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Paradoxes as Philosophical Method and their Zenonian Origins

BARBARA SATTLER

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BARBARA SATTLER
BOCHUM UNIVERSITY

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CONTACT
mail@aristoteliansociety.org.uk
www.aristoteliansociety.org.uk

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B I O G R A P H Y

Barbara Sattler is professor for ancient and medieval philosophy at Bochum University, and has taught at St. Andrews, Yale, and Urbana-Champaign before.

The main areas of her research are issues in metaphysics and natural philosophy in the ancient Greek world, especially in the Presocratics, Plato, and Aristotle. She focuses on the philosophical processes through which central concepts of metaphysics and natural philosophy, such as space or speed, arise in Greek antiquity. By showing that such concepts were originally spelt out in ways significantly different from the way they are today, she aims to make us aware both of the rich conceptual basis we often take for granted, as well as to sketch out possible alternative understandings. She is the author of *The Concept of Motion in Ancient Greek Thought – Foundations in Logic, Method, and Mathematics* (CUP 2020), and is currently writing a book on ancient notions of space.

E D I T O R I A L N O T E

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BARBARA SATTLER

I. INTRODUCTION

PARADOXES HAVE BEEN EMPLOYED in philosophy throughout its history in a number of ways – to silence an opponent, to point out that reality is inconsistent, as games or jokes, and much else. Philosophically, we may distinguish between paradoxes intended to show that the objects of our inquiry are inconsistent (inconsistencies in reality or the world), paradoxes that are intended to show our conceptual tools to be problematic, and paradoxes intended to show a tendency in the language to become entangled in difficulties.¹ And paradoxes--of any of these three domains of objects--can also be used as part of a *method* of investigation. By this I do not simply mean that they are systematically employed, but rather, as we will see below, that they can be used as a tool to test whether we may have chosen a problematic path in our investigation.

In my paper today I want to show that one of the most fruitful ways of employing paradoxes has been as a kind of philosophical method and that Zeno of Elea was the inventor of paradoxes in this very sense.² We will first have a brief glance at different accounts of what is understood by a paradox, before we will look at the structure of the paradoxes of Zeno that have been handed down to us. In a brief comparison between Zeno and thinkers before him I will then show to what extent Zeno introduced paradoxes as a productive method that we are still employing today, while thinkers like Heraclitus, I argue, use paradoxes as a description of reality.

Understanding Zeno as introducing a new method into philosophy also fits with ancient testimonies that considered Zeno as a thinker who is relevant for questions of method: according to Diogenes Laertius VIII, 57, Aristotle called Zeno the inventor of dialectic and Plato in his *Phaedrus* 261a-e places Zeno in the context of practising sophistry and *antilogikê technê*. The fact, that the method Plato and Aristotle connect with Zeno is not the introduction of paradoxes is at least in part due to the fact that the Greek word *paradoxon* only starts being used as a noun (and not only as an adjective as before) and as one relevant for philosophy with Aristotle's

1 Kant, for example, thought that our reason is such that it entangles itself in paradoxes, the antinomies; vagueness paradoxes have varyingly been interpreted as displaying inconsistencies in our language, our concepts, or in reality.

2 While Zeno is often credited as the first thinker presenting us with paradoxes, usually we find neither reasons given for this claim nor any explanation specifying in which sense paradoxes are talked about (see, for example Cuonzo, 2014, 143).

Organon – and, as we will see, in Aristotle this term has a slightly different meaning than today.

2. WHAT DO WE UNDERSTAND BY A PARADOX

We often distinguish between different kinds of paradoxes, such as epistemic, logical, ontological, or truth paradoxes;³ but as paradoxes they all seem to share some basic structure. As a first pass we may follow Sainsbury's understanding of paradoxes as "an apparently unacceptable conclusion derived by apparently acceptable reasoning from apparently acceptable premises".⁴ With real paradoxes, it seems we have done everything right in choosing our premises and correctly reasoned from them, but yet we end up with an unacceptable conclusion.

Rescher has argued against talking about "acceptable" here, since being 'acceptable' is a matter of yes or no, while what we really face is different degrees of plausibility. For him "a paradox arises when a set of individually plausible propositions is collectively inconsistent", whereby the inconsistency at issue must be real rather than merely apparent.⁵

For our understanding of a paradox we will leave in the reference to "apparent" for two reasons: firstly, it sometimes takes centuries to judge whether a conclusion is indeed inconsistent; so what may have been a "real" inconsistency with the conceptual tools available at one point in time, may be understood only as an apparent inconsistency at another time. If we are not only talking about the current state of affairs but the development of paradoxes in the history of philosophy, and if we want to leave open the possibility that paradoxes concern our (changing) conceptual tools, it seems wise, to talk about "apparent inconsistencies".⁶ Secondly, also in contemporary debates there is not always agreement on the question whether a paradox presents a "real" inconsistency or not. There are quite a few strong paradoxes which according to some scholars have found a solution once and for all, while other scholars point out that there is still a problem; and also Zeno's paradoxes of motion continue to inspire possible replies from philosophers, mathematicians, and physicists, most recently from quantum theory. So "apparent" will be left in there to mark the possibility of an epistemic position of uncertainty.

3 Rescher p. 72-73 classifies paradoxes as semantical (involving the idea of truth, falsity, and reference), mathematical, physical (including Zeno's paradoxes), epistemic (involving knowledge and belief) and philosophical.

4 Sainsbury 2009 (first ed. 1987), p.1

5 Rescher 2001, p. 6.

6 Interestingly Rescher takes up a lot of paradoxes from the history of philosophy without accommodating this fact in his definition of paradoxes.

