety of what is not)." She has also erased the wiggly arrows indicating temporal becoming or passage. *Time as commonly understood by mortals is gone.* What we are left with is whatever is "all together" and "complete."

Parmenides' rejection of time is complete. Using the admonitions of the goddess he can reject Heraclitus' flux – what is given in perception harbors contradictions. And the common mortal belief that there is a metaphysical distinction between past, present, and future – plus passage between them – is also exposed as two-headed and backward turning.

Being skeptical about the ultimate reality of time for reasons of logic is a theme that echoes in latter philosophy. Kant, for example, argues that time is merely an *a priori* form of human sensibility. It is both a form of "inner sense" and an aspect of how we experience and construct the empirical world. But he is adamant that noumenal reality (the reality of "things in themselves" or, we could say, *what is in itself*) is not temporal. Why? In the Antinomies section of *The Critique of Pure Reason*, he argues logic reveals that the extension of temporal concepts beyond mere objects of human sensibility leads to contradictory conclusions (a form of the goddess' charge of two-headedness) (Kant 1965, 384ff.) Later, J. McTaggart makes a distinction between time as series of earlier than/after than relations (what he calls the "B-series") and time as a series of past/present/future determinations (what he calls the "A-series"). He claims the B-series fails to capture the essence of time because it contains no real change, but the A-series involves the assignment of multiple, contradictory A-determinations (Hoy and Oaklander 2005, 44–54). Again, the claim is basically that time is not real because it is contradictory.

#### 4. Post Heraclitus-Parmenides, and Best Mortal Cosmology

Both Heraclitus and Parmenides were pessimistic about mortals changing their ways of thinking and talking. They were right. In regard to Heraclitus, we have continued to believe in the endurance of identity-preserving objects; very few people have adopted the radical ontology of events or processes as fundamental, and those who have still talk in the idiom of the common. In regard to Parmenides, we have continued to talk about the future and the past and to blame our finding ourselves in a different state (of body or mind) on the passage of time: “where has the summer gone?” or “where did the time go?” As noted at the start, there are probably evolutionary or pragmatic explanations (and even justifications) for such mortal two-headedness. Both in philosophy and in cosmology, however, the very different views of Heraclitus and Parmenides have continued to find champions. This final section will highlight some ongoing, opposing themes.

##### 4.1. *Temporal Consciousness*

Heraclitus was right when he pointed to the ostensible givenness of perceptual (or experiential) flux. If a philosophy takes such givenness as epistemologically foundational, then there is some effort to elude or minimize the kind of contradictions that trouble Parmenides. Perhaps Henri Bergson is the best example. Though a mathematician, he complained that any “geometrical” or mathematical or logical-conceptual analysis of time is a falsification of time. Instead, he advocated a purely intuitive (non-conceptual) experience of the flux of Duration (or Absolute Becoming) as the only way to know the reality of time (Hoy and Oaklander 2005, 34–43).

If, on the other hand, one is troubled by the contradictions that seem to make the experienced present specious, then one might try to find an explanation of temporal consciousness that is not infected with contradictions. These explanations will be part of a larger theory of consciousness, and there are a variety of these many tending to call themselves scientific. Typically, the ostensible unity of a state of consciousness is replaced by a temporal sequence of theoretically posited component states. Early in the twentieth century, both C.D. Broad and E. Husserl came up with such theories (though they worked in different epistemological traditions and had different views of what made their theories part of a “scientific” philosophy).<sup>17</sup> Today, cognitive neuropsychologists might posit brain states or modules that do the kind of jobs to which Broad and Husserl pointed. But wait. Even if science can achieve an account of brain states that explains how they can be representations of *time*, how should the temporality of *those states* be understood: they seem subject to the distinctions of past/present/future and to the passage of time. The dominant intuition is that we live in only one main state of consciousness, the one that is present (now) and almost instantly becoming what is not. But how can this be if Parmenides is right?

