

Time and Subtle Pictures in the History of Philosophy

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Abstract

For centuries, philosophers of time have produced texts containing words *and* pictures. Although some historians study visual representations of time, I have not found any history of philosophy on pictures of time inside texts. This paper argues that studying such pictures can be rewarding. I will make this case by studying pictures of time in the works of Leibniz, Arthur Eddington, and C. D. Broad; and argue they play subtle roles. Further, I will argue that historians of philosophy more widely could benefit from paying more attention to pictures.

I Introduction

Throughout history, philosophers of time have produced texts containing words *and* pictures. I use ‘pictures’ in the broadest possible sense, to include all kinds of illustrations, figures, and diagrams¹; however, as I focus on pictures inside texts, this discussion excludes standalone pictures such as paintings. In this sense, pictures of time can be found in the texts of many historical thinkers, and abound in more recent works². Although historians sometimes consider pictures of time³, I have not found any history of philosophy on such pictures⁴. This paper argues that studying time pictures inside historical texts can be philosophically rewarding. It makes this case by considering the works of three philosophers: Leibniz, Arthur Eddington, and C. D. Broad. I will argue that their pictures play subtle philosophical roles: embodying or expressing philosophical positions, priming readers to accept upcoming theses, and acting as rhetoric devices. Examining these pictures opens new ways for scholars to understand historical philosophers.

This paper seeks to convince historians and philosophers of time specifically that pictures deserve more attention than they currently receive. However, it also suggests that historians of philosophy *generally* could benefit from considering pictures inside texts. As we’ll see, history of philosophy is largely disinterested in pictures, yet other historical fields have profited by considering them, and I argue we should follow suit.

The paper proceeds as follows. Section II provides some background, situating this study within existing literature on pictures from neighbouring disciplines. Section III, the heart of the paper, studies three sets of time pictures. First, Leibniz’s 1716 diagram of the universe over time. I argue this diagram subtly embodies Leibniz’s relationism, and may even suggest his final view on whether perfection increases in the universe. Second, Eddington’s 1928 representations of temporal frames. I argue that these seemingly scientific, philosophically-innocent diagrams implicitly embody his ideas about becoming, priming the reader to accept his upcoming arguments for them;

¹ The *Oxford English Dictionary* offers eight definitions of ‘picture’, ranging from ‘A visual representation’, to ‘a symbol, type, or figure’ (Anon, 2019).

² Time pictures can be found in McCall (1994, pp. 2-5), Savitt (2002, p.162), Bourne (2006, pp. 12-13), Dainton (2010, pp. 2-10), and Dyke (2013, pp. 329-334). McCall (1994, p. 4) cites many more.

³ For example, Rosenberg & Grafton (2010) study time pictures from classical tables to modern timelines. Champion (2017) studies time pictures in the fifteenth century, Griffin (2018) in the fourteenth. Neher and Tallant (2016) offer a rare philosophic perspective on time in Renaissance artworks, focusing on paintings.

⁴ Even if my literature searches have missed something - and apologies if so - history of philosophy on time pictures is clearly rare to vanishing.

and express his religious optimism. Third, Broad's 1938 time diagrams. I argue these embody various aspects of his metaphysics, and power his key critique of J. M. E. McTaggart's argument for the unreality of time. Section IV discusses pictures within the history of philosophy more broadly, arguing they deserve a closer look.

II Pictures as bearers of information

Many historical scientific texts contain pictures, from frontispieces to figures. Historians of science realised their importance relatively recently. Just over forty years ago, Martin Rudwick (1976, p. 149) claimed that, in the history of geology, original visual materials are 'missing altogether' or 'reduced to a virtually decorative role'. That situation has since changed, owing to Rudwick and others who pioneered the study of pictures. Later historians of science followed their lead⁵. Their work is particularly relevant to us because, unlike say historians of art, they are largely focused on pictures within texts.

Historians and philosophers of science widely claim that pictures matter because they can bear information. As Rudwick (1976, p. 151) explains, pictures can convey information about all kinds of things: machinery, paintings, plants, animals, travel. Brian Baigrie (1996a, p. xviii) argues that pictures can add information to a text. Laura Perini (2005, pp. 262-3) claims scientists treat figures as 'integral parts' of their arguments. Nicola Mößner (2018, p. 213) agrees, arguing scientific images can record, store, and transmit information. In an extraordinary study of philosophic artworks, spanning paintings to book frontispieces, art historian Susanna Berger (2017, p. 3) shows that pictures can offer new and enriching 'additions' to philosophical ideas.

If pictures can convey information, then they can embody or express philosophical ideas. They can even be used as rhetoric devices. For example, cartographer Brian Harley (1989) argued maps are rhetoric devices - seeking to persuade readers about the importance of places. Baigrie (1996a, p. xxiii) discusses several scholarly pieces testifying that visual depictions can 'bring about conviction', just like arguments. Hall (1996, pp. 36-7) argues pictures of unreal machines aim to 'persuade' us they will work. Similar claims are occasionally made about philosophical pictures. For example, Berger (2017, pp. 188-191) shows that Thomas Hobbes used visual representations as powerful 'instruments of persuasion'. The frontispiece of his 1642 *De cive* aims to 'persuade viewers visually' of Hobbes' view that life under Libertas (natural freedom) leads to horrors: arrow fights and dismembered bodies. Berger's work builds on earlier studies of Hobbes' pictures: see historian of art Horst Bredekamp's (1999), and intellectual historian Quentin Skinner's (2008).

This paper assumes that pictures can bear information; given its widespread acceptance, I take this to be uncontroversial. The authors discussed below evidently believe their time pictures convey information - that is why they include them. The more interesting step is to show that the information pictures bear can be significant to the historian of philosophy of time. To make this step, I argue pictures can convey information *subtly*, expressing ideas or aiding arguments in ways that are not made explicit.