In contrast to Sainsbury, Rescher's account does not explicitly mention our apparently acceptable *reasoning*, i.e. the way in which we derive the conclusion from the premises, as a separate point. However, some form of reasoning must be the implicit background for the collective inconsistency of the individually plausible propositions. For a collective inconsistency becomes clear through reasoning, unless we assume a divine point of view where the inconsistency of the individual premises can "just be seen". Being human, I think we should make our reasoning involved explicit in our understanding of a paradox, since something can go wrong here. Thus in our attempts to solve paradoxes we need to keep our reasoning in mind as one possible point requiring changes (we may, for example, think that a wrong inference from the premises to the conclusion plays a role in Zeno's arrow paradox).⁷

Let us move on to the question of how to characterize the premises. As we just saw, for Rescher it is important that the premises in question are (merely) plausible as it explains why it is possible for us to get into inconsistencies and how we can solve paradoxes: we get entangled in paradoxes, since our modes of reasoning are valid when applied to true premises, but may yield implausible or even contradictory conclusions when applied to plausible premises. And Rescher's method of paradox-solution can be captured as finding the least plausible premise (or premises) in the argument the removal of which will free us from the inconsistency in the conclusion.⁸ It is, however, worth pointing out, against Rescher, that not only plausibility but also acceptability can come in degrees – being acceptable need not be a matter of yes or no, since something may be acceptable for the sake of the argument, but not as such, for example. And we also have to determine what counts as acceptable. But in whatever way we determine the exact relationship between plausibility and acceptability, what seems to be important for good arguments is that they work with premises that seem to be true,⁹ they have the force of seeming truth, while plausibility does not need to have the same pull.¹⁰ In most cases, not all of the premises can be true,¹¹ so some premises will be

7 Cf. Sattler 2020, chapter 3.

8 2001, pp. 26-27. This focus on plausibility also seems to be the reason why Rescher refers solely to premises in his account of how paradoxes arise, without explicitly mentioning our reasoning.

9 Cf. also Mackie 1973.

10 I take the difference between something seeming to be true and it being plausible to be that we are committed to something that seems true to us until disproven, while we may not feel equally committed to something sounding plausible.

11 Having only true premises in a paradox is only possible in cases where something has gone wrong in the reasoning so that from true premises we derive a false conclusion without this being obvious on the surface of the argument; or where the seemingly

only in the neighbourhood of a true statement.¹² But they all *seem to be true*, otherwise we could get rid of the problematic premise straight away without ever arriving at a paradox.

While talking about being acceptable in the case of the premises seems to be unproblematic, we may want to specify the “unacceptableness” of the conclusion. With paradoxes, the conclusions derived are “apparently unacceptable” for Sainsbury, for Rescher we get into inconsistencies. Cuonzo, who does not really give a definition of paradoxes, but rather a summary of other definitions, in addition suggests the conclusions to be “obviously false or inconsistent,¹³ while Sergi Oms has claimed that characterisations assuming paradoxes as an apparently valid argument with apparently true premises and an apparently false conclusion are too narrow; instead, he has suggested that a paradox is an argument that “does not generate the kind of commitment to the conclusion that should stem from the acceptance of the premises and the validity of the argument”.¹⁴

While in some contexts, this weaker understanding of paradoxes as not generating equal commitment to the conclusion as to the premises may be useful,¹⁵ we will concentrate here on paradoxes containing false and inconsistent conclusions. However, the falsity in question cannot simply be empirical, as when an argument tells me it is sunny now, when this is not the case, since empirical falsity may simply be the result of a bad argument, but not yet a paradox. For a paradox the falsity in question needs to be of a more fundamental kind, so that we do not straightaway know how to fix it. It will usually be an inconsistency.¹⁶

Summing up, the structure of a paradox can be said to be an apparently sound proof of an unacceptable conclusion. That is, the premises worked with seem to be true and the reasoning from the premises to the conclusion

unacceptable conclusion turns out to be acceptable after all.

12 See Sattler 2015.

13 Cuonzo, 2014, p. 7. On p. 212 she gives the following summary of a paradox, taking up the definitions of Rescher, Sainsbury, and Mackie: “A set of mutually inconsistent propositions, each of which seems true; an argument with seemingly true premises, seemingly good reasoning, and an obviously false or contradictory conclusion; an unacceptable conclusion derived from seemingly true premises and apparently valid reasoning.”

14 In his talk “Some Remarks on the Notion of Paradox” at the joint session 2020.

15 It could, however, also include cases that are not paradoxes at all, but rather bring out the *unwelcome* consequences of different commitments we hold.

16 I will not deal with Whitehead and Russell’s 1910, 37 analysis of paradoxes, since they are not sufficiently general in their discussion of paradox which is tailored to the class paradoxes, that is to paradoxes concerning membership in classes or collections (logical or set-theoretical paradoxes). By contrast, also the paradoxes of interest to them fit the general understanding I give in the main text.

seems to be valid and yet we end up with a problematic conclusion. I think such an understanding of a paradox is the one that has become most fruitful in philosophical discussions.¹⁷

But why is the conclusion of a paradox problematic? Either, because it is inconsistent in itself, or because it is inconsistent with some known state of affairs, or with some principle or conviction we hold. We may think that the additional principle or conviction we hold needs to function as an explicit premise in the argument, otherwise we do not yet have a paradox as we do not have some internal inconsistency. While I agree that this is ultimately the case with real paradoxes, we will see such an additional principle playing a role in Parmenides and Aristotle. With them, what is called a paradox (in Aristotle) or may be seen as one (in Parmenides) is an argument that when connected with some other principle or doctrine that a particular person or school may hold¹⁸ is shown to be problematic. The fact that this additional principle is not part of the argument as such will show below that with Parmenides and Aristotle we do not find the kind of “internal” paradox that Zeno establishes.

Paradoxes come in different strengths, there are weaker and stronger ones, and only paradoxes of a certain strength will count as good. If we count only those paradoxes as strong for which no solution seems possible or none so far has been found, this would rule out Zeno’s paradoxes since several solutions have been suggested. It would, however, also rule out most other paradoxes, since there is hardly a paradox where no solution so far has been suggested (which does not mean, of course, that scholars agree that these solutions will work). In fact, a situation without any suggested solution seems to be only encountered shortly after a paradox has been raised for the first time. So alternatively, we may think it is enough for a good paradox in case it is convincing that people employ the assumptions it relies on and a solution is not simply obvious, irrespective of whether we have an agreed upon resolution. In this sense Zeno’s paradoxes are clearly good paradoxes. Following Sainsbury’s criterion for stronger paradoxes as those about whose solution we are still in severe and unresolved disagreement, will also give us this result. For there is still severe and unresolved disagreement about how to solve Zeno’s paradoxes – that merely employing mathematical tools does not fully address them (while it does allow us to deal successfully with motion and space in the sciences) has been pointed out by several researchers;¹⁹

17 This is not to say that this is how the word “παράδοξος” was originally used in Greek; for this cf. below and Probst, 1989.

18 Such as Parmenides’ own doctrine.

19 See Code 1982a and 1982b, Hasper 2006, and Sattler 2020, chapter 3; cf. also Sainsbury p. 16-18.

and also the fact that new replies to Zeno continue to be suggested, points in this direction.

