

# Time, Mind and Aristotle. An Interview with Thomas Crowther

Tom Crowther is professor of philosophy at the University of Warwick. He mainly works on metaphysics, the philosophy of mind, epistemology and Aristotle, with a particular focus on the nature of time and the temporal structure of experience.

## 1. Can Our First-Person Experience Tell Us Anything About the Nature of Time?

In brief, I think our first-person experience can tell us something about the nature of time. But I think this for reasons that differ from those have often been offered for answering this question affirmatively.

Let me begin with a bit of background. The story of 20th century philosophy of time was a tale of two warring factions; with so-called “A-theorists” on the one side and “B-theorists” on the other. These unusual-sounding names derive from important ideas that were articulated in the work of the Cambridge philosopher John M. Ellis McTaggart. <sup>1</sup> Crudely put, “A-theorists” believe that the distinction between past, present and future (the “A-series”) is a feature of temporal reality itself. There really is a time that is the present, and so there really is a past and a future. This is captured by the claim that “reality is tensed”. A-theorists also believe that there is a dynamic aspect to time; that time really passes. My typing this sentence is a present event but it will soon become part of my past. And my lunch will move from the future into the present, and then it will become past. <sup>2</sup> B-theorists are philosophers who think that the distinction between past, present and future is not a feature of the temporal world itself. They think that this distinction is merely a matter of how we view things, rather than a matter of how things are out there independent of us. They think that temporal reality itself is a series of times and events the relations between which can be understood simply in terms of temporal notions such as “earlier than”, “later than” or “simultaneous with” (the B-series). Notice these relations are completely independent of notions of past, present or future. One can in principle know that 2030 is earlier than 2040 without knowing whether 2030

<sup>1</sup> Though the debate continues to be refocussed and refined, and the distinction itself continues to come under critical scrutiny, 21st century discussion in the philosophy of time is still shaped by this distinction. The key McTaggart texts are McTaggart (1908) and McTaggart (1927).

<sup>2</sup> For examples of the A-theory see Prior (1959), Zimmerman, (2008), Markosian (2004).

or 2040 is in the past, present or future. B-theorists also deny that time is dynamic, that time is something that really passes. This denial is often captured by the idea that B-theory is a block view of time. The times and events that constitute temporal reality are all in existence in the way that the different marked parts of a 12 inch wooden ruler are all in existence. <sup>3</sup> I incline towards taking various claims characteristically advanced by A-theorists – such as the claim that “reality is tensed”, and that “there is such a thing as temporal passage” – to be true. But I am sceptical about the way that experience has tended to enter into debates about the truth of claims of this kind.

At the very least, it is at least natural to reconstruct some of these arguments for the A-theory that have been offered in the literature in the following way: <sup>4</sup>

1. When we reflect on first-person experience it seems to us that reality is tensed/there is such a thing as temporal passage.
2. The best explanation of its seeming to us that reality is tensed/there is such a thing as temporal passage is that reality is tensed/there is such a thing as temporal passage.
3. Therefore reality is tensed/there is such a thing as temporal passage. <sup>5</sup>

Here, first-person experience is playing an epistemic role: it provides one with justification for various A-theoretic claims about the metaphysics of time. In the recent literature, most B-theorists have characteristically rejected (2), arguing that there are better explanations of the character of temporal experience consistent with taking reality to be tenseless or to involve no passage at all. <sup>6</sup> But it is an assumption common to A-theorists who argue in this way, and to many of the B-theorists who oppose it, that the very notions of “tensed reality” and “temporal passage” that figure in the formulation of this argument are sufficiently well-understood in the first place. I don’t think this is right. It is a familiar point that many of the traditional characterizations of temporal passage are either incoherent or remain uncashed metaphors. <sup>7</sup> But I think it is no less true that there is an insufficiently clear grasp of what it is for reality to be tensed. In particular, I think that the literature does not contain a satisfying discussion of the very idea of what it is for something to be *in the present*. I think that reflection on first-person experience can help us in trying to make some headway with these basic questions concerning the very content of such notions as “tensed reality” or “temporal passage”. This, in my view, is where experience – at least most fundamentally – comes into debates about the philosophy of time. It is a further story exactly what such reflection tells us about these notions. Telling this story is one of the themes of my research in this area.

<sup>3</sup> For important examples of the B-theory in the earlier part of the 20th century see Smart (1949) and Williams (1951). More recent work includes Mellor (1998), Oaklander (1984), Le Poidevin (1991), and Dyke (2008).

<sup>4</sup> This kind of argument is at least suggested in passages of Dainton (2011) for example.

<sup>5</sup> Reconstructions of arguments for the A theory like this play an important role in the arguments in Paul (2010) and Dyke (2008).

<sup>6</sup> This is the line taken by Paul (2010), Dyke (2008, ch.2), and other B-theorists such as Prosser (2016, ch.7).

<sup>7</sup> Scorn for A-theorists’ attempts to articulate the relevant features of the manifest world is a theme of some of the classic mid-20th century work on the B-theory. See, for particularly good examples of this, Smart (1949) and Williams (1951).

Returning to the kind of argument we have just been considering, this leaves it open whether experience has any epistemic role to play in debates about time, once such questions about the content of the notions up for dispute have been clarified and made determinate. One thought here might be that once these questions have been settled, then we are still faced with the task of providing an argument for the claim that notions such as “the present” or “temporal passage” actually have application. And it may be that experience then has a role to play in providing a premise in those arguments, much as the argument in (1)-(3) above. <sup>8</sup> That may be so. But there are other possibilities. For one to even entertain the thought *that object is that colour* (a kind of thought that philosophers call a ‘perceptual-demonstrative’) it is necessary that there is in fact an object in front of one, that one perceives, that has some perceived colour. If someone is indeed entertaining a perceptual-demonstrative thought of some kind, then there is not a further step to be taken to establish that the concepts involved in the demonstrative have application in their environment, let alone a further step to which experience of a certain kind may be relevant in providing a premise. The very conditions required for someone to entertain such a perceptual-demonstrative thought are sufficient in themselves for the existence of the things which are the referents of the concepts that constitute the content of the thought.

