PROBLEMS FROM THE PRESOCRATICS

by

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Also by Stephen Priest:

The British Empiricists
Theories of the Mind
Merleau-Ponty
The Subject in Question

Hegel's Critique of Kant (ed.)
Jean-Paul Sartre: Basic Writings (ed.)
A Dictionary of Philosophy (ed. with Antony Flew)

Preface

I examine philosophical problems posed by the Presocratic philosophers, the earliest western thinkers. Their ideas and arguments are evaluated, and briefly compared with those of Plato and Aristotle. This book is based on first year undergraduate lectures and deliberately retains their informal spoken style. Page references are to: Jonathan Barnes (ed.) *Early Greek Philosophy* (Penguin). My interest in the Presocratics was first sparked by G.E.L. Owen whose classes I attended in King's College Cambridge. I feel I owe him much. If he is reading this, he might express the same mild surprise as he did all those years ago.

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Introduction

Who were the Presocratics? The Presocratics are the earliest Western philosophers but, in hindsight, they were involved both what we would call 'science' and philosophy. They did not draw a distinction between these two enterprises. Their aim was simply to explain *everything*. They are usually thought to be: Thales (c. 585 BC), Parmenides (born c. 510 BC), Heraclitus (died after 480 BC), Anaxagoras (c. 500/499 - c. 428/7 BC), Democritus (c. 460 – c. 370 BC), Pythagoras (fl. C6th BC), Anaximander (died 547/6 BC), Anaximenes (fl. c. 550-400 BC), Xenophanes (c. 570 – 476 BC), and Zeno (born c. 490 BC). Some, despite being labelled 'Presocratic', were partly contemporary with Socrates (c. 470 – 399 BC).

Jonathan Barnes, in his useful anthology of Presocratic writings, *Early Greek Philosophy* (Penguin), identifies three periods of ancient Greek philosophy:

585BC - 400BC The Presocratic period. (In 585BC, the philosopher Thales successfully predicted an eclipse of the sun.)

400BC - 100BC The period of the schools. By 'schools' Barnes means established philosophical schools such as those of Plato, Aristotle, the Epicureans, and the Stoics.

100BC – 529AD (In 429AD, the Emperor Justinian banned pagan philosophy in Athens.)

Barnes divides the Presocratic period itself into three philosophical tendencies: bold and creative thinking for about one hundred years (say 585-485), logical criticism of that philosophy, and finally consolidation (the last two tendencies over roughly 485-400). In Hegelians terms, we could understand Barnes' taxonomy as thesis, antithesis, and synthesis.

Two major influences on the Presocratics were the geometry of ancient Egypt, and the myths and proto-science of the ancient Babylonians.
We will not study the science of the Presocratics, because much of it was mistaken. But understanding why the Presocratics held mistaken scientific views can be philosophically interesting. Some of them felt the world is made entirely out of water. This view is probably inherited from the Babylonians.

The Babylonians believed the world is flat, like a disc, and over the disc was a light blue dome. They believed that reality is ultimately water, because if you travel far enough across land you come to water. They explained this by saying the disc was floating on water. There are holes in the disc, where the water shows through. The also thought there are holes in the light blue dome through which water seeps. Beyond the dome, again, reality is water. (On this, see Arthur Koestler's interesting history of science up to the Renaissance: *The Sleepwalkers* (Penguin)). No doubt, if we time-travelled to Ancient Babylonia and questioned the existence of the light blue dome over the flat disc, we would be regarded as stark staring mad. In daylight, at least, the world *looks* that way. There is a lesson here: Even if it seems *completely obvious* that *p*, it does not follow that *p*. No matter how psychologically compelling it is that *p*, possibly not *p*.

Is there then no certainty? Many philosophers think the claims of mathematics and logic more certain than other claims. If 'certain' here is an epistemological concept then this might be doubted. I might doubt some huge equation or proof but not doubt some elementary empirical fact, or that there is something rather than nothing. If we say 'necessary' rather than 'certain' the claim looks more plausible. But, then, it might be necessary that there is something.

The view that the world is a disc cannot explain our current view that the world is a spherical but our view that the world is spherical can explain the view that the world can appear as a disc. A principle we tend to work with is:

If *p* explains *q* but *q* does not explain *p* then *p* is true and *q* false

but this looks invalid. Unless we build 'truly explains' into 'explains', *p* might be false. *q* might be false either way. If *p* and *q* are jointly consistent, they could both be true.

There is possibly another lesson. Science has a history. If science has a history can it be true? We tend to assume the clock has stopped in the present (ie when *we* are); that the science we now have is true. But why should that be? If there is science (life, consciousness) in a million years

time perhaps our science will look as naïve and false as the Babylonian world picture looks to us.

To the Presocratics, the world probably did look like a disc. That is the phenomenology, and it requires an enormous amount of schooling to overcome it.

Where were the Presocratics? Neither of the two main centres for the Presocratic philosophy was in Greece, although the Presocratics wrote and spoke in Greek. One centre was the eastern coast of the Aegean (now the south-western coast of Turkey), including Miletus (Thales, Anaximander, Anaximenes), Ephesus (Heraclitus), Colophon (Xenophanes). Pythagoras and Anaxagoras also lived there. The Greeks had settled the area and called it 'Ionia'. The Greeks had also colonised southern Italy, the other major centre of Presocratic philosophy, called 'Eleas'. It included Elea (Parmenides and Zeno) and Croton (Pythagoras). Mutual contact existed. Pythagoras moved to southern Italy. Anaxagoras lived in the Clazomenae, Democritus and Heraclitus on Abdera. For a while, Pythagoras lived on Samos.

Xenophanes is thought to have been the teacher of Parmenides. Zeno was a follower of Parmenides.

The Presocratics disagree over the answers to philosophical questions, so they cannot be referred to as a philosophical 'school' in virtue of any common doctrine. For example: Parmenides. argues that there is only Being, and no non-being, no nothing. Heraclitus, depending on how we read him, argues either that everything is changing or that there is *only* change. Democritus argues that, if we could divide the tiniest sub-atomic particles into smaller ones, we could ultimately make a last division: a division after which we could divide no further. Pythagoras argues that there life after death. We are, or have, immortal souls and reincarnation is real. (Although Pythagoras is famous for geometical thinking, some historians now doubt that he authored the famous theorem.) Anaximander argues that there different kinds of infinity pertaining to numbers, space, and time. Xenophanes thinks there are limits to knowledge, things we can never know but he thinks we can know *that*. Zeno argues that motion and plurality are paradoxical so, appearances to the contrary not withstanding, they do not exist.

Given these disparate conclusions, do the Presocratics have anything philosophical in common? They assume that the world is ordered and intelligible. They deploy naturalistic explanations, as far as these will take us. They think parsimonious explanations are likely to be right. There is a common, root, conceptual scheme deployed in Presocratic explanation. It is, to that extent, systematic. The same philosophical vocabulary is used,

notably: *arche*, *kosmos*, *logos*, *phusis*. (See the glossary at the end of this book.)

Although, to our minds, science and philosophy are assimilated by the Presocratics, they clearly think explanation is distinct from myth. Parmenides wrote philosophy in the form of a poem. The Poem is curious, because the opening verses approximate to myth rather than philosophy, and it contains out-of-date science that is not so useful to us. In Parmenides' poem, philosophy is weaned off myth. The Presocratics advance argument not dogma. This is a large difference between early philosophy and pre-philosophical myths, which include very little argument. (People who oppose philosophical questioning today sometimes try to redescribe philosophy as myth.) In doing philosophy, it is important to give a reason for a view, otherwise you might just as well believe the opposite. So far as we can tell, the Presocratics were the first people to see this.

Questions

(1) How and why did philosophy begin?

(2) Who were the Pre-Socratics?

(3) Can a clear distinction be drawn between philosophy and mythology?

I

PARMENIDES' SPHERE

To understand Parmenides, we must understand the profound difference between these two questions:

'What is there?'

and

‘What is it to be?

The answer to the question ‘What there?’ is some kind of list, for example: physical objects, numbers, minds, the first event, acts of political violence. The list might be long and subject to disagreement. The list of things that you believe exist is your *ontology.*

Suppose, for sake of argument, somebody’s list is *right*. All and only the things on their list exist. Suppose, numbers and physical objects exist. Asking ‘What is it to be?’ is asking what makes those *on the right list rather than off it*. What does it consist in for them to *be rather than not be*? This new question is not the question ‘What exists?’ It means What is this ‘existing’ that the things that are engaged in? The question ‘What is it to be?’ means the same as ‘What is *being*, as opposed to nothing or absence of being)?’ Notice, it cannot be answered by adding to or deleting from the list.

There are huge differences between physical objects, states of mind, and numbers. If these exist, then radically different kinds of things exist. But if we say all these *exist*, we are presupposing they have something in common: They *are* rather than are not. What is this *being* rather than not being?

We need to be clear on the distinction between *beings* (for example, physical objects) and the *being* of beings: whatever it is about these things that their existing consists in: the property, if it is a property, that all and only *the things that are* have in common. Parmenides describes the characteristics of being, the properties of what he calls 'the one being' (134). I list them here:

[1] 'it is'
[2] 'being'
[3] 'it is ungenerated'
[4] 'indestructible'
[5] 'whole'
[6] 'of one kind'
[7] 'unwavering'
[8] 'complete'
[9] 'Nor was it'
[10] 'nor will it be'
[11] 'since now it is'
[12] 'all together'

[13] 'one'
[14] 'continuous'
[15] 'That it came from what is not I shall not allow'
[16] 'for it is not thinkable or sayable that it is not'
[17] 'it must either altogether be or not be'
[18] 'Nor [...] anything apart from itself'
[19] 'it is or it is not'
[20] 'How might what is [...] perish ?'
[21] 'How might it come into being ?'
[22] 'Nor is it divided'
[23] 'since it all alike is'
[24] 'neither more here nor less'
[25] 'it is all full of what is'
[26] 'Hence it is all continuous'
[27] 'what is approaches what is'
[28] 'it is beginningless'
[29] 'ceaseless'
[30] 'powerful necessity holds it enchained in a limit which hems it around'
[31] 'not incomplete'
[32] 'not lacking - if it were it would lack everything'
[33] 'The same thing are thinking and a thought that it is'
[34] 'without what is [...] you will not find thinking'
[35] 'nothing either is or will be other than what is'
[36] 'whole'
[37] 'unmoving'
[38] 'it is completed on all sides'
[39] 'like the bulk of a well-rounded ball'
[40] 'equal in every way from the middle' (134-5)

I shall say something about each of these in turn. The following arguments are partly reconstructed from Parmenides' fragments, partly invented to give at least *prima facie* plausibility to his claims.

[1] 'it is'

Interpretations:

[1 a] Being is (rather than is not).

[1 b] There is Being (rather than nothing).

Argument that there is Being rather than nothing (I):

(1) There is no (such thing as) nothing.

(2) There is either Being or nothing.

(3) Therefore, there is Being.

Argument that there is necessarily Being rather than nothing (I):

(1) Necessarily, there is no nothing.

(2) Necessarily, there is either Being or nothing.

(3) Therefore, necessarily there is Being.

Argument that there is necessarily Being rather than nothing (II):

(1) There is no nothing.

(2) If there is no nothing, there is no transition from nothing to Being or from Being to nothing.

(3) If Being could *not be* then there could be a transition from Being to nothing.

(4) Being cannot not be.

(5) Therefore there is necessarily Being rather than nothing.

[2] 'being'

Interpretations:

[2 a] Being is self-identitical.

[2 b] Being is Being.

Argument that Being is self-identical (I):

(1) If Being were not Being, Being would not be.

(2) Being cannot not be.

(3) Therefore, Being is Being.

Argument that Being is self-identical (II):

(1) Necessarily, nothing differs from itself.

(2) Being is necessarily not nothing.

(3) Being does not differ from itself.

(4) Therefore, Being is Being.

If Being were not self identical then there would be no Being because self-identity is a necessary condition for existence. (Intuitively: if something differs from itself it cannot exist.) It is not possible for Being not to be, because that would entail the possibility of a transition from Being to nothing. That is impossible because there is no nothing. Therefore Being cannot not exist. Therefore Being exists. If being self-identical is necessary for existing then existing is sufficient for being self-identical. Therefore Being is self-identical.

[3] 'it is ungenerated'

Interpretations:

[1 a] Being did not begin to be.

[1 b] There is no coming to be.

[1 c] There was never a time without Being.

[1 d] Being was not caused to be.

Argument Against Generation:

(1) There is not (such a thing as) nothing.

(2) Being beginning to be entails a transition from nothing to Being.

(3) If there is not nothing, there is no transition from nothing to Being.

(4) There is no transition from nothing to Being.

(4) Therefore, Being did not begin to be.

Argument Against Generation:

(1) There is not (such a thing as) nothing.

(2) Coming to be entails a transition from nothing to Being.

(3) If there is not nothing, there is no transition from nothing to Being.

(4) There is no transition from nothing to Being.

(4) Therefore, there is no coming to be.

The first premise is that nothingness, or non-being, does not exist. If it did exist, it would not be nothing. The conlcusion entails that Being did not begin to be. Parmenides rejects the view that there was nothing at all, followed by the universe coming into existence. There was never nothing.

(4) 'indestructible'

Interpretations:

[1 a] Being will not cease to be.

[1 b] There is no ceasing to be.

[1 c] There will never be a time without Being.

[1 d] Being will not be caused to be.

Argument for Indestructibility:

(1) There is no (such thing as) nothing.

(2) Destruction entails a transition from being to nothing.

(3) If there is no nothing, there is no transition from being to nothing.

(4) Therefore, there is no destruction.

If being was destructible, Being could cease to be and there would be Nothing. However, there is no such thing as nothing so the transition from Being to Nothing is impossible. Being is indestructible.

5) 'whole'

Interpretations:

[1 a] There is nothing outside Being.

[1 b] Being has no parts.

[1 c] Being is not a part of Being.

[1 d] Being does not lack anything.

Argument that Being is a whole:

(1) There is nothing outside Being.

(2) If Being were not a whole, Being would be a part of something.

(3) If Being were a part of something, there would be something outside Being.

(4) Being is not a part of something.

(5) Therefore, Being is a whole.

Being is a whole, not a part of anything. The fact that there is something rather than nothing is enough for there to be Being rather than Nothing.

(6) 'of one kind'

Interpretations:

[1 a] There are not kinds of Being.

[1 b] ‘exists’ is not equivocal.

Argument that Being is of one kind:

(1) If Being were of more than one kind, ‘exists’ would be equivocal.

(2) To say of different kinds of things that they are is to say the same thing of them.

(3) Being is not equivocal.

(4) Therefore, Being is of one kind.

The crucial premise is (2). To say of numbers, electrons, wars, states of mind, that they exist is to say the same about all of them. It is to say they are rather than are not. To deny this is to confuse the two questions:

‘Is it?’

and

‘What is it?’

Being is therefore of one kind, even if things with wildly different properties exist.

(7) 'unwavering'

Interpretations:

[1 a] Being is unchanging.

[1 b] Being does not gain or lose any properties.

[1 c] Being does not move.

Argument that Being is unchanging:

(1) If Being were to change, Being would gain or lose properties.

(2) Being has no properties.

(3) Therefore, Being is unchanging.