There is however, an additional problem when dealing with these ancient paradoxes in that in several cases not only do we not have an agreed upon solution, we also do not have an agreed upon diagnosis, there is disagreement about what exactly the paradox is.²⁰ This is the case, for example, with Zeno's Moving Rows paradox.²¹

Let me finally stress one point that is in the background of any discussion of paradoxes, but is worth emphasising given what is to come: in order for paradoxes to work as paradoxes, the law of non-contradiction (in one form or other) has to hold.²² The conclusion of a paradox is, as we just said, either inconsistent in itself, or inconsistent with some further claim we are committed to. Thus for a paradox to work it has to be clear that getting entangled in a contradiction is a proof that something is wrong in our argument, and that we need to find a way to change it.²³ Paradoxes thus understood do not undermine the principle of non-contradiction, but rather use it as the most important standard for our reasoning – a point we will see to be of crucial importance later on (and central for the difference between Heraclitus and Zeno).

The principle of non-contradiction was not always understood in the same way we do today – an understanding that was first formulated in outline in Aristotle and prepared for in Plato.²⁴ In Parmenides and Zeno we find a less fully developed version according to which the principle of non-contradiction is understood as “[not (S is P and S is not-P)] regardless of respect, and S has to be either P or not-P, whereby P and not-P can be understood as what we would call contraries or contradictory opposites”.²⁵ Interestingly, however, there seems to be only one paradox of Zeno where this specific version of the principle of non-contradiction features in deriving the paradox: in the arrow paradox, Zeno infers in the conclusion that the arrow is unmoved from premises giving the conditions

20 Solution and diagnosis are, of course, often hard to keep apart.

21 Cf. Sattler 2015.

22 *Pace* Priest.

23 Cf. also Mackie, 1973.

24 Aristotle states it, however, only in terms of internal negation; see Horn 2001; cf. also Sattler, forthcoming 2022.

25 So the so the principle of excluded middle simultaneously has to hold but is interpreted in terms of contradictories or contraries. This version of the PNC starts being changed implicitly by post-Parmenidean thinkers like the atomists, and explicitly by Plato. The Elatic understanding of the principle of non-contradiction allows Zeno to take disjunctions like F and non-F as exhausting the logical space so that we can infer the truth of one disjunct from the inconsistency of the other: given that plurality leads to inconsistency, we have to assume a (simple) One (fragments 1 and 2 Lee).

for something being at rest (“Everything is at rest whenever it is in a space equal to its own size”). Accordingly, we have to assume that Zeno equates “being at rest” and “being unmoved”. This only works if we assume that everything has to be either in motion or at rest, excluding the third possibility that some things may simply be unmoved (in the way we may claim eternal truths to be). In none of the other paradoxes, however, will this specific interpretation of the principle of non-contradiction play a role.

3. THE STRUCTURE OF ZENO’S PARADOXES

Zeno was the inventor of numerous paradoxes.²⁶ The paradoxes that have been handed down to us can be divided into three series, the paradoxes of *topos* (place or space), the paradoxes of plurality, the paradoxes of motion, and, in addition, the single paradox of the falling millet seed.²⁷ Of Zeno’s own words, we only have a few sentences with the paradoxes of plurality in Simplicius, and a single sentence with the paradoxes of *topos* in Diogenes.²⁸ So while we cannot be sure whether Zeno may not, in addition to the paradoxes we possess, have come up with paradoxes of a completely different kind, we can at least look at whether the paradoxes handed down to us have a common structure and what kind of a function this structure (or these structures) suggests – whether Zeno saw them as pointing out inconsistencies in reality, in language, or in our conceptual tools.

There have been frequent attempts in the scholarship on Zeno to fit them into a systematic program. Often these programs focus only on the four paradoxes of motion,²⁹ but sometimes they are meant to embrace all of them. In the English-speaking world, Owen most prominently sought to reconstruct one system for all the paradoxes we know of Zeno by interpreting them as the different manifestations of the supposition that the real world is divided.³⁰ If all of Zeno’s paradoxes fitted such a program, this may suggest also a common conceptual structure. However, so far all these schemes have shown themselves to be wanting in their interpretations of the paradoxes.³¹

26 See DK 29 A15; Kirk, Raven, and Schofield, 1983, 264-265 and Barnes, 1982, 233.

27 The paradoxes of *topos* can be found in DK 29 A24 and B4, and Lee fragments 13-18; the paradoxes of plurality in DK 29 B1-3 and A21-23, and Lee 1-12; the paradoxes of motion in DK 29 A25-28, and Lee fragments 19-36; and the paradox of the falling millet seed in DK 29 A29, and Lee fragments 37-38. For the division, cf. Lee, 1936, 9.

28 DK 29 B1-4; Kirk, Raven, and Schofield, 1983, 266; and Lee 1936, 29.

29 See, for example, Salmon 1980 and Heath 1921, vol. 1, p. 275 and for an argument against the scheme employed by them Kirk, Raven, and Schofield 1983, p. 265. Brochard 1954 sees a couple of such schemes at work.

30 Owen, 1957-58.

31 See KRS, 1983, 265. I discuss this in Sattler, 2020, chapter 3.

While the paradoxes do not all seem to fit into one systematic program in that they all contain the very same problematic assumption (or pair of assumptions), they may, however, all follow the same paradoxical structure (in the way discussed in the last section). In his *Parmenides* dialogue, Plato has Socrates summarize the first argument of Zeno as “if the things that are, are many, they must be both like and unlike, which is impossible” (127e, fragment 12 Lee). And in what follows, Plato seems to suggest something along these lines as the general structure of Zeno’s paradoxes: “if we assume that there is x (for example, that there is a plurality), then Zeno shows that x is F as well as not-F”.³² “x is F and not-F” can be understood as the conclusion that characterizes a paradox – a conclusion that is unacceptable because it is inconsistent, as suggested above.³³

In order to figure out whether Plato’s suggestion is indeed capturing all of Zeno’s paradoxes, so that we can understand Zeno as claiming that if we assume motion, plurality, *topoi*, or falling millet seeds, then we will always end up with the claim that x is F and not-F, I will give a brief overview of Zeno’s paradoxes.³⁴

Of the plurality paradoxes, some can obviously be understood along these lines: if we assume a plurality, the many things are F and not-F; for example, like and unlike in Plato’s *Parmenides* 127e1-4, finitely and infinitely many according to DK29 B3. With others, however, it seems less clear whether they present indeed an inconsistency, or more generally an absurd result – for example, DK29 B1 shows that if a plurality exists, each of the things of the plurality has to be so small as to have no magnitude at all

32 We may at first think that this is a structure that works only for the plurality paradoxes, but in *Parmenides* 128eff., Plato mentions motion and rest as a central pair of concepts and may thus hint at the motion paradoxes: “But if someone first distinguishes as separate the forms, themselves by themselves, of the things I was talking about a moment ago – for example, likeness and unlikeness, multitude and oneness, rest and motion, and everything of that sort – and then shows that in themselves they can mix together and separate, I for my part’, Socrates said, ‘would be utterly amazed, Zeno’” (129d-e, translation by Gill and Ryan with alterations); cf. also *Phaedrus* 261c-e. Accordingly, the structure given by Plato may be seen an attempt to combine at least the plurality and motion paradoxes by showing that the basic structure is the same in both series: to make the same thing seem both F and not-F.