III Picturing Time in Leibniz, Eddington, and Broad

The pictures discussed below span 222 years, and I have selected them for two reasons. First, time is central to the metaphysics of their authors; if studying the pictures of Leibniz, Eddington, and Broad elucidate their views, this should be of scholarly interest. I am not aware of any scholarship on these pictures, which is especially surprising given the voluminous literature on Leibniz.

⁵ Other pioneering works include Eugene Ferguson (1977); and John Murdoch (1984), part of the *Album of Science* series edited by Bernard Cohen. Later scholarship includes Baigrie (1996a), Freedberg (2002), and Lefèvre (2004).

Second, these pictures showcase alternative ways of representing time. They are all non-naturalistic, depicting things humans could never observe. As historians of science have discussed⁶, in such cases thinkers depict precisely what *they* consider salient. Consequently, our philosophers each depict time differently. The pictures below represent time in various contexts and at contrasting scales: Leibniz depicts the duration of the universe, Eddington depicts the duration of his life, Broad depicts a few instantaneous events. Each picture orientates time on a different axis; some represent space; some label the ‘past’ and ‘future’. Time can be represented in myriad ways, and we’ll see that the pictorial choices authors make are rooted in their underlying philosophies.

Leibniz: The universe over time

In correspondence published in 1717, Leibniz clashed with Samuel Clarke over the nature of time. Clarke defended Newtonian ‘absolutism’: eternal time exists independently of created things. Leibniz defended ‘relationism’: temporal relations holding between created things comprise time. As Leibniz (1717, p. 57) put it, time is the ‘Order of Successions’. Their correspondence, and Leibnizian relationism, is well studied⁷.

On Clarke’s view, God could have created the material universe earlier in time than he did. In a letter dated 18 August 1716, Leibniz rejects this possibility, using Figure 1⁸.

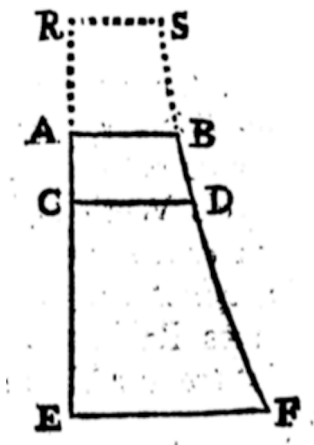


Figure 1: Time in Leibniz’s universe (1716)

Leibniz writes:

Let us suppose our Universe... represented by the Figure A F; and that the Ordinate A B represents its first State; and the Ordinates C D, E F its following States: I say, one *may conceive* that such a world began *sooner*, by conceiving the Figure prolonged backwards, and by adding to it S R A B S. For thus, *Things* being encreased, *Time* will be also encreased. But whether such an augmentation be *reasonable* and agreeable to God's Wisdom, is another Question, to which we answer in the Negative...

God created things at what *Time* he *pleased*; For this depends upon the *Things*, which he resolved to create. But *Things* being once resolved upon, together with their *Relations*; there remains no longer any choice about the *Time* (Leibniz, 1717, pp. 217-9)

⁶ See Baigrie (1996a, pp. xix-xx) and Hall (1996, p. 9).

⁷ Literature includes Vailati (1997), Futch (2008), and Dainton (2010, pp. 175-181).

⁸ Figure 1 taken from Leibniz (1717, p. 217). Reproduced with permission of Durham University Library, Palace Green Special Collections SC 05667.

God could not have created the universe at an earlier time, for time began when the universe was created. As God created things, temporal relations emerged, and so did time. Figure 1 is present in all Leibniz's extant, handwritten drafts of this letter⁹.

Leibniz explicitly uses Figure 1 to make a point against Clarke. However, I argue it also implicitly embodies his relationism. Leibniz's picture resembles a 'chronological table': a chronology dating historical (especially Biblical) events in tabular form¹⁰. Figure 2 provides an example from Henry Isaacson's 1633 *Saturni Ephemerides*¹¹:

40	704	
45	809	
50	814	ADAM & EVE, The years wherein the two Sones were borne are not expressed.
55	819	KAIN, a Husbandman. ABEEL, a Shepherd, flaine by KAIN. <i>Gen. 4.2.</i>
60	824	HENOCH,
65	829	IRAB,
70	834	METHUSAMEL,
75	839	ADA, LAMECH, ZILAIH.
80	844	IABA, He first made Tents and invented the ordering of Flockes. IVBA, He invented the Harpe and Organ. TYBAL, CAIN, Hee wrought in Braic and Yron. NAAMAHA, Shee kempt out the wolle of Woolle, Carding, Weaving & Spinning, &c.
85	849	
90	854	

Figure 2: Isaacson's tabular chronology

The leftmost column shows years since creation, its neighbour years on the Julian calendar.

Leibniz's diagram resembles a table in two ways. First, time is oriented top-to-bottom: earlier events at the top, later ones at the bottom. This orientation was one just option among many - major medieval thinkers also represented time along horizontal axes¹². Second, Leibniz's diagram comprises a 'thick' vertical column divided by horizontal ordinates. Leibniz could have drawn time more simply, as a 'thin' one-dimensional line, using A, C, E only. Time could have flowed horizontally, not vertically. Figure 1 *might* have looked like Figure 3:

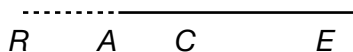


Figure 3: How Leibniz's universe might have looked

⁹ I am grateful to the Gottfried Wilhelm Leibniz Bibliothek at the Niedersächsische Landesbibliothek for allowing me to see these earlier drafts.

¹⁰ See Rosenberg & Grafton (2010, pp. 26-69).