##### 4.2. *The Status of Temporal Passage*

Here is where a swerve back in the direction of Parmenides’ Rt. 1 provides a different view. Early in the 1900s, Albert Einstein replaced Newtonian physics (which assumed



an Absolute Present and Absolute Passage) with a revolutionary theory proclaiming a new absolute: spacetime distance. In this theory, which distant events are simultaneous (e.g., now) is relative to the state of motion of the observer. So, separated and differently moving observers will find *different* events to be simultaneous (or happening “now”). In this theory, it is mortal hubris, and a factual mistake, to assume that the simultaneity class one mortal observes holds for all observers. If dramatically different sets of events could be deemed to be happening Now, it is cosmic egocentricity to attach *metaphysical* significance to one’s own past/present/future distinctions. If Newton judged some distant event to be in the what-is-not of “the” past, some other observer could with equal legitimacy claim, “no, it is what is now.” It was not long before the mathematics of Einstein’s revolution was seen to be congenial to viewing the cosmos as a four-dimensional whole, with all events having equal claim to be part of what-is. The cosmos was now pictured as something like Figure 1.2 – *after* Parmenides’ goddess has erased the “Past (what is not)” and “Future (what is not)” labels. Surprisingly, the best cosmology of mortals was beginning to look like *some* kind of picture of Parmenides’ One. (Because the cosmos of Relativity is not continuously homogeneous, the goddess would not be entirely pleased.) Immediately, there were Heracliteans who opposed this cosmos as a “block universe” that must be wrong because it was missing real Becoming and Passage.

Whereas Parmenides’ goddess would just snort that the objectors are “dazed,” there were some philosophers who saw in the new physics support for their view that what is really real about time is reflected in eternal truths about earlier than/after than relations. Recall that in addition to beliefs about what is past/present/future, even common mortals can acknowledge that there are truths about temporal relations that do not depend upon when one believes them or talks about them. In the spirit of Leibniz’s relational (not relative) theory of time, B. Russell proposed constructing an ideal language that would not be tensed and which would take as basic *relations* amongst existing events (“existing” is now supposed to be read “tenselessly” – as not associated with Absolute Becoming or metaphysical Passage or implying any special location in the spacetime whole).<sup>18</sup> Perhaps, after all, there can be some kind of real time in Parmenides’ what-is.

It was Russell’s relational theory that McTaggart called “B-series” time. He rejected it because he thought that tensed A-determinations (in terms of past/present/future) were required to for real change. However this may be, in the second half of the twentieth century, some philosophers focused on language, and they thought they had *a priori* insight into the meaning of tensed expressions and terms like “now,” “past,” and “future.” In something like the spirit of McTaggart, they complained that the meanings they thought they knew could not be translated by Russell-like tenseless languages. Unlike McTaggart, though, they tended to embrace the *sui generis* reality of what they called “A-time” (or “tensed time”). They took the alleged failure to find “meaning equivalences” to signal the metaphysical superiority of A-determinations. From the point of view of Parmenides’ goddess, however, these tense arguments might be seen as a misguided return to Heraclitus – or worse, to the ordinary language of common mortals. They miss the whole point of the tenseless B-theories: they are trying to avoid the egocentricity and contradictions of mortal use of A-determinations. They are not trying to translate (and preserve) mortal confusions; they are trying to dispense with them.

To use common mortal understanding of the term “Now” as a test of truth would be like mortals insisting the goddess use their Rt. 3 signage on Rt. 1. No way.<sup>19</sup>

Well, where are we? There is an affinity with Parmenides in the tenseless, relational theories of philosophers like Russell and in the holistic perspective of relativistic physics. Like Parmenides’ goddess, these views use logic to suggest that reality is larger than and other than what is registered from the common mortal perspective. The real temporal dimension of the cosmos does not require what is to be subject to Passage or Becoming, nor is there any metaphysical significance associated with mortal past/present/future distinctions. Moreover, the way might be clear to try to explain the human *experience* of passage and becoming in terms of the different spacetime locations of different (earlier than/after than) brain-state events.<sup>20</sup>

#### 4.3. *Best Mortal Cosmology? (Just a Peek)*

Heraclitus rebounds, and there is still war in cosmology. Cosmology is in flux, with models (and books) proliferating.<sup>21</sup> Justice cannot be done here to the richness of the field, but we can point to the opposition between Heraclitus and Parmenides as an ongoing theme.