33 We may wonder whether x is a proposition or a thing characterized by F and what kind of an item F is. For the ancient context, we should not restrict ourselves to propositions, but may also consider individual terms.

34 I can give only a very rough overview of the basic paradoxes here; for a defence of the interpretation of the plurality and motion paradoxes, see Sattler, 2020, chapter 3 and Sattler, 2015; for the *topos* paradox see my book manuscript on space; for the millet seed paradox see my unpublished paper “A new beginning of the vagueness paradoxes”.

and so large as to be infinite.³⁵ We may understand this conclusion indeed as a logical inconsistency – something cannot be at the same time of some (namely infinite) and of no magnitude. Alternatively, we may think that given the meaning of small and large, something cannot simultaneously be excessively small and excessively large in extension, while the paradox seems to force us into this absurd claim. Finally, we may think that the paradox presents a conflict between showing things of a plurality to be infinitely small or large and our experience that such things are of a finite size (and thus neither infinitely small nor large) – an experience that we may count as being external to the paradox, but internal to the belief system of a pluralist.

Of the motion paradoxes, the dichotomy and the Achilles paradox present us with the proof that in order to cover a finite distance we have to cover infinitely many smaller distances, and that we have to cover these infinitely many smaller distances in a finite time.³⁶ This may be understood as showing that the same x – a distance to be covered in a motion – has to be both finite and infinite, and thus holds inconsistent attributes. Accordingly, we may understand these two paradoxes as showing that x has to be F and not- F .³⁷ The arrow paradox is meant to show that the flying arrow is at rest.³⁸ In this paradox, rest is seen as the contradictory of motion;³⁹ thus the paradox shows that the arrow is both F and not- F , both moving and not-moving. The fourth paradox of motion, the paradox of the moving rows, aims to show that the set-up of three rows of equal size two of which move in opposite directions leads to the conclusion that “half the time equals double the time”.⁴⁰ Again, it is not fully clear here whether this paradox present us with an absurd consequence in the sense of being analytically false (as a straightforward way of understanding the explicit claim we get from Aristotle that half the time is double the time may suggest) or a consequence that can be expressed as a logical contradiction (e.g., that half the time is not half the time).

35 This is also how Cuzo, 2014, 148 reads it.

36 DK29 A25 (Lee fr. 19, Aristotle, *Physics* 233a21-23 and *Physics* 239b9-14) and DK29 A26 (Lee fr. 26, Aristotle, *Physics* 239b14-29). Aristotle argues in the latter passage that the main paradoxical point is the same in these two paradoxes.

37 Even if the two paradoxes also raise other points; and the question whether the two attributes are indeed inconsistent or not depends on what we understand by ‘finite’ and ‘infinite’, as already Aristotle shows in his treatment of Zeno’s paradoxes.

38 DK29 A27 (Lee fr. 29, Aristotle, *Physics* 239b5-9) and DK29 A27 (Lee fr. 28, Aristotle, *Physics* 239b30-33).

39 See Sattler, 2020, chapter 3. As we saw above, Zeno does not distinguish between being unmoved and being at rest, which allows for motion and rest to be understood as contradictories. We do not find the distinction between ‘resting’ and ‘not-moving’ clearly drawn before Plato’s *Parmenides*, and systematically employed before Aristotle.

40 DK29 A28 (Lee fr. 35, Aristotle, *Physics* 239b33-240a17).

The millet seed paradox shows that if one millet seed does not make a sound when it falls, then a whole bushel cannot make a sound.⁴¹ This paradox can also be understood along the lines of *x* being *F* and not-*F*. For we end up with the conclusion that a bushel of millet seeds does not make a sound when falling, which contradicts our experience that a falling bushel of millet seeds does indeed make a noise. So the bushel makes a sound and does not make a sound, *x* is *F* and not-*F*.

Finally, the paradox of *topos*, presents us with an infinite regress:⁴² if everything that exists is in a place and place itself exists, then place will be in a place, *ad infinitum*.

Accordingly, we see that while many conclusions of Zeno's paradoxes have the structure "*x* is *F* and not-*F*", not all can be characterized like this. Besides logically inconsistent consequences, we also find analytically false one, and infinite regresses – thus different structures, not all of which fit the general characteristic given above, even if we may associate them all with the paradoxical genre more generally.

A characteristic that we do, however, find in all of these paradoxes is that they start from positions that are not Zeno's own, but rather widely held – that there is a plurality, motion, and *topoi* – and show these to be problematic in themselves. That Zeno is not showing conviction held by himself to be paradoxical, can be seen, for example, from Simplicius's account of Zeno's plurality paradoxes according to which Zeno shows that the person who claims there to be a plurality gets into an inconsistency (τῶι πολλὰ εἶναι λέγοντι συμβαίνει τὰ ἐναντία λέγειν).⁴³ And three fragments make it explicit that Zeno himself did indeed not share the assumption of plurality, divisibility, and so on, fr. 1-3 in Lee, the second of which I quote here:⁴⁴

For, he argues, if it were divisible, then suppose the process of dichotomy to have taken place: then either there will be left certain ultimate magnitudes, which are minima and indivisible, but infinite in number, and so the whole will be made up of minima but of an infinite number of them; or else it will vanish and will be divided away into nothing, and so be made up of parts that are nothing.

41 DK 29 A29.

42 DK29 A24. Sedley, 2017 suggests to understand the *topos* paradox in a way that fits the '*x* is both *F* and not-*F*' structure. For an argument against this reconstruction, cf. my book manuscript, chapter 2. I am leaving aside here what can be understood as a second *topos* paradox, DK29 B4.

43 DK B2, Simplicius, *Phys.* 139.5.

44 Porphyry attributes fragment 2 to Parmenides, but Alexander and Simplicius think it to be more likely by Zeno, cf. also Lee p. 12. For this ascription to Zeno, cf. also Sattler 2020, chapter 3. Cf. also Lee fr.1, Simplicius 139.19-22.