¹¹ Figure 2 taken from Isaacson (1633, §I). Reproduced with permission of Durham University Library, Palace Green Library Bishop Cosin's Library P.1.1.

¹² See Boyd Davis (2012, p. 10) and Champion (2017, p. 8).

Figure 3 does not resemble a chronological table. By using Figure 1, which does resemble a table, Leibniz draws attention to the same thing tables do: the things inside the tables. His representation of time as a vertical, thick two-dimensional wedge, reminds us that each state of the universe is complex: at A B, or C D, many things occur. Further, just as in tables, relations hold between them: Irad was born after Henoch¹³. The ontological focus is placed where it should be - on things and their relations. In this way, Figure 1 expresses Leibniz's relationism.

More speculatively, Figure 1 may also embody Leibniz's considered view on perfection. Figure 1 has an unusual shape: ordinate A B (the first state of the universe) is shorter than ordinate E F (its last state). The implication is that, from earlier to later, the states of the universe somehow increase. But what aspect of these states is increasing? Leibniz does not accept that the *number of substances* increases over time¹⁴. Nor (as far as I am aware) does Leibniz claim anywhere that the *size* of the universe increases over time. However, Leibniz does wonder if *perfection* increases over time.

In a letter to Louis Bourguet dated 5 August 1715, just over a year before our letter to Clarke, Leibniz (repr.1989, pp. 664-5) asks whether the universe is always 'equally perfect' over time, or 'always increases in perfection'. As shown in Figure 4, Leibniz offers three possibilities¹⁵:

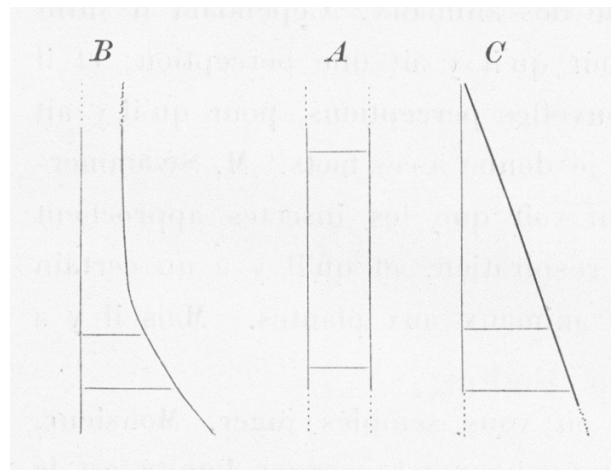


Figure 4: Perfection in Leibniz's universe (1715)

On 'rectangle A', the universe has no beginning in the sense there was a first instant in time, and nature is always equally perfect. On 'triangle C', the universe has a beginning, and it always increases in perfection. On 'hyperbola B', the universe has no beginning, 'and the instants or states of the world would have been increasing in perfection from all eternity'. Leibniz writes of these possibilities, 'I do not yet see any way of demonstrating by pure reason which of these we should choose'.

Figures 1 and 4 have different aims - representing Leibniz's view on time, and perfection, respectively - yet both represent the universe over time. There is a striking resemblance between Figure 1, and hyperbola B of Figure 4: both hyperbolas curve in the same manner, are dissected by horizontal ordinates, and represent time flowing top-to-bottom.

¹³ In another context, Leibniz writes that chronological order is essential to representations of time, which 'reveals the connections between events'; see Rosenberg & Grafton (2010, p. 90).

¹⁴ See Strickland (2006, p. 53).

¹⁵ Figure 4 taken from Leibniz (repr. 1875-90, III.582). Reproduced with permission of Newcastle University Special Collections, Merz Collection M193.1 LEI.

This may be because, a year after to writing to Bourguet, Leibniz had settled on the view that the states of the universe always increase in perfection. This would explain why the drafts of his letter to Clarke invariably use this shape - when drawing the universe this shape came naturally, perhaps even without conscious thought. If this is right, then the fact Figure 1 represents the universe as a hyperbola rather than a triangle also implies Leibniz now believed the universe lacks a beginning in time (although he was prepared to argue against Clarke that if the universe had a beginning, it could not have had a different one).

Although earlier scholars have asked whether Leibniz's world increases in perfection¹⁶ they have not connected Figures 1 and 4 - perhaps because historians of philosophy usually search for textual, rather than visual, connections through a figure's corpus. Nonetheless, I suggest this connection warrants consideration. One way to deny a connection between the diagrams would be to show that Leibniz often uses hyperbolas to represent things, implying there is no connection between those representations. To make this argument, one would have to comb through Leibniz's corpus, considering philosophical connections between images. No such project has ever been undertaken but I would welcome it: such a study could reveal new interrelations within Leibniz's philosophy.

To sum up, Figure 1 plays an explicit role in Leibniz's objection to Clarke but it also plays subtle roles: expressing his relationism, and perhaps even his considered view on perfection.

Eddington: Events in “my” personal timeframe

In 1928, physicist and philosopher Arthur Eddington published *The Nature of the External World*. Eddington (1928, p. vii) explains the book treats ‘the philosophical outcome of the great changes of scientific thought which have recently come about’, including relativity and thermodynamics. Chapters 1 to 11 are ‘for the most part’ occupied with these new physical theories and their underlying conceptions. Chapters 12 to 15 consider the relationship between science and the ‘wider aspects’ of human experience, including religion. I’ll focus on the pictures found in Chapter 3, “Time”¹⁷.

Eddington (1928, pp. 36-9) opens the chapter by explaining some scientific ideas about time, including Einstein's theory that time is relative to your frame of reference. If someone travels rapidly across the universe they could age one year, whilst someone who stays on Earth ages seventy years. ‘Physical time’, Eddington (1928, pp. 40-1) writes, ‘is, like space, a kind of frame in which we locate the events of the external world’. He aims to show how ‘in practice’ external events are located in a space and time frame. As there is an infinite choice of frames, he uses his own frame as an example - and note how Eddington *literally* frames his diagrams.