Einstein’s relativistic view began as a theory of electromagnetism, but, generalized it became a theory of the large-scale structure of the cosmos and included gravitational phenomena. But it was not the only revolution in physics in the twentieth century. There was also Quantum Mechanics (QM), a theory at first of small-scale interactions. It was soon recognized the two revolutions had points of incompatibility, and the search was on for a “unified” theory. Will one theory somehow absorb the other, or will both be replaced by something more general? Here, the point to notice is that some interpretations of QM sound Heraclitean.<sup>22</sup>

Consider some remarks by W. Heisenberg:

[Anaximander’s undifferentiated Being] cannot in itself explain the infinite variety of things. This leads to the antithesis of Being and Becoming and finally to the solution of Heraclitus, that change itself is the fundamental principle. . . . We may remark at this point that modern physics is in some way extremely near the doctrines of Heraclitus. If we replace the word “fire” by the word “energy” we can almost repeat his statements word for word from our modern point of view.

(Heisenberg 1958, 63)

At this point (the 1950s), Heisenberg was perhaps wanting to treat “energy” as pointing to the flux of some “potentia” and expecting that some new set of concepts “will probably be found someday in connection with the theory of elementary particles” which will show that both relativity (Special Relativity) and quantum mechanics are “limiting cases” of the new theory.<sup>23</sup> Here, Heisenberg is serving as just an example of a range of quantum physicists (be they instrumentalists, positivists, Bergsonians, followers of the Copenhagen Interpretation, or even String theorists) who are reluctant to abandon or downgrade the metaphysical priority of the time of common experience, the time shaped by observed flux.

Well, if strife rules it rules also in quantum mechanics. Here is a hint of opposition. In a paper called “*Quantum Cosmology*” (my emphasis), S. Hawking ends with the passage:

In general relativity, time is just a coordinate that labels events in the universe. It does not have any meaning outside the spacetime manifold. To ask what happened before the universe began is like asking for a point on the Earth at 91 [degree] north latitude; it is just not defined. Instead of talking about the universe being created, and maybe coming to an end, one should just say: The universe is.<sup>24</sup>

For another echo of Parmenides’ goddess saying no to time (at least the time of common mortal flux) listen to J. Wheeler say, at *the* bottom, “no time”:

On this geometry [of Einstein’s spacetime] quantum theory, we know, imposes fluctuations. Moreover, the predicted fluctuations grow so great at distances of the order of the Planck length that in that domain they put into question the connectivity of space and deprive the very concepts of “before” and “after” of all meaning. . . . We will not feed time into any deep-reaching account of existence. We must derive time – and time only in the continuum idealization – out of it.

(Wheeler 1994, 301–2)

In their discussion of different recent approaches to trying to quantize general relativity, G. Belot and J. Earman note the tension between what they call Parmenidean relational theories and opposing attempts to “carry classical notions of time over to quantum gravity,” and they conclude: “Here we reach an impasse: Parmenideans and Heracliteans have divergent intuitions about the nature of time and change, and these intuitions condition their tastes in approaches to quantizing gravity” (Belot and Earman 2003, 246). Would either Heraclitus or Parmenides be surprised?

This chapter began with the attempt to show how Heraclitus’ and Parmenides’ radical rejection of some common “mortal beliefs” resulted from their different views of time. Granting that common mortals are likely to persist in their “dazed” “two-headedness,” the issues morphed into challenges for science and philosophy: can mortals achieve an explanation for the human experience of time and passage, one that coheres with a more comprehensive image of reality? Can science settle on a tenseless, relational (Parmenidean) image or will something like Heraclitus’ *logos* rule the collapse of wave functions, the evolution of quantum worlds? Like Parmenides’ poem, this essay ended with a glimpse at mortal cosmologies. How wise was the goddess when she warned that such mortal attempts are deceptive? Time will tell. Or not.

## Notes

- 1 A standard is Guthrie (1962). For a shorter introduction see Matson (1987). For more on sources, translations, and controversies see Kirk, Raven, and Schofield (hereafter “KRS”), and McKirahan (1994).
- 2 Forget, for now, about the issue whether the future is “determined” – that is, happens in accordance with 1–1 causal laws. The issue here is whether the future is *determinate*, *whether or not* the laws of nature are deterministic in the style of Newtonian mechanics.