<sup>8</sup> For an example of this view of the role of experience in general metaphysics see Lowe (1998, ch.1).

Given what I have said here, it remains open that the situation is somewhat similar in the case of the temporal notions we have been discussing. That is, it is possible that the conditions required for one to have a grasp on the concepts of “the present” or of “temporal passage” – where those notions are clear and determinate enough to frame fruitful debates about the nature of time – are such that the obtaining of these conditions guarantees that these concepts have application. Were this the case, there would be no need for an independent argument for the existence of the present or of passage, an argument in which experience of a certain type functioned as an independent premise (as in the argument (1)-(3) above). <sup>9</sup> These are complex and delicate questions that go well beyond what I can go into here. Before moving on from this question, I ought to mention a familiar worry about taking first-person experience to tell us anything much about the nature of time. Briefly put, the thought is that contemporary physics simply tells us that reality is tenseless and there is no such thing as temporal passage.

<sup>9</sup> I emphasize that the claim here is not that experience will thereby be irrelevant in constituting the relevant truth about how things are. For it will be open to argue that the occurrence of experience of a certain kind plays a constitutive role in a grasp of the relevant notion of the present or of the notion of passage (in a similar way that it is likely to be argued that the occurrence of experience of a certain kind plays a constitutive role in the capacity to entertain thoughts with perceptual demonstrative contents).

This raises many further questions that I cannot possibly do justice to here. Of course it triggers the worries about contentfulness that I have just talked about. But setting this aside for the moment, what I think, very crudely, is that the notion of time that physicists operate with – and that informs the work of many philosophers of time – is just a different notion of time from that which I am attempting to better understand in my research (and others like me are). I am primarily interested in providing an account of the nature of *manifest time*. Manifest time is *time as it is revealed to us in sense-perceptual experience of the world, and first-person*

*reflection on that experience.* It is not that I am not interested in that other notion of time, or that I take it to be irrelevant to metaphysics. I just suspect that there is much less substantive disagreement here than there might seem to be at first sight.

## 2. **Some Philosophers Have claimed that Our Experience of Time Eludes Our Attempt to Capture Its Nature Conceptually. Artistic Practices Seem Better Suited to Express this Elusive Nature Than Philosophical Reflection. What do You Think of this Claim?**

There are two different but related ideas here. Let me deal with them separately. I am inclined to think that there is something right about both of them, but with the caveat that each of these suggestions really raises many more questions than it answers.

The first claim is that our experience of time is nonconceptual. Let's try to unpack this a bit. Experiences are phenomenally conscious events or processes. Drawing on an idea from Thomas Nagel (1974) one can say that experiences are events or processes such that "there is something that it is like for the subject" to be undergoing them, in the way that there is nothing it is like for a rock to be rolling down a slope.

What it is for an experience to be *of time* is potentially quite controversial. But let me try to address this question in a way that does not commit us to too much on this front. Whichever side of these various debates about time or temporal experience one is on, it ought to be relatively uncontroversial that an experience as of some kind of change going on (e.g. a ball rolling along the lawn) or of stasis (e.g. an experience as of a cat just lying there motionless on the lawn) or of one occurrence succeeding another (e.g. an experience as of one footstep following another) count as *experiences of time* in some reasonably broad sense. I think every philosopher of time would be able to agree that we have experiences of time in such a broad sense.

Now to the substance of the first question. The claim that one's experience of time eludes our attempt to capture its nature conceptually might mean a number of things. <sup>10</sup> But the usual way in which this claim has been understood is as the claim that the subject can have an experience of time without the subject of the experience possessing the concepts that would be used to characterize the content of the experience. <sup>11</sup> The "content" of the experience is how things seem to one in having the experience one does. In this case, the claim is that it would be possible for one to have experiences as of something changing, or as a cat in stasis on the lawn, or footstep following footstep, without having the concepts of "change", "stasis" or "x follows y". There are different notions of a concept obviously, and a lot depends on how this notion is understood. But let's assume – as it has been in debates of this kind – that having a concept, for example, the concept *blackbird*, consists in the ability to use the word "blackbird" correctly. Against this background, the idea that the experience of time is nonconceptual appears quite plausible. Those of us who have children will find it hard to resist the

<sup>10</sup> For different sides of this debate see Evans (1982) and McDowell (1994). See Crowther (2006) for argument that there are ambiguities in how this claim might be understood, ambiguities that have an impact on how effective some of the important arguments in this area are.

<sup>11</sup> See, for example, Crane (1992).

thought that even before our offspring came to understand the use of the words “change”, “stasis” or “succession”, they enjoyed experiences in which things seemed to them some way, a way that is characterizable in terms of these very temporal concepts. That shows that the possession of these concepts is not necessary for perceivers to have these experiences. It seems to me that one could make the same point on the basis of reflection on the experience of non-linguistic animals of various kinds.

This claim has generated quite a bit of discussion in the literature over the last few decades. <sup>12</sup> I do not present the ideas I have just discussed as conclusive. But at the very least, the claim seems plausible. Even if it is conceded that this claim is plausible, though, some caveats need to be made. First, note that this is just a negative claim. It does not tell us a great deal about our temporal experience, nor exactly how the relevant temporal features of experience are to be explained. It says only they are *not* concept-dependent in the relevant way. That leaves many different options open about what the positive story is.

<sup>12</sup> See for example, McDowell (1994, lecture III) for an influential response.

Second, it does not follow from this that there aren't *any* temporal experiences with conceptual content. Think of the differences in the kind of perceptual engagement involved in someone without any music-theoretic training or understanding of musical form listening to a piano sonata by Mozart, and the auditory experience of an expert on sonata form like Charles Rosen, who is listening to the same piece of music. I think that the rich perceptual experience that Rosen has in such circumstances is something that wouldn't be shared by one who knows nothing of music theory or sonata form. And I think that the kind of auditory experience that Rosen is having wouldn't have been available to him unless he had the conceptual capacities that are drawn on in his auditory experience of that piece of music.

The second part of this question involved the suggestion that artistic practice may express the nature of the experience of time better than philosophical reflection. This is a really interesting suggestion. A lot here, I think, depends on how exactly it's understood.