Both of which conclusions are absurd. It cannot therefore be divided, but remains one. Further, since it is everywhere homogeneous, if it is divisible it will be divisible everywhere alike, and not divisible at one point and indivisible at another. Suppose it therefore everywhere divided. Then it is clear again that nothing remains and it vanishes, and so that, if it is made up of parts, it is made up of parts that are nothing. For so long as any part having magnitude is left, the process of division is not complete. And so, he argues, it is obvious from these considerations that what is is indivisible, without parts, and one (Fr. 2, Simplicius 139.27, Lee's translation).

This paradox claims that if we assume some one thing (such as, for example, a finite distance) to be divisible and thus to have some kind of parts, it will not only at the same time be a plurality, but also leave us with no way to give a consistent account of these parts. Accordingly, having shown the paradoxical result of this assumption, Zeno argues that we should assume what truly is to be indivisible, without parts and thus truly one and the opposite of what is commonly assumed.

We may think that showing an opponent to get into problems with her argument is a common feature in any sort of agonistic argument-culture and found in philosophy right from its very beginning. Thus, it would not be a feature specific to Zeno's paradoxes. What is, however, special, is that Zeno shows these problems not from his own position. Rather, he attempts to show that independent of any positions he or the Eleatics may have hold, the assumptions of plurality and motion can be shown to be inconsistent or absurd from within and thus from the very starting point of the people who assume them; and only once this inconsistency is shown, does Zeno suggest the opposing position as an alternative. All of Zeno's paradoxes start from the position of the opponent, take up the opponent's claims and then demonstrate that accepting these claims entangles the opponent himself in a contradiction or an absurdity.⁴⁵ Locating the paradox completely within the position of an opponent is a move first introduced with Zeno, as a brief comparison with his predecessors will show.⁴⁶

4. POSSIBLE PREDECESSORS

Paradoxes seem to be have been introduced into philosophy first by Heraclitus, who was born roughly 60 years before Zeno. Heraclitus's whole philosophy may be seen as being based on paradoxes or paradoxical

45 This also holds true for interpretations which do not see Zeno as ultimately arguing for a particular position.

46 Zeno's paradoxes also show that our everyday experience is in fact not an adequate criterion for judging an ultimate explanation of what there is; see Lee. fr. 8, Philoponus, *Phys.* 42.18-21).

thinking. He is well known for claims such as “God is day night, winter summer, war peace, satiety hunger”.⁴⁷ While this claim does not as such form a contradiction, we do indeed find real contradictions in Heraclitus, that seem to suggest a paradox:

In the same river we step and do not step, we are and are not (DK22 B 49a).⁴⁸

With claims like this, Heraclitus seems to be the first philosopher to introduce paradoxes as an important point into philosophy: we step and do not step in the same river, we are and are not – without any further distinctions of respects or time this seems to be a clear contradiction.⁴⁹ If I went swimming at a certain spot in the Danube yesterday and again today, it seems I went into the Danube twice, and thus have stepped into the same river. However, when I went into the Danube today, it seems I didn't encounter the very same river, for if I put in some green powder to dye the water yesterday, it will have disappeared today. The river is constantly changing since what makes a river a river – its water – is constantly changing, so that we may ask, in the Platonic variation of the paradox, whether we step into the same river even once. Heraclitus's paradoxes suggest that they give an accurate description of reality.

Some interpreters, like McCabe, have understood Heraclitus as offering resolutions to these paradoxes himself: for her, the paradox quoted above is resolved by the claim in the variation of this paradox in fr. 12 that “to those who step into the same river, different and different waters flow” – the river qua the outlines of the river banks can be stepped into twice; while the river qua the waters which constitute it is constantly changing. So, in general, we may understand Heraclitus as raising paradoxes that then can be resolved by introducing the appropriate respects – the same thing, like sea water, is the purest and the foulest, because it produces opposite effects on different objects or perceivers, it is deadly for human beings, but life-preserving for fish (DK fr. 61). But if we understand Heraclitus like this – and I am not claiming that it is false to do so – then we do not really find paradoxes in the sense specified above, any strong paradoxes, in his work, but only riddles in paradoxical sounding formulations that can be resolved with the help of different respects. So either Heraclitus does not

47 This is the first part of fr. 67.

48 There are two further versions of this paradox, DK fr. 12 and 91. For a discussion of these three fragments see McCabe 2015.

49 DK22 B 49a employs a contradiction, as we saw above, but more often Heraclitus employs contraries, so, for example in DK22 B 67 and 88. In the scholarly literature, there is a big debate whether Heraclitus does indeed go against the law of non-contradiction (as, for example, Barnes claims, pp. 71 and 79-81) or not (so, for example, Graham, p. 190).

really deal with paradoxes, or, if we do not follow McCabes interpretation and take the river fragment as intending to present a genuine paradox, his paradoxes concern the object of investigation and Heraclitus suggests that these objects, and the world as such, are paradoxically structured. (In the following I will only deal with this second option, since it is the only one relevant for our discussion).

Both Heraclitus and Zeno ask us to change our common belief system due to their philosophy – Heraclitus in that we should endorse that reality is constantly changing and paradoxical, Zeno by claiming that central common beliefs lead into paradoxes and thus have to be given up. But in contrast to Heraclitus’s paradoxes, the inconsistencies deployed in Zeno’s paradoxes are not to be embraced but meant to be avoided. This can be done in different ways: in some of his plurality paradoxes, notably fragment 1 to 3 in Lee, Zeno explicitly suggests avoiding the paradoxical result by accepting the opposite position (the position introduced by Parmenides), that there is only one thing that is unmoved. Other paradoxes, like the arrow or the stadium paradox, however, do not explicitly derive any opposing assumption from the paradox. Here the paradoxes may be seen to suggest either that we should simply not assume that there is any motion of what truly is or that we should give up our philosophical inquiry into motion, for even if there is motion we will not find a consistent account of it, or that we need to look for other ways out of this predicament. But in any case, Zeno’s paradoxes are meant to *stop* our usual beliefs as a first step because they violate the principle of non-contradiction. Heraclitus also questions common assumptions held by his contemporaries, but he does so by claiming that the real way to think about them is in a contradictory way – his statements *endorse* a structure of reality that violates the principle of non-contradiction and thus seems strange to common sense.⁵⁰

That Heraclitus and Zeno employ the principle of non-contradiction in crucially different ways is also supported by Aristotle’s investigation of this principle in his *Metaphysics*. There he claims that “it is impossible for anyone to believe that the same thing is and is not, as some consider Heraclitus said” (*Metaphysics* 1005b23-25, DK22 A7). While Aristotle himself leaves it open whether Heraclitus did indeed attempt to violate the principle of non-contradiction, some people that Aristotle refers to did in fact think Heraclitus went against it. This possible violation of the principle of non-contradiction suggests that Heraclitus’s paradoxes are not paradoxes in our sense specified above, according to which paradoxes are not questioning the principle of non-contradiction, but rather use this principle as an important criterion – only because we attempt to adhere

50 And is paradoxical in this sense.

to this principle, do paradoxes seem to be problematic. In contrast to Heraclitus, most of us assume that in order to make progress in philosophy we need to show how paradoxes can be resolved or avoided. Paradoxes are a warning sign that in some way we are at a dead end; it tells us that we have to go back to the crossing and have to choose a different turning.

