Heraclitean Flux and Identity through Change

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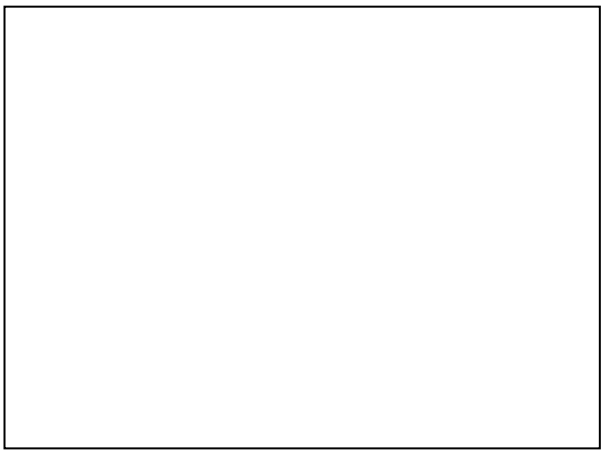

Gerald Keaney

School of History, Philosophy, Religion and Classics.

I hereby state that the following chapters are my original work.

Gerald Keaney

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Abstract

My thesis argues that there is a reading of Heraclitus' theory of flux that can be at least as closely associated with Heraclitus as its rivals, and is a reading of the theory as the first theory of how it is possible for an object to persist through change. Furthermore, in developing this account of persisting objects we find a reason why we should all be indexicalists. The thesis examines alternative readings of the theory of flux that were favoured in times past and suggests these positions, both historically and metaphysically problematic, have stood in the way of this use of the theory to understand persistence, and further that the use was not open to Heraclitus himself. In the preferred reading an idea of change as governed by principles we have come to associate with thermodynamics is combined with the idea that persistence through change requires opposition. The resulting theory can be shown to index properties to the state of an opposition at a given moment. Differences in this state can then be shown to be indexed to times.

As a result, properties are indexed to times, and further the theory of flux can be shown to give us an idea of an enduring whole presence. In this way, the basic assumptions of the theory of flux, ones that many will find appealing, give us a properties-to-times account of persistence. This is the indexicalist account of how it is that differences in an object's properties at different times (i.e. change) can nonetheless be compatible with the persisting object of commonsense. The problem is that we also believe that variation in properties give us different objects, and change does indeed give us a variation in properties, raising the disturbing suggestion that no single object can persist through change. In short, indexicalism claims that while an object possesses different properties, the properties are indexed to different times, and always are so indexed. The properties are in this way possessed invariantly, with the indexing being a form of qualification which allows that properties are not simply gained and lost. Against the various denials of persistence, and suggestions that persistence is a contradiction that have been associated with Heraclitus, I argue the indexicalists view is the proper outcome of the theory of flux.

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0: Introduction

It is hard to know what to expect of the Heraclitean theory of flux. In the following chapters we will encounter instances of writers who have believed that the theory fundamentally questions an assumption in dominant thought, namely that the world is stable. However, we will find those holding out such hopes for the theory also tell a dubious historical story about the origins of the theory, and the supposedly revolutionary metaphysics embodied in that story are unconvincing. Nevertheless, here I will argue that when the theory of flux is read along lines that are at least as historically plausible, if not more plausible, than has been popular in the past then we find some interesting ideas associated with Heraclitus. Ultimately I will argue we get a refreshing account of the subject matter long associated with the theory of flux: the persistence of objects through change. This, I will urge, mandates a view of persistence that already exists in contemporary metaphysics: 'indexicalism.'

An initial difficulty for such an analysis is that change, as the theory of flux is usually taken to be, arises when the same object is taken to be different across time. This suggests different bearers of incompatible properties, and so also numerical difference. Heraclitus is thought to have used the theory of flux to first explain the nature of the difficulty, if not account for it adequately. Those who have portrayed him as a revolutionary think he theorised that this sameness and difference are a contradiction we should embrace. Others think that he argued that there is no sameness to cause any puzzlement. More recently we find the version of the theory I will argue is metaphysically more promising. Scholars studying Heralcitus came to think of the theory of flux as a theory of transformation and opposition, an alternative history to older readings. Heraclitus is here concerned with the components of the difficulty arising from an analysis of change, for example how physical objects are the kinds of things to change. But as in older readings, we also find a justified expectation that the theory of flux is a more or less explicit preface to the discussion of the initial difficulty confronted when we analyse change.

The origins of Heraclitus' theory of flux are now two and a half millennia

distant. His fame ultimately rides on the fragmentary reports of those who read his book *On Nature*. Naturally, then, the theory has been variously interpreted. So if one wanted to use ancient Heraclitean fragments to understand change, perhaps all that we can expect is some kind of loose inspiration. In fact if the reader has does not think the material I uncover should not even be associated with the historical Heraclitus perhaps she should think of the project in exactly this way; very loose inspiration indeed. But I also make the stronger claim that certain more recent readings of the fragments are at least as plausible as long standing and influential readings of Heraclitus.

In thus developing Heraclitus' views I will follow a group of recent scholars who defied what I will present as a traditional reading of Heraclitus. We will find that many of these recent scholars, though not sharing everything in common, read Heraclitus as theorising that certain rules govern change in objects. My core concern in what follows is persistence: I try to describe how an object changes, where the result is not the creation of a new object, nor the destruction of the old. Instead the object continues to persist through the change.

This is in stark contrast to tradition where, for one reason or another, the object was taken not to persist: there was no continuing sameness. In fact a version of tradition I will associate with Cratylus but that is also a reading of Heraclitus is useful to set up the problem of change: it tells us identity requires sameness, while change requires difference, to conclude the object cannot persist through change. Today metaphysicians are still oft-times puzzled by the persisting object. We find such objects all around us. Objects can seemingly be discoloured or dyed, harden or soften, become cooler or hotter. Every ordinary physical object seems to go through some kind of change suitable to its nature, and all the while retains that nature, leading us to think of it as the same object. Today, too, there are various ways of dealing with this trouble: these are accounts of what I shall refer to as the Problem of Change.

The solution that, will I argue, is grounded by the theory of flux is the 'indexical' or 'properties to times' account of the Problem of Change. For as a view of the cosmos informed by conflict, I will argue that a post-traditional reading of the theory of flux can provide an argument to choose this account by relating properties to times in

an attempt to clear away the puzzlement. By taking the properties to be invariantly indexed to the times at which these are had, the general idea is that the sameness required for an object to persist is salvaged. This use of the theory of flux is original.

We will find that closest suggestion comes from Moravcsik (1983). He, however, does no more than argue that the theory of flux was headed in the direction needing an account of the Problem because it had thought objects were the kind of things to persist, but it never got to the stage where it had to have the account because Heraclitus did not recognise the logical notion of identity that is threatened when we can not have a single object persist through change. Today, because we use the logical notion of identity with ease, this distinction between objects as the kind of things that persist through change, and the persistence of a single object is otiose. As soon as we consider if objects are the kind of things to persist through change we automatically consider the identity of a single persisting object. It must be kept in mind though, that to follow the claim that I am putting the theory of flux to a new use in providing an account of The Problem of Change, I cannot assume that Heraclitus also, in considering how objects we the kind of things to last through change, then shifted his attention to single persisting objects as we do.

To get to the account grounded by the theory of flux let me consider some methodological themes in the order these will concern me in the chapters that follow. Primary is the direction I will move in as a result of an interest in thermodynamics. I believe that against some of the less convincing and less comprehensible ways that change is 'affirmed' by philosophers who present themselves as radicals in some way (including Trotsky, Lenin and even Hegel, at least when he was younger), a clear and scientifically respectable way of emphasising the role of change is to be found in the study of thermodynamics (here we find more scientifically-orientated thinkers like Davies, Stengers and Prigogine). Phenomenally – that is if we consider the kind of phenomena Heraclitus himself could have observed and the first area of 19th century research into thermodynamics, the variables encountered in thermodynamics are associated with macroscopic objects. But today thermodynamics can also offer a statistical explanation of why such objects will tend to change. In a low entropy state there are proportionally more alternative states of higher entropy than lower, so

variation culminating in states of higher entropy is more probable.

As I will mention in the first section of Chapter One, 'diachronic difference' is required for persistence. In this section I also mention that while the alternative stance has often used Heraclitus as a figurehead by which to promote obscure affirmations of change, more recently he has been thought of as having a precocious grasp of the principles integral to thermodynamics. So I take up this more promising reading, which will lead me to concentrate on Wiggins' reading of Heraclitus in which the association with thermodynamics is at its most explicit. To trace the origins of interpretations of Heraclitus, as well as to argue out important incongruities in the recent scholars concerned with thermodynamics, I will refer to different stories about Heraclitus in terms of the author using the possessive: 'Wiggins' Heraclitus,' 'Popper's Heraclitus' and so on. To be able to follow the more recent scholars I have also accepted background material Wiggins more or less takes for granted and that is contentious.

0.1: Background Assumptions

Some would consider it naïve to think we have enough agreement over the changing object in the theory of flux for the theory to develop it for contemporary metaphysical use. We can then hardly claim use the theory of flux except perhaps in a very loose sense already mentioned. Heraclitus just lived too long ago, his work was not adequately preserved. Barnes (1979) tells us "Heraclitus attracts exegetes as an empty jampot wasps".[1] Marx had a great deal of respect for Hegel, but he found Hegel's reading of Heraclitus implausible. Marx too had concluded that it was a difficult thing indeed to make sense of Heraclitus.[2]

I will come back to Barnes' remark shortly, but note that classical scholarship since Marx's time have created an alternative to the traditional reading of Heraclitus Marx found in Hegel. This tradition had Heraclitus deny persistence and it often associated him with contradiction. The tradition still has adherents for example

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[1] Barnes (1979) p.57.

[2] See the opening remarks of Marx (1922).

Richardson (1994) and Barnes himself, and it heavily informed the dialectical materialist reading, an understanding of Heraclitus made popular, especially by Lenin. But a group of recent scholars has moved away from the tradition and its outgrowth. It is the points of agreement among them that I will use to reconstruct the theory of flux as it at least equally plausibly existed, and in a way that puts ideas associated with Heraclitus since the demise of the tradition to ongoing metaphysical use. This permits, even invites, a metaphysical investigation of the theory of flux, one that is overdue and is the project of this thesis.

One reason I think this post-traditional story can be associated with Heraclitus is that the agreement concerns certain themes in the readership that allow us to narrow down what, on a reading that rejects tradition, Heraclitus might have said if he was coherent. One such theme is the idea that Heraclitus responded to the Milesians rather than Parmendides, and it is to set the stage for the reading of the theory of flux itself that I examine the Milesians in the second section of Chapter One. There I will argue attempts to paint Heraclitus as a mythmaker are comparatively unwieldy and implausible. Even the arch-traditionalist Hegel remarked: "The child has no rationality, but does have the real capacity of becoming rational."[3] More recent scholars can agree with Hegel at least in so far as he gives us a point of comparison between the development of a child and that of philosophy. Ideas can be associated with Heraclitus and the theory of flux to trace a vital step in the growing process we can find in the history of philosophy as we know it.

The commentators I will prefer here have approached Heraclitus and his predecessors as philosophers engaging argumentatively with one another. There is a certain appeal to doing so. We might adopt a Davidsonian insistence that under conditions of radical interpretation, where we are among unfamiliar beings without shared language or customs, the charity to assume those you are interpreting are rational is needed to free translation from insurmountable difficulties. But even assuming (as does seem plausible) overall progress in the history of philosophy, it does not follow from Davidsonian charity that the Heraclitean fragments have to be taken seriously

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[3] Hegel (1987) [1831] p.133.

philosophically. Philosophers are not always rational; that was the point of the comparison with the development of a child. Certainly philosophical advances were made over the centuries, but these could have been made by thinkers other than those examined here. But here it is enough to find ideas around Heraclitus as an early figure, ideas that can be put to use today.

I am not suggesting the association is no more than wild speculation. Though daunting, the conditions of interpreting the fragments are less radical than we find in the example of the unfamiliar beings since we can at least translate ancient Greek and know of ancient Greek customs. I will follow the use of Heraclitus' Milesian heritage to set parameters in place, guiding what those who accept the parameters could plausibly claim about the theory of flux. And if he responds as a philosopher to Milesian concerns (also understood philosophically) then despite his early date Heraclitus is not another mythographer like Hesiod. The *Theogony*, with its personifications of natural forces, is certainly mythical.

Admittedly Hesiod could seem close to early philosophy in attempting to explain the origins of the cosmos. The void produces the world. This is a mythical idea since for Hesiod it is part of the story of the origins of the various personifications: gods, goddesses and superhuman figures. It is also mystical in that, as the choice of originating principle suggests, there are no arguments offered as to why the void is an originating source. Hesiod was not as keen to argue his point as it seems Parmenides was keen to do. Heraclitus has been read as similarly mystical, yet this is at odds with the coherent well-grounded story post-traditional commentators such as Wiggins tell us about Heraclitus. Against the excess of readings that Barnes finds so daunting there is a credible and marked out path.

Another problem could be raised against this approach. If the theory of flux played the role I have attributed to it of describing how objects are the type of thing that can persist through change, and a plausible idea of the theory in part came about because later thinkers recognised the contribution Heraclitus made, we would be entitled to ask why the theory has not been developed logically already. Since Aristotle and even before, philosophers have been using logic and pondering on how an object made

different by change can be thought of as having persisted through that change. We might expect any consequences of the theory of flux has for such thought would already have been explored. The theory would have played its part in the history of ideas. How can it be that only now and apparently for the first time that the consequences of the theory are properly forwarded for constructive consideration?

"Aristotle was interested in his predecessors," Cherniss (1964) has written, "not as an historian, but as a philosopher."[4] Cherniss is gesturing at the idea that Aristotle was more concerned with his own arguments than historical facts. Sometimes Aristotle was more concerned to use earlier writers to illustrate his positions, or as foils, rather than to give a faithful rendition of their ideas. I will suggest, in part, the distortions that came out of Aristotle in particular, and the tradition generally, deflected more serious interest in the theory of flux. If it is true as I will follow readers suggesting that Heraclitus himself did not explicitly recognize logical notions, then it makes sense to I think Heraclitus never had a chance to be part of a more sophisticated, deliberately logical treatment of what we also find such readers holding to be his central concern. This is objects as the kind of things that persist through change. So I will exercise some care when taking up Aristotelian sources, using these to clarify ideas that were of interest to Aristotle, rather than as historical evidence.

If thus approaching Heraclitus' relations to Milesian philosophy is an instance of siding with those who have rejected tradition in order to limit the number of interpretations I will consider it is not the only one. Before I deal with the theory of flux in earnest, then, I consider tradition and its problems in the first section of Chapter Two. Rejection of tradition in favour of more recent scholarship involves accepting that knowledge of the past can be incongruous. It was the amount of time that had passed that had made knowledge of the past difficult to obtain in the first place, and yet the greater amount of time that has passed can, as I am suggesting for Heraclitus, also allow our insights into the past to grow. The incongruity arises when, as time passes the community of scholars gains an increasingly close understanding of the evidence, and, indeed, of their own methods of inquiry. This leads me onto the second section of

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[4] Cherniss (1964) p.22.