The notion of “expression” is most naturally used to indicate the idea of something which is *inner* and (in some sense) *private* to the subject, being made *outer* and (in some sense) public. So we take someone's crying to express their sadness, for example, or their furious shouting to express their rage. The fact that we talk about expression here seems to involve the idea that the subject does something with their body that serves as the public vehicle for something broadly *internal*, which is what's expressed. In these cases, it is emotions of different kinds which are expressed.

Given that philosophical reflection, understood as deliberation about philosophical questions, does not essentially appear to involve doing things with one's body, one might worry about the degree to which it is *expressive* of anything. This, of course, is not to say that such reflection doesn't *manifest* anything. As an exercise of creativity, intelligence or rationality, it clearly does manifest capacities that one possesses. But it is normal to distinguish expression from manifestation.

Against the background of this way of understanding the question, I think it's true that artistic practice does express the nature of temporal

experience better than philosophical reflection. But I think that this may be true in a sense that is not particularly interesting: philosophical reflection – as a mental rather than bodily action – doesn't really express anything.

A different way to take the suggestion is as the idea that artistic practices, like music, dance or drama, provide *particularly good examples* of the elusive temporal characteristics of experience. Specifically, they provide better examples than philosophical reflection does. I am inclined to agree. The temporal properties of such practices as music, dance and drama are so evident and important that it is hard to even begin to see how to make sense of them without thinking of their temporal properties.

But again, I want to hedge this agreement. Don't forget that philosophical reflection itself is something temporal, that is, it is something that goes on in time and over time. Philosophical reflection might involve, say, over the space of an hour, one trying to work out what Aristotle is saying about time in some passage of Book IV of the *Physics*, or involve trying to work out whether two sentences in the same paragraph of that work are consistent with one another. This is activity that goes on over time. One can narrate what went on over that time. One can say, *it took me an hour* to come to understand that the way I had read this paragraph previously was mistaken.

It is easy to forget that such reflection is temporal. There are many reasons for this. One obvious contributing factor is the sheer difficulty of the topic. If the temporal properties of experience are elusive, then even more so is arriving at an understanding of the temporal properties of such actions as thinking, reasoning and decision. I think there has been very little good work done on this. <sup>13</sup> Another is a tendency to run together philosophical reflection with the very idea of propositional contents and their relations. Consider the argument form below, in which 1 and 2 are the premises and 3 is the conclusion. It is true, I think that the propositional contents, and the relations between the contents communicated by this argument form:

<sup>13</sup> Here I'd refer the interested reader to Part II of Matthew Soteriou's outstanding 2013 book *The Mind's Construction*, for the best thing written on these issues in the recent literature.

1.  $p$
2. If  $p$  then  $q$
3.  $q$

are atemporal and timeless. These atemporal and timeless properties are a bad fit for the temporal properties of experience. But 1-3 is not an instance of philosophical reflection. It is a written inscription that communicates relations of implication between abstract contents. Philosophical reflection, on the other hand, is something that agents do, that may involve judging that such propositional contents are true, or imply one another, or may involve deliberation about whether they are true or not. But such reflection is not to be identified with the contents themselves.

Even with that warning having been made, I still think it's hard to deny the suggestion when it is understood in this way. Artistic practices – in particular, music, dance, and drama – do provide *better* examples or models of the experience of the passage of time than does reflection. They and their temporal properties are publically observable and open to view.

But this isn't true of philosophical reflection and mental activity in general. Indeed, nothing about the temporal properties of philosophical reflection seems obvious. (The idea that we are able to point our attention inside ourselves to see the drama of our thinking unfold before an internal eye seems wrong to me, as a claim about the character of my own mental life).

Though I'm aware I've pursued this topic for too long anyway, I'd like to make a final point, because there is another way that the question might be read, and indeed is perhaps more likely to be read. This raises an important issue about philosophical enquiry more generally. And here I want to dissent from the suggestion rather than agree with it.

A different way that one might understand this suggestion is that there is an intrinsic difficulty in thinking that philosophical reflection can properly illuminate certain areas, because philosophical reflection is linguistic and conceptual, and the relevant subject-matter is not. This is a general worry about philosophical theorizing that might apply much more widely than just to the case of temporal experience, but to other topics that seem to involve something *ineffable*, or *inarticulable*. According to this worry, "philosophical theory" is simply incapable of delivering the kind of illumination of these topics that philosophers might have hoped for, simply by virtue of this distinction between the linguistic medium and the non-linguistic subject matter. And it is this in-principle incapacity that provides for the possibility that illumination might be better provided by a form of engagement that took place in a different medium, say, dance or music or poetry.

I should start by saying that I certainly don't think that philosophical reflection has a monopoly on providing illumination and understanding. Of course the kinds of practices I have mentioned can do just that, in ways which are sometimes very subtle and difficult to discern, and at other times overwhelming and unmistakable. Many of us spend a great deal of our lives allowing art to transform us in all of these ways. But with that being said, I think it's important to resist the worry as I've just expressed it. The "medium" of philosophical theory and the philosophical use of language is not some insurmountable barrier when it comes to engaging with subjects like this. It's just the form within which philosophers work. Philosophical reflection in these areas can be done well, or it can be done badly. A good philosopher ought never try to pretend that the relevant problems and challenges arising from the nature of the subject matter don't exist. Doing this work well is hard. It requires creativity, and requires that philosophers find ways to draw on their own imaginative powers, and to draw on the imaginative powers of their readers. It requires exercising the capacity for insight and understanding, and putting this together with what might have to be a new way of conceptualizing the subject-matter; one that is capable of providing form for these exercises of insight and understanding. And all of this needs to be done in a way that makes one's intellectual engagement with the – purportedly *ineffable* and *inarticulable* – subject-matter publicly accessible, in a form that invites and makes possible constructive critical engagement from other enquirers.