- On some interpretations, for example, there might be determinate quantum mechanical futures even if the laws of quantum mechanics are not 1–1 causal laws.
- 3 Don't worry about the *epistemological* problem that the temporally remote bettors might have great trouble ever *knowing* that their bets are true or false. Assume, for the sake of discussion, the perspective of Zeus or some other immortal.
  - 4 St. Augustine, *Confessions*, Book XI (E.B. Pusey, trans.), reprinted in Hoy and Oaklander 2005, 23.
  - 5 Guthrie discusses eleven meanings (Guthrie 1962, vol. I. 420–424).
  - 6 Here I am using the translation in (KRS 190). Other translations tend to insert “and” between each of the pairs of opposites. And I have left out Hippolytus' interpolation, “all the opposites . . .”.
  - 7 This perceptual, or experiential, phenomenon signals the tension between “mental time” and “physical time.” Heraclitus endorses the temporal complexity of perception and does not worry about logical consistency. Other philosophers, like W. James, C.D. Broad, and E. Husserl will try to remove the logical inconsistencies via a theory of consciousness (mental states) that does not take perceptions at face value. See, e.g., Hoy (2001).
  - 8 Consider the infrequently commented upon Fragment 84a: “Changing it is at rest” (McKirahan 1994, 124). Is Heraclitus contradicting the general position that change is ceaseless? Probably not. On one level he could be pointing to the stability of the *logos* of change (*it* never changes). On another level, he could be pointing to the lazy tendency of mortals to suppress the ceaselessness of change and to linguistically arrest (rest) change: they say “It is summer.”
  - 9 I follow Guthrie in taking this quote from Plutarch seriously. See (Guthrie 1962, 450ff. and 488–492). Other scholars have worried that one of Heraclitus' surviving fragments uses “same river” – “Upon those who step into the same rivers, different and again different waters flow” (Fragment 12, McKirahan 1994, 122); see also his footnote 19. However, there is no doubt that Plato and Aristotle interpreted Heraclitus like Plutarch (concerning the river), and it is primarily through Plato and Aristotle that philosophy has been influenced by Heraclitus' views about time, change, and identity. So for our purposes, little harm will be done in viewing Fragment 12 as an epigrammatic (riddle-like) use of common usage, not something that undercuts the traditional river problem.
  - 10 Heraclitus makes it clear the problem is not just a problem for flowing rivers. Fragment 6: “The sun is new each day.” Guthrie gives us details (Guthrie 1962, 462ff.). Heraclitus envisaged a receptacle region in the sky that collected fiery exhalations from the sea. During day time, this fire returns to earth. Literally, each day's measures of fire from “the sun” is from a continually different batch of fire, each batch being in constant flux. Heraclitus' astronomy might be wrong, but this example illustrates Heraclitus' willingness to abandon the enduring identity of ordinary things and to affirm that what really exists is *ever different* present states of (fiery) flux.
  - 11 In the eighteenth century, the British empiricist David Hume seeks to find the basis for personal identity (similar to Heraclitus) in the given contents of present experience. He fails, concluding that belief in personal identity is just a habit (or custom). (Hoy and Oaklander 2005, 140–7.)
  - 12 Plato will later worry that a theory like Heraclitus' will present things that are so ephemeral (to would-be knowers who are themselves in such constant flux) that neither language nor knowledge would be possible. See (Burnyeat 1990, 42–52, 278–283, and 310–314). Plato proposes there is more to reality than Heraclitus' flux, and a kind of knowing that is not sensory perception.
  - 13 As in the case of Heraclitus, nearly everything about Parmenides' philosophy is controversial: translations, interpretations, and significance. As extremes, consider two major figures

of twentieth-century philosophy, K. Popper and M. Heidegger. Popper is eager to read Parmenides' monism in a materialist way, as a generalization of his cosmological discovery that the moon is really dark matter shining by reflected light. In this reading, Parmenides is mainly trying to banish the non-material Void (one traditional candidate for "what is not"). See the versions of his essay, "How the Moon Might Shed Some of Her Light upon the Two Ways of Parmenides" in (Popper). On a different path, Heidegger tries to use Parmenides' poem to recover some primordial phenomenological experience of truth as "unconcealing," and suggests that the poem might deserve the title, "On the Coming Forth into the Unconcealed" (Heidegger 1932, 139). Neither Popper nor Heidegger help explain Parmenides' rejection of time. I will try to avoid such interpretations. Again, though, I must plead guilty to flirting with anachronism, for I will use some of the ideas in later philosophies of time to try to explain how Parmenides might be relevant to these later theories. See Mourelatos (2008) for more issues that concern philosophers.