Chapter Two where I deal with Wiggins' reading.

0.2: The Theory of Flux

The theory of flux became famous when philosophy was first coming to terms with the puzzles sometimes presented when everyday concepts are examined thoroughly. Change is concept we use to understand many types of vital facts from seasons to growth and aging. Since the time of Heraclitus, and particularly in more recent times, philosophers have proposed a number of ways of deal with how it is that change can involve the same object being different. But as much as in Heraclitus' day we reach for arguments to support proposals that go beyond our familiar understandings, including of change. It was by offering this that the theory of flux was important to Heraclitus. By seeking to prove that the theory is capable of the same task in the milieu of today's focussed attempts to deal not just with the components of the difficulty, but the difficulty in its entirety, I seek to prove it can be just as important today. Can we assume, though, continuity here? That is can we assume we are dealing with the same basic theory two and a half thousand years later?

The answer is yes only in so far as a number of commentators have plausibly agreed on the basics in question. To begin, Barnes himself admits that the confusing swarm of ideas surrounding Heraclitus is due to a diversity of viewpoints in the readership: eschatological, heresiarchical, Stoic. Each type of readership ferreted out the Heraclitean material it required. Yet few enough of these projects directly concern the theory of flux. There are in fact many topics in Heraclitus' corpus that can arguably be avoided, or mostly avoided, when discussing flux as I wish to discuss it: a saying Heraclitus penned on his door, pantheism and panpsychism which can even come out of reading Heraclitus to take the Laws of Thermodynamics as divine decrees.[5] These issues have limited if any relevance in what follows. So another way in which it is possible to plausibly focus on some readings of Heraclitus at the expense of others is through a concentration on the subject matter of the theory of flux, something I follow Wiggins to undertake in the second section of Chapter Two. And indeed for the reason that the

[5] Though I do touch on this in Chapter Two.

diversity of interest in Heraclitus has attracted a diversity of interpretation, a page after his statement about the wasps and the jam pot Barnes admits "the filth of the Heraclitean stables has perhaps been exaggerated."

But what of the subtleties of translation, the grouping of fragments,[6] and also the correlation of historical facts are relevant to the theory of flux? Aiming to use the theory of flux metaphysically I do not delve into these questions deeply, but again all I am proposing is a reading that has to at least match and hopefully better the degree of plausibility of the often slimly supported assumptions of tradition (e.g. that we believe Heraclitus responded Parmenides as their views are incompatible). I claim only that it is quite possible that Heraclitus had a theory about how objects are the kind of things that persist through change, if not on the individual persisting objects. Then I hope to fuse contemporary metaphysics with the ancient analysis of permanency and change recently associated with Heraclitus. I can do this because of the agreement I find among those who have defied tradition.

Agreement fills out the story of the theory with detail that should be coherent, and that explains more of the historical evidence than if we concentrated only on a single post-traditional reader. The result can then compete with the tradition. Where there is agreement lacking what should, for the sake of coherency, be present, I can point this out. But I can not claim that in itself agreement proves that the post-traditionalists are right, or disproves any of the various traditional readings (as differ among themselves, Cratylus' from Plato's, Plato's from Aristotle's, Aristotle's from Hegel's, Barnes' from Hegel's). I can argue the post-traditionalist reading makes as much sense of history and the fragments as the material upon which tradition relies.

I also draw out disagreements exhibited by others who also have rejected tradition with positions I find in Wiggins and other scholars close to him. I argue some of this is easy to reconcile with Wiggins' explicitly thermodynamically-themed reading of the theory of flux (for example, Popper's reading of the theory), but some moves away from an emphasis on change altogether, making it thoroughly incompatible with

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6 For a respected recent starting point for some of these kind of questions see Marcovich (1966).

the thermodynamic theme. For example, if the younger Kirk's Heraclitean theory is one of 'flux', it is by historical convention only. In all cases I can only argue that a reading along Wiggins' lines is coherent and viable, and that it therefore holds its place in the field of available scholarship. Tradition still provides an accessible way for scholars to explore the idea of unmitigated instability (for example Richardson), and has influenced popularised reading of flux (for instance Lenin's), so the traditionalist is an opponent who must be reckoned with.

In order to carry out the task of competing with tradition, I have stuck with Burnet's rendition of the fragments. It is true the material I have presented through Burnet's translations may not be grouped in the same way by all commentators, nor rendered in a way that matches Burnet's translation *verbatim*.[7] The reason I use Burnet's fragments is that, as I shall most comprehensively argue in the first section of Chapter Three, he is crucial in the break from tradition and so these were an influential starting point for the community of recent scholars that interest me. Discussion of Heraclitus in terms of Burnet's translations of these fragments can then serve in my discussion of the commonalities between recent scholars. The same applies to the extent of my use of Burnet's interpretations when discussing the Milesians. These remain useful to explore the starting points for the further agreement between the new readership of interest to this project. My aim is not nuanced classical scholarship, but to document a comparatively plausible reading of Heraclitus in order to draw a metaphysical lesson from it.

This is how I shall uncover a theory about transformation and opposition. While the details of this reading of the theory if flux have to wait, it is already possible to imagine how this might assist in both understanding and accounting for the Problem of Change. If an object can transform then perhaps it can be the same one thing while also undergoing difference. If some how the opposite qualities or properties we might assume are needed for difference can be untied, then too, we might imagine it could persist. If we combine the transformation and opposition we get an idea of the reading of the theory of flux that interests me: somehow a transformative single substance is

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[7] Barnes (1988) p.100 notes the importance of how the fragments are grouped to interpretation.

able to take on the different opposed qualities and yet remain the same, and somehow this can tell us how a single object can persist through change qua that object.

0.3: The Doctrine of the Unity of Opposites.

"The theorisation of opposition" will shown to be often read as older than that of transformation, and inherited by Heraclitus from a figure that may well have been a mentor, Anaximander. In the readings I shall be most interested in, Heraclitus agreed with Anaximander that change could be understood in terms of opposition, but he felt the need to work backwards and offer an alternative explanation of the origin of these oppositions; theorizing a transformative substance as just mentioned. We can take the details how the oppositions are at work in a changing object to be separate to the theory of transformative substance proper. The split between description of oppositions and the theory of flux proper is found *mutatis mutandis* even in readings I do not follow. Also generalised is a naming of the treatment of oppositions in change itself as The Doctrine of the Unity of Opposites. It is this doctrine that I will argue can be adapted to understand and provide the basics of an account of the Problem of Change.

Burnet's reading of Heraclitus raises the question of the position of The Doctrine of the Unity of Opposites in his overall account. This is because for Burnet the theory of flux is derived from this Doctrine, whereas I shall argue the derivation proceeds back in the other direction. Here is an example where post-traditional agreement can be lacking that should, for the sake of coherency be present. I shall, when examining Burnet's work, argue that if you reject tradition it makes more sense to derive The Doctrine of the Unity of Opposites from the theory of flux. To carry out the derivation the second section of Chapter Three again relies on Wiggins, this time in order to gives us an idea of what Heraclitus thought about issues that will prove crucial to understanding persistence: properties, opposition and time.

The Doctrine of the Unity of Opposites also raises a methodological point similar to that we found raised by Barnes' image of the wasps. I will indicate how it is useful to divide Doctrine of the Unity of Opposites into narrow and wider versions. This is plausible because while the narrow Doctrine tells us how physical objects as a type of

thing persist, Heraclitus had more catholic interests, and so the wider Doctrine of the Unity of Opposites tells us how opposites interact to give us persistence in objects of a certain type.

Granted this approach to Heraclitus, the wider Doctrine of the Unity of Opposites plausibly can be read as giving us subgroups of objects in which persistence occurs in different ways as a result of oppositions. Fr (51a) reads "Oxen are happy when they find bitter vetches to eat" and fr.52. I will take the point to be that a comparatively large amount of bitterness is conducive to the persistence of the oxen. Less of a quality will be found to mean more of its opposite, and outside certain parameters the wider Doctrine of the Unity of Opposites tells us what balance of opposites is needed for the persistence of certain kinds of objects. In this case sweetness is not deemed conducive to the persistence of oxen. Variant interpretations of the wider Doctrine of the Unity of Opposites may also have added to the impression the "Heraclitean stables" are filthy, but I can avoid the muck. Wider instances are only important to me as examples of the way the narrow Doctrine of the Unity of Opposites works; I will not take up the question of whether the examples are exactly those of the historical Heraclitus.

0.4: Indexicalism

Indexicalism is a theory of persistence that requires whole presence. To begin to understand whole presence, we might consider a popular rival way of reconciling the sameness and difference we find in change, which when I discuss it, I will do so under the heading of 'four-dimensionalism.' Objects are understood as instantaneous parts or stages, somewhat similarly to the sameness-denying Heraclitus for whom nothing persist beyond an instant, but with the important divergence that sameness is salvaged in the relationship these parts or stages have to one another. We find here an example of the defiance of commonplace intuitions around persistence: folk psychology does not usually think of, for example, persisting selves as a series of parts or stages, but as a wholly present entity wherever and whenever we find that self. So, indexicalism, by denying there are any such parts and stages, and saving sameness by indexing the same properties to the same times, also has some appeal as an account of The Problem of Change. I shall argue in what follows that read as a theory of transformation explaining

the action of oppositions described in the Doctrine of the Unity of Opposites, the theory of flux is not just an analysis of objects as the kind of things that change, but gives us a reason to believe in the whole presence of advocated by the indexicalist position on persistence.

So will we come, via the Doctrine of the Unity of Opposites, to the application of Heraclitean ideas to The Problem of Change. This Problem is laid out in detail in section one of Chapter Four. We find in section two that Heraclitus has already been assigned an inconsistent account of the Problem by Popper. I will argue however that Popper's reading of the Doctrine of the Unity of Opposites that underlies his view is another example of a less plausible historical story about Heraclitus giving us an unconvincing metaphysic, as well as lacking the coherency that makes for a competitive post-traditional reading. To Popper's credit, he differs from similar popularist interpretations of Heraclitus in that he at least argues for his reading. As well he abstains from making grandiose claims about how a dubious metaphysical position can successfully contest all philosophical notions of stability. Lenin again comes to mind, while Trotsky additionally exemplifies the statement about dubious metaphysical positions.

The third section of the chapter offers us a range of accounts of the Problem more popular in today's metaphysical circles. It argues using the ideas of objecthood and time coming out of a post-traditional reading of The Doctrine of the Unity of Opposites mandates belief in one of the more mainstream accounts of the Problem of Change, namely indexicalism. All that remains from here is to defend indexicalism against the contemporary metaphysical arguments against it, which I do in Chapter Five, before then concluding that we should indeed accept indexicalism.

While both the recognition that there is a viable alternative to traditional reading so Heraclitus and that indexicalism can be defended are important, the original component of the work that follows is the idea that the theory of flux can provide an argument for indexicalism. As I shall mention in Chapter Four and to a lesser extent in Chapter Five, any argument that one of the accounts of the Problem of Change is mandatory is hard to find. Consequently, an argument for indexicalism makes it

attractive, in addition to the fact it is the kind of folk friendly account we want to believe.

0.5: The Chapters

Chapter One begins with a type of thinking I will describe as an 'alternative stance' in philosophy thought to be founded by Heraclitus, and that emphasies change over stability. It argues that the most promising component of this stance is concerned with thermodynamics, and points out that there is a post-traditional trend towards assigning Heraclitus basic thermodynamic principles. The second section of the chapter argues that Thales was the first philosopher, and looks at why the Milesian came to regard change as random. This paves the way to follow recent scholars who find Heraclitus laying down guidelines governing how physical objects as a type of thing persist through change (i.e. we could contrast this with Plato's view that abstract objects are not the type of thing to persist through change).

Chapter Two briefly characterises the traditional reading of Heraclitus. To explore the recent scholarship that reacted against this tradition, the section takes up Wiggins' arguments about the use Heraclitus made of his Milesian inheritance. I argue Wiggins' story is comparatively plausible, including his insistence that Heraclitus did not explicitly recognise logical notions. I cohere a number of readers of Heraclitus around Wiggins, showing these people provide independent argument for the plausibility of Wiggins' reading of the fragments, as well as filling in some details. By depending on some well established ideas found in thermodynamics I observe that the resulting reading is, at first blush, metaphysically capable of understanding how objects are the kind of things that can persist through change. If the theory of flux can understand persistence, it could be used to argue for an account of persistence.

Chapter Three examines Burnet's break with tradition. Here I agree with Popper that the Doctrine of the Unity of Opposites should be derived from the theory of flux. The chapter then uses The Doctrine of the Unity of Opposites to focus attention on how, once Heraclitus is thought to be concerned with objects as the type of thing that persist through change, these do in fact persist. This permits a flux-theoretic

understanding of Aristotle's standard definition of the form of change through which an object persists. This is alteration, though again the preferred reading I prefer does not link Heraclitus directly with the Problem of Change arising when alteration takes place. We do however encounter the Heraclitean idea of opposition, property, object and time, crucial for the coming argument.

Chapter Four sets out the logical problem that arises when we claim that individual objects persist through change. The second section of this chapter follows the account of the problem that Popper argues was favoured by Heraclitus. It argues Popper's suggestion needs further metaphysical work to be of greater interest and that he loses the train of his own attempt to associate ideas with Heraclitus. The central section of the chapter deals with the different rival accounts of the Problem of Change popular today. The last section of this chapter uses the theory of flux to argue for indexicalism or a 'properties to times' account. It does this by showing the transitive nature of the indexing relation, as well as the whole presence that suggests indexicalism can be taken from the ideas of opposition, found in Chapter Three.

Chapter 5 defends indexicalism. There are a number of difficulties with indexicalism, one of the best known being that properties are not possessed by an object 'simpliciter' but in relation to times. There is also the question of how it handles issues besides persistence, vagueness in particular. I will argue that the account is coherent, and that the apparent disadvantages of the account can be overcome.

I conclude that we should all be indexicalists, and that since on the way to that conclusion thermodynamics proved important, we should take seriously the implications for our idea of how objects we care about persist. These objects could include people and societies. Finally I note that we should examine the ramifications of indexicalism both along the same lines and in metaphysics more broadly.

Chapter 1: Before and After Heraclitus

> When I was a child I spoke like a child, I thought like a child, I reasoned like a child: when I became an adult, I put an end to my childish ways.
>
> 1 Corinthians 13.11

Plato, when reflecting in the *Theaetetus* on those writers who had come before him, found Homer and other poets concerned with change.[1] Understandably, Plato contrasted these authors with the later philosophers who broke from the mythical and story-telling tradition, and who theorised great stabilities of world and mind. Plato also found by way of examination of the thinkers who had come before him, and whose problems he set out to solve, a philosophical stance that he attributed to the story-tellers that theorised the importance of change. For Plato, Heraclitus came to represent the problematic adoption by philosophy of what was once the subject matter of poems. In Hesiod we find stories of the birth of the Gods and the relation these mythical figures have to seasonal changes and change involving the human life cycle. In Heraclitus, I will suggest, we find the idea that objects are just the type of things that persist through change.