What is a property? If 'property' is defined widely as, say, 'anything that is true of anything', then it is false that Being has no properties. It is false that nothing is true of it. (If Parmenides is right, Being has at least the forty properties listed above.) if property is defined narrowly as, say, 'empirical characteristic' then Being has no properties. Beings but not Being can be blue or green or round or square. If changing is gaining or losing properties in this sense, then Being does not change.

Being is unwavering. Being 'does not tremor'. Being does not change, so, *a fortiori*, does not move. Beings and things change and move, but their existence, or existence as a whole, does not change.

(8) 'complete'

Interpretations:

[1 a] Being lacks nothing.

[1 b] Nothing lacks Being.

[1 c] There is nothing except Being.

Argument that Being is complete:

(1) There is nothing outside Being.

(2) If Being were not complete, it would lack something.

(3) If Being lacked something, there would be something outside Being.

(4) Therefore, Being is complete.

Being is complete because it lacks nothing, in the sense that it is not he case that it lacks anything. Being has no need for anything else in order to exist. It follows that Being is a substance in the (later) Aristotlelian sense: that which depends on nothing for its existence.

(9) 'Nor was it'

Interpretations:

[1 a] Being has no past.

Argument that Being has no past:

(1) If Being had a past then Being would be in time.

(2) If Being were in time, there would be a transition from Being to nothing or from nothing to being.

(3) There is no transition from Being to nothing or from nothing to being.

(4) Being is not in time.

(5) Therefore, Being has no past.

(10) 'nor will it be'

Interpretations:

[1 a] Being has no future.

Argument that Being has no future:

(1) If Being had a future then Being would be in time.

(2) If Being were in time, there would be a transition from Being to nothing or from nothing to being.

(3) There is no transition from Being to nothing or from nothing to being.

(4) Being is not in time.

(5) Therefore, Being has no future.

It was not, nor will it be. Being has no past, and no future. People have a past and a future, but being (rather than non-being) does not. Being is entirely present. Time has the following sub-components: past, present, future, before, simultaneous, after, change, duration, beginning and ending. Except for present, these concepts not are intelligibly ascribed to Being *qua* Being.

(11) 'since now it is'

[1 a] Being is now.

[1 b] Being is only now.

[1 c] Being is identical with Now.

[1 d] The Now is what Being is.

Argument that Being is present:

(1) If Being were not present, Being would not be.

(2) Being cannot not be.

(3) Therefore, Being is present.

Being is now. Being is present. Arguably, the time is ‘always’ now anyway. (It is currently now for example). If it is always now, there is no past. Perhaps there was a past but the past does not exist because it does not exist now. When the past did exist, it was now. The future does not exist because it has not happened yet, and when it does it will be now. In Parmenidean terms, the past and future belong to non-being and, because there is no non-being, there can be no past and no future. Presence is the presence of Being. Being is the presence of Presence.

(12) 'all together'

[1 a] Being exists simultaneously.

Argument that Being exists simultaneously:

(1) If Being did not exist simultaneously, Being would have a past or a future, or both.

(2) Being has no past or future.

(3) Therefore, Being exists simultaneously

(13) 'one'

[1 a] Being is one not many.

[1 b] Being is a unity.

Argument that Being is one:

(1) If Being were not one, Being would be a plurality.

(2) If Being were a plurality there would be nothing as well as Being.

(3) There is no nothing.

(4) Being is not a plurality.

(5) Therefore, Being is one.

(14) 'continuous'

Interpretations:

[1 a] Being contains no nothing.

[1 b] Being contains no time intervals.

[1 c] Being contains no space intervals.

Argument that Being is continuous:

(1) If Being were not continuous, Being would be discontinuous.

(2) If Being were discontinuous there would be nothing as well as Being.

(3) There is no nothing.

(4) Being is not discontinuous.

(5) Therefore, Being is continuous.

(15) 'That it came from what is not I shall not allow'

Interpretations:

[1 a] Being did not come from nothing.

[1 b] Being did not come from not being.

[1 c] Being did not come from anything that does not exist.

Argument that Being did not come from what is not:

(1) If Being came from what is not then what is not would exist.

(2) What is not does not exist.

(3) Being did not come from what is not.

That it came from what is not, I shall not allow. There is no such thing as nothing, and thus nothing for being to emerge out of.

(16) 'for it is not thinkable or sayable that it is not'

[1 a] 'Being does not exist' cannot be imagined or meaningfully said.

[1 b] What is not [the case] cannot be thought or referred to.

Argument that what is not is not thinkable:

(1) Only what is is thinkable.

(2) What is not is not what is.

(3) Therefore, what is not is not thinkable.

'It is not sayable or thinkable 'that it is not''. Nothingness is unthinkable. What would it be to think nothing? This could mean *not to think*, but Parmenides is not interested in that. Or, it could mean *to think* but, in having this thought, to *think nothing*. What is thinking nothing? Could it be thinking but not thinking any propositional content, ie, thinking but not entertaining any 'thoughts' in the Fregean sense of 'thought'? Then there might be propositional attitudes not directed to any content. A strange idea, but is this logically impossible? Where is the contradiction? Or, could 'thinking of nothing' mean 'having a mental image of nothing'? This would mean: having a mental image, but not having a mental image of anything. It is very difficult to produce a mental image of nothing at all. What is the 'of' doing here? Here is the image. What is it an image of? Nothing. Well, what is the image like if it is an image of nothing? What is left of the image if we substract anything it is an image of?

Parmenides thinks that, if you are thinking, you are thinking of something. Whatever you think of must exist, in some minimal way, just to be an object of thought. Nothing he says suggests the object of thought has to *physically* exist, just that, *if you think of something, you think of it as though it exists*. There is no nothingness, and nothingness is inconceivable. It is impossible to truly say that 'nothing exists'. This statement might be meaningless, even to the person who says it.

Should we say that thinking and saying are similar: that all and only what can be thought can be said? Parmenides mentions thiking and saying separately, as though there is logical space for what is thinkable to diverge from what can be said. On the other hand, what is not is neither thinkable nor sayable so only what is is thinkable and sayable so, at least this level, what can be thought is (numerically identical with) what can be said.

Parmenides distingushes two and only two 'roads of inquiry', (132) Being and Not Being.

[1] 'that it is and cannot not be' [132]

[2] 'that it is not and must not be' [132]

[1] 'is the path of persuasion [for truth accompanies it]' [132]

[2] 'is a trail devoid of all knowledge' [132]

[1] means:

[a] There is only what exists.
[b] What exists necessarily exists.

[2] means:

[a] There is no such thing as nothing.
[b] Nothing necessarily does not exist.

(17) 'it must either altogether be or not be'

Interpretation:

[1 a] Being cannot partly be and partly not be.

[1 b] Being does not admit of degrees.

[1 c] Be-ing does not admit of degrees.

Argument that Being cannot partly be and partly not be:

(1) Only that which has parts can partly be and partly not be.

(2) Being has no parts.

(3) Therefore, Being cannot partly be and partly not be.

Being must altogether be or not be. Existence, as opposed to energy, cannot come in *quanta* or 'packets'. Existence cannot just be 'a bit'. Being does not admit of degrees. Having other properties (colours, size) can admit of degree. Suppose there were only one thing, then there would be being. Adding a thousand more planets means there are more objects, but there is no more Being as opposed to nothing, or Nothingness. Adding beings does not add to Being.

(18) 'Nor [...] anything apart from itself'

[1 a] Being is not identical with anything except itself.

Argument that Being is not identical with anything except Being:

(1) If Being were identical with anything other than Being, there would be something as well as Being.

(2) There is not anything as well as Being.

(3) Therefore, Being is not identical with anything except Being:

(19) 'it is or it is not'

[1 a] Either Being is or Being is not.

[1 b] Either Being exists or Being does not exist.

[1 c] Either there is something or there is not (anything).

Argument that Being either is or is not:

(1) If being neither is nor is not then Being either both is and is not or neither is nor is not.

(2) That Being either both is and is not or neither is nor is not entails a contradiction.

(3) Being neither is and is not nor neither is nor is not.

(4) Therefore, Being either is or is not.

Parmenides says

'[...] contradictories are not true together' (133)

Prima facie, this at least means:

-(p&-p)

but the force of 'together' might yield:

-(p&-p) (t1)

which is consistent with

p (t1) & -p (t2)

The claim

'[...] to be and not to be are deemed the same and not the same' (133)

is an anticipation of the opening paragraphs of Hegel's dialectic: 'The Doctrine of Being' variously presented in the *Science of Logic* and the *Encyclopaedia Logic*. Hegel thinks Being and Nothing (*Sein* and *Nichts*) are opposites, semantically, psychologically and ontologically, and so not the same. On the other hand, they are mutually dependent: The one term is not meaningful without the other, the one is not thinkable and cannot exist without the other. The attempt to think one leads to the other. We can insert Hegel's dialectic *at this point* to understand Parmenides.

Plato says:

'Never will this prevail, that what is not is' Plato *Sophist* 237A (133)

Normally, we think this false. Things that are not begin to be (as, conversely, things that are cease to be). But this is not what is meant here. Plato is ruling out non-existence having the ontological status of being; that which is not the case *being* the case, not its becoming the case, its being the case. This claim looks contradictory, because it looks like: 'What does not

exist exists', 'what is not the case is the case', or, equally impossibly, as he puts it; 'what is not is'

(20) 'How might what is [...] perish ?'

Argument that Being cannot cease (to be):
See (4) above.

(21) 'How might it come into being ?'

Argument that Being cannot begin (to be):
See (3) above.

(22) 'Nor is it divided'

[1 a] Being is not in two (or more) parts.

[1 b] Being is not two (or more).

[1 c] Beings are not Being.

Argument that Being cannot be divided:

(1) Only that which has extension can be divided.

(2) Being has no extension.

(3) Therefore, Being cannot be divided.

(23) 'since it all alike is'

[1 a] Being is uniform.

[1 b] Being admits of no variations.

[1 c] Being the same in so far as it is.

[1 d] Being is the same as itself.

Argument that Being is uniform:

(1) Being is either uniform or not uniform.

(2) If being were not uniform Being would have properties.

(3) Being has no properties.

(4) Therefore, Being is uniform.

(24) 'neither more here nor less'

[1 a] Being does not exist in degrees.

[1 b] Being does not admit of degrees of being.

[1 c] Being not more in one place than another.

Argument that Being does not exist in degrees:

(1) If Being existed in degrees, non-being would exist.

(2) Non-being does not exist.

(3) Therefore, Being does not exist in degrees:

(25) 'it is all full of what is'

[1 a] There are no gaps in Being.

[1 b] There are no patches of nothing in Being.

Argument that there are no gaps in Being:

(1) If there were gaps in Being, non-being would exist.

(2) Non-being dos not exist.

(3) There are no gaps in Being.

(26) 'Hence it is all continuous'

[1 a] There are no intervals in Being.
[1 b] There are no intervals (in being).

Argument that Being is continuous:
See (14) above.

(27) 'what is approaches what is'

[1 a]

Argument that :

(28) 'it is beginningless'

Argument that Being did not begin (to be):
See (3) above.

(29) 'ceaseless'

Argument that Being will not cease (to be):
See (4) above.

(30) 'powerful necessity holds it enchained in a limit which hems it around'

Argument that:

(31) 'not incomplete'

Argument that Being is complete:

See (8) above.

(32) 'not lacking - if it were it would lack everything'

Argument that Being is complete:
See (8) above.

(33) 'The same thing are thinking and a thought that it is'

Argument that only that which exists can be thought:
See (16) above.

Being and Thought:

'Parmenides [...] identified being and thought and did not locate being in sensible objects' Plotinus Enneads V i 8 (132)

Plotinus also reports Parmenides as claiming:
'[...] the same things can be thought of and can be'
Plotinus Enneads V i 8 (132)

Questions about Plotinus' remark on Parmenides:
Is Parmenides a rationalist ?
Is Heraclitus an empiricist ?
Is Parmenides an idealist ?
Can existence be perceived ?

(34) 'without what is [...] you will not find thinking'

Argument that Being is necessary for thinking:

(1) Without Being, there would not be anything.

(2) If there were not anything there would be no thinking.

(3) Therefore, Being is necessary for thinking.

(35) 'nothing either is or will be other than what is'

Argument that Being cannot change:
See (7) above.

(36) 'whole'

Argument that Being is a whole:
See (5) above.

(37) 'unmoving'

Argument that Being is motionless:

(1) Being cannot change.

(2) Nothing that cannot change can move.

(3) Therefore, Being is motionless.

(38) 'it is completed on all sides'

Argument that Being is complete:
See (8) above.

(39) 'like the bulk of a well-rounded ball'

Argument that Being is like a sphere:

(1) It is a phenomenological fact that each of us experiences him or herself at the centre of Being, with the universe arranged all around.

(2) Experiencing oneself at the centre of Being, with the universe arranged all around is experiencing the inside of a sphere.

(3) Therefore, Being is like a sphere.

Being is like the bulk of a well-rounded ball (or sphere). In desperation, some commentators have ascribed this comment to archaic science. However, being is not a ball from the outside, but from the inside. We are at the centre of the ball, surrounded by existence on every side stretching infinitely into the distance. The ball of being is mysterious, because it seems to have only an inside without an outside. But the inside seems to be boundless. The way modern readers think about this depends on their scientific preconceptions, but much modern thinking sees the universe in a

third person, objective way. Understanding Presocratic thinking requires regarding this view as not necessarily complete. Parmenides' view makes more sense when thinking from a first person singular, subjective view.

(40) 'equal in every way from the middle' (134-5)

Argument that Being does not admit of degrees of being:
See (17) above.

In common with the other Presocratic philosophers, only fragments of Parmenides' work survive. Parmenides' major work was written in the form of a profound poem. Having found the philosophy (on p. 134 - 135), we may go back to these sections to grasp their significance. Parmenides was the first thinker to raise this question in a serious, philosophical way.

Questions

1. Does nothing exist?
2. What is the difference between existing and not existing?
3. Does everything exist?
4. Can a clear distinction be drawn between being and non-being?
5. What does it mean to say there is something rather than nothing?
6. What is it to be?
7. What is Parmenides sphere? Does it exist?
8. 'It is not thinkable or sayable that it is not.' Discuss.
9. 'Nothing either is or will be other than what is.' What does this mean? Is it true?
10. Is Parmenides a rationalist? Is Parmenides an idealist? Would he be right to be either?

II

HERACLITUS' RIVER

Heraclitus is famous for two positions in philosophy: Everything is changing, and the world is the unity of opposites.

Is everything changing? It is not immediately clear what 'everything is changing' means. Does it mean each separate thing is changing? Or does it mean the whole, the totality of what is, is changing? Does it mean both? Does whatever changes change in every respect? all the time? sooner or later?

Plato's *Theaetetus* is one of our sources for Heraclitus. The dialogue is mainly about what knowledge is but, in section 152 – 153, Socrates talks about Presocratic philosophy, and considers the doctrine that

'Nothing ever is, but things are always coming to be.' *Theaetetus* (152-153)

I propose two interpretations of 'everything is changing':

(1) The weak view: All things are constantly changing. There is a distinction between a thing and the changes a thing undergoes. The relatively enduring subject of change is not any of its changes. (1) is suggested by:

'it is impossible to step into the same river twice'

If (1) is right, *each thing is changing*.

(2) The strong view. There are only changes, there are no things. Change is so thoroughgoing that it is false that there is a relatively enduring subject of change. It is wrong to talk about things, because to do so suggests a degree of permanence which does not exist. (2) is suggested by.