- 14 I am detouring around some historic issues, for example, is Parmenides really expressing some semantic aversion to "non-being" or "nothing" or "voids"? Is he some kind of idealist when he says the same thing that can be thought can be? For a further discussion of these issues and the minimalist (avoidance of contradictions) explication of his rejection of time used here, see Hoy (1994).
- 15 As Guthrie notes, scholars can debate whether Heraclitus was Parmenides' primary target. But he goes on to say that the horde's errors stem from reliance on perception, and Heraclitus was guilty of this. Moreover, Heraclitus' in-your-face use of paradoxical language serves to "display the quintessence of that imbecility which Parmenides here deplores" (Guthrie 1962, vol. II 24).
- 16 Interestingly, one of Parmenides followers and defenders seemed to consider such a view and still proposed a paradox attempting to show that motion is impossible (or not what it appears to mortals). In his Arrow Paradox, Zeno considers the motion of an arrow from point A to B. If each real present instant of its "motion" is not a duration or succession of presents, then at each present time the arrow occupies a volume of space *just* equal to its length. So there is no present in which it moves. If each instant is an instant of no motion (or more generally, no change), then how is motion (or change) accomplished? A modern answer to this question attempts to analyze motion relationally in terms of the arrow's just being at different locations at different times. It is not something "accomplished" within Heraclitus' flux. This answer is part of a view of time that might sidestep some of Parmenides' complaints about time, but first we need to explain in more detail what his most general objection might be. For more on the Arrow Paradox, see Salmon (1980) and Strobach, this volume Chapter 2.
- 17 For more references see Hoy (2001).
- 18 See Russell (1964). It was Russell's theory that McTaggart classified as B-series time and opposed it to his A-series of past/present/future determinations. He complained that the B-series could not be basic to real time just because it did not include what he thought was "real change."
- 19 There are many scholarly works debating, in primarily linguistic modes, B-time versus A-time. For overviews, see the work of N. Oaklander who valiantly counters and diagnoses the flux of A-theory claims (Oaklander and Smith 1994). See also Mellor (1998). More recently, "A-theorists" have morphed into "Presentists." For a recent response that we can call Parmenidean, see Paul (2010).
- 20 For classic statements see Williams (1952), (reprinted in Hoy and Oaklander 2005), and Grunbaum (1969).
- 21 For a sample of books highlighting the centrality of time issues, see Barbour (2000) and Carroll (2010).

- 22 There are several competing “interpretations” of quantum mechanics, and some might be Parmenidean: for example, Everett’s “many worlds” view (see Barbour 2000).
- 23 He did not include General Relativity because he did not think it had “reached its final form” (Heisenberg 1958, 100). It is also interesting to note that he had a Heraclitean tolerance for contradictions, not only for those concepts in “natural language” which “immediately touch reality,” but also for those in mathematics: “It may be useful to remember that even in the most precise part of science, in mathematics, we cannot avoid using concepts that involve contradictions” (201).
- 24 (Hawking 1987, 561). Hawking is here expressing agreement with Augustine’s thesis that there is no time apart from the events of the universe, but his words are Rt. 1 words. (Augustine went on to draw attention to the possibility that temporal distinctions are subjective “protractions” of mind.)