The first section of this chapter will indicate that we can associate Heraclitus with a stubborn problematic from Milesian philosophy, and that thus reading him can be of value to contemporary philosophy. The second section of this chapter will show that, try as they might, the Milesian philosophers just could not recognize change as the fit subject for theory. Though of course Heraclitus had to have forbears before he had followers, it is to relevance of the Heraclitean legacy that I now turn. This is to provide a preliminary outline of why it is important to investigate Heraclitean ideas of persistence.

1.1: Heraclitus and an Alternative Stance in Philosophy

The remnants of Plato's attitude to Heraclitus and his ilk can still be found. In the 20th century Russell (1984) [1945] differentiated them from a mainstream philosophy that was

[1] McDowell (1973) 152e5, p.17.

uncomfortable with Heraclitean ideas, and that in response sought a return to stability.[2] He gestured toward an ongoing conflict within western philosophy between a mainstream emphasizing stability on the one hand, and an alternative stance of thinking emphasizing change on the other. Heraclitus' fr. 83 gives an indicator of a change-orientated approach: "It rests by changing." Here I will argue this alternative stance can use Heraclitean thought to argue for an account of how an object persists that it might call its own.

Like Russell, Grey (1987) also discerns:

> two fundamentally opposed stances in the history of philosophy...reaching back...to (the usual) Greek origins...On the one hand there is the conviction that truth and reality reside in stable and immutable forms...On the other hand there is the conviction that reality is ceaseless flux, change and decay — the tradition exemplified in the philosophy of Heraclitus.[3]

The stance emphasizing stability is typically associated with the influential Parmenides. Such thinkers may not cite the direct influence of Heraclitus; it would be enough if they could be argued to have championed the importance of the idea of change to solving philosophical problems. Hegel did claim to use Heraclitus as the basis for a dynamic alternative to the over-stressing of conceptual stability he discerned in Enlightenment thinking.[4] He then rather grandiosely announced: "Here we see land. There is no proposition of Heraclitus I have not adopted in my Logic."[5]

Trotsky (1942) believed that he could reject Hegel's idealism and keep thought that was "related to vulgar thinking in the same way that a motion picture is related to a still photograph." This line of thinking is associated with the term 'dialectical materialism.' It is influenced by Hegel's reading of Heraclitus, one that I will argue lacks historical plausibility and attributes Parmenidean concerns to Heraclitus. Dialectical materialism is even less plausible as metaphysics, also making unargued claims such as

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[2] Russell (1984) [1945] pp.64-65.

[3] Grey (1987) section 1.

[4] Hegel (1987) pp. 46-49.

[5] Hegel (1955) [1831] p.279.

there is no stillness, all things are really one (a Parmenidean concern), and that there are many real life contradictions,[6] all alongside the claim Heraclitus pioneered these ideas.[7]

I will have cause to mention some theorists who have also argued for the existence of real life contradictions (prominently Priest (1987) and Mortensen (2005)). But these theorists at best provide belated argument for one or two of the contradictions adduced by the dialectical materialists, and in no way rehabilitate the dialectical materialist reading of Heraclitus. I will argue here instead for a different consistent reading of Heraclitus that yields better metaphysical results. This will prove to be in keeping with a more promising direction in the philosophical stance that emphasizes change.

Davies (1989) is an example of this more promising direction. He sympathetically discusses various philosophies emphasizing change, including dialectical materialism, but his interests lie in the changing cosmos uncovered by the study of thermodynamics. Likewise Prigogine and Stengers (1984) have applied the idea that objects have a tendency to change they found in thermodynamics to a host of areas in philosophy including the idea of personhood. This will resonate with Wiggins' reading of Heraclitus to be examined next chapter. Gleick's (1998) *Chaos*, also uses smaller changes to understand changes in larger systems in the context of thermodynamics, another theme to be found in Wiggins and allied commentators on Heraclitus. And Stewart's (1992) *Does God Play Dice* pursues similar ideas. Indeed Burkett and Foster (2006) have argued early ideas of thermodynamics had a profound influence on Marx, who though supposedly highly influential on dialectical materialism, has never been shown to argue for or endorse cosmic oneness, the non-existence of stillness or many of the real life contradictions later proclaimed by dialectical materialism. Marx also doubted Hegel's

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6 Mortensen (2002) section 5.

7 Also Lenin (2005) [1916]. See Lichtenstein (2007) essay 1 for criticism of the denial of stillness and 8.2 for partial criticism of the dialectical materialist's many real life contradictions. Lichtenstein does not, however, doubt the historical veracity of the dialectical materialist Heraclitus. In reading Heraclitus it is relevant that Kirk, Raven and Scholfield (1983) p.194 criticize the 'no stillness' claim. Deadlocks of still matter are not ruled out if the motion can be in opposed directions, even if matter tends to be in motion. Argument against stillness is found in some readings of Heraclitus that I will suggest have merit, notably Burnet's and Popper's (handled in Chapters Three and Four respectively). The issue will prove largely peripheral to me.

reading of Heraclitus in a letter to Lassalle, another commentator on Heraclitus,[8] gesturing towards a more fruitful reading of the Heraclitean fragments.

Perhaps it is possible to hold both dialectical materialism and embrace the idea coming out of the study of thermodynamics, but my point is one about perspective and direction. All of the thinkers mentioned in the last paragraph have used the theory of thermodynamics to provide an emphasis on change, and have thus been able to provide a viable alternative to thinking that neglects change. Thermodynamics examines the tendency ordinary physical objects have to change, as well as the conditions under which these might persist through change. The immense number of different states available to an object means the tendency is for irreversible change; it is increasingly extremely unlikely that the object return to an original single state. However not all the changes render the object homogenous with its environment, thus not all require that object be obliterated. Thermodynamics begun by dealing with the stable phenomenon of commonsense including objects, though because statistically it postulates that a zero change in entropy is extremely unlikely it found objects have a very strong propensity to change. Nevertheless by allowing there can be stability in the entropy of a non-closed system if energy comes in from the outside, thermodynamics permits ongoing difference between an object and its environment.

The aim of the writers mentioned as interested in using thermodynamics to emphasize change is to get a new perspective on old philosophical questions, including questions around social issues, personality, selfhood and determinism. It is true these 'alternative' thinkers do not all explicitly rely upon Heraclitus. Davies (1989) does not acknowledge Heraclitus despite an apparently Heraclitean claim: "Anyone who has stood by a fast flowing stream cannot fail to have been struck by the endlessly shifting pattern of eddies and swirls."[9] But despite this, we have a productive strand of thinking in which Heraclitus may not simply be a figurehead, but a thinker whose ideas are of ongoing relevance. As well, faced with Hegel's unattractive reading, we can insist Heraclitus can be understood more productively and that an emphasis on change can yield better results than we find in unsubstantiated claims about contradiction and omnipresent motion.

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[8] For Marx and thermodynamics see Burkett and Foster (2006). Marx (1922) doubts Hegel's Heraclitus.

[9] Davies (1989) p.72. We will encounter the famous river fragment of Heraclitus shortly.

In fact in this way we find the possibility of a return to Heraclitus. Parmenides and his Eleatic school held change to be illusion. Platonism thought that what was really real was an unchanging heavenly world. Both were inspired by the Problem of Change (section 2 chapter 2 has more detail). If we grant the theory of flux had dealt with the Problem of Change in some way, even if primitively or by doing no more than laying out the rudiments of it, that means that Plato at the very least, and probably Parmenides (if he was indeed after Heraclitus), did not feel the theory of flux or anything else on offer at the time could account the difficulty. And this is understandable; at least if we consider traditional reading we would want some solid arguments if we were to deny persistence, and we will find these alack. So this pair retreated from change altogether.

Since Plato's time there have been various accounts of the Problem of Change, yet, it seems, not before suspicion of change had attained somewhat mainstream status. The influence of Plato was alone was capable of creating the impression, uncomfortable to some, that not just Western Philosophy but Western thought including scientific thought shied from change. But those who through thermodynamics affirm the importance of change also offer us the completion of a grand historical circle. If Heraclitus read along lines of their interests can give us an account of the Problem of Change, and I think he can, then their historical foundations are all the more secure. Certainly more than if we take the theory of flux to deny persistence or promote contradiction as some of the alternative thinkers above have done (Hegel and Trotsky are respective examples).

What then is change? We can talk about a landscape changing as we travel along it since we experience different features, the temperature changes as we hike up a mountain. This is actually 'synchronic' difference, the difference across a snapshot of a spatially extended area at a single time, and would be required to discern an object within that space. It is not today known to present us with any great conceptual difficulties. Parmenides did have a problem with this kind of difference (dealt with in section 1 of the next chapter), but for my part I will treat synchronic difference as unproblematic.

Frequently we also talk about changes over time, not just between places. This is 'diachronic' difference or what we term 'change'. It is synchronic difference across time

and it is this that raises The Problem of change since unlike in the case of synchronic difference, a single given object can be subject to diachronic difference, raising the difficulty of how that object might also preserve its sameness. We can initially define change as follows: for any x, x has undergone diachronic difference iff some predicate P applies to x at some time but not at another. This gives us what are called 'Cambridge changes'. So if a cow is thin at some time but not thin at another, under this definition of change the cow has changed. The problem of course is that such a definition admits changes that do not seem real. If a mouse squeaks at time t_1 then at t_1 the Andromeda Galaxy is two million light years from the squeak, while at t_2 this may be false since the mouse may no longer be squeaking. But the galaxy has undergone no real change and in this way our intuitions are offended. Such change is disparagingly described as *mere* Cambridge change.

A more intuitively recognizable form of change can be understood by restricting P to predicates describing the intrinsic properties of an object. It has been argued that this intuition has a causal basis.[10] Properties are 'intrinsic' just if these involve no relevance to any other object, and where lost or gained these are termed 'temporary intrinsics.'[11] Distinguishing these changes then gives urgency to a certain problem,[12] and one that is sometimes thought to have first been stated by Heraclitus. It is easy to suggest that, not only concerned with change, Heraclitus also accepted that object-identity required sameness or no difference in property, yet change requires difference in some relevant intrinsic property. Without such a difference we do not have change. So Heraclitus believed that no object can persist through change. With changes happening moment to moment the startling conclusion was that no object ever persisted; all last but a moment. A reason this view of Heraclitus is tempting is that it results from an apparently sound argument, albeit one I will suggest next chapter is more convincingly associated with Cratylus, a student or follower of Heraclitus. No matter who first had this idea, here we have a sketch of Problem of Change.

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[10] Mellor (1998) p.87ff.

[11] Mortensen (2002) section 2.

[12] *Ibid*, section 5. The problem that will now be outlined has been argued to arise even in the case of mere Cambridge changes (Rodriguez-Pereyra (2003) p.192ff.), but I will restrict myself to the problem as arising out of temporary intrinsics. Here the problem is more urgent, pertaining as it does to an intuitively recognizable form of change. Further the indexicalist account of the problem for which I argue will not be accepted unless it can be shown to apply to temporary intrinsics, as will become clearer in Chapter Five.

It is a problem that we must account for if we do want to say a changing object persists and so does not lose its identity after an instant. Surely an animal fattened up by a farmer persists. As a person I believe I persist, at least between birth and death. It seems commonsensical that rocks persist through changes such as erosion, and most people would probably want to claim rivers persist; many people would believe that even a fire persists between the time of its ignition and when it is doused. Unless objects in general can persist, it would be difficult to explain how galaxies, societies or persons as objects, or as composed of objects, could be fruitfully understood *qua* changing things. My suggestion in the pages that follow is that Heraclitus did not first state this problem, but that he can help us account for it.

The subject of discussion here is everyday changes, those to ordinary objects capable of losing or gaining a property in ordinary physical ways. In the past the name of Heraclitus, besides where used to set out the Problem, hindered rather than assisted the discussion of everyday change. Traditionally, since Plato if not before, Heraclitus was invoked to deny an answer to this Problem or obscure it with contradictions, as the first section of the next chapter will discuss. Hegel was part of this tradition, and the use of his reading of Heraclitus by dialectical materialists postulating various contradictions and a cosmos of non-stop motion will be shown to not to reach the same conclusions as tradition, but it carries on the obfuscation. By contrast, those emphasizing change through a concern with thermodynamics not only could have in Heraclitus a founding father in line with their theoretical approach, but, I will argue, an account of everyday changes any thinker challenged by someone like Cratylus will find of interest.

Despite thus being critical of Hegel's reading of Heraclitus, it would be incongruous for me to dismiss Hegel's method. I shall show Hegel deriving the idea of 'Becoming' from Heraclitus (in both his works on logic (Hegel (1991) [1817] and Hegel (1999) [1812]). Becoming was Hegel's own starting point and I see no problem with employing a theme here: we might say that an emphasis on change seeks to use the thought of change to stimulate change in thought. [13] For this we can, in fact must, return to ideas found in the discussion of the first philosopher to embrace change by

[13] Hegel (1955) [1831] pp.283ff.

understanding physical objects as the kind of things that change in certain ways — although we will find for Hegel's Heraclitus objects do not persist through changes.

Let us consider an example of a different reading to Hegel's and the dialectical materialists. Heraclitus thinks objects could persist under certain conditions, and though mentioning oppositions, does not obviously invoke contradictions. In Fr.104 we find "…. It is sickness that makes health pleasant; evil, good; hunger, plenty; weariness, rest." On one plausible reading, at least, this may be understood as claiming that I enjoy health as a contrast to my being sick, I enjoy rest as a contrast to weariness, etc. Thus we find various objects (including people) apparently surviving changes. Note here as well, though, that Heraclitus does not specifically mention any individual objects. In fr.104 he tells us about the types of change a person might undergo and still be, or at least feel, robust and capable of continuing persistence.

This is enough. If Heraclitus can tell us not just about the kind of changes through which certain sorts of objects might persist, but also why objects are just the kinds of things that can persist through changes, then we would have an understanding of persistence we could develop. So Heraclitus' understanding of all physical objects, I will argue, can give us grounds for preferring an account of the Problem of Change.

As a starting point in this project, the theory of 'flux' is the place to find a Heraclitean understanding of how physical objects are the type of things that persist through change. The theory has always been read as expressing a core Heraclitean concern. 'Flux' has been the catchphrase to describe Heraclitean theories of change since the time of Plato. 'Flux' is typically defined as "the action or process of flowing." Etymology informs us the Latin derivation is *fluxus*, a flowing, including of solid objects, in turn derived from the infinitive *fluere* "to flow." It is usually applied to water and other liquids.[14] Of course as Latin this word could not have been in Heraclitus' Greek work *On Nature*. "*Panta rei*" or "everything flows" provides us with a Greek equivalent and a popular association of flowing with Heraclitus' thought.[15]

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[14] Simpson (1968) pp.251-252.