One might think that questions concerning aesthetic experience and aesthetic engagement are one of these areas in which philosophical theory might be a barrier to successful illumination of a subject-matter that eludes the reach of language. For a model of what philosophy can

do here I'd encourage you to read some of Richard Wollheim's magnificent work on these topics. <sup>14</sup> If the subject matter in question is the muddy and nuanced character of our ethical responses and the fine structure of our ethical life, read anything on these subjects by David Wiggins or Bernard Williams, or read Sarah Broadie's extraordinary book *Ethics with Aristotle*. <sup>15</sup> It is interesting here to note that the challenges that the philosopher faces are in fact quite similar to the challenges faced by those working in literature and poetry. It would be very odd to harbour reservations about the capacity of the novel to illuminate character and emotional life because the fine details of character and emotional life are too delicate, intricate and subtle to be capturable or understandable through the crude tools of conceptual structure or linguistic expression. To this philosopher – and lover of literature – the work of Marcel Proust and Leo Tolstoy, amongst many others, would dispense with this line of thought pretty quickly.

<sup>14</sup> See for example, Wollheim (1980) and Wollheim (1987).

<sup>15</sup> See for example, Wiggins (1998), or the magnificent series of lectures in Wiggins (2006). Williams (1985) is one of the most important works in moral philosophy of the second half of the twentieth century. Williams (1981) and (1995) are collections of extraordinarily brilliant essays.

I don't think that any of this is accidental. I think that part of what will make for good philosophy in these areas is the ability of the philosopher to draw on imaginative capacities, skills of intelligent and creative insight and description, and focussed reflection on the world as it strikes them. These are just the capacities that are also required of good novelists. None of these skills comes (or stays) easy. These reflections prompt me to want to interrogate a bit further quite what the implied difference is between philosophical reflection and artistic practice, as we find it in the question. But this answer is already becoming Proustian and Tolstoyan enough in its length, so I had better leave things here.

### 3. Do You Think Aristotle's Reflections on Continuity May Still Be Relevant Today, After Georg Cantor Succeeded in Providing a Mathematical Formalization of the Continuum?

This is a very interesting question, and a question that is very difficult to give a satisfactory short answer to. There is so much that is controversial here. Hopefully some of my answers to other questions will help to fill out my thoughts about these issues a bit further. With the advent of set theory, in the work of Richard *Dedekind*, Karl Weierstrass and Georg Cantor, mathematicians came to possess a system of powerful new techniques for understanding and representing notions of continuity and infinity which went far beyond anything that was available to Aristotle and his contemporaries.

Part of the new conception of continuity that underlay Cantor's set-theoretic approach was the idea that it is possible to understand the notion of something continuous (or what Aristotle might have called "the infinite by division") in terms of a set of points. That is a straightforward rejection of ideas about the relations between points and lines that we find Aristotle articulating in Book VI of the *Physics*. There – amongst many other things – Aristotle offers an argument for the view that we cannot understand a finite magnitude as a construction from a set of extensionless points, no matter how many points we add together. If Cantor is right – and

the axioms of his set theory are generally accepted – then it might seem that this argument is a mistake.

I think that even if we accept that Cantor is right that we can represent continuity and ‘the infinite by division’ in a way that seems to be inconsistent with what Aristotle says in Book VI of the *Physics*, there remain a number of ways in which Aristotle’s discussions of continuity remain relevant for contemporary philosophy. I will mention just two, though I don’t think that these are exhaustive.

The first thing to say is that I think that Aristotle’s investigations of continuity in the *Physics* is quite circumscribed. My view is that even the most abstract and formal parts of the discussion of the notion of mathematical continuity in Book VI are not intended to be descriptions of the relations between magnitudes, quantities or objects, understood as abstract objects that have a determinate identity and reality completely independent of all connection to the natural world. They are discussions of formal and structural properties that are intended to be applicable to, or grounded in, the structural properties of the world that is the object of natural science, that is, that world as manifest to us in our ordinary experience of it. In general, the *Physics* is an attempt to identify the *principles of nature*, and so, an attempt to understand such notions as “time”, “change” and “place” which are basic in the world as we find it in our everyday experience. Here is a place in *Physics* III.5 where Aristotle is speaking to this point: «Now, the issue here might be a very general one, including the question of whether there is a place for infinity among mathematical entities and among things which are intelligible and which have no magnitude. However, we are conducting an investigation into perceptible things...» (*Ph.*

204a34–a36). <sup>16</sup> This may reflect nothing more nor less

<sup>16</sup> In this passage I quote the translation by Waterfield (1996).

than a specific application of Aristotle’s general views about mathematics. A familiar narrative in histories of the development of mathematics is that Aristotle just straight out rejected Plato’s idea that mathematics had a distinctive subject matter; a set of Forms or abstract objects, their properties and relations, which were metaphysically distinct from the objects of the sensible world. According to this narrative, for Aristotle, mathematics can only be a high-level or general scope investigation of the formal or quantitative features of objects that can be encountered through the senses, whether we are talking about geometry or arithmetic. Unfortunately, from the few passages of the *Metaphysics* in which these questions come into focus, Aristotle’s views about mathematics – and in particular the ways in which his attitudes to mathematics differ from some of the different ideas about mathematics that we find in Plato – cannot be reconstructed in very much detail; or at least

with very much confidence. <sup>17</sup> However, one doesn’t

<sup>17</sup> For extremely helpful discussion of Aristotle’s philosophy of mathematics see Lear (1982) and Bostock (2009, ch.1).

need to be committed to claims about Aristotle’s views of mathematics in general to think that in the *Physics*, the discussions of mathematical notions of continuity are intended to be discussions that capture facts about the notion of mathematical continuity that are applicable to the world of natural science as *it is manifest to us in sense-perception*. The lines quoted from III.5 above are evidence of that. And once one thinks about the notion of continuity in this way – as an attempt to spell out certain formal features of the

world as it manifests itself to us – I think that many of the claims Aristotle makes are intelligible, perceptive and defensible. The very notion of an extensionless point as being constitutively dependent on the notion of a limit of a line or of a part of a line, seems to make sense when we reflect on the way in which parts of the world are manifest to us in sense-perception. To the extent to which it makes sense to think of extensionless points as coming to awareness, they are manifest to us as the ends of lines or parts of lines. <sup>18</sup> And though this kind of approach to mathematical continuity – as a conception of the formal properties of the world as it is manifest to us – instantly generates a range of further questions, this approach seems no less relevant to me than the kind of project that P. F. Strawson, in the introduction to his 1959 work *Individuals* famously described as “descriptive metaphysics”, and contrasted with “revisionary metaphysics”. Strawson says: «Descriptive metaphysics is content to describe the actual structure of our thought about the world, revisionary metaphysics is concerned to provide a better structure» (1959, 9). Strawson describes Descartes, Leibniz and Berkeley as revisionary metaphysicians. Amongst late 20th century philosophers we could add David Lewis to this list.