' it is even impossible to step into the same river once.'

If (2) is right, *there is only change*.

Soctates' report of Heraclitus' theory of flux in the *Theaetetus* rules out the weak theis and suggests the strong thesis:

'[...] all the things which we say are - which is not the right way to speak of them - are coming to be' (152 d)

If we say that *things change* we misuse language. We imply a distinction between the existence of a relatively enduring subject of change, the thing that changes, and the changes it undergoes. There is no thing as the thing that changes, only the changes themselves. To obtain a strictly accurate ontology, we should replace the language of Being with the language of becoming; give up 'is', 'are' etc and use only 'becomes', 'becoming' etc. Socrates gives Heraclitus's reason for his doctrine as this conjunction:

'because nothing ever is but things are always coming to be'

Unpacking the conjuncts, this entails:

[1] 'Nothing ever is'

and

[2] 'things are always coming to be'

It is not right to talk about Being, or anything's being; not only because there are no things but also because 'being' conceals or falsifies the fact of change. As Parmenides argues, Being is changeless.

Argument that there is no Being:

(1) Being is changeless.

(2) There is only change.

(3) If there is only change there is nothing changeless.

(4) Therefore, there is no Being.

The other conjunct of Heraclitus's reason for his doctrine of change is:

[2] 'things are always coming to be'

This means, choose anything you like, it is (in) a process of beginning. It has not already begun. I has not not yet begun. It is beginning, or 'coming to be'. One might be inclined to understand this as:

(1) *x* partly exists, ie, part of *x* exists.

and

(2) *x* does not wholly exist, ie, the whole of *x* does not yet exist.

This would be to reject 'It has not already begun', above. But this is not what Hercalitus means. As reported by Socrates, or on what we are calling 'the strong doctrine' the analysis entails two mistakes. The term 'exists' is used and the variable 'x' is used. In fact, nothing 'exists' because everything is in a process of *coming into* existence. Nothing can be rightly called 'x' because nothing (no thing) exists to be called x.

Argument that there is no Being:

(1) Being is not coming to be..

(2) There is only coming to be.

(3) If there is only coming to be there is no Being.

(4) Therefore, there is no Being.

In this radical Heraclitean sense, 'coming to be' is terribly difficult to understand. He have to think *the transition between* Nothingness and Being.Then we drop both Nothingness and Being, so we are left with the transition itself, or what we were calling 'the transition'. We are capable of imagining a process *already underway*. We can even imagine that the process has not yet begun. What is hard is imagining the beginning itself. Of course, we can imagine some kind of blank and then imagine, say, a black dot. But this misses the point. We need to be able to picture or understand *what happens between* there being a blank and there being a blank with a black dot. This, whatever it is, constitutes reality according to Heraclitus.

There is not just coming to be. There is ceasing to be. There are not only beginnings, there are endings. Socrates says there is an explanation for this:

'[...] coming to be, and what passes for being, are produced by change, while not being and ceasing to be are produced by inactivity.' (153)

Now we have four components of the Heraclitean doctrine:

[1] ‘coming to be’

[2] ‘ceasing to be’

[3] ‘change’

[4] ‘inactivity’

[1] and [2] ‘are produced by’ [3] and [4] respectively. Now, we might think there is an oddness in including ‘inactivity’ here. Heraclitus thinks there is only change, so how can there be its opposite, inactivity? Two points:

(a) Heraclitus is a dialectical thinker so, in doing philosophy, in taking account of anything we have to take account of its opposite.

(b) ‘inactivity’ in Heraclitus has an ontological status rather like ‘nothing’ in Parmenides: It does not exist. There are no inactive things because there are no things. There is no inactivity because there is only change. Parmenides thinks nothing *necessarily* does not exist. *Prima facie*, it is not clear that Heraclitus thinks inactivity necessarily does not exist. Parmenides thinks nothing could not have existed. It might be that Heraclitus thinks there could have been inactivity, so it would be a contingent fact that there is not any inactivity. On the other other hand, if inactivity logically, or essentially, consititutes ceasing to be then perhaps inactivty is impossible in some strong sense of ‘impossible’ after all.

What does it mean to say that coming to be is produced by change? On the weak Heraclitean view, we can understand ‘coming to be’ as either:

[1] a is F at t1 and a is not F at t2

or

[2] a is not F at t1 and a is F at t2

Change is gaining or shedding properties and coming to be is gaining properties.

However, there are four mutually related faults with this picture of Heraclitus:

(a) Change comes out as the cause of *ceasing to be* as well as *coming to be* here. (I did not spell this out just now but the proof is obvious.) But Heraclitus does not say this. Heraclitus told us that 'inactivity' is the cause of ceasing to be. This is not captured by the model.

(b) The view is quasi-Aristotlelian. This is a sign it is not Heraclitean. The *transitions between* being F and not being F, and so on, are not modeled. Heraclitus and Aristotle are not contemporaries but, as a rule of thumb, if Aristotle likes it Heraclitus does not and *vice versa*.

(c) It only expresses the weak view. 'x' and 'F' name things and properties. One feels that the real Heraclitus, or the more interesting Heraclitus, holds the strong view. There there are no things and, arguably, no properties, at least, no enduring properties.

Consider the fragments from Heraclitus, in Barnes, from page 100 onwards. Aristotle says that Heraclitus thinks that his account

[ ] 'holds forever' (101)

so Heraclitus thinks his philosophy is eternally true.

and

[ ] 'men prove uncomprehending'.

Ordinary, common-sensical people do not understand his philosophy.

His insight about change holds true regardless of anything. Ironically, or paradoxically, the truth value of Heraclitus's philosophy is therefore something that does not change. For all *x*, *x* changes. An exception is: 'There is change' does not become false. Is Heraclitus entitled to this exception? So long as we acknowledge that it is an exception, his position looks consistent: There is only change, except for *the fact that* there is only change. That fact remains utterly unchanging. If it changed from true to

false, it would not be the case that there is only change. Heraclitus has to accept any unchanging entailments of *the fact that* there is only change. For example, from 'It remains unchangingly true that there is only change', it follows that *there is at least one fact*, *there is at least one truth*, *there is at least one timeless propostion* and so on.

Does Heraclitus believe in the one or the many? Is he like Parmenides, who insists reality is One, because reality is One or many and it makes no sense to say that Being is more than One? Or, is he like Democritus, who thinks the concept of Being cannot exceed the concept of beings, and beings are an atomistic plurality? Heraclitus says:

[ ] 'from all things one and from one all things' (114)

A synthesis of Parmenides and Democritus looks impossible. Parmenidean Being is monolithic, necessary, and essentially One. There is no motion. There is no nothing. Democritean atoms are many and there is no One. There is perpetual motion. There is the infinite void, so there is nothingness. Parmenides and Democritus have antithetical philosophies. Nevertheless, Heraclitus offers us a synthesis of the One and the many.

There are many changes but the totality of changes is One. Without the many changes, there could be no totality, and so no one. With no One there could be no totality of changes, and so no many.

Heraclitus thinks what is is the unity of opposites: He speaks of opposites as *the same*. What could 'the same' mean here? Heraclitus suggests that

[ ] 'dark is the same as light'

[ ] 'bad is the same as good'

[ ] 'and up is the same as down' (103).

Prima facie, each of these seems contradictory. We assume being dark excludes being light, being bad excludes being good and so on. This means:

'If something is dark, it is not light', and so on

Then. being both dark and light entails being both light and not light, which is a contradiction.

(1) If *x* is dark *x* is not light (A)

(2) *x* is both dark and light (A)

(3) *x* is not light (1,2)

(4) *x* is light (2)

(5) Therefore, *x* is both light and not light (1,2,3,4)

'*x* is both light and not light' is a contradiction. It is a substitution instance of

x is *F* & *x* is not *F*

which is itself a substitution instance of

both *p* and not *p*

which is the logical form of a contradiction. A contradiction is the conjunction of a proposition and its negation. To obtain a contradiction, you have to take just one proposition and both affirm and negate it. Exactly, or all and only, what is affirmed must be denied. Otherwise, we are not talking about a contradiction here.

Heraclitus invents dialectical philosophy. Here, 'dialectic' means the study of opposites, and it is possible to think of philosophy as made up of opposites. Philosophical questions revolve around opposites: free will and determinism, mind and body, self and other, good and evil, finite and infinite. Doing philosophy usually involves arguing for one side of these opposites. Heraclitus lists some of these pairs of concepts, and can be understood as doing philosophy in a constructive way, as opposed to a combative way (where we try to find arguments to support our view and refute others). He suggests that opposites are mutually dependent:

There is no light without darkness, no darkness without light.

There is no bad without good, no good without bad.

There is no up without down, no down without up.

and so on. When Heraclitus says that opposites are *the same*, he means that they are *mutually dependent*. This makes it possible to regard opposed concepts as being at the extreme ends of a continuum. He proposes a

holistic view of philosophy, in which seemingly mutually exclusive categories are shown to be complementary aspects of a greater whole.

Hegel, the early 19th century German philosopher, influenced by Heraclitus, argues that that rights and duties are mutually dependent. The relationship between a lender and a borrower can be characterised as a *right* on behalf of the lender, and a *duty* on behalf of the borrower. It is as though relationships are more fundamental, more true, more real, than their relata.

Heraclitus says:

[ ] 'dark and light, bad and good, are not different but one and the same' (103)

[ ] 'straight and twisted [...] are the same' (103)

[ ] 'up and down are one and the same' (103)

[ ] 'The path up and down is one and the same' (103)

[ ] 'The polluted and the pure are one and the same' (103-4)

[ ] 'Immortals are mortals, mortals immortals: living their death, dying their life' (104)

[ ] ‘We step and do not step into the same river’ (117)

[ ] ‘We are and we are not’ (117)

Heraclitus on creation:

[ ] 'War is the father of all' (102)

'[...] the created universe is itself the maker and creator of itself' (104)

[ ] 'God is day and night, winter and summer, war and peace, satiety and famine' (104)

[ ] ‘Beginning and end are common’ (115)

Heraclitus on the universe:

[ ] ‘All things come about in accordance with fate’ (106)

[ ] ‘All things come about through opposition’ (107)

[ ] ‘The universe flows like a river’ (107)

Heraclitus is reported as saying that the universe is (102):

[ ] ‘divisible and indivisible’

[ ] ‘generated and ungenerated’

[ ] ‘mortal and immortal’

To obtain a contradiction, you have to maintain that just one thing is unambiguously both true and false. Contradictions are often mixed up with things that are not contradictions. ‘I love you and it is not the case that I love you’, for example does not necessarily entail any contradiction. ‘I love you and I hate you’ could be true and insightful. A contradiction is always and everywhere false (or, on some views, neither true nor false but meaningless).

(1) 'divisible and indivisible'
(2) 'generated and ungenerated'
(3) 'mortal and immortal'
(4) 'word and eternity'
(5) 'father and son'
(6) 'god and justice' (102)
(7) 'day and night' (103)
(8) 'good and bad'

‘divisible and indivisible’

Heraclitus’ claim that the world is divisible and indivisible seems contradictory because ‘x is divisible’ seems to entail the falsity of ‘x is not divisible’ and ‘x is not divisible’ seems to entail the falsity of ‘x is divisible’. It looks as though at most one of these claims could be true. However, the *respect* in which the world is divisible might not be the same as the respect in which the world is indivisible. Perhaps beings are divisible and Being, the existence, of what is whatever is, is indivisible.

‘generated and ungenerated’

Similarly, each particular thing in the universe could be generated, have an origin, begin to be, but the universe as a whole be ungenerated, have no origin.

‘mortal and immortal’

Every particular thing will no doubt pass away (mortality), but the totality of things is immortal. Being will never be replaced with nothingness.

'word and eternity'

'father and son'

'god and justice' (102)

'day and night' (103)

'good and bad'

Heraclitus says:

‘all things come from war’

or strife. The word translated ‘war’, *polemos*, refers to the conflict between opposites. By ‘war’ or ‘strife’, Heraclitus means ‘becoming’, and in an extract from Plutarch (117) we read how Heraclitus viewed these concepts.

This philosophy is in many ways the opposite of the philosophy of Parmenides, who insists that Being does not change. We can understand Heraclitus as putting Parmenides’ world into motion: Being begins to change.

Parmenides holds that being is thinkable and nothing is unthinkable. He also says that nothing moves by which we understand ‘It is not the case that anything moves’ or ‘motion is illusory’. More fundamentally, and more plausibly, Parmenides means Being does not change.

Heraclitus’ becoming has to be provisionally understood in terms of Being and non-being. Becoming consists of *beginning to be* or *ceasing to be*. When there is becoming, or change, there is ceasing to be and coming into existence. Heraclitus means being *out of nothing*, and being turning *into nothing*. Ordinarily, or empirically, we believe that things do not come into being out of nothing. Heraclitus knows that this kind of becoming usually involves some kind of transformation of matter (for example, trees into paper). He means, in *any* process, there is coming to be and ceasing to

be, beginning and ending. The lecturer's words, this stream of sounds, are an instance of becoming. Choose any time you like. There is ceasing to be (the sound disappearing into the past, and then gone forever, so absolutely ceasing to exist. Choose any time you like, new sounds are coming into being out of nothing. Interestingly, you can choose *the same time* both times you choose.

Heraclitus is aware of the obvious fact that people are caused to speak but is irrelevant to the phenomenology of sound.

Heraclitus pays attention to his own experiences, coming and going, and to the interior of his own mind, his thoughts coming and going. Diogenes Laertius reports Heraclitus himself:

'He was no-one's pupil, but said that he had inquired into himself and learned everything from himself' (106)

When Heraclitus describes becoming, he does not mean *x* begins, *x* lasts for a while, and *x* ceases to be. He means *x* beginning and *x* ceasing to be are simultaneous. This is necessary for actual change or real becoming.
To see this, contrast Heraclitus's view with Aristotle's:

x changes if and only if *Fx* at *t1* and not *Fx* at *t2*

x moves if and only if *x* is at P1 at *t1* and *x* is at P2 at *t2*

x moves if and only if *x* is at P1 at *t1* and *x* is at P2 at *t2* (and occupies some juxtaposed series of places at all the time between *t1* and *t2*).

If there is motion there is change but there might be change withoug motion. Motion is change of spatio-temporal location, so one kind of change. (The doctrine that all change is motion is a materialist doctrine.) Look at Aristotle from a Heraclitean point of view. Aristotle describes the situation *before* the change, *Fx*, and the situation *after* the change, not *Fx*, but wholly omits any description of *the change itself*. Heraclitus is interested in the *transition* between being *F* and being not *F*.

Aristotle is commited to a relatively enduring subject of change. Aristotle says:

'Things are said to come to be in many ways, and some things are said not to come to be, but to come to be something; only substances are said to come to be unqualifiedly. In the other cases it is evident that there must be some subject that comes to be something' *Physics* 189

Habitually, we think of the world as an aggregate of objects. Heraclitus redescribes these objects as changes. Heraclitus thinks that everything is changing in every respect, even if it does not look that way to us.