We may think that Zeno's usage of paradoxical structures is in fact not that different from Heraclitus's, since Zeno is engaged in setting up paradoxes, not in solving them. But in Zeno's paradoxes it is made clear that if we show something to violate the principle of non-contradiction, something has to change – we need to rethink or stop our investigation, or at least some conversation about it has to take place. His paradoxes work, because it is clear that getting entangled in a contradiction is a proof that the argument or account involving the contradiction cannot stand as it is. While Zeno uses the principle of non-contradiction as the crucial criterion for philosophical inquiries in his paradoxes, for Heraclitus this principle is one that does not capture what we ultimately inquire about, and that thus is no reliable guide for our inquiries.⁵¹

Summing up, we can say that if Heraclitus is indeed presenting us with full-fledged paradoxes, he uses them as a genre quite different to the one Zeno employs. Heraclitus suggest endorsing his paradoxes, while Zeno's paradoxes are meant to stop our common assumptions that build on these paradoxes. This difference is also displayed in the different role the principle of non-contradiction plays for their philosophy. Finally, Heraclitus's paradoxes concern the content of investigation – they show the world to be paradoxical, while Zeno paradoxes are meant to make us change our assumption about what truly is; thus they work as a philosophical tool, what we may see as a method to make us pause in our normal investigation and rethink our assumptions and reasoning.

Given that Parmenides uses the principle of non-contradiction as a central and systematic criterion of inquiry in his poem, and that his poem is indeed the first place where a version of the principle of non-contradiction is methodically employed as such a criterion,⁵² we may think that we find Zeno's method already in Parmenides.⁵³ If we look briefly at the argumentative structure in Parmenides's poem, we find a

51 Even if Heraclitus has to assume that other people take the principle of non-contradiction at least implicitly as a guideline for otherwise his fragments would not produce their provoking effect. If we follow a McCabian reading of Heraclitus, we see him respect the PNC by resolving the apparent contradiction with the help of different respects; but, as mentioned above, in this case he would in fact not be involved in raising paradoxes.

52 Cf. Sattler 2020, chapter 2.

53 Also Parmenides thinks that if we get into a contradiction due to our common assumptions, we have to reject these assumptions.

couple of passages that may seem to anticipate this method. Parmenides argues for a certain understanding of what is (*eon*) by showing that the contrary assumption leads to absurdities or contradictions – Being is not-F because it cannot be F. For example, he argues in fragment 8, lines 3-14 for the claim that Being is ungenerated by examining the two possibilities of generation (and destruction) there are – what has come into being could come either from what is not or from what is. And by showing that both possibilities contradict what he has established so far (that Being cannot not be), it is demonstrated that Being cannot be generated.⁵⁴

Prima facie, such argumentative structures in Parmenides seem to correspond to Zeno's paradoxical method. However, Parmenides in fact claims that "you cannot think p because this conflicts with q, which I have established before". Assuming Being to have been generated would not be consistent with what he himself has established so far (namely that Being has to be and that non-Being cannot be), and thus the assumption that being is generated has to be rejected. Parmenides does not, like Zeno in his paradoxes, start from the position of the opponent, take up the opponent's claims and then show that accepting these claims entangles the opponent himself in a contradiction or an infinite regress. Rather, Parmenides uses a standard external to what somebody accounting for generation would use.

Parmenides's poem may, however, in other parts anticipate what Zeno does in his paradoxes, for example in its account of the two-headed mortals in fragment 6 for whom:

Being and non-Being is regarded as the same
and not the same, and of all things there is a backward turning path
(fr. 6, lines 8-9).

Here it seems that the mortals themselves claim that Being and non-Being are the same and not the same. Thus their claims seem to be inconsistent in themselves, and not simply in conflict with Parmenides's account. However, it is on the basis of Parmenides's strict account of what we should understand by Being that their claims seem to confuse what Parmenides considers to be Being and non-Being (what they themselves would probably consider to be all Being), which is thus also seen as being the same and not the same.

By contrast, Zeno goes a step further than Parmenides by showing that some assumptions, like plurality, are not only inconsistent with some Eleatic position which he or Parmenides may hold, but are *inconsistent in themselves* – a point we find made explicitly in Simplicius's account of Zeno's plurality paradoxes, referred to already above:

54 For a more detailed analysis of this passage, cf. Sattler 2020, chapter 3.

In his book, in which many arguments are put forward, he shows in each that a man who says that there is a plurality is stating something self-contradictory (*ta enantia legein*). One of these arguments is that in which he shows that, if there is a plurality, things are both large and small, so large as to be infinite in magnitude, so small as to have no magnitude at all (DK B2, Simplicius, *Phys.* 139.5, Lee's translation).⁵⁵

In this passage, Simplicius claims that Zeno shows the very assumption of a plurality to be self-contradictory. Thus, from the position of somebody assuming plurality Zeno shows how this assumption undermines itself, without relying on Eleatic claims.⁵⁶ By contrast, Parmenides showed how assuming motion and plurality conflicts with Parmenides's own assumption of the one true Being that he had established beforehand.

We may think that Parmenides's treatment of the realm of *doxa* also shows the opponents' position to be inconsistent in itself, even if it is left to the reader to draw this conclusion, so that we would already get this important methodological move from Parmenides. However, there again the realm of *doxa* is shown to be inconsistent with what Parmenides has established in the poem before, in the realm of *alêtheia*. In itself, without the Parmenidean background, we do not have any reason to assume light and night as principles to be problematic (fr. 8 lines 51-59). The way of *doxa* could not be understood as being inconsistent if the way of *alêtheia* had not been sketched beforehand.⁵⁷ Zeno, by contrast, attempts to show that independent of what is established by Parmenides in his poem, the pluralist assumptions do not get off the ground, because by assuming plurality they have to make inconsistent claims. While Parmenides shows that the opponent of Eleatic philosophy contradicts what Parmenides himself has established before, Zeno tries to show that the opponent of Eleatic philosophy contradicts himself. Thus, Zeno's method of creating paradoxes allows for a stronger refutation of the opponent.⁵⁸

Parmenides' argument may nevertheless be seen as paradoxical in a way, if we take into account the usage of the word "*paradoxon*" in ancient Greek. In everyday Greek, the adjective "*paradoxos*" refers to what is uncommon or different from what is expected; it is against, *para*,

55 Cf. also the account in Plato's *Parmenides* 127e1-4.

56 This is the general way Zeno's paradoxes work. We saw above that there are also some paradoxes of plurality, however, where from this 'neutral' starting point Zeno aims to establish an Eleatic One.