<sup>18</sup> And note further that where we understand these lines as themselves extensionless, in the sense that they lack breadth, these lines themselves manifest themselves to us as the surfaces of manifestly space-filling objects, their boundaries, or the boundaries of their parts.

Strawson offers Aristotle and Kant as examples of descriptive metaphysicians (1959, 9). That characterization, I think, is instructive. For it is suggestive about how we might expand the scope of what such a descriptive approach to metaphysics might involve. <sup>19</sup> It is obvious from their work that Aristotle and Kant were not merely interested in the structure of our *thought* about the world, or the *structure of the world as thought about*. For the *Physics* and the *Transcendental Aesthetic* are, quite explicitly, investigations of the *structure of the world as manifest to sense-perception and as manifest in temporal awareness*. Subject to this expanded conception of what descriptive metaphysics involves, what Aristotle appears to be doing in *Physics* VI is sketching out a branch of descriptive metaphysics; that branch which concerns notions of quantity, counting, measuring and ordering. He is not engaging in a discussion of the mathematics of continuity that is purely formal in the way that the set theory of Cantor, and his formalization of the notion of the continuum, is. Aristotle’s discussion of the nature of form, structure, magnitude, and continuity in the *Physics*, quite generally, is to be constrained by how these structures show up in the way that the natural world is manifest to us.

<sup>19</sup> I do not imply that Strawson himself would have been happy with this catholicism about the notion of descriptive metaphysics.

It doesn’t follow from this that set theory shows that there is no place for such a project. Set theory and a descriptive metaphysics of manifest time are just different projects. The connection with the notion of descriptive metaphysics will no doubt strike some philosophers reading this as constituting even more of a reason to be suspicious about what Aristotle is up to in the *Physics*. I guess it’s obvious that I don’t share these suspicions. But I don’t have the time or space to say much more about these questions here.

There is a second sense, though, in which Aristotle’s discussions of continuity remain relevant even in the face of the idea that Cantor’s assumptions about how the continuum ought to be formalized are conceded.

This idea is related to some of the ideas I have just discussed. But it also involves scrutiny of the extent to which Aristotle does – or does not – offer us a unified treatment of continuity in the text of the *Physics*. And it focusses in particular on the interest of Aristotle’s claims about continuity, specifically, his views about temporal continuity.

The most focussed discussion of the notion of continuity in the *Physics* is in Book VI, the first chapter of which Aristotle devotes entirely to arguments for the existence of continuous quantities. <sup>20</sup> This discussion concerns that notion of continuity which we might call “mathematical continuity” or the notion of “the infinitely divisible”. More formally, according to this view:

<sup>20</sup> For important discussions of continuity in the *Physics* see Bostock (1991) and White (1992).

(MC)  $x$  is a continuity iff  $x$  cannot be divided into indivisible parts/ $x$  is divisible into infinitely divisible parts.

In Book VI of the *Physics*, Aristotle offers a battery of arguments for the truth of this claim about spatial and temporal magnitudes. But I think that there is another conception of continuity that is central to Aristotle’s discussion in the *Physics*. This is a conception of continuity that is particularly associated with time, and a form of temporal continuity. This idea is bound up with Aristotle’s idea that time is continuous or infinite in the sense that it just goes on and on.

At III.6, 206a23– 206b3, Aristotle says:

But the way in which the infinite manifests itself is different in the case of time and the human race from what it is in the case of the division of magnitudes. Generally speaking, the infinite exists by one thing being taken after another. What is taken is always finite on its own, but always succeeded by another part which is different from it. But whereas in the case of magnitudes each part persists, in the case of time and the human race the parts cease to be, but in such a way that the process does not fail. <sup>21</sup>

<sup>21</sup> Here I follow the translation of Waterfield (1986).

I think the idea that Aristotle is getting at here is that time is continuous because the “process” (the process in which the reality of time consists, presumably) “does not fail” that is, it does not come to an end. When one phase of process gives out, there is *always* another phase of process that follows it. So, we have this idea of a chain of occurrences, drinkings of coffee, walks to the shops, eating dinner, which is a continuous but never-ending narrative, a story which will include births, lives and deaths of different creatures of different species and which will take in the narratives of things both living and not living, which just goes on and on.

This notion of temporal continuity can be labeled “dynamic” in that it links the temporal continuity of something to the existence of an unceasing succession of process-phases.

(DC)  $x$  is a temporal continuity iff the existence of  $x$  involves process-phases always being succeeded by further process-phases in such a way that  $x$  does not come to an end.

In *Physics* Book III, it is this notion of dynamic temporal continuity, and the closely related notion of the “potentially infinite” that is on the surface of the text. <sup>22</sup> This is a notion of continuity that is quite distinct from that which I called “mathematical continuity”. Mathematical continuity is a property of a single magnitude and the relations between its parts. Dynamic continuity is not. Dynamic continuity has an important connection to the idea of process or occurrence. Mathematical continuity does not. Dynamic continuity is a property possessed by things with the logic of noncountable mass (things of which there can be more and more, for example *time*, *process*). Mathematical continuity, understood here as it is by Aristotle as the property of a single bounded magnitude, is not. One result of these observations is that at least without some quite substantial further argument, the concession of Cantor’s views about mathematical continuity, that is, about the possibilities of understanding finite magnitudes in terms of sets of indivisible parts – even if we were prepared to waive the kind of defence of these ideas offered above – would be of very little direct consequence for this idea that time is a dynamic temporal continuity. For set theory has, on the face of it, nothing to tell us about the dynamic continuity of time. This notion of dynamic continuity plays an important role in Aristotle’s discussion of time and his discussion of the sense in which time is infinite. And it is of considerable independent interest for contemporary debates in the philosophy of time.