Is Heraclitus a rationalist or an empiricist, or neither? Rationalism is the thesis that a priori thinking gives metaphysical knowledge and some knowledge is innate. Empiricism is the thesis that no a priori knowledge is metaphysical and all knowledge depends on sense experience. Locke, Berkeley, Hume, Mill, Moore, Russell and Ayer are empiricists, whereas Descartes, Spinoza and Leibniz are rationalists. It is possible to understand Parmenides as a rationalist, who thinks thinking, logical thought, is the best guide to reality, and Heraclitus as an empiricist, who thinks experience the best guide to reality. Parmenides concludes that Being is a sphere on the basis of thought, whereas Heraclitus pays very close attention to his experience and concludes that everything is in a state of constant flux. Heraclitus claims 'I inquired into myself' (113)

Does Heraclitus break any logical laws? What is a logical law? A logical law is a proposition true on logical grounds alone; a logical truth. For example, the laws of non-contradiction, identity, excluded middle, and double negation are logical laws. In propositional calculus the law of non-contradiction is:

$$\neg(p \,\&\, \neg p)$$

'It is not the case that both *p* and not *p*'

in predicate calculus: $(\forall x) \neg(Fx \,.\, \neg Fx)$

'For any *x*, it is not the case that *x* is *F* and *x* is not *F*'.

In propositional calculus the law of identity is:

$$(p \rightarrow p)$$

'If *p* then *p*', in predicate calculus:

$$(\forall x)\,(Fx \rightarrow Fx)$$

'For any *x*, if *x* is *F* then *x* is *F*'

in predicate calculus with identity:

$(\forall x)\ (x = x)$

'For any x, x is x'

in modal predicate calculus with identity:

$\Box(\forall x)\ (x = x)$

'Necessarily, for any x, x is x'

In propositional calculus the law of excluded middle is:

$p \vee -p$

'Either p or not p'

in predicate calculus:

$(\forall x)\ (Fx \vee -Fx)$

'For any x, either x is F or x is not F'

In propositional calculus the laws of double negation are:

$-- p \rightarrow p$

'If not not p then p'

and

$p \rightarrow --p$

'If p then not not p'

and in predicate calculus:

$(\forall x)\ (--Fx \rightarrow Fx)$

'For any x, if x is not not F then x is F'

and

$(\forall x)\ (Fx \rightarrow \text{--}Fx)$

'For any *x*, if *x* is *F* then *x* is not not *F*'.

Aristotle does not distinguish sharply between *logical laws*, *laws of thought* and *laws of being*, so the consistent, the *conceivable and what could exist coincide, and the inconsistent, the inconceivable and what could not exist coincide. Aristotle's informal statements of the law of non-contradiction include:

'*For the same thing to hold good and not to hold good simultaneously of the same thing and in the same respect is impossible*' (*Metaphysics* ☝ 1005b):

$(\forall x)\ \text{-}(Fx\ .\ \text{–}Fx)$

or arguably:

$(\forall x)\ \text{–}\ \Diamond(Fx\ .\ \text{–}Fx)$

and

'*Nor* […] *is it possible that there should be anything in the middle of a contradiction*' (1011b):

$\text{-}\ \Diamond(p\ .\ \text{–}p)$

His statement of the law of excluded middle is:

'*but it is necessary either to assert or deny any one thing of one thing*' (1011b)

$(\forall x)\ (Fx\ \text{v}\ \text{–}Fx)$

or arguably;

$\bullet(\forall x)\ (Fx\ \text{v}\ \text{–}Fx)$

Aristotle says it shows a lack of education to demand a proof of logical laws. He does however bring a self-refutation argument against their putative refutation by the sophist, Protagoras (c. 485 - c. 420 BC), who thinks that every claim is true but there is no truth over and above belief by

or appearance to persons, and Heraclitus, who thinks that everything is changing in every respect so there is no truth. Aristotle says saying anything meaningful or true, for example making Protagorean or Heraclitian claims, presupposes logical laws.

Questions

1. Is everything changing?
2. Is there anything which never changes?
3. ‘The universe flows like a river.’ Does it?
4. Is there only change?
5. Can the verb ‘changes’ be defined?
6. If there is only becoming, is there no being and no nothing?
7. Why are there opposites such as up and down, here and there, one and many?
8. ‘the way up is the way down.’ Discuss.
9. Is Heraclitus an empiricist? Would he be right to be one?
10. ‘all things come from war (*polemos*).’ Do they?

III

ANAXAGORAS: MIND

Anaxagoras's doctrine of infinity entails that there are no atoms. Here, x is an atom if and only if x has no parts and there is nothing smaller than x. This philosophical uses of 'atom' should not be confused with that in modern physics. In philosophy ‘atom’ means variously ‘indivisible item’ or ‘infinitely small item’ or ‘that than which there cannot even in principle be a smaller’. Physical atoms can be divided, in theory and in practice, and there are entities smaller than physical atoms, so it would be false to claim that the atoms of the physicist are the atoms of the philosophers. It would be to misunderstand a philosophical problem to say the atomists ‘anticipated’ scientific atomic theory.

There might be idealism in Greek thought, depending on how we read 'Anaxagoras [...] was the first to put mind in charge of matter' Diogenes

Laertius Lives of the Philosophers II 6-14 (236). Anaxagoras says about Being: '[...] all things were present in the whole (231), 'this totality will be the one existing thing of Parmenides', 'generation and destruction are combination and dissociation' (232), 'nothing comes into being from what does not exist', 'what is cannot not be' (229). Anaxagoras claims about Infinity: ‘the small [...] there is no smallest' (229) and 'of the large there is always a larger' (229).

Anaxagoras views reality as infinite in three ways:

(1) Reality is infinitely divisible.

(2) There is an infinite number of things.

(3) The universe is infinitely large.

(1) Reality is infinitely divisible.

Anaxagoras says:

[ ] 'of the small [...] there is no smallest' (229)

Is matter is infinitely divisible? Anaxagoras thinks so. If something has size, or occupies space, it can be divided into two. No matter how small something is, it can always be divided into smaller pieces. Democritus, on the other hand, thinks we must reach a point where we cannot divide things any further.

There are two ways of looking at the problem of infinite divisibility, physical and logical:

(1) The physical interpretation

Are there physical atoms? Anaxagoras's doctrine of infinity entails that there are no atoms. Here:

x is an atom if and only if there is nothing smaller than x (but x is a constituent of something larger than x)

or

x is an atom if and only if x cannot be divided (but x is a constituent of something that can be divided).

These uses of 'atom' should not be confused with that of modern physics. The atoms of modern physics are not atoms in the Presocratic sense because they can be divided and they are not the smallest particles. (They are called ‘atoms’ because it was initially thought they could not be divided.) Physics since 1905 recognises constituents of matter which it does not make sense to say can be divided: quanta or ‘packets’ of energy. From the point of view of physics, Democritus looks correct and Anaxagoras incorrect.

(2) The logical interpretation

Can anything that has size in principle be divided? There are two relevant kinds of impossibility: *practical impossibility* (e.g. It is practically impossible to jump over Magdalen College Tower using standard human faculties, or to send a space ship to distant stars using 2012 technology) and *logical impossibility* (e.g. being a round square, that 2 + 2 = 3, that one is taller than oneself, or is one’s own father). Descriptions of logical impossibilities entail contradictions. Unlike physical impossibilities, it is very difficult to imagine logical impossibilities. Does logical possibility map onto practical possibility? Normally we think anything logically impossible is *a fortiori* practically impossible but not *vice versa*. The descriptions of mere practical impossibilities entail no contradiction.

It is educational to read Anaxagoras and Democritus as writing on the logical possibility of infinite divisibility. Anaxagoras thinks it logically possible to divide anything, no matter how small. There is no limit to how small the constituents of the universe are, so there are no *fundamental* constituents. We can always find a constituent of a constituent.

Argument that there are no fundamental constituents:

(1) Any constituent has a constituent. (A)

(2) A fundamental constituent is a constituent with no constituent. (A)

(3) If any constituent has a constituent then there are no fundamental constituents. (1, 2)

(4) Therefore, there are no fundamental constituents. (1, 2, 3)

Anaxagoras is committed to the view that there is an infinite number of past and future events in the same way that the negative and positive number series are infinite. There is the problem of whether such theoretical

or numerical infinities match infinities in reality. We should not *just assume* the negative and positive number series map onto past and future events with a one-one mapping.

(2) There is an infinite number of things

Anaxagoras might mean by this that there are an infinite number of physical objects: No matter how big a number of physical objects is, there is a greater number of physical objects than that. Another interpretation is: this is an entailment of the fact that things are infinitely divisible. If any constituent has constituents there is an infinite number of consituents. if constituents are things, there is an infinite number of things.

We could also raise the question of how we count things. What are the grounds for distinguishing one thing from another? Perhaps an object ends where its surface ends. But where exactly is that? At an atomic level, an object gains and sheds atoms. At a quantum level, the surface is not like a macroscopic surface. Perhaps the criteria for inviduating objects have to be Einsteinian: This space-time process is not this one if and only if it *is not where and when* this space-time process is. This give us:

a is not b if and ony if a is not where b is

a is not b if and only if a is not when be is

But, how do we sort space-time processes into parts and wholes? Perhaps the criteria for distinguishing one thing from another are arbitrary or at least stipulative, or at least, depend on preconceptions, real or perceived interests.

Anaxagoras says:

'All things are neither fewer nor more numerous.' (277)

What does this mean?

(a) This could means *the number of things remains constant*. No matter how many things there are, that number does not increase or decrease. All addition or subtraction is re-arranging.

Anaxagoras thinks there is no absolute creation and absolute destruction. This view is certainly equivalent to Parmenides' claim that Being cannot be generated or destroyed and looks incompatible with Heraclitus' doctrine of coming to be and ceasing to be. Anaxagoras knows there is creation and destruction in the commonsensical sense, but such

beginnings and endings are to be understood as the rearrangement of components.

(b) Anaxagoras might mean that *there is only one infinite number*, which seems obviously wrong, or at least, is the subject of some dispute. Or he might mean that there are not different sizes of infinity. Again, this looks wrong. Consider the so-called natural numbers. It seems intuitively plausible that there are *more numbers than even numbers*. Nevertheless, there is an infinite number of even numbers, and an infinite number of numbers. One is inclined to say that these infinities are not the same size. If Anaxagoras thought there is only one size of infinite number, he might well be wrong. At least, there is a large amount of mathematics we cannot do without assuming there are different sized infinite numbers.

(3) The universe is infinitely large.

Anaxagoras says:

'of the large there is always a larger' (229)

We could understand this as about constituents of what is, or about the whole of what is.

(a) As a claim about consituents; Anaxagoras means any constituent is a constituent of a larger constituent, so there is no largest constituent. This gives us a similar argument to the one about infinite divisibility but going in the opposite direction.

Argument that there is no largest constituent:

(1) Any constituent is a constituent of a constituent. (A)

(2) A largest constituent is a constituent that is not a constituent of a constituent. (A)

(3) If any constituent is a constituent of a constituent then there is no largest constituent. (1, 2)

(4) Therefore, there is no largest constituent. (1, 2, 3)

(b) As a claim about the whole of what is; Anaxagoras is saying; no matter how large we think existence is, existence is larger than that. We could understand this as a logical consequence of the interpretation about

constituents or as a quasi-Parmenidean claim about Being. No matter how large you think Being is, Being is larger than that. If you think you have found some limit to Being you have only in fact found *a being*.

Plato says:

‘You see a number of great objects, and when you look at them there seems to be one and the same Form (or nature) in them all; hence you conceive of greatness as one.’ *Parmenides* (131E)

Mind (*Noûs*)

The Greek word for 'mind' or 'intelligence' is ‘noûs’. There are at least three levels at which noûs can be understood in Anaxagoras:

(1) An individual human mind. But he seems to mean more than just this; a non-physical material or substance.

(2) Order as opposed to chaos in the universe. ‘Noûs’ is a label for natural laws and the operations of physical objects in accord with them or, perhaps more subtly, the *intelligibility* of the universe; or the point to which it can be made intelligible.

(3) A controlling intelligence, the cause of all motion. Why does reality contain motion rather than no motion? Reading Anaxagoras on this third level, noûs is rather like God, controlling the universe, initiating motion, and setting order rather than chaos.

The properties of noûs are :

[1] 'infinite'
[2] 'self-controlling'
[3] 'mixed with no thing'
[4] 'alone itself by itself' (227)
[5] 'it is the finest of all things' (228)
[6] 'the purest'
[7] 'it posseses all knowledge about everything'
[8] 'it has the greatest strength'
[9] 'mind controls all those things, both great and small, which possess soul'
[1] 'All mind, both great and small, is alike. Nothing else is alike'
[1] 'Mind [...] is where all the other things also are' (228)
[1] 'mind began to move things' (230)

[1] 'Anaxagoras [...] was the first to put mind in charge of matter' Diogenes Laertius Lives of the Philosophers II 6-14 (236)

(1) 'infinite'. If we understand noûs as consciousness, it is possible to regard it as infinite in not being spatially bounded. If we understand noûs as a cosmic intelligence, then the powers of noûs would be , if not infinite, then extremely large.

Argument that the cause of the universe is infinite:

(1) The universe is infinite (because it contains infinite properties, eg infinite mathematical properties).

(2) The cause of anything infinite is itself infinite.

(3) Therefore, the cause of the universe is infinite.

This conclusion does not give us 'the cause of the universe is consciousness' and, on this interpretation, noûs is consiousness. However, if we go with, say, the Copenhagen interpretation of quantum physics rather than, say, the Many Worlds interpretation, then consciousness causes the universe.

(2) 'self-controlling'. The idea is that a mind (or a person with a mind) can control his or herself.

There is an argument about whether a distinction should be drawn between actions and happenings, where actions are performed or executed and happenings are not but 'just happen'. It is also possible to argue that all actions are happenings, but not *vice versa*. There are intentions behind actions, but (probably) not behind (mere) happenings.

One explanation of how human beings can be free is to say that human beings are (amongst) the causes of their own actions. Anaxagoras might mean we have the power to intervene in our own actions. He at least seems to be committed to this:

a controls b if and only if b changes only if a changes

but then this gives us this idea of self-control:

a controls a if and only if a changes only if a changes

but we knew this already. It is analytic that something changes only if it changes. Also, we can derive from:

a changes only if a changes

this:

a changes if a changes

and so this:

a changes if and only if a changes.

But all these are also analytic. We need something more informative (about non-linguistic reality). Someow, we need the notion:

a changes a

where *a* makes *a* do whatever it is that *a* does.

(3) 'mixed with no thing'. One could take this as either a rejection of materialism or an endorsement of mind-body dualism. If it means consciousness does not 'contain' matter, or is not material, then Anaxagoras is rejecting materialism or perhaps neutral monism. If it implies both consciousness and matter exist but one is not the other then this looks like Cartesian dualism. On the other hand, although Descartes insists nothing mental is physical and nothing physical is mental, he also says the two are 'mixed'. This suggests that Anaxagoras is rejecting psycho-physical causal interaction (which Descartes insists obtains).

(4) 'alone by itself'. If ultimately only nous exists, then, in a sense, there is nothing but noûs.

We could read this as a kind of idealism, perhaps absolute idealism. Is Anaxagoras an absolute idealist? (Thirty years ago there was a fashion for saying there is no idealism is ancient Greek philosophy. I found this extraordinary. People saying this had clearly not read Anaxagoras. Even Plato *can* be read as an idealist.) NB: idealism and mind-body dualism are mutually inconsistent. On idealism, consciousness is the only substance. On mind-body dualism, consciousness and matter are both substances. (Here 'susbstance' is taken in one of Aristotle's sense: that which depends on nothing but itself for its existence.)