## References

- Barbour, J. (2000). *The End of Time, the Next Revolution in Physics*. Oxford: Oxford University Press. Begins by taking sides with Parmenides against Heraclitus.
- Belot, G., and Earman, J. (2001). Pre-Socratic Quantum Gravity. In C. Callender, and N. Huggett (eds.), *Physics Meets Philosophy at the Planck Scale* (213–255). Cambridge: Cambridge University Press. Technical paper dealing with reconciliation of quantum mechanics and relativity in quantum gravity; reflects some issues raised by Heraclitus and Parmenides.
- Burnyeat, M. (1990). *The Theaetetus of Plato*. Indianapolis: Hackett, 1990. The excellent and substantial Introduction includes issues from Heraclitus and Parmenides.
- Carroll, S. (2010). *From Eternity to Here, the Quest for the Ultimate Theory of Time*. New York: Dutton. Accessible treatment of time issues in current physics and cosmology.
- Grunbaum, A. (1969). The Meaning of Time. In N. Rescher (ed.), *Essays in Honor of Carl G. Hempel*. New York: Humanities Press. Analyzes the appearance of temporal becoming.
- Guthrie, W. (1962). *A History of Greek Philosophy*, vols. I and II. Cambridge: Cambridge University Press. A standard survey; volume I includes Heraclitus, and volume II, Parmenides.
- Hawking, S. (1987). Quantum Cosmology. In S. Hawking and W. Israel (eds.), *300 Years of Gravitation*. Cambridge: Cambridge University Press.
- Heidegger, M. (1992). *Parmenides*. Translated by A. Schuwer and R. Rojcewicz. Bloomington: Indiana University Press. A 1940s lecture course, shows how Heidegger was attempting to use Parmenides for his distinctive phenomenological purposes.
- Heisenberg, W. (1958). *Physics and Philosophy*. New York: Harper. Philosophical reflections that indicate some affinity for Heraclitus.
- Hoy, R. (1994). Parmenides’ Complete Rejection of Time. *Journal of Philosophy*, 91, 573–598. Elaboration and defense of the interpretation of Parmenides used here.
- Hoy, R. (2001). The Theoretical Character of Husserl’s Theory of Time Consciousness. In N. Oaklander (ed.), *The Importance of Time*. Dordrecht: Kluwer Academic. Suggests that Husserl’s phenomenology of “internal time-consciousness” was a theory guided by attempts to avoid logical difficulties of the specious present.
- Hoy, R., and Oaklander, N. (eds.) (2005). *Metaphysics: Classic and Contemporary Readings*, 2nd edition. Belmont, CA: Thomson-Wadsworth. An anthology that keys on problems of time and the challenges that evolving science pose for philosophy and the common (or “manifest”) image of reality. Contains the work of several authors mentioned here.
- Kant, I. (1965). *Critique of Pure Reason*. Translated by N.K. Smith. New York: St. Martins.
- Kirk, G., Raven, J., and Schofield, M. (1983). *The Presocratic Philosophers*, 2nd edition. Cambridge: Cambridge University Press. A standard source of pre-Socratic material and issues.



- Matson, W. (1987). *A New History of Philosophy*, Vol. I. New York: Harcourt Brace Jovanovich. Concise and insightful history.
- McKiraahan, R. (1994). *Philosophy before Socrates*. Indianapolis: Hackett. Translations and useful commentary.
- Mellor, D.H. (1998). *Real Time II*. New York: Routledge. Covers tense/tenseless issues.
- Mourelatos, A. (2008). *The Route of Parmenides*, revised and expanded edition. Las Vegas: Parmenides Publishing. Influential work that shows the complexity of issues that surface when reading Parmenides.
- Oaklander, N., and Smith, Q. (eds.) (1994). *The New Theory of Time*. New Haven, CT: Yale University Press. Tensed versus tenseless debates.
- Paul, L. (2010). Temporal Experience. *Journal of Philosophy* 107, 333–59.
- Popper, K. (1998). *The World of Parmenides*, ed. A. Petersen. London: Routledge. An attempt to read Parmenides cosmologically; it includes Popper's classification of people like Einstein as Parmenidean.
- Russell, B. (1964). *Principles of Mathematics*. New York: Norton. Contains Russell's version of the relational theory of time attacked by McTaggart.
- Salmon, W. (1980). *Space, Time and Motion*. Minneapolis: University of Minnesota Press. A philosophical introduction that includes a discussion of Zeno's paradoxes.
- Wheeler, J. (1994). It from Bit. In J. Wheeler, *At Home in the Universe*. Woodbury, NY: American Institute of Physics Press.
- Williams, D. (1951). The Myth of Passage. *Journal of Philosophy* 98, 457–72. Now-classic analysis of the experience of passage from the perspective of relativity theory. Reprinted in Hoy and Oaklander.