<sup>22</sup> For important work on the notion of the potential infinite see Hintikka (1966), Lear (1979) and for an excellent recent discussion see Coope (2012).

#### 4. Are there Any Important Differences According to Aristotle Between the Continuity of Space and that of Time?

In short, yes there are. Let me say a little bit about some of these differences, and why these are interesting. If we focus our attention just on the notion of “mathematical continuity” that Aristotle discusses in Book VI, these differences won’t come into view. Aristotle thinks that both finite intervals of time and finite spatial magnitudes are mathematically continuous in the sense that I described earlier under (MC). That is, they are both infinitely divisible. But once we move away from this notion of continuity, differences emerge. In connection with the notion of time, I described a property that I described as “dynamic continuity” (DC) above). This was the idea that something is dynamically continuous if it consists of process-phase following process-phase, in such a way that the process never gives out. It is clear that this notion of dynamic continuity does not apply to spatial magnitudes. It is obviously not the case that spatial magnitudes consist of process-phase continuously following process-phase.

However, perhaps we might see this notion of dynamic continuity as just the specific application to time of a notion of continuity or infinity that does have application in the spatial domain. In the same way that the first notion of mathematical continuity was that of infinite divisibility, the idea that “we can always go smaller”, we might think that the notion of continuity of which dynamic continuity is a species is just that of *the infinite by addition*; that is, the idea that “we can always go bigger”. And then the thought might be that there is an analogue of this truth in the spatial case. Just as it is true that for every process-phase, when it gives out, there

is always another that follows it, it might be thought that for every determinate spatial magnitude that is traversed, once one reaches the far side, there is always another spatial magnitude ready to be traversed on the far side. For any spatial interval or magnitude, there is always more space on the other side of its boundary.

But Aristotle is very clear that he thinks that this claim about space, and indeed, material objects in space, is false. It is not true, according to him, that space is unlimited in this way. He thinks that the spatial universe is bounded and finite. And there cannot be an actually infinitely extended body. On the other side of that boundary of the spatial universe there is simply nothing; where “nothing” does not just mean “empty space”. These are views for which Aristotle offers an array of baroque arguments in *Physics*, III.5.

This claim is the source of a number of difficulties for Aristotle. Aristotle appears, for example, to accept Euclidean geometry. But Euclidean geometry does seem to require us to make sense of the idea of the of a straight line that can be extended indefinitely. If the universe is spatially limited, at the very least there seems to be a tension with the idea that one can construct a line like that. (I think that there are things to say here in Aristotle’s defence, but I won’t go into them now). I think that much of the resistance to Aristotle here is not so much that we each individually could give a proof of the infinity of space, or spell out the physics that shows that it is, but that his views about the nature of these limits and his views about actually infinite bodies, do not seem to be supported by particularly persuasive argument – they seem to emerge from some extremely elusive *a priori* arguments in *Physics* III.5 – and they are also embedded within a geocentric cosmology that we know to be false.

What’s really driving these claims about the finite nature of the spatial universe, and the impossibility of actually infinite objects? I think that this is a fascinating question. I suspect that here again we are seeing evidence of the fact that Aristotle is interested in manifest space, or space as it is presented to us in everyday sense-perceptual awareness. And while one might be impressed with the thought that at least as far as we move around on the earth, for every step across a distance we traverse, there is always another step we can take, so one also might have been impressed with the idea that whether one is in Macedonia, Athens, the islands of the Aegean or Chalcis, all of the action takes place “under one (visible) roof”; one vast cosmic container that seems to be the same container wherever one is.<sup>23</sup> What’s particularly interesting for me here, amongst other things, is that it reveals the extent to which the central role in Aristotle’s accounts of continuity and infinity appears to be being played by temporal notions rather than spatial ones. That strikes one even more clearly when one looks more closely at Aristotle’s views about what it is for space to be mathematically continuous; that is, for a spatial quantity to be an infinitely divisible magnitude. For, at least on the face of it – and here there is another area around which there is extensive disagreement between commentators – Aristotle’s explication of this notion in *Physics* III.6 itself appears to depend crucially on temporal notions. In particular, it seems to involve the

<sup>23</sup> Acknowledging that it is “the same container” wherever one is, is consistent with acknowledging that it does seem to move around in various predictable ways over time, and also seems to look slightly different to one depending on where one is spatially located.

idea that if one were to begin dividing up such a magnitude into smaller spatial parts, then for every spatial magnitude that might result from such a division, that process of division could always (in some way, in principle) be continued.

This raises questions both interpretive and philosophical about what «in some way» or «in principle» could possibly mean as applied to the extendability of such a process of division. <sup>24</sup> But whatever these further difficulties, it is very hard to come away from the discussions of continuity and infinity in Books III, IV and VI of the *Physics* without the sense that it is Aristotle's views about time, and the various respects in which time is continuous and infinite, that are the real intellectual driving-force behind the discussion.

<sup>24</sup> See Lear (1979) for fascinating discussion of this question.

## 5. How Do You Think We Should Understand the Connection Between Time and the Soul that Aristotle Draws at the End of the Fourth Book of *Physics*? Does It Imply Some Sort of Idealism?

The idea that there are connections between time, the soul, and the activities of the soul, is a thread that runs through Aristotle's discussion of time in the Book IV of the *Physics*. But there is a famous – or infamous – passage in which Aristotle discusses this question head-on. Here is the passage from Edward Hussey's translation in the 1983 Clarendon Aristotle Series edition of the *Physics* Book III and IV. I have omitted just a couple of sentences for ease of reading:

It is also worth investigating how time is related to the soul, and for what reason it is that time is thought to be in everything – on earth and in the sea and in the heavens... One might find it a difficult question, whether if there were no soul there would be time or not. For if it is impossible that there should be something to do the counting, it is also impossible that anything should be countable, so that it is clear that there would be no number either... But if there is nothing that has it in its nature to count except soul... then it is impossible that there should be time if there is no soul, except that there could be that X which time is, whatever X makes it what it is; as for example if it is possible for there to be change without soul. (*Ph.* 223a16–28)

Idealism about some subject-matter, say, ordinary commonsense objects like palm trees and peregrine falcons, is the view that such objects are in some way dependent on the mind or its activities (“activities” here is broad enough to include: experiences, beliefs, our capacities for describing the world in language, or broader cultural practices or institutions). Idealism is more plausible for some subjects than for others. For example, it would be odd to think of the property *now being seen by Tom*, as something independent of facts about Tom and his experiences. But when it comes to such things as ordinary objects – or time, for that matter – philosophers have generally wanted to avoid being idealists. At least, philosophers within the kind of philosophical tradition in which I was raised have generally wanted to avoid idealism about such things, and taken realism – the view that such things are in some robust and meaningful sense independent of us and our activities – to be the default position.