We could read it as a kind of theism. But perhaps the creation of creation by God precludes God's being alone. On the other hand, pantheism (at least partly) closes the gap between God and creation: God is

what is, whatever is. Then, rather like the God of pantheism, nous is ‘alone by itself’. There is only what is whatever is.

Suppose Anaxagoras does not mean any of that. Suppose noûs is your mind, my mind. Then ‘alone by itself’ hints at existential anxiety and profound loneliness on behalf of the author. Each of us lives our own life, makes our own choices, dies our own death. Anaxagoras comes out as a proto-Jean-Paul Sartre. Anaxagoras might be suggesting that the mind is self-contained and other minds do not obviously exist. Either solipsism is true or is looks as though solipsism is true. An interesting question: What do we have to be like for it to look as though solipsism is true? Does consciousness have to be fundamentally one? Or, is it enough that each consciousness is private (to every other)?

(5) 'it is the finest of all things' (228)
(6) 'the purest'
(7) 'it posseses all knowledge about everything'
(8) 'it has the greatest strength'

(9) 'mind controls all those things, both great and small, which possess soul'

Plato says

‘So, whenever soul takes possession of a body, it always brings life with it?’

‘Yes, it does’

Phaedo (105D)

(10) 'All mind, both great and small, is alike. Nothing else is alike'

(11) ‘is where all the other things also are'. If by noûs he means God, then we could understand this as a kind of pantheism (the doctrine that God is everywhere). Anaxagoras does not use this terminology, but this does not mean he was not a pantheist.

If noûs is a shorthand way of discussing a set of natural laws, then the things that happen in the physical world happen in accordance with natural law. Because the universe contains intelligence, it is intelligent.

We can also understand noûs as an individual mind. Hume is rightly awe-struck that it is possible to think about objects at a distance, and Anaxagoras might be pointing to this peculiar aspect of our minds. New York can be present to our minds, even though we are in Oxford. Why? How? This looks like action at a distance. You might say: This is a

representation of New York that you are presented with. But this does not seem adequate. (A representation of New York would be something else.) Somehow, your thought really is about New York. It stretches out there.

If consciousness is a kind of infinite space it includes New York, and anything else for that matter. Consciousness is as he puts it ‘where all the other things also are’.

(12) ' began to move things' (230) A good philosophical question is: Why does anything happen? Why is what is, not utterly static? Perhaps there has always been change. Perhaps every event has a predecessor event. This might be right or might be wrong. Even if there is an infinite regress of past eventswe still need to know why there are any events: why there is an infinite series of events rather than *no events whatsoever*. Either there are happenings for no reason at all or something makes what happens happen. Why should we argee with Anaxagoras that *noûs* makes things happen? Well, as far as the physical universe is concerned, the cause of all physical events cannot be physical, on pain of circularity. If everything is either mental or physical, the cause of the physical universe is mental. On the other hand, if the universe contains mental events (thoughts, emotions, perceptions) then the cause of all mental events cannot be mental, on pain of circularity.

Suppose, on the other hand, noûs is not cosmic here, but individual. Then Anaxagoras is saying my mind, my intentions, motives, desires, beliefs, move my body. Wittgenstein and Gareth Evans point out that I raise my arm by raising my arm (not by causing my arm to rise). Heidegger says when I use my hands, the intelligence is in the hands. There is insight in these points but all of them leave room for consciousness to cause bodily movements.

(13) 'in charge of matter'. What does ‘in charge of’ mean here. it might mean:

(a) mind is logically prior to matter: It entails a contradiction to assert that there could be matter without mind. But what contradiction?

(b) mind is causally prior to matter: Unless there is mind there is no matter. Mind is some kind of prerequisite for matter. Mind is a necessary condition for matter. The sense of ‘necessary condition’ is’that without which not’.

(c) mind determines matter: Either mind makes matter be or mind makes matter be what it is, or both. Mind cannot not be what it is, or cannot not be, if mind makes it be what it is or be.

(d) mind is epistemologically prior to matter: We cannot know about matter unless we know about mind. How much do we have to know about mind in order to know how much about matter?

(e) mind is ontologically prior to matter. Unless mind exists matter does not exist. This just looks like (b) above again.

'in charge of' implies that noûs 'directs' matter: Material changes are brought about by noûs. It also implies a measure of freedom or autonomy; that consciousness acts. If someone is in charge of something that implies it is subject totheir will, their decisions. If so, Anaxagoras is saying consciousness implies freedom. Aristotle says:

'Thought […] it is in its essential nature activity.' De Anima 430a

but then asks a good question:

'But how is it that thought is sometimes followed by action, sometimes not?' *De Motu* (701a)

Being:

Anaxagoras says:

[1] '[...] all things were present in the whole. (231)
[2] 'this totality will be the one existing thing of Parmenides'
[3] 'generation and destruction are combination and dissociation' (232)
[4] 'nothing comes into being from what does not exist'
[5] 'what is cannot not be' (229)

Anaxagoras on generation and destruction:
[1] 'generation and desruction are combination and dissociation' (232)
[2] 'no things are generated or destroyed, but they are comingled and dissociated from things that exist' (232-3)
[3] 'nothing comes into being from what does not exist' (233)

Appearance and Reality:
[1] 'The senses [...] We are not capable of discerning the truth by reason of their feebleness' (234)

[2] 'what appears is the sight of what is unclear' (235)

Anaxagoras is a rationalist not a empiricist. These are (early) modern terms imposed retrospectively, but that does not mean that they do not apply. By ‘rationalism’ and ‘empiricism’, I mean:

‘rationalism’ (def.) the thesis that there exist synthetical *a priori* propositions which are metaphysical.

‘empiricism’ (def.) the thesis that unless there is experience there is no knowledge.

If you look at Anaxagoras’ essential claims, they mainly look metaphysical and synthetic *a priori*: Their truth is supposed to come as news, about ultimate reality, yet we are supposed to be able to decide their truth merely by thinking.

Idealism is this:

‘idealism’ (def.) Unless there are minds there is nothing.

(where ‘minds’ means ‘at least one mind’). When I studied in Cambridge decades ago the idea was current that idealism is a modern doctrine, not found in ancient philosophy. Anaxagoras might provide an exception. There might be more.

Questions

1. What is *noûs*?
2. Does consciousness exist?
3. What is consciousness?
4. Can a clear distinction be drawn between appearance and reality ?
5. Are minds parts of one and the same mind?
6. Does the physical universe depend on consciousness?
7. Is Anaxagoras an idealist? Should be be one?
8. Is Anaxagoras a mind-body dualist? Should he avoid being one?
9. Are there different kinds of infinity? Do they all exist?

IV

DEMOCRITUS: ATOMS AND THE VOID

Democritus thinks there are only atoms and the void. He is pursuing ontology, the branch of philosophy that putatively establishes what kinds of things exist, or answers: *What is there?* His ontology is very economical: Only two kinds of thing exist, and everything we see about us can be explained in terms of just atoms and the void. The void is nothing. The atoms exist 'in' nothing. So, *pace* Parmenides, Democritus thinks nothing exists, and he thinks there is a plurality.

Argument that nothing exists:

(1) Atoms and the void exist.

(2) The void exists.

(3) The void is nothing.

(4) Therefore, nothing exists.

(Logically, the first premise is redundant. We include it only as a Democritian tenet sufficient for his (2).)

The void is Nothing and the atoms are Being. Aristotle reports:

'Democritus says[s] that the full and the void are elements, calling the one "being" and the other "non-being"' Aristotle *Metaphysics* (985b)

What is an element?

E is an element if and only if the existence of *E* is a necessary condition for the existence of anything.

This means: unless there are elements (at least one element) there is nothing. But as the void is nothing, Democritus is saying unless there is nothing there is nothing: Unless there is nothingness (void) there cannot be anything whatsoever. In his philosophy, there cannot be any atoms unless there is the void.

What are atoms?

The Properties of Atoms:

[1] 'the same atoms endure' (247)
[2] 'eternal things'
[3] 'small substances'
[4] 'infinite in quantity'
[5] 'place, distinct from them'
[6] 'thing'
[7] 'solid'
[8] 'being'
[9] 'so small that they escape our senses'
[10] 'all sorts of forms and all sorts of shapes'
[11] 'differences in magnitude'
[12] 'generate and compound visible and perceptible bodies'
[13] 'the atoms struggle'
[14] 'they collide'
[15] 'they ...]are bound together'
[16] 'silly to think that two or more things could ever become one'
[17] 'necessarily there are indivisible bodies and magnitudes' (251)

I say something about each of these.

[1] 'The same atoms endure'. The number of atoms does not increase or diminish.

Democritus' use of 'the same' rules out the possibility of atoms ceasing to exist and beginning to exist but the overall number of atoms nevertheless remaining constant. On this non-Democritean ontology, for any atom that ceases to exist another atoms comes into existence. Democritus holds that no atom begins to exist and no atom ceases to exist.

[2] 'eternal things'. This second property of atoms is a logical consequence of the first. Democritus says:

[ ] 'Atoms are eternal: they have always existed and will always exist.' (reported by Simplicius) (247)

There was no such event as the coming into being of the fundamental constituents of the universe. There will be no such event as their ceasing to be. If the constituents of the universe are sufficient for the existence of the universe, it follows that the universe itself is eternal.

[3] 'small substances'. Atoms are small. Atoms are so small, in fact, that they are in principle indivisible. It is a necessary truth that an atom cannot be divided. It would be contradictory (and so logically impossible) for an atom to be divided. Nonetheless, atoms have size, some spatial extension. How are these two theses to be reconciled?

(1) Atoms are indivisible.

(2) Atoms are spatially extended.

It does not seem much help to point out that atoms are very small indeed, that their spatial extension is very little. Intutively, any spatial extension could be divided. A small extension just divides into smaller extensions. (We are still talking about the theoretical possibility of division here.) We could try this:

(3) Atoms are infinitely small.

This means, no matter how small you think an atom is, it is smaller than that. How small is that? Suppose I think an atom is infinitely small, is that not small enough? Suppose we have a way of quantifying smallness and an atom is small to the smallest infinite number. Is that small enough? It is. The atoms are that small. However, this might mean the atoms are *inconceivably* small. But what is conceivability? Having a mental image of? Or, just thinking: ‘an atom is infinitely small’?

(4) Atoms are inconceivably small.

has to be reconciled with

(5) Atoms have size.

The trouble is, if they have any spatial extension whatsoever, it looks as though we can imagine them. It then looks as though we can imagine them being divided. Could they then theoretically be divided? To show that they could not we would have to find a contradiction entailed by the idea of their divisibility. Is there any such contradiction?

Atoms are substances. One of Aristotle’s ideas of substance is that it depends on nothing else for its own existence. Substances are ontologically self-sufficient. Reading backwards from Aristotle, we can suggest that Democritus thinks atoms sustain themselves.

Is Democritus entitled to the view that atoms are substances? One could argue:

Argument that atoms are not substances:

(1) A substance does not depend upon anything (except itself).

(2) Atoms depend on the void.

(3) Atoms depend on something other than themselves.

(4) Therefore, atoms are not substances.

But is the void 'something' or 'anything'? If the void is absolutely nothing at all then Democritus' claim that atoms are substances looks safe. On the other hand, Democritus is not like Parmenides on nothing. Democritus thinks the void exists. This makes it look as though atoms depend upon something that is not an atom but exists. Then it is less plausible to construe them as substances.

(4) 'infinite in quantity'.

(a) Choose any finite number you like: there are more atoms than that.

In a way, this looks wrong. Suppose I choose "7". Then there being eight atoms is there being more atoms than the number I have chosen. Let's try this:

(b) Choose any infinite number you like: there are more atoms than that.

this looks more acceptable. At least, if I choose an infinite number we know the number of atoms is infinite so there *could be* that number of them.

Will this do?

(c) Choose any number you like: there are more atoms than that.

Suppose I choose a finite number, say "753". We are back with the problem facing (a).

(5) 'place, distinct from them'. Atoms depend on the void. Why is this?

Argument from atoms to the void:

(1) There are atoms. (A)

(2) There cannot be atoms unless atoms are somewhere. (A)

(3) Atoms are only somewhere if they are in the void. (A)

(4) Atoms are in the void. (1, 2, 3)

(5) Therefore, there is the void. (1, 2, 3, 4)

One might deny premise (3). There might not be any void, there might instead be space. Then atoms could exist in space instead of in the void, nothingness, nothing whatsoever. This might be right but then we would have to say what the difference is between these two:

(1) space

(2) the void

Suppose the atoms disappeared. What would the difference be between empty space being left over and absolutely nothing at all being left over? We might argue that the difference between the two lies in *the possibility of the atoms' return*. If there is space, the atoms could return to *the places where they were*. But does this make any less sense if the atoms return to the void? If we go Leibnizian or Einsteinian about space, the atoms returning to where they are is only their *standing in the spatio-temporal relations they stood in*. They might do that in the void. there seems to be no logical or *a priori* obstacle to their doing so.

Any atom occupies some place. A place is where something could be, a region of space that might be occupied. Any atom is somewhere, and all the atoms are somewhere. To understand this, draw a distinction between two theories of space, found in the much later works of Leibniz and Newton.

Leibniz suggests that space is *relational*, and Newton that space is *absolute*. According to relational view, the claim that an object is in a place is to relate it to the position of other objects, and space depends on physical objects. Newton holds the opposite view, suggesting that physical objects depend on space. If there were no physical objects, he suggests, there would still be space.

This distinction between relational and absolute space can be used to examine Democritus' view. According to him, the place that an atom occupies is distinct from them, and the space that the totality of atoms exists in is infinite. These two remarks make it sound like he is anticipating the Newtonian view. But he goes on to say that the place where all the atoms are could be called 'void' or 'nothing', and this seems Leibnitzian. Are physical objects located in space or in nothing at all? Democritus' void seems to have some of the properties of space and some of the properties of nothing. The apparent infinity of space would be readily explicable if space were nothing. Counter-intuitively, Democritus seems to imply that the void exists, and in this he disagrees with Parmenides.

(6) 'thing'.

(a) x is a thing if and only if x is distinct from what it is not

(b) x is a thing if and only if x is a spatio-temporal particular

(c) x is is a thing if and only if x is a physical object

(7) 'solid'.

This means:

x is solid if and only if x cannot occupy the same place as y

(8) 'being'. Democritus, at least as reported by Aristotle, holds that Being is many. Existence itself is a plurality. Democritus thinks this because:

(a) wherever there is an atom, there is being

(b) wherever there is no atom there is void, or nothingness.

On this view, there is mainly nothing at all. Atoms exist in the vast void: There are minute areas of existence dotted in areas of pure nothing. Democritus is opposed to Parmenides, who writes that there are no gaps in Being and that Being is one, a well-rounded sphere.

(9) 'so small that they escape our senses'. Democritus could mean either of:

(a) Atoms are contingently imperceptible.

(b) Atoms are in principle imperceptible.

Atoms are contingently imperceptible if, had our senses been different, we could have perceived atoms. Atoms are in principle imperceptible if, no matter how our senses had been, we could not have perceived atoms.
On the first view, atoms are the sorts of item that could be perceived. It is just that we do not have the right equipment to perceive them. Democritean atoms are like quanta. On the second view, atoms are not the sorts of items that could be perceived. Democritean atoms are like numbers or thoughts.

This could be argued either way. We know that atoms are spatially extended. Yet, they are inconceivably small. Anything inconceivably small sounds imperceptibly small.