He kicks off using Figure 5¹⁸:

¹⁶ Literature includes Rutherford (1998, pp. 46-67) and Strickland (2006).

¹⁷ Scholarship on time in Eddington includes Yolton (1960) and Price (2010).

¹⁸ Figure 5 taken from Eddington (1928, p. 41). All figures taken from this text are reproduced with permission of the private owner.

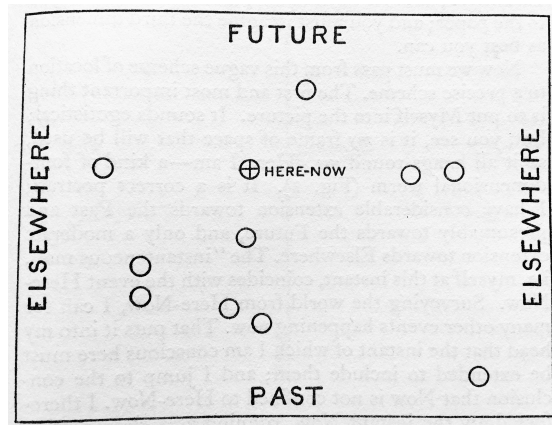


Figure 5: Eddington's personal temporal frame (i)

Eddington (1928, p. 41) explains that each circle represents an event but they are not currently in their correct locations; he will remedy this. He begins identifying events:

I can immediately recognise and label the event Here-Now, viz. that which is happening in this room at this moment. The other events are at varying degrees of remoteness from Here-Now... the remoteness is not only of different degrees but of different kinds. Some events spread away towards what in a general way I call the Past; I can contemplate others which are distant in the Future; others are remote in another kind of way towards China or Peru, or in general terms Elsewhere. (Eddington, 1928, pp. 41-2)

In a second diagram, Figure 6, Eddington puts himself into the frame¹⁹. He is the vertical line labelled 'Myself':

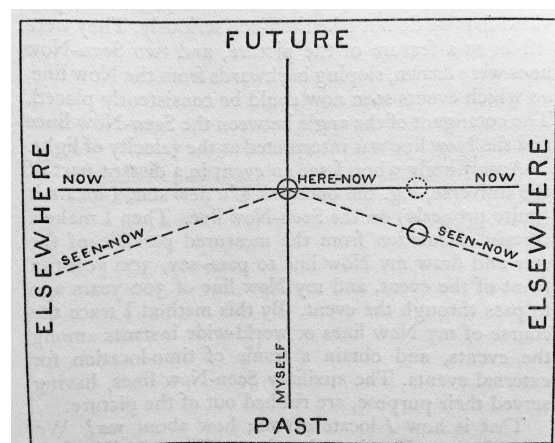


Figure 6: Eddington's personal temporal frame (ii)

Wryly, Eddington (1928, pp. 42-3) describes this 'four-dimensional worm' as a 'correct portrait': 'I have considerable extension towards the Past and presumably towards the Future, and only a moderate extension towards Elsewhere'. From Here-Now, Eddington's self at that moment, he can survey other events 'happening now', such as the furniture in his study, or birds flying past the

¹⁹ Figure 6 taken from Eddington (1928, p. 43).

window. The horizontal line labelled ‘Now’ runs across the world of events, accommodating distant events that are also happening now; these might include monkeys gambolling in China. The dotted line labelled ‘Seen-Now’ represents events that took place elsewhere but are seen by Eddington at his ‘Here-Now’; for example, the light of a supernova takes time to travel across the galaxy.

Next, Eddington adds another person: the line labelled ‘Yourself’, in Figure 7²⁰.

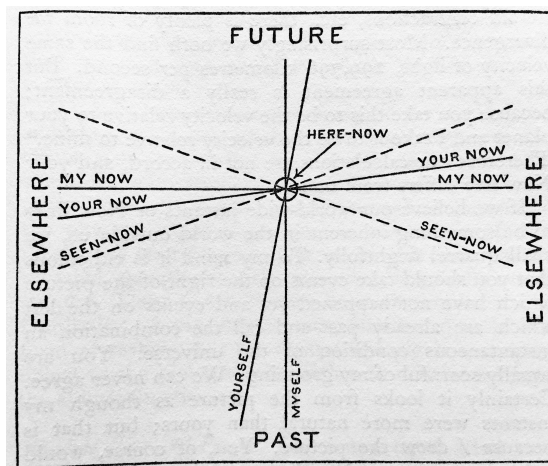


Figure 7: Eddington's personal temporal frame (iii)

Eddington (1928, p. 44) supposes ‘you’ are on another star moving with a different velocity but currently passing close to earth: ‘You and I were far apart in the past and will be again in the future, but we are both Here-Now... [as] shown in the picture’.

Eddington is explicit that the purpose of the diagrams is to explain how temporal frames of reference work. No other purpose is offered, and the diagrams are presented as scientific, not philosophical or religious. However, I argue the diagrams subtly do more than this, by expressing his philosophical views on becoming, and religious optimism.