[15] Though this is only a popular association between Heraclitus and flux. See Russell (1984) [1945] p.63. Barnes (1979) p.65: "few modern scholars think he said it".

And, indeed, the word 'flux' is rightfully associated with Heraclitus' thought,[16] as a reference to the flowing found in his most famous statement. Fr.41, 42: "You cannot step twice into the same rivers; for fresh waters are ever flowing in upon you." Though I am more interested in more recent agreement about the theory of flux than in unearthing subtleties of translation to get even closer to the historical Heraclitus, in the case of this important fragment it is worth noting the fragment is phrased in the dative, a sign of authenticity.[17] The fragment could be taken to suggest all objects are continually subject to change, both the person immersed in and hence presumably affected by the waters, and more obviously the flowing river itself. 'Flux' has traditionally been taken to rule out objects lasting through times due either to a moment by moment loss of every property it has, or a Cratylean worry about identity and the difference inherent in change. Either way this is compatible with the fragment if we take it to mean that the river or person at most exists for an instant.[18] Before we come to the traditional reading next chapter, note as well that the very mention of a river or a bather suggests that flux could name some kind of theory about objects that do persist through change.

We can now tell a story about how the commentators to date has contended that Heraclitus thought objects flux or flow. There is the older traditional reading in which the object does not persist through change, but in Cratylean fashion lasts no longer than an instant. Hegel's reading is an example. Here an object is transitory, much like we might think of certain features of a flowing liquid as transitory, for instance a splash or a spray. The difficulties with tradition are the subject of the first section of the next chapter. The dialectical materialists did not insist Heraclitus reached the extreme traditional

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16 See Lebedev (1985) Excursus 1 for a discussion of reasons to associate flux as flowing with the work of Heraclitus including that 'flux' be translated as 'flow'. The nearest other translation, 'running' does not make sense of the fragments.

17 Kirk, Raven and Schofield (1983) p.196 think the dative of fr. 41-42 is typical of Ephesians at the time. Kirk (1954) has doubted other river fragments as traditional re-readings. For Moravcsik (1983) p.149 this is unimportant provided we have fr.41-42. Vlastos (1955) likewise believes we can "restrict ourselves to what Kirk [1954] regards as genuine." Kirk (1959) goes on to argue that Heraclitus did not have any great interest in change. However Kirk is not as plausible as the commentators followed here who do think that Heraclitus emphasized change, and who often think he did so along thermodynamic lines. For Vlastos (1955), p.313 we can only explain Cratylus if he was at least exaggerating Heraclitus' area of interest: change. For Du Bose (1972) pp.8-9 Kirk forgets Heraclitus advocated an intelligent or theory-dependant use of the senses to detect the hidden role of change in the cosmos. See also Graham (1997) p.5 fn.20.

18 For Cratylus "you cannot step into the same river once:" neither stepper nor river persists.

conclusion that objects do not persist, preferring instead to concentrate on the deliberate contradictions found in the traditional, especially Hegelian, Heraclitus. This, I have already suggested, was not a convincing break with tradition, and certainly not a good way to emphasize change by using Heraclitus to think of objects as changing things.

More conclusively breaking with tradition are those readings in which Heraclitus emphasizes change by considering the object as persisting along thermodynamic lines. Here 'flux' would carry the meaning that an object could persist through change as somehow part of a flow of energetic matter much like a river itself might be thought to persist, even though it undergoes constant change and so is not in the same state for any two instants. Or again, much like an eddy might be a more or less ongoing pattern in a river. Because they did make a conclusive break, I shall refer to the recent scholarship interchangeably as the 'newer' or 'post-traditional' commentators. All of these different commentators understand by 'the theory of flux' a theory formulated by Heraclitus of Ephesos about objects as changing things. I will understand the term 'the theory of flux' in the same way.

There are two obstacles to reading this theory along thermodynamic lines to get an account of persistence. Firstly the traditional reading of the theory must be plausibly, if not conclusively, dismissed with the same treatment also allowing us to avoid the contradictory Heraclitus of the dialectical materialists). Secondly we must confront the casting of Heraclitus as not concerned with a given or individual object, but with objects as *a type of thing*, and at best, with types of objects (asses, fishes, bows or rivers). He did not take an interest in this or that object, and so could not worry about how it might persist through the difference required by change to still have the sameness to be that particular object.

The theories with which Heraclitus commenced inform us of the background of his thought. These provide the pre-existing components that Heraclitus selected to then rework. It is here we find a degree of consensus that Heraclitus' predecessors fell short of being able to tell us very much about change other than it was a dark mystery. These were the Milesian cosmologists: Thales, Anaximander and Anaximenes.

1.2: The Milesians

Any overview of the Milesians must begin with Thales (40 sometime after 585/6 B.C.). Thales is known for suggesting the world was made of water.[19] The real Thales may have only gestured to a cosmology resting the world on a world ocean. It is commonly accepted Thales owes a debt to the myths of the ancient near east, and a world ocean hypothesis would fit his ideas in with prominent cosmological and cosmogonic themes of his day. Burnet (1971) [1892] stresses the context of mythical beliefs. In a move to establish a scholarly background that could take him beyond traditional interpretations, Burnet is also reticent to have Thales as nothing more than a mythographer.[20] Later similarly-minded writers were to take up this reticence.

For Kirk, Raven and Scholfield (1983) any interpretation of Thales which casts him as merely inventing variations on existing myth also gives him little theoretical room to move. Beyond making it hard to understand what, if anything much, Thales was trying to achieve — the variations seem pointless,[21] not even good mythography. That makes very attractive the more charitable and historically significant assumption that Thales was a philosopher rather than just a myth-maker: "Thales earned the title of the first Greek philosopher mainly because of his abandonment of mythological formulations,"[22] rethinking these to propose "water is the continuing, hidden constituent of all things".[23]

Lloyd (1970) is insistent Thales did not consider water a hidden constituent of the cosmos.[24] However, Lloyd admits the question of cosmic constitution was considered prior to Anaximenes' theory, the last of the Milesian cosmologists discussed below, but doubts Thales considered it. Granted that, Lloyd's doubt raises only the question of whether it was Thales or his uncle Thales who proposed the theory, that is, of the finer

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[19] Burnet (1971) [1892] pp.47. I will also date these philosophers according to their 'acme' — when they were 40.

[20] *Ibid*. pp.48-59.

[21] Kirk, Raven and Schofield (1983) p.93.

[22] *Ibid*. p.101.

[23] *Ibid*. p.94.

[24] Lloyd (1970) pp.19-20. See also Cherniss (1951) pp.321ff.

biographical details of the thinker involved. Lloyd casts similar doubts on the personage of Anaximander, the theorist who responded to Thales. Similarly these can be set aside since Lloyd also admits of an Anaximander figure somewhere before Heraclitus who took up both the problem Anaximander left behind with Anaximander's idea of opposition. To show why such an interpretation works and is important I move onto this thinker, and will take his name to be Anaximander, even if here too there is leeway on the exact biographical detail of the thinker involved.

Anaximander (who was 40 between 570-565 B.C.) is then taken to have used the idea of opposition to point out a problem with Thales' theory. Anaximander's understanding of opposition is one in which a substance can be in opposition to another substance. Kahn explains:

> [Water is] the opposite of fire, the element that serves precisely to *put it out*. …water stands at the opposite pole, the extreme reversal which contrasts with fire as winter contrasts with summer, or night with day.[25]

Kahn thus suggests we think of seasonal comparison to understand opposition. Burnet had argued the development of Milesian philosophy was assisted by the fact seasonal difference was pronounced in the area from where the first philosophers came, observing: "the changes of the seasons, and the cycle of growth and decay is a far more striking phenomenon in Aegean lands than in the North."[26] The argument is weak because greater extremes can be found elsewhere (such as in desert climes). However we here get an indication, important for the rise of a recent scholarship of Heraclitus, that Burnet tempers his insistence that ancient thinkers were influenced by myth and mysticism, in this case stressing a background involving basic observation.

It would be plausible to claim that rather than being well defined, Anaximander's idea of opposition was concerned about the way some objects could be observed to be incompatible with or exclusive of others, just as water is incompatible with fire and summer excludes winter. Kirk, Raven and Schofield (1983) think that for

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[25] Kahn (1979) p.140.

[26] Burnet (1971) [1892] p.8.

Anaximander

> the world may have been made up of substances which, while they each possessed individual tendencies contrary to some of the others need not have been formally described as opposites, that is, for example, as the hard and the soft; but simply as fire, wind, iron, water, man, woman and so on.[27]

They want to stress the point that abstract qualities associated with substances like the hard and the soft are *not* at the basis of Anaximander's notion of opposition.

> Caution must be shown, to be sure, about the opposites in Anaximander: it is possible that [later Aristotelian philosophers] the Peripatetics substituted their own more abstract formulations, the hot and the cold, and so on, for more concrete expressions used by Anaximander himself.[28]

Caution, though, must also be shown about committing the reverse error and ruling out what is here called the "more abstract"; to do so would be misinterpret Kirk *et al*'s point. There was no clear definition of opposition demanding abstract tendencies any more than there was one forbidding these.[29] Because the pitting of actual substances in opposition to each other suggests Anaximander's idea of opposition had not been developed, we can expect uncertainty about what is opposed to what and in what sense these oppositions occur. This allows more abstract formulations to indeed make an appearance after Anaximander.

Burnet suggests that Anaximander read Thales as proposing coldness or moistness as universally constitutive.[30] Either would attain the privilege as a quality of water. Again, while the abstraction from substance to quality is not anachronistic, there is no indication at this stage it was consciously done. Burnet does write about Anaximenes,

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[27] Kirk, Raven and Schofield (1983) p.120.

[28] *Ibid*.

[29] *Ibid*. p.119: "in seasonal changes .. heat and drought in summer seem to be pitted against cold and wet in winter." The substances here would be fire and water with any abstractions involved undifferentiated *qua* abstractions. See also p.120.

[30] Burnet (1971) [1892] p.54.

a thinker coming just before Heraclitus, as more consciously abstracting the idea of coldness away from any cold substance.[31] The idea that Heraclitus continued this trend and was aware of the difference between concrete things and abstractions will prove crucial to the post-traditional reading of Heraclitus that permits of an understanding of how an object might persist through change.

Though Anaximander's idea of opposition was loosely posed it nevertheless raises a point that Burnet and certain commentators who followed him found important for the reading of Heraclitus. Burnet considers why water was plausible as a constitutive substance in the way that philosophically differentiates Thales from earlier writers. Water appeared in a number of states (ice, rain, steam):

> Of all the substances we know water seems to take the most various shapes. It is familiar to us in a solid, a liquid and a vaporous form, so Thales may well have thought he saw the world processes go from water and back to water before his very eyes.[32]

The fact that water, like the variegated cosmos, could have many forms makes it plausible water could be the constituent of all the things in that cosmos. Applying the same reasoning to any abstract formulation of water — perhaps as wetness since vapour precipitates wetness and ice can revert to wetness — will rephrase this reading of Thales' theory to state that the qualitative tendency of a substance creates and maintains the cosmos. In this case the actual quality of wetness would only sometimes be constitutive, an odd outcome to us, but we must recall the latitude with which Thales abstracted. He may have only talked of the quality of water being constitutive on some occasions, on other occasions he would have been referring to the substance itself as constitutive.

Anaximander asked what happened in a Thales-style cosmological theory to the idea of the opposed substances that complete the variegation of the cosmos. Only a few fragments remain from these philosophers, but Aristotle had clearly restated the earlier Milesian idea of opposition. One quality opposes another when there cannot be less of

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[31] *Ibid*. pp. 74-75.
[32] *Ibid*. p.49.

one quality without more of the other, and *vice versa*.[33] An object can become hard without becoming less damp; these are different qualities, not opposite ones. It cannot become drier without becoming less damp; these are opposed qualities. It is assumed here that if objects are to persist through change then opposites are required. For it makes no sense to claim that a soft object becomes black, unless it is the case that previously the object had a quality that did not admit blackness without that quality being lessened, that is unless the object previously possessed an opposed quality of paleness. Likewise the object will not change from its soft state unless it has more or less softness, that is, unless it admits more or less of the quality opposed to softness.[34] Certain real qualities, those opposed to wetness, are then problematized for Thales, dryness, hotness and perhaps others. How could there be these qualities to the exclusion of wetness?

We should not be too hasty in assessing what Thales achieved when confronting this problem, for as I will tell the story this will soon eliminate interesting metaphysical ideas. Hegel (1955 and 1987) for instance, when writing about the Milesian school and Heraclitus' response to it, consistently follows a narrative wherein Thales sets up a problematic by being unable to acknowledge change in his cosmology. Hegel's Heraclitus seeks to rectify the problem by means of the idea of 'Becoming' (discussed in section 1 of the next chapter). But even just focusing on Thales we can already see that this is not quite right. In fact Thales can acknowledge the most basic idea of change, synchronic difference. Water can take different forms at a given point in time, so there could be hardness over there (ice) and softness over here (moistness).

Moreover, given how Aristotle understands opposition, it may even have been possible in Thales' theory to synchronically have the opposite of water: fire, dryness heat or whatever. If there was more water in one place, say for instance in greater concentration, then there would be more wetness, and so less of its opposite. So the theory that the variant forms of water can explain various cosmic forms would have then been appealing to an ancient, especially if we consider that evaporation is invisible, and while walking in the market Thales may (as has been suggested for Anaximenes below) have undertaken breath experiments, and thus found moisture precipitating (on pottery etc)

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[33] Aristotle (1922) 1.1 (314b20).

[34] *Ibid*.

from air, giving him the conclusion air too was made of water.

It is diachronic difference, that is change over time including change through which objects persist, that would have confounded Thales on the reading preferred. To be sure, the cosmos could drown. It could be inundated as it was in the myth of Noah and the ark, in Thales' case because water is the constitutive substance. But this is hardly a satisfying account of change. We do not experience diachronic difference as an untrammelled rush to a watery grave. Rather there are reversals, periodicities. This is the nub of Anaximander's critique. If things do not have to go the way of water, and if events do not give us a reason to assume water, or wetness, or coolness or whatever is always victorious, then there is at least one other active ingredient to the cosmos, there is at least something like fire, something contrary to water.

It is now hard to understand how water could be constitutive or in anyway cosmically privileged. If water was engaged in some kind of battle with fire on more or less equal terms, then the transitions from hot to cold and back again could be explained as a result of their encounter, just as a fire might smoulder after being doused, and indeed just as the application of fire to the states of water is what produces the changes like melting. Post traditionalist Moravcsik (1983) believes that while Thales did not clearly see this immediate consequence of his theory, he needed to explain the transformation of water into the variety of forms and could not.[35] The theory that there are cosmic oppositions then comes to seem a powerful advance in so far as it gives us a basic explanation of change, and is superior to a Thales-type theory of constitutive substance.