(10) 'all sorts of forms and all sorts of shapes'. Because of this, atoms can relate to one another to form physical objects (Democritus perhaps anticipates molecules). It is not clear whether 'all' is used literally or metaphorically, nor whether 'shape' means only 'physical shape'.

(11) 'differences in magnitude'. Atoms differ in size, although they are all extremely small. It is not clear which of these is intended:

(a) Each atom differs in size from every other atom.

(b) Some atoms are different sizes from others.

On (a), no two atoms are the same size. On (b), two atoms might be the same size.

(12) 'generate and compound visible and perceptible bodies'.
'generate' could imply:

(a) A physical object is brought into being by atoms.

(b) Atoms are necessary for physical objects.

(c) Atoms are sufficient for physical objects.

(d) Atoms are necessary and sufficient for physical objects.

'compound' implies:

(a) atoms are parts of physical objects

and might imply

(b) a set of atoms is identical with a physical object

or only

(c) a set of atoms constitutes a physical object.

(Here we follow David Wiggins on ‘constitutes’.)

(13) 'the atoms struggle'. The atoms move and collide in a way that one resists another and one displaces another.

(14) 'they collide'. Atoms collide, and bind together.

There is a limit to the binding together of atoms, according to Democritus, in that this binding is always contiguous: They touch each other but don’t fuse. It would be utterly silly to think that two things could ever become one, he argues.

Atoms cause appearances but are reality:

'When they approach one another or collide or are entangled, the aggregates appear as water or fire or plants or men, but all things really are [...] these indivisible forms and nothing else' (252)
Things made of atoms come and go. Atoms remain.

(15) 'they [...]are bound together'.

(16) 'silly to think that two or more things could ever become one'. Democritus no doubt has in mind the popular view that two physical objects cannot occupy the same place at the same time. Is this true? It seems obviously right in the course of our experience, that they *do not* but this does not show that they *could not*. Could two physical objects not fuse? What kind of impossibility are we talking about here? We could say that two physical objects fuse, but their atoms do not. Their atoms are then juxtaposed (in the void). But is it be logically impossible for the atoms to fuse? One is inclined to say no. The consquences of fusion would no doubt be peculiar. Where is the x? Oh. It is exactly where the y is: occupying all and only the space taken up by the y. How many objects are in exactly this place? One? Two? A million? An infinite number? we must not confuse

‘This is strange’ with ‘This is impossible’ or ‘This does not happen’ with ‘This could ot happen’.

However, as soon as we allow that more than one physical object can occupy the same space, we seem to allow that an infinity of objects can occupy the same place. The idea of physical objects *being distinct* might presuppose the impossibility of more than one physical object being in the same place at the same time. Their being distinct is arguably a necessary condition for their being *objects*.

(17) 'necessarily there are indivisible bodies and magnitudes'. *Pace* Anaxagoras, Democritus rejects the view that matter is infinitely divisible. Democritus seems to hold that if something is an atom it is both extended and in principle indivisible. Are these two views mutually consistent?

Why does Democritus think that atoms are both logically indivisible and have size? It could be objected that these two properties are incompatible with one another: Anaxagoras felt that anything with size could in principle be divided. On p. 250, Democritus gives the makings of an argument for atoms having both these properties together. If we attempt to divide an object infinitely, there are only three possible results:

(a) The object will be made only of points (as in geometry), which has location but no size.

(b) The object is composed of nothing at all - the process of division is separating structure from structure and there is nothing the universe is made of.

(c) The third view, which Democritus holds, is that the first two points are impossible. One point does not have or produce any size. An aggregate of points does not have or produce any size. No accumulation of *nothing at all* will produce anything. So he adopts the position that there are indivisible atoms with size.

What is the Void?

(1) 'a place distinct from them [the atoms]' (247)
(2) 'infinite in extent'
(3) 'void'
(4) 'infinite'
(5) 'nothing'
(6) 'the full and the void are "elements" [...] the one "being" and the other "non-being"' (248)

I say something about each of these.

(1) 'a place distinct from them [the atoms]'.
(2) 'infinite in extent'.
(3) 'void'.
(4) 'infinite'.
(5) 'nothing'.
(6) 'the full and the void are "elements" [...] the one "being" and the other "non-being"'.

Is Democritus a materialist?

Materialism is the view that if something exists it is physical. Can the atoms be physical if they have size but are not divisible? The void cannot be physical because, although it contains the atoms, in itself, or in its own right, it entails the absence of anything physical. Democritus presents a very Spartan view of the universe, suggesting that everything is entirely made up of physical atoms located in nothingness. It follows from this that Democritus has a materialist philosophy, the view that everything that exists is physical (although Democritus believes that the void exists and this is not physical). Materialists believe that even things which do not appear to be physical (i.e. mental, abstract, metaphysical) are in fact physical: numbers, beginnings, political acts, regrets, mental images. Materialism must not be mixed up with the view that everything has physical *causes*. Materialism is the doctrine that everything *is* physical.

Democritus thinks that every macroscopic physical object is an arrangement of atoms. There is a number of possible views on this subject:

(a) The physical objects could be the atoms (identity relationship).

(b) The physical object may be constituted from atoms.

(c) Physical objects could be reduced to atoms, for the purposes of explanation. E.g. the behaviour of the physical object becomes explicable in terms of the behaviour of the atoms.

(d) The physical object may be nothing over and above the atoms that it is made up from.

(e) Possibly any language used to talk about about physical objects can be translated into a language about atoms.

Can the universe be *only* atoms? From page 251 onwards in Barnes, Democritus tries to explain how colours and other properties are based in atoms. Appearance and Reality

Is Democritus both a sceptic and a rationalist?

‘Democritus sometimes does away with what appears to the senses’ Sextus Empiricus (252)

Democritus' Attack on Relativism

(1) '[...] every impression is true

(2)' then it will also be true that not every impression is true'

(3) '(since that is an impression)'

(4) Conclusion: 'It will be false that every impression is true' (256 [?]07)

Democritus’ argument may be reconstructed as follows:

Argument Against Relativism:

(1) Every proposition is true.

(2) ‘Not every proposition is true’ is a proposition.

(3) The proposition ‘Not every proposition is true’ is true. (from (1))

(4) Therefore, it is false that every proposition is true.

(1) $(\forall p)\, p$

(2) $-p$ is a proposition

(3) $-p$

(4) $-(\forall p)\, p$

Questions

1. Do atoms exist?
2. Is everything physical?
3. Is anything infinitely divisible?
4. What is the difference between space and nothing ?
5. Is Democritus a materialist? Should he avoid being one?
6. Is Democritus a rationalist? Would he be right to be one?
7. Has Democritus refuted relativism?
8. '[It is] silly to think that two or more things could ever become one.' Is this silly? If so, how silly?
9. What is the void? Does the void exist?

V

PYTHAGORAS: REINCARNATION

Reincarnation:

'[... Pythagoras'] having become different people at different times' Diogenes Laertius Lives of the Philosophers VIII 36

'[...] when he stretched out with all his mind he easily saw each and every thing in ten or twenty human generations' Porphyry Life of Pythagoras 30 (83)

(1) 'the soul is immortal'
(2) 'it changes into other kinds of animals'
(3) 'When the body dies it [the soul] enters into another animal'
(4) 'When it has gone round all the creatures of the land, the sea and the air, it again enters into the body of a man which is then being born'
(5) 'This cycle takes it three thousand years'
Herodotus Histories II 123 (86)

Plato on the soul:

‘The soul is immortal’

Phaedo 105D

'I divided each soul into three – two horses and a charioteer; and one of the horses was good and the other bad'
Phaedrus 253C

'[…] the entire soul must be turned away from this world of change until its eye can bear to look straight at reality, and at the brightest of all realities which we have called the Good'
Republic 518B

Aristotle on the soul:

'Suppose that a tool, for example an axe, were a natural body, then being an axe would have been its essence, and so its soul; if this disappeared from it, it would have ceased to be an axe, except in name.'
De Anima 412b

Pythagoras believes in reincarnation, and in order to make sense of this view we must draw some distinctions between positions in the philosophy of mind:

(a) Materialism is the doctrine that a person is entirely physical. Thoughts, emotions etc. are also entirely physical, and in metaphysics materialism is the doctrine that everything is physical. This should not be confused with the doctrine that mental events have material causes.

(b) Dualism (mind/body dualism) is construed as the view that minds are not physical objects, physical objects are not minds, and both minds and physical objects exist. This is the view that mental events exist, as well as physical events. (Materialism and Dualism are not the only two options in the philosophy of mind)

Weak dualism is the view that no mental event is a physical event, and mental events exist as well as physical ones. Weak dualism has a certain intuitive plausibility.

Strong dualism, on the other hand, is the view that there exist souls as well as bodies. This view can be found in several of the great religious traditions, but also it seems that Socrates (as reported by Plato) believed in a soul, and that this soul both predates and exists after the death of the body. Descartes' (Cartesian) dualism entails a soul as well as a body.

It was often assumed in the nineteenth and twentieth centuries that materialism is a scientific view of the human being, and dualism is a religious view. Clearly, some religious movements do not contain the

doctrine of the soul (e.g. Buddhism). It is not obvious that orthodox Christianity implies the existence of a soul. Resurrection might give us another body, or the resurrection of the whole human being. The idea of a soul seems to be introduced by St. Paul in his theology, and became important in 4th AD when St. Augustine tried to marry Christianity and Platonism. This casts doubt on the view that mind/body dualism is a religious view.

If materialism is construed as entailing there is no mental reality, it looks unscientific, because science accepta the existence of things which are terribly difficult to explain, and then explains them. We now know from quantum physics that materialism is false and that the entire physical universe depends on the existence of consciousness. Ironically, the truly scientific philosophy turns out to be some kind of idealism. Consciousness *actualises*.

It is widely believed that if materialism is true, it is not possible for there to be life after death. In logic, when you die and the atoms of your body are dispersed, it is not contradictory to suggest that these atoms will be reconstituted to form you again. It is hard to ascribe a probability to this, but it has happened once to for each person, and given infinite future time, living again cannot be ruled out *a priori*.

Pythagoras does not use these terms, but it seems clear that he is a strong mind/body dualist (83). What sort of grounds does he have for believing that we are souls? Consider the question of what makes something ‘me’. This can be construed as an empirical question to be addressed through observation. The answer lies in genes and upbringing, the evolution of the human species, reproduction.

Philosophically, however, it is extremely puzzling that there is a distinction between ‘you personally’ and ‘everybody else’. Your own existence does not *just* consist in being one person amongst others. You view others as objective, but yourself subjectively. One of persons is ‘special’, and you are in, or pervade, or at centred upon that person. This fact, that a person *is* you, is tremendously mysterious, and is metaphysically very difficult to explain. Being ‘you’ does not seem to be a mental fact about a thing, or a physical fact about a thing. It shows up in the fact that you *view the world* from one of the human beings.

The uniqueness of one’s own being suggests the existence of the soul. This is not a necessary inference, but the fact of ‘being someone’ is a persuasive reason to believe in souls. From a logical point of view, if we have premises about a human being (what he wears, where he was born, what he does...) we cannot validly derive as conclusion: ‘this being is me’. There could be an identical person with all these traits that was not you. Indeed, the human being that you are might in fact not have been you. It

might have been just as it is but you do not view the world from it. If you accept this, it seems to be true on a profound level that one is not one's body, or one's mind, or even identical with this human being. The existence of the human being one identifies oneself with is not sufficient to show that one is oneself. Thus there seems to be no theoretical barrier to waking up in somebody else's body.

Pythagoras thinks that this could and does happen. We can be reincarnated as other human beings and animals (82). Supposing the soul is reincarnated, what is that makes it 'you' who is reincarnated? Some philosophers think that personal identity over time depends on memory, even within one lifetime. Personal identity is what makes the later person the same pertson as an earlier person. There are many differences between somebody who is twenty and that person when twelve, but what we are interested in is what makes us able to talk about people being the same person despite all these differences. The problem of continuity becomes even greater if we are reincarnated as a different animal.

Doctrine of eternal return

Eternal Recurrence:

(1) 'at certain periods whatever has happened happens again, there being nothing absolutely new'
Porphyry Life of Protagoras 19 (86)

(2) 'numerically the same things occur again and again'
Simplicius Commentary on the Physics (88)

Distinguish:
(a) Numerically distinct events of the same type will recur.
(b) Numerically distinct events with recur.
Is (b) intelligible ?

Simplicius distingushes:
(a) 'things the same in kind plainly recur'
(b) 'things the same in number recur'
(c) 'the same time recurs' (88)

Pythagoras thinks that the same events recur an infinite number of times. This cyclical view of reality requires us to distinguish two meanings of 'the same' (88), which in English can mean either 'the same one' (numerical identity) or 'the same sort' (qualitative identity). When Pythagoras says the

same thing occurs an infinite number of times, it is easier to make sense of this in terms of qualitative identity. Numerically the same event cannot be repeated, while qualitatively the same events can occur one after the other. Pythagoras, however, suggests that 'things the same in number recur' i.e. there is a repetition of numerically just one event. This view is hard to understand.

Pythagoras is an early advocate of vegetarianism:
(1) 'abstain from living things' (85)
(2) 'eating meat is an abominable thing' (87)
(3) 'the souls of all the animals enter different animals after death' (87)

Doctrine of mathematics

NB Modern historians do not ascribe to Pythagoras the famous mathematical doctrines associated with his name. Nevertheless, we may raise the questions:
(1) Do numbers necessarily exist?
(2) Is reality essentially mathematical?
(3) Do numbers exist?
(4) What are numbers?
Do numbers exist as physical objects, or not? Do they exist in a mathematical reality that is different to spatio-temporal reality? If they exist, where are they?

As a matter of history, it seems that Pythagoras did not write as much about numbers as is attributed to him. If we are materialist and admit that there are numbers, then we are committed to saying they are physical. But our thoughts of a number do not seems to be the numbers any more than the thought of a unicorn is a unicorn. Could there be numbers of things without numbers, and could there be numbers without numbers of things?

The Egyptian influence on Pythagoras:

(1) 'Pythagoras of Samos [...] went to Egypt and studied with the Egyptians' Isocrates Busuris 28-9 (84)
(2) 'The Egyptians were the first to advance the idea that the soul is immortal'

Questions

1. Is there life after death?
2. Do we have souls?
3. 'The soul is immortal.' What does this mean? Is it true?

4. Is re-incarnation a logical possibility ?
5. 'Numerically the same things occur again and again.' How likely is this?
6. 'Eating meat is an abominable thing.' Is it?
7. Do numbers exist? If so, where are they?
8. Has Pythagoras refuted materialism?

VI

ANAXIMANDER: INFINITY

There is a number of ways in which the infinite enters into philosophy. It seems to be a presupposition of mathematics that there are infinite numbers. It seems to be a presupposition of theology that there is an infinite God. It seems to be a presupposition of certain systems of metaphysics that some things are infinite. If there was no first event, perhaps the universe is infinite in backward time. If there will be no last event, the universe is infinite in forward time.

Does infinity exist? Do mathematics, theology and some kinds of metaphysics in fact rest upon an illusion? Is the appearance of infinity an illusion? Anaximander believes infinity does exist. Possibly he is the earliest Western thinker to suggest this. (But immense caution is needed in making historical claims of the form: *x* was the first *F*.) Why does Anaximander believe the infinite exists? He believes the finite presupposes the infinite. He thinks there are infinite processes or infinite numbers which, in a logical sense, presuppose infinity.