57 Accordingly, we should expect the way of truth to come before the way of *doxa* in Parmenides's poem, as fragment 8 makes clear is the case.

58 In contrast to a recent trend in the secondary literature, I understand Zeno as supporting Parmenides' position and argue in detail for this in Sattler 2020, chapter 3. My main claims in the paper here are, however, independent of this understanding.

the usual *doxa*, i.e. not fitting common opinion or expectation, strange or shocking, and thus needing explanation. It is the opposite of what is *endoxos*, i.e. what is generally approved or acknowledged. Parmenides's austere account of what there is – only the One, absolutely simple Being – may be seen as *para-dox* in this original sense of the adjective, i.e. strange and needing explanation.

The first person to use the noun in Greek philosophy as a technical term is Aristotle in his *Organon*.⁵⁹ In his *Sophistical refutation* 165b13-22 he tells us that those who argue as competitors and rivals have five aims: refutation, falsity, paradox, solecism, and reducing the opponent in the discussion to babbling. Thus he lists paradoxes in a competitive context, where they are the third best after refutation and showing the opponent to say a falsity; he doesn't understand paradoxes as a neutral tool or mode of inquiry. And in 172b29-34 he suggests paradoxical statements to be drawn with respect to specific school doctrines and how to solve them. So here we are not dealing with "strong" paradoxes in the sense described above, and they are tied to assumption of specific schools. While Parmenides does not show specific school doctrines to be paradoxical, he demonstrates the thinking of the mortals to be inconsistent with respect to his own thoughts, and thus in relation to a certain doctrine. By contrast, what we find in Zeno is the attempt to show motion, plurality, and *topos* to be inconsistent independent of any specific school or philosophical doctrine.

Given this understanding of the Greek word, we should not be surprised that in his discussions of Zeno, Aristotle he does not talk about 'paradoxes'. Rather, in most cases he talks fairly neutrally of Zeno's *logos*,⁶⁰ sometimes of his *axiōma*⁶¹ or his *aporia*,⁶² and only once does he claim that Zeno *paralogizetai* (reasons falsely), with respect to the arrow paradox (239b). While Aristotle in his account of paradoxes still claims an assumption to be inconsistent with a particular position someone holds, the important methodological move we find in Zeno's paradoxes is to show that some basic and widespread assumptions are inconsistent in themselves.

We may also think of Gorgias as the inventor of philosophical paradoxes as a method, since it is a common methodological move of Gorgias to provide us with seemingly exhaustive dichotomies of a certain realm of which he then shows that none of the disjunctions are possible. For example,

59 We find it in Plato in the sense also the adjective in ordinary Greek carries of strange and contrary to common opinion.

60 *Physics* 233a, 239b, 250a, 263a, *Prior Analytics* 65b *Topics* 160b, *Soph. elech.* 172a and 179b; in 182b it is the *logos* of both Parmenides and Zeno.

61 In *Metaph.* 1001b

62 *Physics* 209a, and in 210b he uses the verb *êporein*.

in the *Apology of Palamedes* we are told that Palamedes either betrayed the Greeks on his own or with the help of others, but he cannot have done it on his own nor with the help of others. Furthermore, the second part of Gorgias's *On what is Not* has been understood as a *reductio ad absurdum* of the Parmenidean thesis. And in his *Helen*, it is not only from his own position that it is made to seem that she both went to Troy and was innocent. Gorgias is, however, younger than Zeno, and I have tried to show elsewhere⁶³ that at least in some of his paradoxical arguments he is clearly building on Zeno. Thus, while we may want to understand part of Gorgias's oeuvre as using a similar paradoxical method as Zeno does, with Gorgias we find some further refinement of the paradoxical structure established by Zeno.

Finally, we may think that a methodological employment of paradoxes derives from outside of philosophy – from the realm of mathematics.⁶⁴ Mathematical *reductio ad absurdum* proofs, as we find it paradigmatically in the proof for the incommensurability between the diagonal and the side of a square, function very much the way many of Zeno's paradoxes do, i.e. the contradiction or absurdity is taken to show that the position implying it is false, i.e. false absolutely, not merely false given someone's position. Such proofs seem to have been used in ancient Greek mathematics quite early on. Our evidence for this proof is Euclid, but since knowledge of the incommensurability is a good deal older,⁶⁵ *ad absurdum* proofs may be as well. How old they are exactly, however, seems impossible to say. They probably date to the fifth century BCE, but this still leaves it open whether and if so to which degree Zeno may have been influenced by mathematicians (or whether the influence may even have been the other way round).⁶⁶

63 Cf. my book manuscript, chapter 2.

64 For example, Cuonzo (2014), *Paradoxes*, p.141 claims that “ancient mathematics provides the foundation on which paradoxes emerged in Greece”, without, however, giving any proof or references for this claim.

65 They are said to come from the Pythagoreans, but our first text testifying to it is in fact Plato's *Theaetetus*; cf. also Knorr (1975), chapter 2.