What motivates this idea that realism ought to be the default

position? Some delicate questions about the nature of the distinction between realism and idealism lurk in the background here. But in advance of taking a necessarily brief look at questions of those kinds, we might identify several motivations. One crude thought is that even if all sentient beings (on which the idealist may think the existence of the relevant objects putatively depends) were wiped out overnight, then there would remain a mind-independent world that contained objects and perfectly determinate facts about them. Or we want to be able to think that it might have been that no sentient beings who developed the representational capacities and culture that we have ever developed, though nevertheless the world independent of the mind did, and remained determinate in very many of the ways that it is so now, even given that we do exist. And with respect to such putative truths about objects like “that object is six feet wide” or even “that person is shameless” we want to think that the truth of such things is constitutively independent of any decisions that I may make about how those things may be, or any desires I may have about whether such things are true. The very idea of the world is the idea of that to which our representations must conform, and against which our desires or decisions, at least in the kinds of cases I have described, don’t get a say. <sup>25</sup> Against this background, if someone says that your view commits you to a form of idealism about something, that is generally a bad thing, or a charge against you. It is a charge that you are generally under an obligation to show is misplaced.

The passage quoted above from the end of *Physics* IV has generated a great deal of discussion. One of the reasons for this is that the reader is likely to come away with the distinct impression that Aristotle is here saying that he is an idealist about time. Indeed, he seems to be offering an argument for that conclusion. An assumption of the passage appears to be that the notion of time is – or at least involves – the notion of what is countable. The next step appears to be that the only thing that has the ability to count is a soul. And then Aristotle seems to suggest that it follows from these ideas that were there no souls (with their abilities to count) then there could be no time.

Because many of us think that idealism about time is something to be avoided, and because all interpretation, even when the subject is not one of the greatest philosophers in history, is informed by some kind of Principle of Charity, there is a pressure on the part of the reader to find something here beyond the initial appearances. An additional motivation in this case is that the argument that I have just briefly reconstructed for the dependence of time on the soul looks pretty poor. <sup>26</sup> Some philosophers have attempted to argue that the appearance that Aristotle is offering an argument for the idealism of time here is just that: an appearance, and nothing more. It is true that the text is not unproblematic. This is Aristotle writing after all. The argument consists largely of a series of conditionals about what would or might be the case, without a clear statement of the truth of the antecedent of these conditionals, and

<sup>25</sup> Of course, any fully satisfying specification of the way in which truths about the world are independent of our decisions and desires will need to be appropriately sensitive to the many ways in which our wills can manifest itself in changes in the facts, from my decisions about how to move my body or how to move parts of the world through moving my body.

<sup>26</sup> As I presented it, the argument seems to be invalid. As reconstructed, it says that O (time) has the property of being F (dependent on a soul) because a feature of a soul that counts O (the capacity to count) has the property of being F (dependent on a soul). But that doesn’t follow. O (time) and a feature of a soul that counts O (the capacity to count) are distinct things. The obvious invalidity of

a clear endorsement or assertion of the idealist conclusion. There are those also who believe that Aristotle intends the reader to see that the argument that he offers here is a bad one. Rather – so the thought goes – the reader is intended to think that just as there can be change independent of the soul – as ventured in the very final sentence of the quoted passage – so also can there be time without the soul. I don't have the time here to explain my reasons for thinking that this approach is mistaken. One very basic worry, though, is that Aristotle has gone to considerable pains earlier in Book IV to emphasize that while there is an important connection between time and change, they are not the same thing. Therefore it is unclear why he would expect or intend the attentive reader to generalize these claims about the mind-*independence* of change to a claim about the mind-*independence* of time.

the argument, as I see it, is a reason to suspect that whatever else may be going on in this passage, an argument of this degree of crudity cannot be the extent of it.

So I am not quite convinced that this is the best way with this passage. To engage a bit more fully with the question, let me try make a more positive suggestion. This will require me to say something a bit more general about “Aristotle’s idealism” in *Physics* Book IV, 10-14. Even if I don't have the time to apply this in detail to the passage, it will generate some ideas about what that treatment might look like.

Idealism itself is not so much a position or an idea as it is a family of positions or ideas. Idealism centrally involves some kind of *mind-dependence* claim. But there are different kinds of *mind-dependence* claims that can be made. Some of them are more nuanced and worthy of consideration than others, and idealist claims about some subject matter might be able to co-exist with at least some of the intuitions that motivate the assumption that we ought to be realists about that subject matter.

Here is an example from a different area. A suggestion that has been made in subtly different ways in the literature about value properties (for example, *goodness* of a certain kind) is that an object is good in the relevant sense in so far as it merits a positive evaluative judgement or positive evaluative response from an appraiser. Given this view, one understands what it is for an object to have the relevant property in a way that involves making essential reference to certain kinds of evaluative responses by subjects. So on this approach there is an element of “idealism” (or “subjectivism”) involved in the understanding of what it is for some property to be the very property it is.

But note that it doesn't follow from this that whether or not something is good or not is something that can be decided or stipulated by some individual evaluator, or that things don't have particular value properties independent of the contingent attitudes that a community of evaluators happens to have. For even if I judge that this object is good, it may nevertheless be the case that this object is not such as to merit such positive appraisal from an evaluator. This is to say that “mind-dependence” about understanding an object, property or phenomenon can come apart from “mind-dependence” about the existence of such a thing or the instantiation of such a property in the mind-independent world.