Anaximander thinks of infinity as a fundamental presupposition. There has to be infinity for there to be the world as it exists. It is a mistake to think of Anaximander as postulating infinity as an extra abstract reality.

What is Infinity?

(1) 'infinite nature is [the] first principle of the things that exist' (71)

(2) 'It is eternal'
(3) 'ageless'
(4) 'it contains all the worlds'
(5) 'there is an eternal motion'
(6) 'worlds, infinite in number'
(7) 'one' (74)
(8) 'moving'
(9) 'infinite'.

I say something about each of these in turn,

(1) 'infinite nature is [the] first principle of the things that exist'. Anaximander's claims infinite nature is the first principle of the things that exist. "First principle" is the translation of the Greek word arche, which can also mean "first cause" or "ultimate necessary condition." A necessary condition is a prerequisite for something that has to be the case in order for something else to be the case. There must be infinity in order for there to be anything. An ultimate necessary condition (a first principle) is a necessary condition that has no necessary condition. Nothing is necessary for infinity.

"Things that exist" could mean empirical objects, or Anaximander might be saying that infinity is necesary for Being. In this case, Being would be infinite. This is not the thought that there is an infinite number of empirical objects, but that the Being of the things that are is infinite, much in the way that someone might think that space or Nothingness are infinite. It makes sense to think of a physical object as finite, but not to think in this way of Being. Being is not bounded.

(2) 'It is eternal'. Infinity is eternal. Infinity did not begin and it will not end. There are sequences, i.e. the positive number sequence beginning from zero, which could be regarded as infinite, while still having an origin, i.e. zero. This is not the kind of infinity Anaximander means. He means infinity that did not begin and will not end.

(3) 'ageless'. Infinity is ageless. If x has three properties: it exists, it did not begin and it will not end, we can raise some philosophical questions about this. Does it last? Arguably it does. If x exists, then it lasts, because existing takes time. Normally, it would seem that if x exists, then it lasts. x at a time t2 would seem to be older than at a time t1. Anaximander seems to be denying this in the case of infinity.

There are possible grounds for endorsing Anaximander's view. One could take the view that it is always now. There are plausible metaphysical reasons for thinking this. The past did exist, but it doesn't exist, because it

is over. The future will exist, but it doesn't exist, because it hasn't begun. Therefore only the present exists. If someone asked what the time was, it would be philosophically correct to reply that it is now. In a sense it is always now despite the fact that clock time changes and different things happen. There is something motionless or non-temporal in the midst of time, and that is now. Nobody knows what now is. It is an unsolved philosophical problem.

(4) 'it contains all the worlds'. Infinity contains all the worlds. It is tempting to read Anaximander as saying something similarly to the Princeton philosopher David Lewis, who thinks there are possible world. This world is not the only world. A possible world is any world that has a consistent description, one that is coherent or does not entail a contradiction. Lewis invokes this notion in order to explain the difference between contingency and necessity. To say that p is necessary is to say that p is true in all necessary world, and to say that p is contingent is to say that p is true in some but not all possible worlds. It seems to some people that these possible worlds do not exist; they are only logical postulates. Lewis says they all exist. In fact there is an infinity of possible worlds. What is the difference between this world and all the other possible worlds? Lewis thinks this world, the one in which we exist, is the actual world? What does it mean to say that this is the actual world? It means we are in it, we occupy it. Lewis thinks we must not confuse the following two points: i) This is the world we occupy. ii) Only this world exists. There is nothing to prevent one from reading Anaximander as referring to possible worlds.

(5) 'there is an eternal motion'. There is eternal motion. Distinguish change and motion. Cf. Heraclitus. There is a profound understanding of motion which is more fundamental than Aristotle's understanding of motion. According to Aristotle, if x has property f at t1, and does not have property f at t2, or does not have property f at t1, but has property f at t2, this is sufficient for change. Change is the gaining or losing of properties. On this view, x could be anything. If anything changes, it either gains or loses a property. Something is true of it at a later time that was false of it an earlier time, or vice versa. Heraclitus can be interpreted in a strong or a weak way, as saying either that there is only change, or that everything changes. Anaximander seems to hold a view rather like that attributed to Heraclitus on the weak interpretation: everything changes. Suppose that x is at a place p1 at time t1, and at the same place p1 at time t2, x has moved.

On the Aristotelian view, motion is a kind of change. If there is motion, then there is change. Is the converse true? If there is change, then is there motion? The view that if there is change then there is motion is a materialist view. If there is change, then there is a change of spatio-

temporal position, i.e. physical change. It is an unsolved philosophical problem whether all change is motion. It is not clearly that psychological changes involve motion. Perhaps atoms in the brain are in motion. According to Anaximander, if there is eternal motion, then at any time there is change of spatio-temporal position. Choose any time you like, there is change of spatio-temporal position.

There are two kinds of pre-Socratic philosophers: philosophers of change or process philosophers (Anaximander, Heraclitus) and philosophers of the changeless or static philosophers (Parmenides, Zeno).

One could construct an argument that everything is in motion. i) Everything is changing (an empirical premise). ii) All change is motion (a materialist premise).

(6) 'worlds, infinite in number'. Worlds are infinite in number. This corresponds to what Lewis says.

(7) 'one'. Infinity is one. It is clear that Anaximander thinks there is a plurality of finite things. Things that can be considered as grouped into sets with a finite number of members. It seems that if we ask how many things exist, the answer is that the number of things that exist is infinite. In what sense can it be that infinity is one? Distinguish between infinity and an infinite number of things. A difference between the things which are infinite in number and their infinity. The property of being infinite is what is one, or a unity.

Another way of understanding (vii): There are different infinite phenomena, eg. mathematical phenomena, theological phenomena etc. If this is true, Anaximander can be read as saying that it is the same infinity that is found in mathematics and theology. Interestingly, since the Renaissance, a split emerges between religion and science, in particular between mathematics and theology. We have inherited this very strong division. The explanations provided by religion and science and by science are different, and seem to make each other redundant. One explanation makes the other superfluous. This distinction is not to be found in the time of Anaximander. The pre-Socratics are attempting to understand everything, without limitations. Since the Renaissance, mathematics has been thought of as scientific. The scholastics thought of as mathematics as divine. It contains perfect truths, therefore it appears to reflect the workmanship of God. Above the portal of his Academy, Plato set the words: “Let no one enter here who has not studied geometry.” We are living at a moment in history when there a sharp distinctions between academic disciplines, whereas the pre-Socratics were inventing ways of

thinking for explaining the universe. Understanding this should make it less odd that Anaximander thinks there is only one kind of infinity.

(8) 'moving'

(9) 'infinite'

Arguments for Infinity

(1) 'it is ungenerated and indestructible' (75)
(2) 'it is [...] the divine' (75)
(3) 'time [...] this is infinite'
(4) 'division of magnitudes'
(5) 'mathematicians actually use the infinite'
(6) 'generation and destruction will give out unless there is something infinite'
(7) 'what is finite is always limited by something' (76)

All these are derived from Aristotle's *Physics* (203b 6-11). It is historically uncertain whether Anaximander subscribed to them but Anaximander is mentioned in the same passage.

(1) 'it is ungenerated and indestructible'.

(1) What is did not begin.
(2) What is cannot, so will not, end.
(3) Therefore, What is is infinitely extended backwards and forwards in time.

(2) 'it is [...] the divine'.

(1) If what ultimately is is divine then what ultimately is is infinite.
(2) What ultimately is is divine.
(3) Therefore, What ultimately is is infinite.

(3) 'time [...] this is infinite'

(1) Time exists.
(2) Time is infinite
(3) Therefore, infinity exists.

(4) 'division of magnitudes'

(1) If x is infinitely divisible, something is infinite.
(2) x is infinitely divisible.
(3) Therefore, Something is infinite.

(5) 'mathematicians actually use the infinite'

(1) Mathematics presupposes the infinite.
(2) Mathematics is true/works.
(3) Therefore, the infinite exists.

(6) 'generation and destruction will give out unless there is something infinite'

(1) Beginning and ending would cease if nothing were infinite.
(2) Beginning and ending do not (ever) cease.
(3) Therefore, Something is infinite.

(7) 'what is finite is always limited by something'

(1) If something is finite, something is infinite.
(2) Something is finite.
(3) Therefore, Something is infinite.

Aristotle appears to ascribe these views to Anaximander:

'Because they do not give out in thought, numbers seem to be infinite [...] so do mathematical magnitudes and the region outside the heavens. If void and space are infinite, body too must be infinite'
Physics 203b

Aristotle himself holds that no infinity is actual. Any infinity is only potential. What does this mean? Is it true?

Questions

1. What is infinity? Are there different kinds of infinity ?
2. What is a beginning? What is an end ?
3. Did what is begin?

4. Is what is ultimately divine?
5. Could time end?
6. Is anything infinitely divisible?
7. Does mathematics presuppose the existence of the infinite?
8. Could beginning and ending end?
9. Is the limited necessarily limited by something?

VII

XENOPHANES: KNOWLEDGE

Xenophanes thought of himself as engaged in just one activity, but in order to understand him we need to draw a distinction between three aspects of his thought:

(1) Epistemology
(2) Metaphysics
(3) Philosophical Theology

Epistemology is the attempt to solve philosophical problems about knowledge. Metaphysics can be defined either as the study of reality as a whole, or as the study of reality as opposed to appearance. Theology is the study of God, including human relations with God. (‘Does God exist?’ is a philosophical question, not a theological question. Doing theology involves assuming, at least methodologically, that God exists.) Although Xenophanes’ scientific ideas have been superseded, problems he raises in these three disciplines remain unsolved.

(1) Epistemology

Xenophanes says:

(1) 'everything is inapprehensible' (94)

(2) 'the clear truth no man has seen nor will anyone'

(3) 'Even if he should actually manage to say what was indeed the case, nevertheless he himself does not know it; but belief is found over all'

I say something about each of these.

(1) 'everything is inapprehensible'. This claim is ambiguous between:

(a) Each thing is unknowable.

and

(b) The whole of what is is unknowable.

or both.

(2) 'the clear truth no man has seen nor will anyone'.

(3) 'Even if he should actually manage to say what was indeed the case, nevertheless he himself does not know it; but belief is found over all'.

Xenophanes might think that we have no knowledge because (1) anything we believe could turn out to be false and (2) we do not have absolute certainty, only what we believe. We need to distinguish:

(a) *p* is believed and *p* is true
(b) *p* is known

What is knowledge? An analysis of knowledge in Plato's *Theaetetus* is 'true belief with an account':

A knows that *p* if and only if:

(1) A believes that *p*
(2) *p* is true
(3) A has evidence that *p*

One account of knowledge gives three conditions for the truth of the statement 'person A knows proposition P', where P is anything at could be believed - an indicative sentence. Ayer's *The Problem of Knowledge*. It would be strange for someone to say they know something without

believing it. Believing is part of knowing. If you know something, then that thing should be true. You might think you know something that turns out to be false, but in fact you can only know true things. The suggestion that A must have evidence for P prevents A from claiming to have known something that later turns out to be true.

What is knowledge? Where is knowledge? Is there a difference between knowledge and belief? Are there things that we will never know? If this is the case, can we know it? Xenophanes says 'everything is inapprehensible'. This could mean that there is a limit to knowledge - not everything is graspable by the intellect. We could understand 'everything' as the totality of whole of reality, as if our senses and minds give us access only to certain parts of reality. Or we could argue that we only know appearances rather than reality: we only know the world as it appears to us, not as it really is in itself. If we had different senses, or more or less sensory systems, our experience of the world would be different. It may be a contingent fact that the world appears to us as it does (i.e. it is not necessarily the case that it appears to us in the way it does; it is contingent about the senses we have).

Xenophanes is a sceptic (the view that there is no truth, that everything is false). In philosophy, we may suggest scepticism about some things but not others. If Xenophanes means everything is unknowable, he is a sceptic, denying that anything is knowable.

'We have no knowledge, we only have belief'. We need to know what knowledge and beliefs are. But do we need a definition of these words, do we need to know how knowledge and belief are constituted, or do we need to know the necessary and sufficient conditions for something being knowledge or belief? We could also ask where knowledge is. In philosophy, there is recurrent analysis of the word knowledge.

What is a belief? To raise this question, we can ask what the difference between believing something and just thinking it is. If you believe something, you are thinking it. But the converse does not seem to be true. What additional component turns a thought into a belief? We must already know that we do not believe something in order to think it but not believe it.

The fact we respond to beliefs differently than to thoughts, presupposes a difference between thoughts and beliefs. We can say that beliefs are pretty much either true or false. In order to distinguish beliefs from thoughts we might suggest that evidence or background knowledge turn thoughts into beliefs.

He does not, however, answer the question of what and where knowledge is. Do books contain knowledge in the way brains do? They contain ink marks on paper. Is this knowledge?

(2) Metaphysics

Xenophanes (96) argues that there is a first principle (arche), and another word for this is ‘universe’ (cosmos). He uses arche and cosmos to mean the same thing as a fusion of origin and universe, the existence (‘being’) of all objects. The answer to the problem that the first two sets of concepts seem mutually exclusive is that Xenophanes is not referring to particular beings, rather being as a whole. Non-being (e.g. nothingness) is infinite, each being is finite (e.g. the universe). But being itself cannot be coherently said to be finite, or infinite.

Xenophanes says:

'the first principle, or the existing universe' (96) [is]:

(1) 'one'
(2) 'neither finite nor infinite'
(3) 'neither changing nor changeless'
(4) 'ungenerated'
(5) 'eternal'

I say something about the first principle and then consider each of these in turn.

(1) 'one'
(2) 'neither finite nor infinite'
(3) 'neither changing nor changeless'. Distinguish:

(a) 'It is what does not exist that is changeless, (97)

(b) 'It is several things which change'

(c) '[...] the rest which is distinct from change and stationariness'

‘*x* is stationary’ implies ‘x could move’ (ie, *x* is the sort of thing that could move)

(4) 'ungenerated'
(5) 'eternal'

(3) Philosophical Theology

Xenophanes says:

(1) 'this one universe was god' (96)
(2) 'god is one'
(3) 'he is [the] most powerful of all things'
(4) '[the] best of all things is god'
(5) 'unique'
(6) 'homogeneous'

I consider each claim in turn:

(1) 'this one universe was god' (96)
(2) 'god is one'
(3) 'he is [the] most powerful of all things'
(4) '[the] best of all things is god'
(5) 'unique'
(6) 'homogeneous'

Xenophanes is an early exponent of:

(a) Pantheism (God is everything)
(b) Monotheism (There is only one god)

and detects

(c) Anthropomorphism (the projection of human characteristics onto the non-human, here, onto God)

Questions

1. Are there limits to knowledge? If so, can those limits be known?
2. Is knowledge constrained by experience ?
3. 'The clear truth no man has seen nor will anyone.' Is this clearly true?
4. What is a belief?
5. What is truth? Does truth exist?
6. What counts as evidence?
7. 'Even if he should actually manage to say what was indeed the case, nevertheless he himself does not know it; but belief is found over all.' Does believing always fall short of knowing?
8. 'This one universe [is] God.' Is this right?

9. Does Xenophanes identify *kosmos* with *arche* ? Would it be correct to do so?

VIII

ZENO: CHANGE

Parmenides denies the existence of nothingness, or non-being, and argues that Being necessarily exists, is *one*, and is *changeless*. One way of understand Zeno is as defending the last two claims, and extending Parmenides' view of Being to objects and events. Zeno argues that the description of objects and changes entail contradictions so, in reality, they cannot exist. He therefore thinks many basic and commonsensical views about the world are mistaken.