Eddington's views on becoming are detailed in Chapters 4 and 5, where he argues that time has a one-way arrow, independent of what science tells us. Eddington (1928, p. 87) asks what a personification of Science would say to the notion that, “Every day I grow better and better”. He suggests Science would say:

“I see no signs of it. I see you extended as a four-dimensional worm in space-time... I will grant that one end of you is better than the other. But whether you *grow* better or worse depends on which way up I hold you. There is in your consciousness an idea of growth or ‘becoming’... I have searched for such a label all through the physical world and can find no trace of it” (Eddington, 1928, p. 87)

In Eddington's view, Science treats time akin to space. On a map of the Alps, one mountain might be higher than its neighbour. These mountains aren't growing higher or lower, they just have different sizes at different points. Similarly, as Science views Eddington's life laid out in time, he doesn't grow better or worse, he is simply better or worse at different points. Even if Science acknowledged that Eddington changes over time, there is no privileged direction along his timeline: hold the timeline one way, Eddington grows better; another, he grows worse.

Against Science, Eddington argues time does have a privileged direction. He (1938, pp. 89-91) finds our world to be one of ‘evolution and progress’. The feeling of ‘becoming’ is a ‘true mental insight’ into the physical world, one not revealed by physical measurements. He argues that

²⁰ Figure 7 taken from Eddington (1928, 45).

if Science is right and time lacks an arrow, it should accept the possibility of reversing events. He challenges Science to really envisage that:

teach us how from Man and a myriad other primitive forms of life, Nature in the course of ages achieved the sublimely simple structure of the amoeba... tell how the waves of light hurry in from the depths of space and condense on to the stars; how the complex solar system unwinds itself into the evenness of a nebula. Is this the enlightened outlook which you wish to substitute for the first chapter of Genesis? (Eddington, 1938, pp. 91-2)

More on this reference to *Genesis* below.

Eddington (1938, p. 97) describes ‘becoming’ as ‘that dynamic quality - that significance which makes a development from past to future reasonable’. If you agree with Eddington that becoming is a real feature of the physical world, you are committed to believing that some events are really past and others future. Time’s arrow really points from past to future. Eddington (1938, p. 92) claims that if becoming were not a real feature of the external world, the world would lie ‘passively spread out in the time-dimension’, and his consciousness would ‘invent’ its own serial orders. This description is in line with Bertrand Russell’s (1915, p. 212) view that pastness, presentness, and futurity arise only in mental experience.

I argue Eddington has embedded his belief in ‘becoming’ within the diagrams above, through his choice of labels. He has labelled the top of each picture ‘Future’, and the bottom ‘Past’ - but he need not have done so. The symmetrical labels ‘Elsewhere’ hang to the left and right of each diagram, and they convey the points Eddington wishes to make about temporal frames without implying an arrow in space. Similarly, Eddington could have chosen the symmetrical labels ‘Elsewhen’ - that would remove any hint of an arrow in time. Further, Eddington needn’t have used the label ‘Here-Now’. His points about temporal frames of reference could have been made equally well by replacing the label ‘Here-Now’ with something that does not invoke becoming. He could have simply lettered events (as in Figure 1). Or he could have replaced ‘Here-Now’ with ‘London-1927’. Similarly, labels such as ‘Seen-Now’ could be replaced with ‘Seen-1927’. Were Russell to picture time frames within the external world, I am sure he would purge them of pastness, presentness, and futurity.

The diagrams of Chapter 3 implicitly express Eddington’s views on becoming, yet he does not argue for those views until subsequent chapters. I argue this is a form of ‘priming’. In psychology, priming is a process whereby the introduction of one stimulus affects how people respond to a subsequent stimulus. The process is analogous to priming a water well: once the well has been primed, water can be produced whenever it is turned on. It works by activating a memory or association with the second stimulus, and can occur unconsciously²¹. For example, if asked to name a fruit, people primed with the idea of yellow will likely name a banana rather than an apple. By silently associating time with becoming in Chapter 3, Eddington has (perhaps unintentionally) primed his readers to accept his not-yet-argued-for view that time involves becoming. As such, these diagrams act as rhetorical devices, persuading their readers of temporal becoming.

Further, I argue these diagrams express Eddington’s religious optimism. As Boyd Davis (2012, p. 8) explains, Western representations of time usually depict time flowing left-to-right or top-to-bottom, following standard Western reading practice. Figure 8 illustrates some possible time orientations:

²¹ For a broader introduction, see Kalat (2017, pp. 257-9).

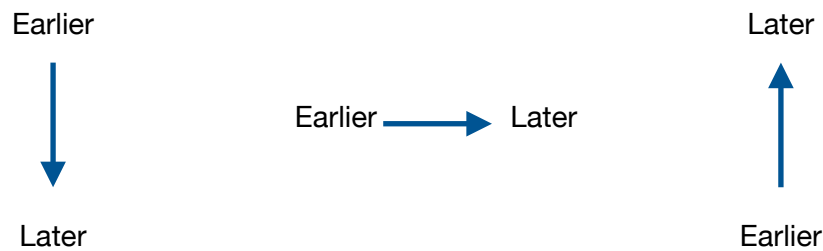


Figure 8: Possible time orientations

Leibniz chose to depict time flowing top-to-bottom, and (as we will see) Broad chose left-to-right. Why did Eddington make the unusual choice of bottom-to-top?

One possibility is that Eddington is imitating Hermann Minkowski's spacetime diagrams, which sometimes depict time flowing bottom-to-top²². However, I argue for another possibility, following hints in the final chapter of *The Nature of the External World*, "Science and Mysticism".

As foreshadowed in his earlier reference to *Genesis*, Eddington (1928, p. 338-9) argues we should believe in 'mystical religion', and posit a universal mind. In doing so, he consciously goes beyond science, describing physical science as limited in scope, leaving a background we can 'fill with a reality of spiritual import'. In this context, he makes some comments on time:

the direction of the arrow [of time] could be determined by statistical rules, but its significance as a governing fact "making sense of the world" could only be deduced on teleological assumptions. If physics cannot determine which way up its own world ought to be regarded, there is not much hope of guidance from it as to ethical orientation. We trust to some inward sense of fitness when we orient the physical world with the future on top, and likewise we must trust to some inner monitor when we orient the spiritual world with the good on top (Eddington, 1928, pp. 338-9)

As I read this passage, time helps us make sense of the world in a teleological framework because Eddington perceives the world as progressing or improving *by design*. Eddington is arguing that physics has limits - if Science can't be trusted to hold a timeline the right way up, it can't be trusted on ethical or spiritual issues. Religion, however, can hold the timeline the right way up.