And this is relevant because, as I have alluded to above, one might think that what is really troubling about idealism, and what we really ought to care about resisting, is mind-dependence in this latter sense. We don't

want to think that the facts about ordinary commonsense objects and their properties are determined simply by our desires or decisions, or that there is no difference between an asteroid wiping out all sentient life, and wiping out everything there ever is or could be. But the moral of the kind of proposal just considered is that we can resist this kind of problematic idealism, even if our views about how to understand the relevant facts about those objects incorporate a form of idealism or subjectivism. I suspect that the kind of idealism about time that emerges in *Physics* IV.10-14 can be more helpfully understood in terms of the kind of idealism that I have just spent time describing. <sup>27</sup> From this perspective, Aristotle would be advancing the claim that it is not possible to understand what time is without making reference to certain kinds of capacities of souls; specifically, the capacities for counting (including counting changes, and counting what he calls «the nows»).

<sup>27</sup> If I understand him right, this is the kind of suggestion that is made by Jonathan Lear in his fascinating discussion of *Physics* IV.10-14 in his book *Aristotle: the Desire to Understand*.

But that would be consistent with the idea that the existence of determinate countable changes of various kinds, and determinate facts about the «countable nows» is independent of the existence of particular souls who are doing any counting or measuring of changes or «nows». It should be noted that if one is attracted to this approach, then one important task is to give an account of the way that Aristotle couches his dependence claims in the paragraph with which I began my response to this question. For the critics may observe that contrary to the kind of story I have been trying to tell, Aristotle seems to make precisely the kind of dependence claims that I have said are the particularly problematic ones (e.g. «it is impossible that there should be time if there is no soul» (*Phy.* 223a26)). It is the existence of time that is said to be dependent on the soul, not *an understanding of what it is*, it might be objected. This is an interesting challenge, and it raises many further questions.

Let me end just by making a few observations. An obvious point to make in response is to note how natural it is to express even the claims about the mind-dependence of understanding in existential terms. If one is speaking loosely, it is fairly natural to describe even the more nuanced form of idealism discussed above in existential terms («If there were no practice of evaluative judgement there would be no goodness or badness») even though these existential constructions are elliptical for the richer intelligibility claim. It's also not irrelevant to this question, I think, to note that as Aristotle's philosophy matures, the very notion of "to be" (*na einai*) becomes crucially connected to the very idea of what can be made intelligible or understandable. Even if the *Physics* is a less mature work than the *Metaphysics* (where such a use of "to be" achieves its most articulate and developed form) what we may have here is an earlier example of a "to be" construction, in which the sense of it is not primarily "to exist", but to "be intelligible or understandable".

## Suggestions for Further Reading

### Aristotle, Continuity and the Infinite

I would suggest that the interested reader start with Aristotle himself. The following translation is very good, and an excellent place to begin:

Aristotle *Physics*. Transl. by Waterfield, R., with notes from Bostock, D. (1996). Oxford, Oxford University Press.

The following edition of the Clarendon Aristotle series focuses on Books III and IV. Edward Hussey's notes are excellent:

Aristotle *Physics Books III and IV*. Transl. with notes by Hussey, E. (1983). Clarendon Aristotle Series. Oxford, Clarendon Press.

If you want to investigate Aristotle's philosophy of time in more detail, two particularly important recent studies of Aristotle on time can be recommended:

Coope, U. (2005). *Time for Aristotle, Physics IV.10*. Oxford, Clarendon Press.

Roark, T. (2011). *Aristotle on Time: A Study of the Physics*. Cambridge, Cambridge University Press.

Here are three texts that include excellent discussion of issues relating to continuity and the infinite in ancient philosophy from the point of view of contemporary research on the philosophy of time.

Sorabji, R. (1983). *Time, Creation and the Continuum: Theories in Antiquity and the Early Middle Ages*. London, Duckworth Press.

This is a tour-de-force of a book, introducing ancient theories of time and the continuum and assessing their significance for contemporary research. It is relevant to many of the issues touched on in the discussion above.

Moore, A.W. (2019). *The Infinite*. 3rd ed. London, Routledge.

The first section of this book, which is now in its third edition, is an extremely helpful historical overview of the history of the notion of the infinite (to which notions of continuity are inextricably linked). Sections two and three contain excellent discussion of the infinite from one of the most interesting philosophers working today.

And finally:

White, M. J. (1992). *The Continuous and the Discrete: Ancient Physical Theories from a Contemporary Perspective*. Oxford: Clarendon Press.

White's text is difficult, but very rewarding.

If I had to recommend one book on Aristotle for those who are interested in the themes I have been discussing here, it would have to be:

Lear, J. (1988). *Aristotle: The Desire to Understand*. Cambridge, Cambridge University Press.

Jonathan Lear's book is a substantial work of philosophy in its own right, in addition to being an outstanding general overview of Aristotle's philosophy. It contains particularly stimulating discussions of *Physics* Book III and IV. My own views about Aristotle's discussion in *Physics*, Book IV (particularly about 'the now', which I have not said much about here) and my view that there are two different notions of continuity at work in the *Physics*—which I have said something about here—owe much to a few suggestive remarks of Lear's in this text.

### Time and the Temporal

For very helpful basic introduction to contemporary philosophy of time, from a B-theoretic perspective, see:

Bardon, A. (2013). *A Brief History of the Philosophy of Time*. Oxford, Oxford University Press.

For those who want to go deeper into contemporary philosophy of time, I would suggest that one reads the papers collected in section C of:

Van Inwagen, P and Zimmerman, D. (2008) *Metaphysics: The Big Questions*. 2nd ed. Oxford, Blackwell.

Essential reading here must be the late Hugh Mellor's follow-up to his own 1981 book *Real Time*, a book that sparked so much interest in the philosophy of time in the late 20th century. This is:

Mellor, D.H. (1998). *Real Time II*. London, Routledge.

Even if one disagrees with Mellor, there is an extraordinary amount of interesting philosophy here.

There is a great deal of work in contemporary philosophy of mind that lies at the intersection of philosophy of perception and the metaphysics of time. For a very valuable collection of essays that includes introductions to research on the nature of temporal experience as well as substantial contributions to that research, see: Phillips, I. (ed.) (2017). *The Routledge Handbook of Philosophy of Temporal Experience*. London, Routledge.

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