The argument that comes out of this understanding of Anaximander can be phrased as follows. The need to explain change as it is observed and experienced is incompatible with a universally constitutive substance, so the argument that water as a substance found in various states can account for cosmic variety must fail. Further, the counter-argument can be applied not only to Thales' ideas on water as universally constitutive, but to any similar theories, for no single type of changes should be the only one. If these thinkers in the childhood of history lacked exactness about what stands in opposition to what, this too can effectively extend the Anaximander argument; no matter

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[35] Moravcsik (1983) p.137.

how water was paired in opposition, both it and its opposite would be disqualified from being universally constitutive: wetness or coldness, fire or heat, air or dryness.

Anaximander now had to explain what it is that makes up the cosmos and yet permits a fuller account of change, and so explains evenly matched oppositions. His solution was a further substance. On a common philosophically-inclined reading the new substance is indeterminate because it could not be either of the opposites in any opposition, yet every substance seems to have had an opposite.[36] Anaximander termed the further constituent the *apeiron*.[37] Because of the grammar of the fragments Cherniss (1951) thinks we can know that the *apeiron* was not limited to being indeterminate and was plural in nature. Cherniss proposes the *apeiron* was:

> so thoroughly mixed together as to be severally indiscernible in the mixture, but which when segregated from the mixture are recognisable as all the differences of an articulated world.[38]

The charity found in this reading of Anaximander makes plausible Cherniss' assumption that the *apeiron* considered as such an indeterminate plenum was postulated to make headway in relation to Thales, and was not simply a rehash of older mythological themes such as the void we find in Hesiod's *Theogony*. Those swayed by a post-traditional commentators are then inclined to think it is Anaximander with the *apeiron*, and not Parmenides outright denial of change, that sets up the problematic that Heraclitus engages with in the theory of flux, and to find out how we must consider the *apeiron* in more detail.

Anaximander still needs to explain how the indeterminacy of the *apeiron* gives rise to the determinate world. Given what has just been discussed, an appealing way of having him address the problem is as follows. The *apeiron* sustains oppositions within a world order that does not permit the dominance of one side in any of the opposition, so Anaximander draws those oppositions from the *apeiron* as an inexhaustible neutral

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[36] Burnet (1971) [1892] pp.53-54. The exception may be air as we shall find when examining Anaximenes.
[37] Kirk, Raven and Schofield (1983) pp.108-109.
[38] Cherniss (1951) pp.324-325.

source. The *apeiron* is inexhaustible because it is infinite. The neutrality of the *apeiron* with respect to any side in an opposition follows since as a mixture it is all the ingredients of the world together without internal boundaries.[39] As the undifferentiated collection of all the ingredients in all oppositions, it is no one side in any opposition or in fact any one opposition alone.

On this line of reasoning it would seem when boundaries form within the *apeiron*, a world forms. Opposition is crucial for explaining how, by this process, the "primal soup" of the *apeiron* gives to the world the order we find around us:

> [H]ow is the separation of opposites from the unitary *apeiron* related to the generation or separation of world orders from the *apeiron*? A general answer is easy to supply: we expect that the world orders are generated by the separation of opposites...This latter relationship has been identified by scholars as an exchange between equal opposing forces; these forces have in turn been identified by some as pairs of 'opposites' in the strict sense, such as summer and winter, or hot and cold, and by others as both 'opposites' and individual entities such as fire.[40]

As the *apeiron* separates it does so not only into any given (possibly abstractly conceived) substance, but also into the opposite of that substance and other oppositions. As there is an infinite amount of all these things, even if water puts out fire here or heat overcomes coolness over there, the world order could still have initially received enough of the ingredients to recreate the oppositions from the infinite supplies of the *apeiron*. This is possible because the *apeiron* is all the substances involved.

This gets us closer to the problematic that, on a post-traditional reading, engaged Heraclitus. The oppositions give us an idea of change by suggesting a constant to-ing and fro-ing as long as the opposition lasts. This image of strife occasioned by a battle between

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[39] The lack of internal boundaries has long been attributed to Anaximander's *apeiron*, but it has been questioned. See for instance Gottschalk (1965) p.51. His reservations about this are dealt with below. Asmis' (1981) reservations about this description of the *apeiron* are also dealt with below, just prior to my discussion of Anaximenes.

[40] Asmis (1981) p.281.

opposites is an early conception of change,[41] the battle between different substances or tendencies taking place over time.[42] So we have from the point of view of a discussion of the Problem of Change a crucial advance on Thales' cosmology. With but a single constitutive substance and only that category to work within it seems there is no scope for change. Anaximander's oppositions take the step of introducing the required differences and relating these in an ongoing oppositional battle to arrive at an understanding of change. However on the newer readings Heraclitus found a problem with Anaximander's understanding of change.

To begin to understand how, we must recall that the *apeiron* is a unity. Failure to do so explains the confusion over whether Anaximander is a monist or a pluralist about the *apeiron*, a confusion going back to Aristotle's reports. Gottschalk (1965), for instance, does not believe that the ingredients of the world separate out of the *apeiron* since he takes strong doxographic evidence for Anaximander's monism in hand. He cannot then imagine how it is that further substances can arise out of that which is unified. The mixing of all substances without boundary in the *apeiron* does not, for him, solve the problem, since "it seems odd to speak of a fusion with a separate identity existing before its constituents,"[43] as a fragment does. But if the lack of internal distinction of its constituents is exactly what makes the *apeiron* indeterminate, it would not be so odd to speak of the fusion. There would be no way of isolating a part of the *apeiron* since there would be no determinants to distinguish one part from another. Anaximander could not have remedied this by imposing some sort of grid to isolate parts of the infinite *apeiron* in space, since Gottschalk admits Anaximander probably predates such geometry.[44] The *apeiron* is without parts.

Today we might respond that an infinite unity can be divided into parts, and *ex hypothesi* is so divided, for it is the division of the *apeiron* that gives us a world. Every world is a part of the *apeiron*, and because the infinite *apeiron* can be and is divided into

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41 Kirk, Raven and Schofield (1983) pp.118-119.

42 *Ibid*. pp.120-121. The importance of time here will be explored more thoroughly in Chapter Three.

43 Gottschalk (1965) p.45. He discusses the problem of interpreting Aristotle on this matter pp.37-39.

44 *Ibid*. p.52: "It is said Anaximander did not have the Euclidian concept of space." This would suggest that Anaximander did not have a grid that was independent of given features and so could not have divided up the effectively featureless *apeiron*.

finite worlds, we are not reading Anaximander right to take the *apeiron* as a unity. But the *apeiron* always remains while any number of worlds can come and go. The *apeiron* is also of a different character to the worlds that separate off from it. So conceived as eternal the *apeiron* is an indivisible unity while the worlds are many. These finite worlds are divided off from each other and further are made up of distinct components like the battling oppositions. Nothing similar can be claimed for the *apeiron*.

It is the unified *apeiron* that Anaximander cannot think of as changing on the most coherent version of the ideas being associated with Anaximander here. The battle of oppositions over time that informed his idea of change was impossible in the *apeiron.* In the *apeiron* substances are so mixed together that none has the character that permits either concretely or abstractly conceived opposition, and so the character required for any two to be paired in conflict. With no opposition it is not possible to compare the fortunes of a substance in opposition over time. This gives us the beginnings of a problematic that a post-traditional reading can have Heraclitus take up: in the *apeiron* the cosmic, changeless, sameness that Anaximander criticised in Thales remains the source of the world. In the *apeiron* it is hard to imagine even synchronic difference.

Certainly change could occur on this reading of Anaximander, at least in the world orders. A world order was not just characterized by the battles between the oppositions over time, but how each side fared, the outcome being crucial to any idea of opposition grounded in observation. The natural periodicities the oppositions explain are not exact, and though Anaximander only had crude instruments, this inexactness would have been known to him.[45] It also could easily be explained by his theory. The surfeits and gains the oppositions make at each other's expense are not an even exchange, but a series of forays and sallies, compensations and counters with different degrees of success. As an example of this unevenness some summers are hotter or cooler than others, some winters longer or shorter. A given world order can be identified by the unevenness in the outcomes of the oppositions that determine the periodicities of that world order. The outcomes are different to those of other world orders — for example some worlds would be hotter or cooler than others (much as this is the case in science fiction). Different cycles of change characterize different world orders.

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45 See Asmis (1981) p.281.

Before proceeding, let us tally this reading so far with Anaximander's use of the image of justice as found in the relevant fragment, in order to understand how it makes sense of that fragment. Burnet (1971) [1892] quotes the fragment "they make reparation and satisfaction to one another for their injustice according to the appointed time."[46] Given that the "they" Anaximander is referring to are the oppositions in the context of the theory of the *apeiron*, we here find that by asserting themselves in battle oppositions are enjoying only a temporary advantage. The fragment could also be economically read to be referring to the fact that in doing so the oppositional substances are neglecting their debt to the infinite indeterminacy of the cosmos, but that debt will be paid in full when the world order of which that substance is a part returns to the *apeiron*. The injustice is double: that of the assertion of the opposites within a world, and that of the very existence of the world itself. Change requires both injustices, but this fact is powerless to prevent change since the world orders exist regardless of the injustice of change.

A given collection of the various uneven fortunes of the different oppositions characterise a world order and the amounts of each opposition, that determine whether we can claim it is doing well or poorly across the entire world, must have been there from the start of that world. For the *apeiron* only interacts with the world order at the outset, since after that the world is separate. It may be thought the outcome is stasis — with only so much of each opposition the fortunes of the opposites are settled early on and once and for all, soon leading again, and at best, to only synchronic difference. But the injustice within the world remains: forays and sallies come about where here and there an opposition gets the upper hand, even if from the perspective of the entire world order it is in a lesser quantity than its opponent. Justice is done when the innate balance of the world order is re-established. Actually because all changes are unjust on this reading, it seems justice is always exceeded, and the opposition that is reasserting itself winds up over-represented compared to the entirety of the world. This injustice will be over corrected, leading to more and more changes. By providing a theory allowing for ongoing change, Anaximander made a significant advance on Thales.

What is under threat is Anaximander's ability to say anything else about change,

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46 Burnet (1971) [1892] p.53.

and this is because given the foregoing story the *aperion* has a certain mysterious quality. With many different world orders separating from the *apeiron* there are myriad ways any opposition might come into being as the substances making up that opposition come away from the indeterminate whole differently. This is compatible with the infinity of the *apeiron*; it contains the potential to produce an infinite number of world orders. How separation occurs is indeterminate because we can not make any claims about the *apeiron* beside that it is infinite and indeterminate. Thus we can not make any claims about how it separates off into different world orders. The resulting world orders must only be temporary. Since the way the *apeiron* has separated out into a given world order is neither permanent nor shared across other world orders, no given world order is a paradigm of how the oppositional battles must be fought, and none tells us anything about the nature of those battles.

Today in this circumstance we would make the claim that we can have 'contingent' knowledge of such battles. Contingent knowledge is knowledge of what could be or even is, but it is not knowledge of how things have to be. Observation of the battle in a given world would allow us to know how the battles fare in this case, and not how these fare in other scenarios, so our only knowledge of change is contingent knowledge. Anaximander does not regard such 'contingent' knowledge as real knowledge because it does not tell us of the essential character of the oppositions and their battles, of what must be true of these.

To understand this clearly philosophical version of Anaximander we could also think of the changes as random. The sense of contingency here means that in a given world we are confronted with only one of many ways change could go to and forth with different oppositions getting the better and worse of it. Though that one way is fated by the how the *aperion* separates, that decree of fate is unknowable. That is ensured by both the injustice of the birth of a world (there is no determining way it must have separated off), and by the injustice of the subsequent changes, which as a series of over-compensations, obscure how it did separate. Almost anything could happen next in the changing world order, and we could be in any one of many different orders. Just as Anaximander could have no knowledge of what number a dice would show next, there was no way to know what changes would happen next.

Anaximander's knowers would then regard the ensuing battles as random. This may seem incongruous with the idea of Anaximander keenly watching a sundial and making calculations while hunched over maps, but we must recall the unaccounted variations he would have found in the periodicities in nature. These may have been due to crude instruments or crude observation, but in all cases to Anaximander these would have confirmed the randomness he believed characterized change. For all he knew these variations could well become immense tomorrow. Certainly these were to be found everywhere; it is hard to imagine Anaximander encountering a perfectly periodic occurrence. Today we assume other factors interfere to prevent perfectly regular periodicities, so we are not tempted to go on and postulate an *apeiron*. For Anaximander, faced with what he believed was randomness, there is no theory, no knowledge, and the theory of the *apeiron* fitted the mystery he encountered around him. Since the battle of oppositions over time is what gives us the idea of change, we also have change as an improper subject for theory. It is in this sense that change is an anomaly.

So despite his advance on Thales, Anaximander's changing world orders are outside the *apeiron* and therefore anomalous. Only the infinite unity of the *apeiron* is a proper subject of knowledge. If Heraclitus was to describe change, he would have to eliminate the unknowable, penumbral determinations of the *apeiron* as a cosmic source, and yet still have the battling oppositions. Further, these battles had to be constrained in some way so that not just anything could happen next. And this is exactly what we will find Heraclitus doing — in the newer readings at least. On the traditional readings, Heraclitus' ability to come to terms with a problematic found in the details of Anaximander's theory is not important. As the next chapter will show more fully, the traditional conclusion that the theory of flux held no object persists through change (or time) can be reached simply by arguing Heraclitus made what I suggested was the Cratylean argument. Or, the more complex and influential versions of tradition (in particular those of Plato and Hegel), the theory of flux reaches traditional conclusions as a response to Parmenides. Either way Anaximander's theory is not directly relevant.

Traditional commentators concerned with Heraclitus do not then need a philosophically astute Anaximander to tell a workable story within early Greek philosophy. Hegel has Anaximander arguing that it is the finitude of any world order that

renders it, and the change within it, an anomaly, and this reading has been very influential. Compared to the infinity of the *apeiron* any world order is simply insignificant, and this provided Anaximander with the sense of anomaly.[47]

In response to this reading we should firstly note that comparison of the finite with the infinite does not produce the desired sense of anomaly. If the cosmos is infinite and yet divisible into finite parts, a given part does not have to be anomalous, as is clear if the part was made of the same constituent as the whole. With Thales' sameness and an infinite cosmos in mind, it is a philosophically incompetent Anaximander that would have made the error of equating finitude with anomaly. Secondly, change does not obviously occur in finite quantities as it does in any given world order. For change is common to all world orders, and there may be an infinite number of world orders.

This interpretation of Anaxamander uncharitably has him making a simple error, and it bodes ill for the use of Anaximander to challenge Heraclitus to give a better explanation of the oppositions. So, and what is most important here, it also bodes ill for making contemporary use of Heraclitean ideas of opposition today. Hegel and other traditionalists can be content with this lack of charity if their focus of attention is Heraclitus. Thus it is more recent scholars of Heraclitus who would interpret Anaximander as more sophisticated philosophically who must be followed for this project to succeed. Vital in an explanation of the oppositions, it is the problematic of random change outlined here that can give us a Heraclitus who argues that objects are just the sort of thing that can persist through change.