66 Lee 1936, p. 112 thinks it to be “quite possible that Zeno's method may have suggested to geometers the proof by *reduction ad absurdum*”. The degree of any mutual influence between mathematics and philosophy is difficult to trace back exactly, since our mathematical sources before Euclid are very sparse – after Euclid most of the earlier mathematical texts seem not to have been handed down any longer. Given that Plato and Aristotle use mathematical concepts in order to solve problems of conceptualizing nature, mathematics seems to have had an influence on philosophy at least at that time, but this does not help with Zeno. It used to be the case that scholars read Zeno's paradoxes as putting the mathematical notion of the infinitesimal into question, which in turn was seen as leading to Eudoxus's development of proportion theory. This story was, however, put into doubt by Owen, and since Knorr most philosophers of ancient mathematics argue against the assumption that philosophy had any influence on ancient mathematics

5. THE CHARACTERISATION OF PARADOXES IN ZENO – A METHOD

Heraclitus, Parmenides, and Zeno, all attempt to change our common assumptions with their philosophy. But in contrast to Heraclitus and Parmenides, Zeno's paradoxes do not encourage us to embrace a paradoxical reality or show that our common assumptions seem paradoxical in the light of a particular position we hold. We can say that what is specific for Zeno's paradoxes are two points: (a) they show the philosophical assumptions of an opponent to be problematic from within this opponent's position; and thus on his own ground. Zeno is not, like Parmenides, showing that somebody is in trouble with her assumptions from the point of view of a certain doctrine held by someone else. So without bringing his own conviction to the table, Zeno puts himself into the shoes of his opponent and demonstrates from within this position that there are problems. (b) Zeno does not embrace his paradoxes, as Heraclitus does, but takes them as a clear sign that at least some of the assumptions on which they rest have to change.⁶⁷

Thus in contrast to bad arguments, such paradoxes leave us in a situation in which we do not even know where to start in order to deal with them. Zeno's paradoxes force us to pause in our usual assumptions and stop our inquiry in the way it proceeded so far; a pause that often turns out to be fruitful for further philosophical investigation for it makes us rethink what we have taken for granted.⁶⁸ In this way his paradoxes prevent us from simply accepting common, seemingly unproblematic assumptions, such as that there is motion and plurality, and instead either accept opposing assumption, such as that what truly is, is one and unmoved, or show how we can avoid the problems raised by his paradoxes and thus keep these assumptions.

David Sedley has recently suggested that the central claim of Zeno's *topos* paradox – “everything that exists is somewhere; but if place is an existent, where would it be? Presumably in another place, and that place in another place, *and so on and so forth* (καὶ οὕτως εἰς τὸ πρόσω)”, which Aristotle translated into an infinite regress – in fact consciously leaves open how he proceeds. According to Sedley, “Zeno's book offered no more than skeletons of arguments, to be developed in oral debate according to his audience's responses”.⁶⁹ If Sedley is correct, Zeno drafted his paradoxes in a way that could be adjusted to the respective opponent and thus worked as a method to show different opinions to be problematic.

at that time. I remain agnostic on this question.

67 As he shows in fr. 1 and 2.

68 It can, however, also lead into scepticism, as the arguments of the Pyrrhonian and Academic Sceptics suggest.

69 Sedley 2017.

While Heraclitus' paradoxes can be seen as concerning the content of inquiry – they suggest embracing these paradoxes and agreeing that the reality we are trying to investigate is itself paradoxical – Zeno's paradoxes can be seen as the beginning of a method for philosophical enquiry.⁷⁰ Of course, we may think that showing the objects of our inquiry to be inconsistent and there to be inconsistencies in reality is also an important move in philosophy – and one that we not only find in Heraclitus, but also, for example, with scholars of dialetheism. Be this as it may, this is clearly a different usage of paradoxes than the methodological one I think is at work with Zeno.

Furthermore, we may think that Zeno, like Heraclitus, is attempting to correct a mistaken assumption about reality we hold and thus about a certain content: instead of assuming what truly is to be a plurality that moves and changes and is in places, we should assume a Parmenidean unmoved one, just as Heraclitus is trying to show that the stable and consistently describable objects in our reality are in fact undergoing constant change and can be grasped only with the help of contradictions. However, by making it clear that the paradoxes are not to be embraced but rather a stopping point which should make us rethink our assumptions, and by leaving at least some ends open to adjustment depending on the interlocutor, Zeno employs these paradoxes not as an account about reality but as a tool for investigation.

In this way Zeno shows what can be really fruitful about paradoxes in philosophy and prepares the ground for using them as a method of inquiry that has been employed in philosophy ever since Zeno established them. Taking one's starting point from the opponent in order to show the opponent internally to be inconsistent without bringing in one's own position is a feature characteristic of the Platonic Socrates (and presumably a method further developed by the historic Socrates).⁷¹ He frequently shows that assumptions of his interlocutors are inconsistent in themselves or incompatible with some of their other claims (without him thus having necessarily an agenda of his own).⁷²

Discussing paradoxes today, we do not necessarily think of a particular opponent; but the main ideas of Zeno's paradoxes – to show a position to

⁷⁰ Heraclitus's paradoxes are meant as persuasion that consistent claims of the world only give us a surface impression, not its deep structure.

⁷¹ Cf. also Bobzien, 2015.

⁷² For example, Euthyphro's second attempt to give an account of piety as what is dear to the gods is refuted by what can be seen as showing this account to lead into a paradox:

1. Pious is what is dear to the gods.

2. The gods do not agree on what is dear to them; the same thing can be hated by some gods and loved by others.

Conclusion: the same thing is pious and not pious.

be inconsistent from within this position, and to show that this is the case for some of the most basic philosophical assumptions – is still the mark of a strong paradox.

Given that a good deal of philosophy does not deal with experiments nor proceeds in a way that would allow us to derive corrections immediately from the empirical realm (in the way we may do with our models in the sciences where we can, for example, test predictions deriving from our model), paradoxes are a central way of correcting our theories in philosophy. In this way paradoxes may be seen as a kind of *via negativa* – they do not positively tell us anything about our object of inquiry, but they do tell us that our current assumptions about our object are problematic – either because they are or at least seem to be⁷³ mutually inconsistent with each other.

Accordingly, paradoxes stop us in our usual investigations and force us to reconsider basic assumptions we hold about our object of investigation. In this way, they can act like an enzyme for further conceptual developments.⁷⁴ For example, in ancient times, Zeno's paradox of *topos* led Plato to spell out in his *Timaeus* why not everything that exists has to be in a place,⁷⁵ while it made Aristotle explicitly distinguish the different senses of *en* (“in”) in the Greek language. And Zeno's paradoxes of motion are employed by Aristotle in his *Physics* exactly in order to prove that a science of motion is possible that can avoid these paradoxes.⁷⁶ In this way Zeno can be seen a founder of philosophical paradoxes as a method, as a fruitful and essential corrective for philosophical investigation.

Ruhr-University Bochum
Universitätsstraße 150
44801 Bochum
Germany

73 In case something has gone wrong in our reasoning.

74 Also the Platonic Socrates does not use the word “paradox” for these occurrences, for example, what we call the “Meno paradox” Socrates calls an *eristikos logos*, 80e, an argument eager for strife.

Even if some paradoxes may never be solvable – our conceptual tools may always display some problems in our attempt to understand the world.

75 Cf. my space book manuscript, chapter 2.

76 Cf. Sattler forthcoming 2021.

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