We already knew Eddington has an inward sense of becoming, of time moving from past to future. Here, we learn he also has an inward, optimistic sense that it is fitting for the future, like goodness, to be 'on top'. Although it makes sense for someone who believes in progress to orientate futurity and goodness in the same direction, why place them on top? One possible reason is English figures of speech: 'to come out on top' means to finish well. Presumably, in this sense, things in Eddington's universe will come out on top.

Another possible reason emerges a few pages on, where Eddington (1928, p. 351) states there is a 'future non-material existence in store for us': Heaven. Heaven lies in the future for 'there is no comfort in an assurance of bliss in some *former* state of existence'. In this context, Eddington mentions the pre-Copernican idea that Heaven is 'above our heads'. I argue this traditional notion informs Eddington's sense of fitness that the future, like goodness and Heaven, is above us.

In summary, Eddington's seemingly innocuous diagrams play additional subtle roles. They prime readers to accept his view of becoming, and point (upwards!) to his belief in a future Heaven.

²² For example, see Minkowski (1918, p. 290).

Broad: The “temporal facts”

In the 1930s, C. D. Broad produced his two-volume *Examination of McTaggart’s Philosophy*, on McTaggart’s *The Nature of Existence*. The second, 1938 volume of Broad’s *Examination* contains a chapter titled “Ostensible Temporality”. This critiques McTaggart’s argument against the ostensible (seeming) reality of time and sets out Broad’s own views, employing pictures²³.

McTaggart (1927, pp. 9-10) distinguishes two ways of ordering ‘positions in time’. Any position in time has varied ‘contents’: a plurality of simultaneous events. On what McTaggart labels the ‘B series’, positions are ordered by ‘earlier’ and ‘later’. On what he labels the ‘A series’, positions are past, present, or future. McTaggart claims B series positions are ‘permanent’, whilst A series positions are not. To illustrate, take the moment on 8 November 2016 when Donald Trump won the US election. It is permanently the case that this position occurs *after* the position during which Barack Obama won. Yet this position was once future, then present, then past.

McTaggart (1927, pp. 10-11) holds the A series more fundamental to time than the B series, so if you reject the reality of the A series, you reject the reality of time. He argues:

Past, present, and future are incompatible determinations. Every event must be one or the other, but no event can be more than one...
But every event has them all. If [event] M is past, it has been present and future. If it is future, it will be present and past... Thus all three characteristics belong to each event...
we get a contradiction (McTaggart, 1927, pp. 20-21)

As the A series leads to contradiction, McTaggart (1927, p. 22) concludes we must reject the reality of the A series and time itself. This seemingly simple argument has generated reams of discussion²⁴.

Broad agrees with McTaggart that the A series is fundamental to time but he denies we should reject it. Broad defends the reality of the A series and time, and “Ostensible Temporality” opens by canvassing the issues. For example, Broad (1938, p. 271; 277) writes that events seem to be ‘continually changing’ in respect of pastness, presentness, and futurity; he labels this process ‘absolute becoming’.

Having described McTaggart’s A-B distinction, Broad (1938, p. 289) describes the ‘series of A-characteristics’ formed by the characteristics of presentness, and degrees of pastness and futurity. Broad represents this using Figure 9, a series of integers²⁵:

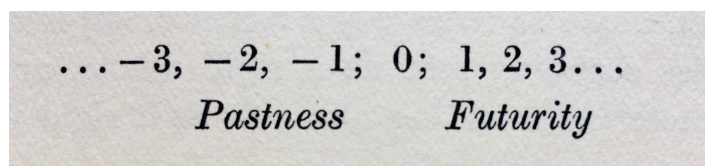


Figure 9: Broad’s series of A characteristics

Broad believes presentness is a mind-independent feature of reality, and the present is special - a thin boundary between past and future. The diagram embodies this. The present is centred, occupying the most privileged position; the same centring can be seen in recent depictions of A

²³ On Broad’s critique of McTaggart, see Ingthorsson (2016, pp. 81-87); on Broad’s own 1938 views, see Mundle (1959) and Savitt (2002).

²⁴ For example, see Dainton (2010, pp.13-26) and Ingthorsson (2016).

²⁵ Figure 9 taken from Broad (1938, p. 289). All figures taken from this text are reprinted with permission of Cambridge University Press; and reproduced with permission of the private owner.

theories²⁶. Degrees of pastness and futurity are distinguished by mere commas, whereas the present is firmly separated from the past and future by semi-colons.