So beside the continuing influence it has, the other reason I mention Hegel's reading of Anaximander is that if we are to use a reading of Heraclitus in contemporary metaphysics it is important to tell a coherent story about Anaximander. In the absence of further historical argument it is true we must here consider the possibility that Anaximander might not have been terribly relevant to Heraclitus. For me what is most important, though, is that the discussion of readings of Heraclitus' views are more metaphysically appealing when the philosophers involved, and particularly when Anaximander and Heraclitus, are making sense of each other. From this perspective it is

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[47] Hegel (1955) [1831] pp.186-187. For the ongoing influence of this reading see Cherniss (1955) p.326.

useful to canvas Hegel's reading in order to clarify why I am steering away from his reading and similar traditional readings that tend to detach Anaximander from Heraclitus. We shall encounter these traditional readings in more detail in section 1 chapter 2 and I shall be more partial to other readings linking the pair in section 2 of the same chapter. It is worth repeating that charitable readings do have an innate historic appeal, allowing us to claim we are remaining in the ambit of ideas associated with Heraclitus.

Regarding this charity, it must be stressed that Anaximander did not find his worlds anarchic once they had come into existence. Quite the contrary; Classen (1977) has argued that unfamiliar processes such as that of separation of the *apeiron* into a world order can only be understood as humans understand the process of their own activity, as imparting order.[48] But even if this is right, at least for Anaximander, the problem remains that the initial imparting of order is mysterious. Anaximander found many world orders, all different, with nothing to explain this difference. If we take a world, the amount of the opposites in it bears no discoverable relation to the amount of the opposites in any worlds that separated out of the *apeiron* before it, or the oppositional ingredients of those worlds that are to come afterwards. The amount of the opposites that will be present in a world is random, it is unpredictable, even though the *apeiron* is plethora or a plenum rather than a chaos. It is this initial apportioning that determines what regularities appear in the changes found in the world. Thus any given world order can be, and presumably would be, law-governed for Anaximander, yet the regularities that produce any law-like behavior and govern the changes in that world are the result of an effectively random process. It is this that for Anaximander, that despite any governance of change problematises change itself as a subject of knowledge.

I am not claiming that the only alternate version of Anaximander to that presented here is the result of a tradition that is prepared to be implausibly uncharitable to the Milesian thinker. Asmis (1985) offers a recent rival interpretation according to which the *apeiron* is only the world orders unfolding through different manifestations. This is incompatible with the reading I have argued for because we do not have the *apeiron* as the infinite external source of different worlds, and it threatens the view of the problematic I have outlined as that facing Heraclitus since there would be no anomaly associated with a

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48 Classen (1977) p.98.

world order and hence with change. As on the reading I have preferred, there is no principle to constrain change and hence no reason why we have one change then another on Asmis' reading. But then again on her reading there is nothing to prevent the unproblematic description of change.

However I think the foregoing reading of Anaximander is at least as plausible as that of Asmis. She has to interpret the fragments so the world orders are successive because her point is that the *apeiron* is not outside the different worlds and is nothing more than the world orders unfolding through different manifestations. It is nothing more than one world after another. But even if these orders can be or are successive, her interpretation must sustain the further claim that these can *only* be successive. Her *apeiron* is not a further source by which we can allow for more than one world at a time.[49] Furthermore, and uncharitably, Asmis' Anaximander cannot develop that aspect of Thales' theory seeking not just the constituents of the cosmos, but the source. There *is* no source on her reading, just one world after, and becoming, another.

Another reading of Anaximander incompatible with the one I have preferred moves us on to the last thinker I will discuss here, and one that one many have read as failing to deal with Anaximander's random change. Finkelberg (1993) has made of the *apeiron* the air of the later Anaximenes. But even if Anaximenes' air was the universal constitutive substance with other oppositions built in to retain cosmic order,[50] there is no reason to believe Anaximander had the same ideas as Anaximenes. The former may have had similar ideas about air containing oppositions upon its separation from the *apeiron*,[51] but it is unnecessarily uncharitable to both thinkers to assume Anaximander was just an earlier version of Anaximenes. Both would be just as, if not more, plausibly understood as making individual contributions. The difference in their ideas will prove useful to telling the rich story of how change came to be philosophized.

Anaximenes was the last of the Milesian school, and so if we cannot easily associate the readdress of random change with him, we must turn our attention to

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[49] Asmis (1981) *passim*.

[50] Finkelberg (1993) pp.249-251.

[51] *Ibid*. pp.238 ff.

Heraclitus. Finkelberg is not alone in reading Anaximenes (40 in 546/5 B.C.) as postulating air as a universally constitutive substance, but recent scholars of Heraclitus would have reason to be uncomfortable with this. If Anaximenes returned to a stage of thinking analogous to Thales, it would seem that thinkers of the time did not feel any urgency about dealing with Anaximander's random change.[52] Anaximenes has been attributed a more abstract formulation where coldness as a tendency of air is responsible for all things in the cosmos.[53] Given that in primitive observation both air and cold have been paired in opposition with fire or heat, either way this uncharitably suggests he would have fallen to Anaximander's argument that a universal constitutive can not properly explain change and opposition.[54]

We can understand the reservations with which some scholars regard Anaximenes' contribution to philosophy. Anaximenes had set about detailing the mechanisms by which air or cold as a tendency of air might create the multiform cosmos. There was 'felting,' a process precipitating matter in a way analogous to how clouds were thought to come out of the atmosphere, or from the way balled slubs can form on the surface of a woolen garment. It appears Anaximenes also explained cosmic variety as the result of rarefaction and condensation. The attention to such detail does suggest that, like Thales, he accepted a premise that a substance could be universally constitutive, and then worked out the kind of processes that would explain manifest difference in the world, perhaps with a story about concentrations of air giving him some idea of opposition and a theory of synchronic difference. However, in building up to a Heraclitus that could engage with Anaximander's problematic, Burnet is uncomfortable with this reading.[55] I too want to show how Anaximenes tried and failed in order to forward a reading wherein the need Heraclitus had to response to Anaximander was all the more urgent.

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52 Burnet (1971) [1892] pp.72-73 gestures at this view, but has reservations discussed below. Also Graham (1997) *passim*. Graham pp.27-28 though, admits Anaximenes would have been confronted with the Anaximander argument.

53 Burnet (1971) [1892] p.75 suggests this. Coldness as a universal constitutive then comes from the idea Anaximenes took air as the universally constitutive substance. Note though Burnet does not mean Anaximenes fell foul of the Anaximander argument because if he did use air to avoid falling foul of that argument, it is also the case he may have used cold in the same way. See the following fn..

54 Kirk, Raven and Schofield (1983) p.149. "Anaximenes still attributed special importance to the chief cosmogenic substances in Anaximander" by keeping the primacy of substance attacked by Anaximander.

55 Burnet (1971) [1892] p.72, so: "[a]t first this looks like a falling off from the more refined doctrine of Anaximander to a cruder view."

A more philosophically interesting tale can be told about Anaximenes than that he embraced a theory of constitutive substance such as Thales'. For then he simply proves vulnerable as Thales to the argument regarding opposition and the tale ends abruptly. If we take Anaximander to be a mentor to Anaximenes rather than an opponent we shall find this approach has made possible a neat interpretation of Anaximenes that will lead into the reading of Heraclitus I find metaphysically informative. Burnet has pointed out that air had something of a privileged status in Milesian cosmology. A strand of thinking associated it with neutrality.[56] As the oppositions were conceived in agonistic terms this could mean those agreeing air was neutral would have rejected the air/fire oppositional pairing to insist air had no opposite.

If Anaximenes was committed to neutrality neither would he postulate the abstract formulation of cold as universally constitutive. Cold could hardly be thought of as neutral — heat is the obvious opposite.[57] This neutrality is the point, rather than a suggestion that the oppositions are exhausted with air as victorious. If air is not in opposition then the Anaximander argument against a universally constitutive substance is sidestepped since as with the *apeiron* there is no need to explain why it has not overcome any contending substance. This apparent acknowledgement of Anaximander raises again the question of random change, for if Anaximander never went beyond such an idea of change, Anaximenes' system has a more dynamic feel.

Though air as universally constitutive would be as qualitatively invariant as the *apeiron*, Burnet thinks Anaximenes used it to invoke quantitative variation.[58] It is a view Cherniss (1951) effectively supports, noting cold in Anaximenes is better read as being explained by such cosmic action, rather than explaining it. Cherniss also notes Anaximenes considered air of normal density to allow both condensation and rarefaction to explain worldly determinacy, and this brings to mind the normality of the *apeiron*. Further, Anaximenes considered air as unlimited in extent as the *apeiron*, again

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56 *Ibid*. p.147.

57 *Ibid*. p.149. For Burnet the evidence suggests that cold, like heat, is something Anaximenes set out to account for rather than accepted as an explanatory principle. See also the Cherniss footnote to the next paragraph.

58 Burnet (1971) [1892] pp.74-75.

suggesting he applied Anaximander's conception of cosmic normality to air.[59]

This more charitable reading uses air to avoid the indeterminacy we found confronted us in Anaximander's *apeiron*. Anaximenes' concern becomes the theorisation of the point of commencement of the world order and hence the possibility of establishing guidelines for change by being able to determine the amounts of the oppositions from the outset. Anaximenes seems then to be on the right path to making change a fit subject of knowledge. For by talking about the *apeiron* in terms of air, quantitative variation is possible within the sameness of substance, where it is not available in a fully indeterminate substance. Quantitative variation would give rise to the determination of density, and the presence of different densities adduced to show the amounts in which the different oppositions come about.

So, whereas for Anaximander the separation of the indeterminate itself had to be indeterminate, Anaximenes questioned this. He provided determinate processes by which a world order was created and even sustained, with the *apeiron* as an ongoing source rather than just a point of commencement. Using air as a way of describing the *apeiron* facilitated the move to determinate processes. For these processes included felting, where the re-described *apeiron* can form the oppositions just as clouds form out of air, and condensation where the oppositions come into being from the *apeiron* just as condensate comes from a humid atmosphere. Equally applicable to any given world order, these processes are as eternal as the *apeiron* itself. Part of the determinate world rather than the indeterminate unitary infinite, these quantitatively conceived processes are fitting subjects of knowledge, and are indeed the subject of Anaximenes' own theory.

Yet change remained an anomaly for Anaximenes, even given the more philosophical reading of him as recognising the opposition argument Anaximander had mounted against Thales. It is exactly because felting and so on are not the oppositions in battle that these are not changes, but special events that enable changes to take place and make up the world order. As regards the changes that are the world order, Anaximenes left Anaximander's cosmic unity intact and indeterminate, the mechanisms he furnished simply detail the random process of the separation of the *apeiron* into the opposites at the

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[59] Cherniss (1951) pp.328-329. Cherniss later, (1964) p.13, likens Anaximenes and Anaximander.

moment of separation. That moment was now a *determinate* act of the indeterminate, but the oppositions still do not stake claims on the *apeiron* by nature, but by brute fortune. It remains mysterious why and how a certain amount of each opposition comes out of the *apeiron* to form a world order. All that is suggested is that some of these oppositions are more or less dense. Some take more, some less, of the ingredients supplied by the infinite originative source. While real knowledge has been extended beyond the infinite to include actual separations from the *apeiron*, there is nothing new to be learned from the fleeting world orders. Change as found in the conflicting oppositions of these orders is aberrant in the same sense as for Anaximander.

As stressed in the Anaximander case, this does not mean Anaximenes was doomed to have a view of the cosmos as anarchic. Quite compatibly with the reading favoured here, Classen (1977) has argued Anaximenes described the ordering processes themselves,[60] something Anaximander had failed to do even though he too had regarded the formation process as an ordering. Classen can then read Anaximenes as working out the details of Anaximander's idea of a processional formation of worlds. This is certainly an advance in that Anaximenes arrived at his mechanisms once he believed he could observe the ordering process continuing (by contrast Anaximander may have believed the process long-complete), and he thus affirmed the importance of detailed observation to theory. Yet the initial apportioning still bears no discoverable relation to the amount of the opposites in any worlds before or after any given world, or those to any that follow it. The amount of the opposites responsible for the creation of a world order remains random allocated. If any governance of change and so change itself were problematic as a subject of knowledge on account of this randomness for Anaximander, then since there is no sign of a reason why we can theorise about such contingencies in Anaximenes, the problematisation of change as a subject of knowledge remains.

1.3: Conclusion

So on the reading I am following, after half a century of cosmology the Milesian school was left with a sense of discontent. Anaximenes had concentrated on what Anaximander had found unimportant, namely formation of evanescent world orders.

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60 Classen (1977) p. 102.

However, by remaining within Anaximander's system he had no further need to understand change as a part of reality since it remained outside the *apeiron* with this infinite indeterminacy as the only fit subject for knowledge. Anaximenes also manages to suggest an acute discomfort with Anaximander's randomization of change; at least the origins of general change come under a theory. Unable to explain the amount in which the opposites were produced, he did not go far enough. World orders are mysterious, almost Hesiodic, in origin, and change is just the oppositions of these world orders playing themselves out. Change is left, as the less charitable reading of the last Milesian would have it literally, out in the cold.

On this reading, Heraclitus is confronted with the sense of injustice that left philosophers unable to claim anything about change other than it involved opposites and obeyed no rules. Fr: (62) seems in part recognition of this "We must know that war is common to all and strife is justice." If we read "strife" as the oppositional battles and so as a reference to change we can see in this fragment what it was Heraclitus had to claim, namely that change is not unjust in Anaximander's sense, but inherent to our idea of objects and rule-governed. In the next chapter we will examine the arguments that he used, according to Wiggins' and other post-traditional readings, to get to the all-important knowing mentioned in this fragment. There I will show that recent scholars, following Burnet as an early influential scholiast, could now have Heraclitus at least attempt to deal with change in the way Anaximenes did not. As Anaximenes threw up his hands in the face of apparently random changes, an alternative stance in philosophy was about to begin.

Chapter 2: Heraclitus of Ephesos

On the reading of Milesian philosophy I have followed, Heraclitus had to provide a view of change as something other than unpredictable and random. Otherwise change would remain outside the ambit of theory; nothing could be claimed about it aside from its random nature and (given Anaximander as just canvassed) that change is the battle of oppositions. Here I will follow certain post-traditional commentators, starting with Wiggins (1982), to explore how Heraclitus accomplished the task of providing a view of change as understandable, and did so by describing how everyday physical objects (up to large heavenly ones) are just the sort of things to persist through change. I will also follow Wiggins to argue it is incorrect to assume Heraclitus also tried to explain how it is that a particular object may persist through change; Heraclitus was not concerned with the persistence of individual objects. So at this early point I am claiming that there is no strictly Heraclitean account of the Problem of Change, merely the development of a view of change that admitted the persistence of physical objects.