To follow Zeno, we need an initial grip on change and motion.

'change' (*def.*) *x* changes if and only if *x* is *F* at t1 but *not F* at t2 or not *F* at t1 and *F* at t2

'motion' (*def.*) *x* moves if and only if *x* is at P1 at t1 and at P2 at t2

So motion is a kind of change: change of spatio-temporal location, the gaining and shedding of spatio-temporal properties.

(I am not saying these attempts at definition are adequate. Heraclitus might well say they capture the situation *before* and *after* change or motion, but change and motion themselves have been drastically omitted.)

The Paradox of the Arrow

Zeno argues:

(1) 'Everything is always at rest when it is in a space equal to itself'
(2) 'What is travelling is always in such a space at any instant'
(3) 'The travelling arrow is motionless' (155)
(4) 'Zeno does away with motion by saying: "What is moving is moving neither in the place in which it is nor in the place in which it is not"

Diogenes Laertius Lives of the Philosophers IX 72 (157)

One interpretation of this argument is:

(1) Anything at a place at a time is at rest.
(2) Anything in motion is always at a place at a time.
(2) If something is in a place at a time it is not in motion.
(3) Therefore, nothing is in motion.

What is travelling is always in a place at a time and anything in a place is at rest (in a space that is no smaller or larger than the physical dimensions of the thing). From this Zeno concludes that there is no motion.

Zeno is saying that something moving from a place (P1) goes through numerous places (P2) to a destination (P3). Objects moving through these places are either in a particular place at a certain time (in which case it is either at rest, or partly outside that place) or not in that place at that time. In order to show Zeno is wrong, we would have to argue that time is not composed of time instants (which have no duration). What it means to say that x has moves is: it is at P1 at t1 and at P2 at t2. Zeno is right that our notions of motion depend on assumptions about time and places. He points out that there might not be time or places.

Given a billion years of science, what we perceive as motion might turn out to be something else. After all, people used to see the world was flat, and were convinced that there were witches. Even something as central to our world view as motion could be called into question in time.

Reply to the Paradox of the Arrow

(1) 'the travelling arrow stands still' (156)
(2) 'It depends on the assumption that time is composed of instants'
(3) 'That is false; for time is not composed of indivisible instants'

Achilles and the Tortoise

Achilles gives the tortoise a head start (in distance but not time) in a race. Of course Achilles can move much faster than the tortoise.

(1) T moves from place P1 to place P2.
(2) A move from P to P1.
(3) T moves from P2 to P3
(4) A moves from P1 to P2 and so on *ad infinitum*.

(5) Therefore, Achilles never catches up with the tortoise.

'The pursuer must first reach the point from which the pursued set out, so that the slower must always be ahead of it' (155)

Achilles runs from a place (P) to a destination (D). A prerequisite for reaching D is reaching the halfway point between P and D, (M). But a prerequisite for reaching M is reaching the halfway point between P and M, (N). Therefore, travel over finite distances is impossible because it entails travel through an infinite number of points.

Reply to Achilles and the Tortoise

(1) '[...] it is false to claim that the one ahead is not caught'
(2) 'It is not caught while it is ahead' (156)
(3) 'Nonetheless it is caught (provided you grant that they can cover a finite distance)'

The Paradox of the Stadium (or Race-course)

(a) x has to traverse a finite distance, 'd'.
(b) To traverse distance d, x has to traverse half distance d, d*
(c) To traverse distance d*, x has to traverse half distance d*, distance d** and so on ad infinitum.
Conclusion: x cannot traverse distance d.

‘Nothing moves because what is travelling must first reach the half-way point before it reaches the end’ (155)

What is motion?

x moves if and only if:

(1) x is at some place P1 at some time t1.
(2) x is at some numerically distinct place P2, at some later time t2.
(3) x exists at some juxtaposed series of places between P1 and P2 at all times
between t1 and t2.

Motion is a kind of change.

What is change?

x changes if and only if x if F at t1 and x is not F at t2 or x is not F at t1 and x is F at t2.

Questions about motion:
(1) Can there be change without motion?
(2) Can there be motion without change?
(3) What is it to begin to move? (How long does beginning to move last?)

It seems to be a materialist thesis that if there is change there is motion.

It seems to be a dualist or idealist thesis that there can be change without motion.

Zeno seems to assume that if motion is an illusion, he can show that change is an illusion. In order to establish the fact that all change is motion, we would have to show that everything is physical (materialism). However, this assumption may be fallacious.

On p. 157, Zeno says that what is moving is neither in the place in which it is, nor in the place in which it is not. These two possibilities are jointly exhaustive and mutually exclusive according to Zeno. Therefore, motion, he concludes, is an illusion. We might suggest the following example. Supposing there is a fly on a table, and it flies off the table. It is clear what it is to say that the fly is on the table, and it is clear what it is to say that the fly has left the table. But what is it to say that fly is leaving the table?
If we say that if one atom of one leg of the fly is in contact with the table, then it is on the table, and if it some distance off the table it has left the table. There must be some event where the fly leaves the table. You can image an object being in some minute contact with the ground, or you can imagine a gap or a distance between the surface and the object. But there is a difficulty about what it is to change from one state to another - this applies to any change. Our rather static view of time and motion may be mistaken.

Paradoxes of Plurality

Zeno thinks there are no places, places being regions or areas of space. Zeno argues that any region of space is located in a region of space that is greater than it. Paradoxically, this process can continue ad infinitum (158), therefore no place can exist. In arguing against the existence of places,

Zeno is arguing that there are no such things as places, and also denying plurality, affirming the one and denying the many (like Parmenides).

If there is not plurality then there can be no quantification. Quantification is the application of quantifiers, concepts such as 'all', 'some', 'a few' 'more than half'. In predicate logic, quantification is the prefacing of a sentence by either the universal quantifier

(∀x), 'For any x'

or the existential quantifier

(∃x), 'There exists at least one x such that'.

Quantification turns a sentence with free variables into a sentence with bound variables, for example:

Fx , 'Something is F',

into

(∃x) *Fx*, 'There exists at least one *x* that is *F*'.

The propriety of the universal and existential quantifiers is not beyond philosophical question. The use of the universal quantifier assimilates 'all', 'any', and 'every' which are arguably distinct concepts. The use of the existential quantifier enshrines formally the doctrine that 'exists' is not a first –order predicate, but 'exists' might be some kind of first-order predicate. Quantification theory is predicate logic.

On the same page there might be a early version of the Paradox of the Heap, which is designed to show that many of our concepts are vague. Consider a heap of sand, and remove one grain. The heap of stand is still a heap of sand. However, if we continue this process we will reach a point where the heap ceases to be a heap. Is there a particular point where this change takes place?

fuzzy logic. Logical system which allows degrees of truth. For example, where '1' denotes truth and '0' falsity, p might be true to degree 0.7 and so false to degree 0.3. In general, if p is true to degree n then p is false to degree 1 – n. Fuzzy logic is a departure from classical logic because a proposition may be to some extent both true and false, and a proposition and its negation to some extent both true. Classical logic, in a sense, is a version of fuzzy logic, that version in which the only admissible truth values in the range from 0 to 1 are 0 and 1. Arguably, fuzzy logic

does justice to the intuitive idea that some indicative sentences are not wholly true and not wholly false. For example, the claim 'He is in the room' seems not wholly true and not wholly false but partly true and partly false if he is leaving the room at the time of utterance.

coherence. *p* and *q* are coherent if and only if the possible *truth of *p* does not preclude the possible truth of *q* and the possible truth of *q* does not preclude the possible truth of *p*. It follows that the concept of coherence presupposes the concept of truth, so truth cannot be explained in terms of coherence without circularity. Nevertheless, coherence is necessary for truth because if {*p, q*} form an incoherent set then at least one of *p* and *q* is false. Coherence also provides a test for truth because if it can be shown that {*p, q*} form an incoherent set, and it is known that one of *p*, *q* is true, then it follows that the other is false, and if it can be known which is true, then it can be known which is false. However, coherence is not sufficient for truth because the coherence of {*p, q*} is consistent with the falsity of both *p* and *q*.

conceivability. Admissibility by the mind. Thinkability. If imagination entails the generation of mental imagery, then everything imaginable is conceivable but not everything conceivable is imaginable. Something is conceivable if and only if it is possible to form a concept of it, but a concept need not involve an image.

Logical possibility is necessary for conceivability, so logical impossibilities are inconceivable, but conceivability is not what logical possibility consists in. A putative state of affairs is logically impossible if and only if its description entails a contradiction, logically possible if it has at least one consistent description. A putative state of affairs is conceivable if and only if it can be thought.

Nevertheless, conceivability without contradiction is important to the epistemology of logical possibility.

On some empiricist views, if I have experience of *a* and experience of *b* then I can conceive of some new item, *c*, composed of *a* and *b*, but not of any item I have neither experienced nor experienced the constituents of.

On some materialist or anti-metaphysical views, if I think I am thinking of something non-physical, say spiritual or abstract, I have only in fact only succeeded in thinking of something physical. On this view, to conceive of something is to think of it as possessing at least some primary qualities.

Is Anything Logically Impossible?

It is widely taken as axiomatic that if the description of a putative phenomenon entails a violation of a logical law then that phenomenon cannot exist. However, if we are persuaded, for example, that Zeno has

found contradictions in the concept of motion (for example: If *x* moves then *x* is at a place at a time and *x* is not at that place at that time) we do not thereby conclude that nothing moves; "Foolish, foolish us! We thought things *moved.* But no. That philosopher Zeno has shown that the concept of motion entails a contradiction. Clearly we should give up this widespread, perceptually compelling but incoherent assumption! Motion is *logically impossible*." Rather, we retain the view that things move and look for a consistent theory of motion. The implications for philosophy, science and theology are wide. Perhaps time travel is not logically impossible, it is just that we so far lack a consistent theory of it. Arguably, something is possible if and only if there is at least one consistent description of it.

Perhaps nothing is logically impossible, because contradictions do not pick out any putative states of affairs. If not, they do not pick out any impossible putative states of affairs. "Ah yes, 'Both (p . $-p$)', it is the putative state of affairs picked out by *that* sentence that could not come about!" But what state of affairs could not come about?

Zeno himself does not discuss time travel but this example raises interesting questions. If time travel into the past were possible, one could go back and eliminate the causes of one's existence (killing one's parents). If we go back to a destination in past time, we seem to have arrived at this destination, but we have not truly arrived at the same destination because we are present. Objections to time travel are based on paradoxes, and Zeno's attack on motion works in a similar way.

We could say that it is empirically obvious that things move, and that Zeno is wrong. But time travel seems paradoxical, contradictory and impossible, until someone does it. In this sort of situation, we would find time travel remarkable but would accept it. The fact that we have found contradiction in theory does mean the theory is false.

Objection: A contradiction could be concealed in a theory. The state of affairs then described in the theory is logically impossible.

Questions

1. What is motion?
2. 'Nothing moves, because what is travelling must first reach the half-way point before it reaches the end.' What, if anything, is wrong with this?
3. Can there be change without motion? If so, is materialism false?
4. What is it to begin to move? How long does beginning to move last?
5. How does Achilles manage to overtake the tortoise?
6. Is plurality paradoxical?
7. What is an impossibility?

8. Can any of Zeno's paradoxes be resolved?
9. Do Zeno's arguments make the philosophy of Parmenides more believable?

Glossary

akousmata.

apeiron.

arche. Beginning. Origin. First principle. Law'. 'Archaeology' is derived from *arche*. (cf. 'archaeology')

den, to.

dikē.

dinē.

Dissoi Logoi.

dokimos.

esti.

genesis.

harmoniē.

hebdamonadōn, peri.

kenon.

kosmos. Everything. The sum total of what exists. What is, whatever is. 'Kosmos' carries connotations of order and arrangement, as opposed to chaos, and beauty (cf. 'cosmic', 'cosmetic')

krasis.

kukeōn.

logos. Proposition. What is claimed or stated. Account. Reason, both in the sense of a reason (for something or other) and logic or reasoning. *Logos* is related to ‘legein’: ‘to say’ or ‘to state’. (cf. ‘logic’)

nomos.

noûs.

medēn.

olethros.

peiras. peras.

polemos. War. Strife. Conflict.

phusiologoi.

phusis. Nature. The Presocratics distinguish *phusis* (nature) from *techne*. (cf. ‘physics’) See *techne*.

polis. City-state.

prēstēr.

psuchē.

sperma.

sunousia.

technē. Skill. Technique. Technology. The world of human artefacts; tools, roads, towns and cities. (cf. ‘technology’)

tekmērion.

'kosmos'
'everything'
'orderly arrangement' ('cosmos')
from verb meaning 'to order (troops)', 'to arrange'(Homer)

'beautiful arrangement' ('cosmetic')

'phusis'
'nature' ('physics')
from verb meaning 'to grow'
'world' (then like 'kosmos')
but: distinguish:
1. 'phusis' -natural world
2. 'techne' -artefact world

+ 'phusis' can mean principle in each thing

'arche'
'beginning' 'origin'
'rule' 'first principle'
('archaeology')

'logos'
cognate with word 'legein' 'to say' or 'to state'
so:
'something said or stated' so 'proposition'
'account' 'explanation' '(a) reason'
logos contrasts with senses & so means 'reason' (faculty or capacity to reason)
('logic' via 'logike')

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UNUSED:

INCORPORATE INTO VERSIONS OF INVIDIVIDUAL PRESOCRATICS

UNUSED HERACLITUS

[1] -*Fa* (t1) & *Fa* (t2)

[1] It is not the case that a is F at time t1, and it is the case that a is F at time t2.

or

[2] -(∃*x*) *Fx* (t1) & (∃*x*) *Fx* (t2)

[2] It is not the case that there is an x such that x is F at time t1, and there is an x such that x is F at time t2.

[1] gives us coming to be of properties. [2] gives is coming to be of things with properties. Then we say that change is either:

[1] [-*Fa* (t1) & *Fa* (t2)] v [*Fa* (t1) & -*Fa* (t2)]

[1] Either: It is not the case that a is F at time t1 and it is the case that a is F at time t2, or: it is the case that a is F at time t1 and it is not the case that a is F at time t2.

or

[2] [-(∃*x*) *Fx* (t1) & (∃*x*) *Fx* (t2)] v [(∃*x*) *Fx* (t1) & -(∃*x*) *Fx* (t2)]

[2] Either: It is not the case that there is an x such that x is F at time t1 and it is the case that there is an x such that x is F at time t2, or: It is the case that there is an x such that x is F at time t1 and it is not the case that there is an x such that x is F at time t2.

Then we say, if any of these disjuncts is true then there is change. If the first disjunct of [1] or [2] is true then there is 'coming to be'. In this way, we can explain, on the weak view, that coming to be is 'produced by' change. It is a logical consequence of a kind of change or, it *is* a kind of change, or this kind of change are necessary and sufficient for coming to be.

Mill maintains that logical laws are not *a priori* or necessary, but empirical generalisations confirmed by all experience but, so far, refuted by none. He thinks all deduction is really induction.

Quine has suggested revision of the law of excluded middle to simplify quantum mechanics. *Plantinga has commented that this is rather like revising a law of arithmetic to simplify the doctrine of the Holy Trinity.