Inspired by McTaggart, Broad (1938, pp. 290-1) represents the ‘temporal facts’ pictorially, ‘by means of an analogy with motion’. In a footnote, McTaggart (1927, pp. 10-11) writes it is ‘very usual’ to contemplate time using a metaphor of spatial movement, and he offers us two. Time can present as a movement from earlier to later: ‘the A series as sliding along a fixed B series’. Time can also present as a movement from future to past: ‘the B series as sliding along a fixed A series’. Citing this footnote, Broad produces two diagrams²⁷:

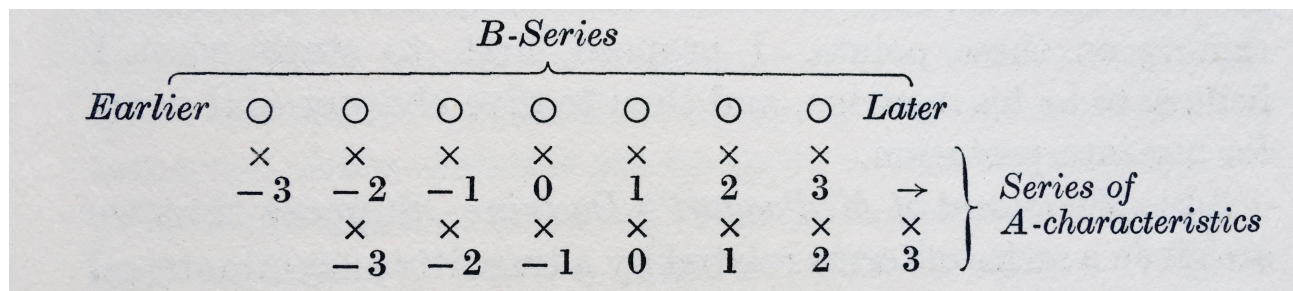


Figure 10: Broad showing A series sliding along a fixed B series

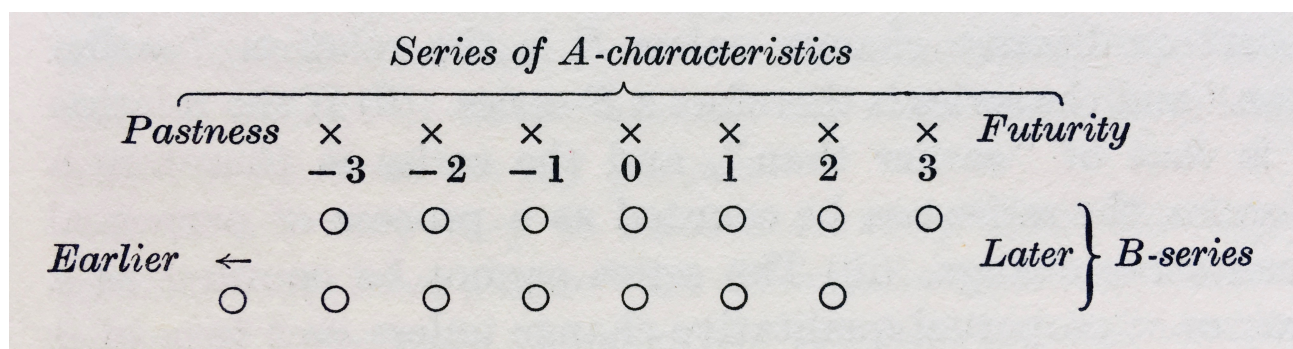


Figure 11: Broad showing B series sliding along a fixed A series

Figures 10 and 11 also embody aspects of Broad’s metaphysics. As in Figure 9, the present is centred, and times are represented by integers; again, Broad is stressing the importance of the present, and his view that pastness and futurity come in distinct degrees. New symbolism is introduced: \times represents terms in the series of A characteristics, and o represents terms in the B series. Perhaps he chose the latter symbol because Broad (1938, p. 273) replaces McTaggart’s notion ‘positions in time’ with his preferred notion of ‘event particle’, and o resembles a particle.

Both Figures 10 and 11 depict Broad’s ‘absolute becoming’. From one moment to the next, a different A characteristic correlates with a different term in the B series. For example, at one moment the degree of pastness -2 correlates with an event, and at the next moment the degree of pastness -3 correlates with the same event. Further stressing this absolute change, Figures 10 and 11 feature arrows indicating the motion of time.

To highlight how Figures 10 and 11 stress A characteristics, I contrast these pictures with one from Broad’s peers. In his 1920 *Space, Time, and Deity*, Samuel Alexander (1920, I.44) defends

²⁶ Bourne (2006, pp. 12-13) and Dainton (2010, p. 8).

²⁷ Figures 10 and 11 are taken from Broad (1938, p. 291).

the B theory: he holds that mind-objective ‘Physical Time’ *only* involves succession from earlier to later. At several points in his work, Alexander represents ‘instants’, moments of time, strung out along a line. Figure 12 is one example²⁸:

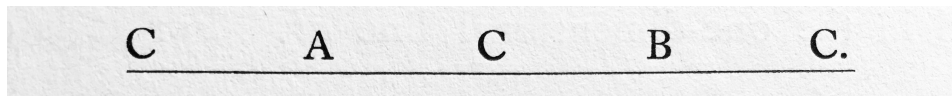


Figure 12: Alexander’s instants across time

Figure 12 contrasts neatly with Figures 10 and 11, as all represent time at the smallest units of their authors’ metaphysics: Broad depicts event particles, Alexander depicts instants. Despite this commonality, there are big differences. Figure 12 makes no mention of past, present, or future - it is devoid of A theory characteristics. Nor are there arrows indicating temporal change. The diagrams of Broad and Alexander both reflect their metaphysics.

I argue Figures 10 and 11 manifest the heart of Broad’s objection to McTaggart’s main argument. McTaggart did not use diagrams but Broad (1938, p. 290) presents Figures 10 and 11 as though they are compatible with his views: ‘If an attempt is made to picture the temporal facts... there are two alternative ways open to us, as McTaggart pointed out...’. Yet McTaggart’s footnote only offers a linguistic metaphor, there is no suggestion he conceived it pictorially. Broad’s pictorial version goes far beyond the original metaphor.

Following lengthy discussions, Broad advances his criticism of McTaggart’s main argument for the unreality of time:

I cannot myself see that there is any contradiction to be avoided. When it is said that past, present, and futurity are incompatible predicates, this is true only in the sense that no one term could have two of them simultaneously or timelessly. Now no term ever appears to have any of them timelessly, and no term ever appears to have any two of them simultaneously. What appears to be the case is that certain terms have them *successively*. (Broad, 1938, p. 313)

This argument is surprisingly simple, and short: the chapter “Ostensible Temporality” numbers 59 pages, and this criticism numbers just 79 words. What’s going on?