The discussion of the Milesians allows us to be clearer about the Problem of Change itself, and such clarity is a good way to enter into discussion of tradition in the first section of this chapter. We can start by imagining ourselves in Heraclitus' position given the non-traditional reading followed so far, and confronted with some promising background ideas. If, to make change a fit subject for theory, Heraclitus must address the sense in which change is random for Anaximander, his first task is not to describe change itself. It is to redescribe the origins of change. This must be done in such a way that instead of the oppositional ingredients being randomly apportioned there is a reason for the amounts in which these are present. Then descriptions of changes can no longer be regarded by as inconsequential by those convinced by Milesian thought. This is how we must read the theory of flux if we assume that it addressed the Milesian problematic as so far presented, and it is now that we can more fully appraise The Problem of Change.

Recall that Anaximander (as read) did have some non-contingent knowledge of change; he thought that in any world change involved the battle of oppositions over time. As (in more recent terms) a 'non-contingent' fact about change, by Anaximander's own lights this was worth saying, and so he said it. But it was all that was worth saying.

If the theory of flux is to be read as saying more about change, it must also say where the oppositions come from if not the *apeiron*. It must enlarge upon what non-contingent features are required for change, in other words upon what are the broader features of any change. Following through with this, the details of change revealed are something I will discuss as in two categories next chapter; the detail of the how any opposites battle (The narrow Doctrine of the Unity of Opposites) and the details of specific sets of opposites battle (The wider Doctrine of the Unity of Opposites). But if we are prepared to go thus far, so much has been detailed we provided we find both a new problem, THE Problem that will concern me here, as well as the rudiments of an account of it.

So we will find a version or reading of the Theory of Flux responds to a recognised need to theorise about objects as able to change, and it here we encounter the Problem of Change. It is only a short step (though one I will contend Heraclitus did not take) to recognising that an individual object changes. This means that the same object exists with different properties at different times. Yet this difference must give us pause as well. We need a given group of properties to discern a single object. If we have not one group of properties, but two or more groups of properties instead, we cannot discern a single object, but instead we discern two or more objects. At this point it might be helpful to think of the discussion of synchronic difference. The location of different groups of properties tells us about the locations of different objects in a landscape. But diachronically, in the presence of change, we intuitively do want one object even though the loss or gain of a property or of properties must mean that two or more groups of properties. This contradiction, arising when the difference found in change drives us to a conclusion incompatible with the sameness that is required for persistence, is the Problem of Change.

Read as developing a view of change that admits of persistence, the theory of flux is primitive, but I do not think that is daunting for the project of using ideas from it today. A person's maturation process is a slow one, and we have no reason to expect anything easier when we approach the maturation of western philosophical ideas about change. In both cases some older ideas are kept and integrated with more advanced concepts. Compared to the sophistication of today's discussion we can find the ancients child-like, living in the childhood of the history of ideas. Likewise the use of a logical

notion such as that of identity does not occur to a child wondering how the same wall could be a different color, though she might remember the puzzle and develop into a metaphysician that does use those notions. The logical notions required will be instead imported after the bulk of the historical discussion, in Chapter Four. The result will be an account of the Problem of Change closely inspired by Heraclitus in that it is an extension of ideas found in a trend in recent in Heraclitean scholarship.

This chapter will link the recent scholarship with a theme from the first section of Chapter One: the alternative stance in philosophy. Interest in the implications of the Laws of Thermodynamics is one way that an emphasis on change can be fruitfully brought to bear in a variety of fields of knowledge. It might have occurred to the reader already that Heraclitus lived long before the likes of Clausius and Boltzmann, not to mention Einsteinian developments that have filled out our understanding of how energy circulates in the cosmos. Nevertheless I want to argue that on a reading that is at least as plausible, if not more plausible, than the traditional reading, Heraclitus approached the persistence of physical objects in much the same way as later thinkers interested in thermodynamics. Further, that this is along lines that will take us in the direction of an account of the Problem of Change.

To do this I want to be clear what I mean by "tradition." Once we know what the tradition is through examining Wiggins' reading, we can follow a consensus found strand of post-traditional commentators of Heraclitus who have reacted against it. Beside the historical question, the results of the newer readings present a far more interesting emphasis on change than both tradition itself and the mystifications that came out of the Hegelian variant. There is no orthodox tradition, but there is certainly a shared theme that links traditional commentators of Heraclitus, and it tends, rather curiously, in some ways to give us a less primitive Heraclitus than the one I will propose.

2.1: Tradition

Charles Kahn broadly characterizes an older view of Heraclitus (and not his own) as having Heraclitus reject all steadfastness, being restricted to belief in "the continuous

change and transformation of all things."[1] Richardson simply states that Heraclitus thought the world was like a flowing river, containing no stability.[2] This sounds like the traditional idea of flux I have already used to familiarize the reader with the problem raised by objects surviving change. I will continue to call this older supposition that Heraclitus rejected all stability "traditional."

Burns uses the term 'tradition' to describe Hegel's reading of Heraclitus and claims Mourelatos has been pivotal in making the term popular among commentators since the 1970s.[3] Graham's (1997, *passim*) overview of the various doxographers and scholiasts does not rely upon this term, but does find opposed poles of scholarship. In (the earlier) Kirk we get a Heraclitus who does not emphasise change in any notable way. Graham contrasts this reading to an older once-entrenched one, positioning himself, as a recent scholar, midway between the two. Diametric opposition to Kirk's reading would indicate that for the older entrenched reading referred to by Graham there is a total emphasis on change to the absence of stability; so "tradition" seems an apt description of it. By differentiating tradition and Kirk's position as extremes, Graham can position himself in the scholarship, and the term "tradition" would be useful in doing so. Likewise for my project.

Discussion of the traditional interpretation of the theory of flux raises the problem of what unites different readings so that all can be described as different versions of a single theory more loosely construed. It is tempting to claim that the theory of flux is the first engagement with the Problem of Change, but on the readings I shall be following the theory of flux did not propose a way to deal with this difficulty. More promising is the idea that a theory of flux is a theory associated with Heraclitus seeking to account for the Problem of Change or drawing together the components that make possible a statement and account of that Problem. The tradition gives us versions of the theory of flux that do the former. I am more interested in a version that does the latter, which is, once tradition is set to one side, what I shall mean by the theory of flux.

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1 Kahn (1979) p.147.

2 Richardson (1994) p.290 portrays Heraclitus as holding diametrically opposite views to Parmenides.

3 Burns (1997) p.8.

By ruling out stability, traditional flux does not thereby rule out objects. The continual changes could be such that, broadly, the right combination of opposites, qualities, properties or whatever it is that the traditionalist uses to individuate an object, allow for objects at a given instant. What insisting on change to the exclusion of all stability does is rule out persisting objects. The usual way of getting to such a traditional position would be to claim that for all objects every instant is both the first and last instant in which it has any given attribute. The other assumption required to get to the traditional position would be that if an object loses all its attributes it would be destroyed.

However the simplest version of tradition, useful in posing the Problem of Change and that I have associated with Cratylus does not need the claim that every object undergoes the moment by moment loss of all attributes. Instead it grants Heraclitus the observation that identity requires sameness of attributes (as was later more formally stated by Leibniz),[4] and then the conclusion follows that if an object loses an attribute it cannot remain the same object. This version of tradition then sets up the Problem of Change by simply noting we then have two objects, one before and one after any such change. We get the problematic conclusion that no object persists through change, and if we add the respectable Heraclitean assumption that there is change at every instant, no object persists through time, or lasts longer than such an instant: the traditional conclusion denying stability by denying persistence. At one point at least Cratylus refused to speak but only wiggled his finger. The refusal to speak would be justified on the basis that by the time reference to an object was communicated, the object would be no more, with the wiggling finger perhaps indicating that due to change no object can preserve identity across time.[5]

It is odd that this version of tradition was not an influential interpretation of

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[4] Leibniz's idea of identity will come under discussion in the next two chapters.

[5] However there may have been more to Cratylus' Heracliteanism than this. For the muteness and finger waving see Guthrie (1962) p.450 fn.3. For other ideas that may be attributed to Cratylus see Wedin (2004) *passim*, and Priest's (1998) p. 96 suggestion that Aristotle and Plato tell us Cratylus at some point held meanings changed as much as physical objects. Indeed, if we believe Plato in *The Cratylus*, then Cratylus did hold a theory of naming at least at some point. This may indicate that Cratylus had ideas incompatible with his traditional conclusion. The theme of such incompatibilities will recur in the discussion of tradition.

Heraclitus over the millennia. Aside from the virtue of simplicity, it makes no suggestion that Heraclitus was influenced by Parmenides. The more influential traditional readings do tend to rely on this problematic assumption. So let us turn to the question of Parmenides' dates, aware that while tradition need not rely on having Parmenides precede Heraclitus, we will find it often does. We can consider as we proceed what writers who have moved away from the tradition have thought on the matter of this dating, and this will be useful when we return to the theory of flux as engaging with the Milesian problematic.

Variance in dates different authors give for different thinkers indicates the difficulties involved in assigning dates to the ancient Greek philosophers, including in the case of Parmenides and Heraclitus. Hegel, for instance, dated Heraclitus as later than Parmenides. Hegel dates Heraclitus as 40 in 500 B.C.[6] For Burnet this is a few years too late, and Parmenides is 40 closer to 475 B.C, rather than the earlier date Hegel offers.[7] Burnet thinks Parmenides' philosophy contains a reference to Heraclitus and for historical reasons must in any case be dated later.[8] Post-traditionalists Kirk, Raven and Schofield (1983), follow Burnet to note that attempts have been made to place Heraclitus' philosophical activity "after 478 B.C. (and even, most improbably, after Parmenides); but they have not won acceptance and rest on implausible [historical] hypothesis."[9] By contrast, Burnet's predecessor, Edward Zeller, accepted that Parmenides predated Heraclitus,[10] and in the next chapter we will find him presenting us with a traditional theory of flux that accommodates such a suggestion.

Let us briefly consider Parmenides' thought before moving to discussion of tradition in its more influential forms. We can begin by accepting he sought to prove that "it is" — that what is always was and always will be. Burnet understood

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6 Hegel (1955) [1831] pp.278-279.

7 Burnet (1971) [1892] p.130 places Heraclitus' acme as early as 504 B.C. Hegel seems to have just rounded the figure off. For Parmenides' dates see Burnet pp.169-170. Stokes (1971) p.86 has noted "the majority of recent students have believed Heraclitus prior (and indeed known) to Parmenides."

8 *Ibid*. p.179.

9 Kirk, Raven and Schofield (1983) p.182.

10 Zeller (1948) [1889]. Nevertheless as I shall describe, Zeller's reading moved away from thinking of Heraclitus as centrally concerned with Parmenidean philosophy.

Parmenides in this way, adding:

> [What is] must be uncreated and indestructible. It cannot have arisen out of nothing for there is no such a thing as nothing. Nor can it have arisen from something, for there is no room for anything but itself. What is cannot have beside it any empty space in which something else might arise; for empty space is nothing, nothing cannot be thought and therefore cannot exist. What is never came into being, nor is anything going to come into being in the future…If it is, then it is now, all at once.[11]

How did Parmenides arrive at this extraordinary view? One way to understand Parmenides is to have him starting with the verb "to be." This is a linking verb. It can link a subject with a predicate, noun, pronoun or with some other grammatical forms. This was the most common linking verb for Parmenides (as indeed it is in English today), and Parmenides assigned it special status as required for the act of judgment. It has long been thought that Parmenides regarded other linking verbs like "seems", "appears" and "becomes" as inadequate to make judgments about what is real. Plato explores Parmenides relation of these other linking verbs to judgments about reality more fully in his account of traditional flux below, while Hegel details how he reads Parmenides as approaching the judicative use of language.[12] I will wait until I discuss their versions of the traditional theory of flux to provide further detail.

Before getting there it is first necessary to follow Parmenides in his usual approach to the verb "to be". He insisted that before we could use it as a linking verb, we had to be able to make sense of it as a word on its own. An analogy with intransitive verb use is helpful in explaining Parmenides' step (see Gill (1996)). Rather than being transferred to an object, the action of an intransitive verb is modified by an adverb or an adverb phrase. The verb then makes sense without being transferred to an object. Similarly Parmenides thought that the verb "to be" should able to be consistently interpreted 'unaccompanied', that is independently of its function as a linking verb. But

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11 Burnet (1971) [1892] p.181.

12 Compare Hegel (1991) [1817] p.138 with what immediately follows .

now, if we take for instance a subject-predicate linkage and claim *x* is green, then we are claiming *x* is not blue. Yet in the first case we have to understand the unaccompanied verb 'to be' affirmatively, and the second we have to understand it negatively. It can not be both. A prose translation of Parmenides' words tells us how this divine revelator places the resulting choice before Parmenides and informs him of the option he is to take, on the grounds there is nothing to be said about what does not exist:

> One path only is left for us to speak of, namely that *It is*. In it there are very many tokens that what is is uncreated and indestructible; for it is complete immovable and without end…a continuous one…Therefore it must be altogether or not at all.[13]

By choosing "it is" as instructed, Parmenides chooses the affirmative unaccompanied use of the verb "to be". He is then severely restricted in the predicates he can apply; "is green" is only one use of the verb "to be" ruled out. The revelator alludes to ideas like male and female, presumably as examples that require the negative unaccompanied version of the verb "to be" (a boy is not a girl) and must be ruled out.[14] Parmenides has to eliminate all uses of language that have as consequences a negative understanding of the unaccompanied verb "to be." Plato's *Parmenides* is an imposing dialogic monument of how onerous a task this was. Most relevantly here change had to be rejected. Changes require states that are not the same as previous states requiring the disallowed understanding of the verb. However even concepts like wholeness and unity can be found to fall prey to the Parmenidean objection: a whole is not a part, unity is not duality.[15]

Let us turn now to consider how tradition was argued for and became established as a reading of Heraclitus. The first of three prominent traditionalists I will cover is Plato. The association between Heraclitus and this early reading of the theory

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[13] Burnet (1971) [1892] pp.174-175. Thus also, p.173 as regards that which is not: "do thou restrain thy thought from this way of inquiry."

[14] Other theories about the later verses in Parmenides' poem (e.g. Graham (1997) p.20) could fit a reading where there is a incompatibility between Parmenides' theories represented by the earlier verses, and the later material.