Broad (1938, p. 309) accepts McTaggart’s claim that A characteristics are incompatible: no term can be past *and* present, or possess different degrees of pastness or futurity. However, against McTaggart, Broad argues that terms do not possess more than one incompatible temporal predicate at any time.

Implicitly, Broad takes it to be impossible for a term to have these characteristics timelessly - having an A characteristic *means* a term is in time. Broad further argues that terms do not have these characteristics simultaneously. It is contradictory to say an apple is simultaneously green and not green. It is not contradictory to say an apple is green at one moment, and not green at another moment. This is where Broad’s diagrams come into play.

Broad doesn’t reference Figures 10 or 11 while making this objection but these diagrams make exactly this point. At one moment, an event particle *o* has one A characteristic, say the degree of futurity 2; and, at the next moment, the same event particle *o* has another A characteristic, the degree of futurity 1. At any moment, any term in the B series is characterised by one and only A characteristic. The diagrams *show*, in the simplest way possible, that terms do not bear incompatible

²⁸ Figure 12 taken from Alexander (1920, I.51). Reproduced with permission of Durham University Library, 052GIF.

predicates simultaneously: they bear them successively. In this way, Broad's pictures of the temporal facts act as rhetoric devices, seeking to persuade us of his metaphysics. His seemingly straightforward visualisations of McTaggart's metaphor power his main critique of McTaggart's argument.

IV Pictures At Large within History of Philosophy

It is worthwhile for historians of philosophy to consider how time is represented in historical texts. Pictures of time can play explicit roles, and implicit ones. The information they carry can be philosophically significant: it can suggest new philosophic connections within an author's corpus, such as Leibniz's views on perfection; bring out new aspects of a text, such as Eddington's stress on becoming and optimism; and explain existing aspects, such as the brevity of Broad's objection to McTaggart. This may also be of interest to twenty-first century philosophers of time, who are often engaging with - and perhaps even creating - pictures of time.

Going beyond the history and philosophy of time, this paper also submits that the history of philosophy more widely could benefit from paying more attention to pictures. Many major philosophers use frontispieces or diagrams within their texts, including Aristotle, Hobbes, Henry More, Descartes, Margaret Cavendish, Herbert Spencer, Henry James, and Henri Bergson. Many fussed over them: Hobbes deploys frontispieces like a general; Claude Clerselier delayed publishing the text of Descartes' *Traité de l'homme* until he was satisfied with the pictures accompanying it; Giambattista Vico spends tens of pages explaining the role of diagrams in his 1725 *Scienza Nuova*²⁹. We should care about pictures because historical philosophers cared.

Despite this, evidence suggests historians of philosophy do not currently think much about pictures. One sign is that new editions of philosophical texts, edited by or for historians of philosophy, sometimes omit or otherwise downplay pictures contained in the originals. As Baigrie (1996b, p. 87) points out, this phenomenon can be seen in Descartes' *Principles*. The first, 1644 Latin edition contains over forty distinct pictures, often reprinted from one page to the next. For example, a vortex diagram which initially appears on p. 110 is repeated eleven times across the following twenty pages. Yet, to use Baigrie's word, the images 'disappear' in later editions. The 1647 French edition by Abbe Picot moved the pictures to the end of the text. Adam and Tannery's 1964-76 "AT" edition followed suit. I have found the pictures fair no better in English translations. The abridged, 1985 "CSM" English translation by Cottingham, Stoothoff, and Murdoch is perhaps the mostly widely used edition, and it omits many of the images. The full, 1983 English translation by Miller and Miller omits some of the pictures, and moves the rest to the end. Neither edition repeats images. I have found the same phenomenon in other major philosophical works. For example, the 1677 edition of Spinoza's *Ethics* within his *Opera Posthuma* includes three images: on page 14 (IP15S), page 47 (IIP8C), and page 55 (IIP13L3). The 2018, critical English edition of the *Ethics*, edited by Matthew J. Kisner, omits the first picture without explanation.

Another sign is how rarely historians of philosophy discuss pictures inside philosophic texts. Although exceptional discussions exist³⁰, more attention seems to be paid to pictures in philosophic texts from fields *adjacent* to the history of philosophy. For example, historians of science have discussed pictures in texts that are both scientific and philosophic: Baigrie (1996b) studies Descartes' *Principles*, and Lo (2017) studies Descartes' *Essais*. Historians of art have also analysed philosophical pictures: Bredekamp (1999) considers Hobbes' imagery, and Berger (2017) covers many early modern philosophical artworks.

²⁹ On Hobbes, see Berger (2017, pp. 188-192); on Clerselier, see Nadler (2016); on Vico, see Verene (2015).

³⁰ For example, see Natali (2013, pp. 113-7) on Aristotle's pictures; and Skinner (2008, pp. 98-103; 182-198) on Hobbes' *De Cive* and *Leviathan* respectively. Although I have no doubt further discussions exist, they are not commonplace.

Why the lack of interest? Historians and philosophers of science have asked this question of their discipline, and their answer may be relevant to us. Baigrie (1996a, pp. xvii-xviii) states humans have a ‘deep-seated conviction that human thinking takes place in words’. Similarly, Mößner (2018, pp. 4-5) claims argumentation is usually thought of as a ‘merely verbal issue’. I suspect a similar conviction is present within history of philosophy: it is only the *words* of philosophers that matters. I hope to have at least shaken this dogma: the *pictures* of philosophers matter too³¹.

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