[15] Plato (1996). On change see pp.142-143, 138c-e; On parts/wholes see pp.141-142, 137c-d.

of flux is diluted through a claim regarding the multiple authorship of what Plato terms "The Secret Doctrine." But, because Plato's name was to carry such authority, and because "flux" as strongly associated by Plato with the Secret Doctrine is, as pointed out in Chapter One, also naturally associated with the name Heraclitus, the reading is foundational for tradition. I am not claiming that Plato was the earliest traditionalist; he could well have been "misled by post-Heraclitean exaggeration and distortions of Heraclitus' emphasis on eventual change; in particular by Cratylus."[16]

The "Secret Doctrine" relates qualities to a perceiver.[17] "[Q]ualities come into being as a result of the interaction of objects and perceivers" but different interactions between objects and perceivers are possible.[18] Plato thinks the concept of quality may suffer from "inconsistency." What is *small* for me far way might be *big* for you right next to it. Of course the "inconsistency" can be easily resolved by qualification. Qualifications could take the form "for you" and "for me" or "viewed close up" as opposed to "seen from a distance," as is obvious in these cases of discrepancies about smallness.

However Plato's Secret Doctrine does not avail itself of this escape route. McDowell takes Plato's point to be that qualification would encounter a fundamental Parmenidean problem. Qualification falls foul of Plato's interpretation of a Parmenidean principle that if anything "is in any way not *f*, it is not the case that it in any way is *f*."[19] So for example if there is some way a cow is not fat, say in comparison to another fatter cow, then there is a way in which the cow is not fat, and so it simply cannot be taken to be fat. But there we are, faced with an animal that seems to be a fat cow. The Secret Doctrine deals with this by claiming the cow can be thought of as "coming to be fat" rather than "is fat." This harks back to the tenuous relationship other linking verbs beside the "verb to" be have to judgments about what is real and with two possible

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16 Kirk, Raven and Schofield (1983) p.195. See also p.186. Kahn (1979) p.87 observes that it is widely recognised that Cratylus began the philosophical custom of projecting his "own preoccupations onto the text of Heraclitus." After Plato the Neoplatonists followed suit.

17 McDowell (1973) p.120 ff.

18 *Ibid*. p.123.

19 *Ibid*.p.126.

outcomes.

Firstly by "'*x* is coming to be *f*' we mean that *x* is engaged in a process of change which we would expect to terminate in *x*'s being *f*."[20] This is not available to anyone committed to a traditional account of flux since to be engaged in this (or any) process (taking place over time and involving changes) would require that the object persist through change. Here, though, the object's attributes are merely expected rather than realised. With any and all attributes of an object expected rather than realised, persistence is also expected rather than realized. The object does persist, but in only in a non-material domain of "expected things" that Plato does not yet relate to that of "real things." Here Plato is indeed interested in pursuing an idealist conclusion, leaving the first possible outcome of the Secret Doctrine to tell a story about our expectations rather than about real persistence. This is not directly a traditional theme.

A second possible outcome of this doctrine is obviously in keeping with tradition and does bring the expectation to bear on reality, but with disappointing results. Here we have it that "'*x* is coming to be *f*' might also be used at the instantaneous terminus"[21] where *x* does arrive at being *f*. This is the moment when our expectations that *f* will be attained by the object are fulfilled, however persistence remains only in our minds. If we take an instance of *f*-ness, the Parmenidean principle applies at this instantaneous terminus since then too there would be some way that something is not-*f*. All we can do is inconsistently interpret the principle to mean that if anything is *f*, it is also, due to the Parmenidean principle, not-*f*. A contradiction arises wherein the object is both *f* and not-*f*, and confronted with this we can only understand it to mean that as soon as an object is *f* it becomes not-*f*. We have a series of discontinuous instants rather than any stable period of *f*-ness or any other qualities. Every object would be instantly losing all its attributes as a result of a Parmenidean concern; it would not persist through time or change, and this is the traditional result.

In reading Heraclitus, Aristotle takes up the second outcome of the Secret

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[20] *Ibid*.
[21] *Ibid*.

Doctrine, at least in so far as an inconsistency is produced. As I remarked in the introduction, using Aristotle as a source for Heraclitean thought is not straightforward. One reason for this is the confusing account Aristotle gives of the theory of flux. Though he is not clear on the issue, Aristotle portrayed Heraclitus as thinking of fire as a Milesian-style constitutive substance.[22] If this is right, Heraclitus could still have synchronic difference as Thales could. He would just have trouble reconciling his Thales-style theory with the observation that all change did not just tend to *ecypyrosis* or universal conflagration. The problem would be parallel to Thales' trouble accounting for a lack of continual drowning. In both cases it makes non sense to think of a constitutive substance not gaining and even losing in oppositional battles. Just as the only changes should have been wet ones for Thales, these should be fiery for Heraclitus read along constitutive lines — *ecypyrosis* would be the *ne plus ultra* of such change.

Such *ecypyrosis* then really draws attention to rather than solves the Thales problem. It would leave (for example) seasonal periodicities unaccounted for, but in any case there is a further problem for Aristotle's Heraclitus, that does lead to an inconsistent reading. Aristotle preferred a model of oppositions different to the Milesian model of degrees of opposition (i.e. where more of one quality is accompanied by less of its opposite — the Milesian model was mentioned in the previous chapter). In *Categories 10* Aristotle thinks that either a quality or its opposite is instantiated. For synchronic difference, which would be, for example, difference in degrees of hotness at one point in time, more of one object's parts would have the quality rather than not as compared to another object at that time. For change parts would lose one of the opposites and gain the other over time — if an object gained at least one hotter part, it would be hotter.[23]

Aristotle then assumes that Heraclitus had his (Aristotle's) and not the Milesian model of opposition, and thus, when it comes to the quality cold, Heraclitus contradicts

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[22] Cherniss (1964). pp.16, 78ff., and p.91, fn.387 notes how unclear Aristotle is about Heraclitus, including about whether fire has a special role. Stokes (1971) writes p.102 that Aristotle, "clearly failed on more than one occasion to distinguish adequately between the Heraclitean and Milesian world views." Wiggins (1982) pp.19-20 fn.20 notes the same Aristotelian obfuscation. As does Barnes (1979) pp.62-63, despite placing some store in Aristotle's reading. The confusion is such that we should not be surprised to find Du Bose (1972) p.5 simply states "Aristotle treated Heraclitus' fire as substratum."

[23] Cherniss (1964) p.4 calls the contraries (as the opposites are called on this model) "extremes."

himself. On the one hand any instance of coldness is an instantiation of the quality of coldness taken as an absolute and to the necessary exclusion of any degree of hotness. But on the other hand hotness cannot be excluded because it is the universal constituent of all things for Aristotle's Heraclitus. So this Heraclitus both affirmed and denied that a cold object was cold, and fell into contradiction. To remedy the problem Aristotle set about theorizing a featureless substratum as a component of all objects.[24] As so far presented, the Heraclitean trouble would arise only for some qualities; obviously for coldness, but maybe also for associated qualities like wetness etc. Nevertheless in embracing a Milesian model of constitution and an Aristotelian model of opposition, this Heraclitus was inconsistent.

Another way Aristotle's Heraclitus has been read as falling into contradiction concerns qualities beyond mere coldness and those associated with it. Cherniss (1964) suggests that Aristotle attributed to his predecessors the idea that due to *ex nihilo nihil fit* opposites must both be in the object at all the times.[25] The idea is that with both opposites required for change, and neither able to enter the object from without, we must both affirm and deny the presence of the opposites in an object because these cannot come from nowhere. Like the contraries model, this is different from the Milesian model of opposition later used by Heraclitus. Also note that unlike the version of Aristotle' Heraclitus just presented, it is not just one quality that is contradictory as with hot and cold, but all since all are equally subject to *ex nihilo nihil fit*. All qualities would give rise to contradictions, and perhaps in the case of coldness there would be an additional reason to postulate an inconsistency.

For Aristotle's Heraclitus contradictions seem to proliferate around other qualities beside coldness in any case. Priest (1998) claims that Aristotle was an early proponent of the idea that contradiction in a theory entails that everything is true in that theory (the principle '*ex falso quod libet*'). Aristotle is a forerunner in that he did not explicitly argue for the principle, but tended to assume it. Priest thinks that Aristotle then tended to believe that if Heraclitus or anyone else endorsed a given contradiction,

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[24] Grene (1963) p.116, Barnes (1979) pp.55ff., Kirk (1959) p.75, Graham (1993) p.22.

[25] Cherniss (1964) p.78.

then that person was endorsing all contradictions. The contradiction around coldness as per the reading where Heraclitus has a Milesian theory of constitution would be an instance of such a contradiction. On one reading Aristotle also attributed to Heraclitus some inkling of *ex falso quod libet*, but not enough to realize that having everything as true in a theory is undesirable. On this reading the tendency is then for Aristotle to have Heraclitus think that if any qualities give rise to contradiction, all qualities gives rise to contradiction. Priest writes:

> Herakliteans, according to Aristotle, thought everything about the world was in a state of flux, and that the way to describe this was in a contradictory way. A change from α to ¬α was thus to be described by the contradiction $\alpha \wedge \neg\alpha$.[26]

This Heraclitus seems to believe that change is just the possession of the unity of oppositions as so understood. This is his theory of flux: change from having to not having a quality. With all qualities undergoing this process all the time, no object can last longer than an instant, and traditional flux results.[27]

There has been some confusion about whether or not Aristotle thought Heraclitus had a sufficiently rich grasp of logical notions to explicitly recognise those that he used.[28] Burnet points to places where Aristotle intimates Heraclitus held this version of traditional flux only because Heraclitus preceded explicit recognition of the logical notion of contradiction and hence the principle forbidding it.[29] Burnet, setting

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[26] Priest (1998) p.96. Priest uses the term "Herackliteans" here, but granted that Aristotle is unclear about what the view of Heraclitus is, and what the view of later followers is, there is no problem with taking Priest's recapitulation of Aristotle to reflect Aristotle's traditional reading of Heraclitus himself. For triviality and contradictions see *Ibid*. p.101.

[27] *Ibid*. p.102. Barnes (1979) presents an argument for a more sophisticated way of getting the same result. For Barnes this is the result of an error accrued by Heraclitus not knowing how to use temporal qualification in propositions. Barnes relies heavily on Aristotle but does not believe Aristotle followed exactly the same path as he to the traditional result. So instead of using Barnes to read Aristotle I here just gesture to him as probably the most rigorous traditionalist since Burnet's break with tradition.

[28] This is because as Kahn (1979) p.192 and p.324, fn.249 notes Aristotle sometimes only insinuated Heraclitus was inconsistent and then on the basis of the ideas of disciples or later commentators.

[29] Burnet (1971) [1892] p.144, fn.1 thinks that Aristotle believed that by being questioned in a certain manner "Herakleitos could be made to admit the principle of contradiction; as it was he did not understand what he said. In other words he was unconscious of its logical bearing."

the trend for recent scholars, wants to show us how unreliable Aristotle is when he does claim Heraclitus was a logician. But a question remains as to how Aristotle's Heraclitus recognised the inconsistency in his thinking to take it to entail that as soon as an object possesses a quality it loses that quality.

Other commentators take Aristotle to be attributing the logical notion of contradiction to Heraclitus, if not the principle forbidding contradiction. By not understanding contradiction must be forbidden, one reading along these lines could have it that Heraclitus was taken to not understand contradiction properly. This idea is taken up by Popper and covered in Chapter Four, and is compatible with the idea that Aristotle's Heraclitus did not recognise how dire it was for a theory to fall foul of *ex falso quod libet*. Another idea along these lines is suggested by Priest's (1998) reading of Aristotle, and is certainly compatible with Hegel's reading (and Mortensen's (2002) version of this reading also covered in Chapter Four). It is that Heraclitus recognized contradiction but that he actively denied *ex falso quod libet*. Perhaps, if as more recent scholarship suggests, Heraclitus did not recognize, much less court, contradiction, what happened instead was that he became a figurehead around the time of Aristotle for those who denied that contradiction entailed triviality. Wedin's (2004) reading of Cratylus could be take to suggest this if we think of Cratylus as Heraclitus' pupil.

Aristotle does not need to assign any Parmenidean concerns to portray Heraclitus as traditional. Note though that by having fire as constitutive, this Heraclitus does not seem responsive to Anaximander's argument to the effect that we need an idea of opposition, and not another constitutive substance. Aristotle also suggests support for his reading by hinting it is a response to Parmenides. At *Metaphysica* 4.7 we find what sounds like a response to Parmenides' "it is" in the slogan "it is and is not." At other times Aristotle resorts to *oratio obliquy* to insinuate the same idea (*Metaphysica* 4.3 and 4.5).[30]

Hegel's traditionalism picks up these hints to have Heraclitus respond to

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30 Recent scholars may also regard fr.81 as a paraphrase of Aristotle. It reads "We step and do not step into the same rivers; we are and are not." Kahn (1979) p.289 agrees with Burnet that the fragment is the work of the dubious Heraclitus Homericus; a personalised recapitulation of Aristotle. Also a target of Kirk (1954) *passim*. Burnet (1971) [1892] doubts Aristotle's reliability and clarity p.144 fn. 1.

Parmenidean concerns by beginning with "it is."[31] Hegel's Heraclitus thinks no affirmative judgment is made by using the verb "to be" unaccompanied since nothing is decided about any subject. This Heraclitus then believes Parmenides made an error in allowing himself the notion of being as a category of affirmative judgment. If a person's notion of being is the category of affirmative judgments they believe are true, and there are no such judgments, we cannot categorise our unaccompanied use of language with the notion of being. Instead we have to use the notion of nothing. However, for Hegel the denial there is any affirmative judgment is itself an affirmative judgment since it affirms an absence, so we do have something to place in the category provided by the logical notion of being. But what is this judgment, what does it decide? Again the answer is nothing. In this way, for Hegel's Heraclitus, the arrival at nothing always constitutes a real judgment getting us back to being, and the arrival at being is always empty in these circumstances, getting us to nothing. There is an eternal oscillation between being and nothing he then understands as a new notion: Becoming, which he believes embodies a contradiction.[32]

We now arrive at the traditional theory of flux. Congruent with Parmenides as read above, this traditional Heraclitus believes that the unaccompanied use of the verb "to be" precedes any transitive use.[33] That is before any transitive use of the verb "to be" (one involving a complement) there is the unaccompanied use of the verb to be (without a complement added) upon which the transitive depends. This yields Hegel's traditional reading of the theory of flux. As soon as we say of some object that "it is *x*" (has a property), then we must say "it is not *x*" as well since Becoming forces us to say "it is not" alongside any use of "it is." For this Heraclitus all objects are in transition, no object exists for more than a moment, since when we say it is *x* and grant that an object

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31 Burnet (1971) [1892] p.144 fn. 1 criticises Hegel for this move on the grounds that Aristotle is unclear, and notes the famous Hegelian misreading of Aristotle. Burnet cites Hegel's *Lectures on the History of Philosophy* Vol.1: "being does not exist any more than non-being," meant to suggest Heraclitus did refine his concept of being into that of Becoming. As Burnet notes Aristotle actually attributed the sentences to the Atomists: either Leucippus or Democritus.

32 Regarding a deliberately inconsistent Heraclitus see Hegel (1991) [1817] pp.144-145. Burnet (1971) [1892] p.144, fn.1 points out that Hegel read Aristotle thus, and that this was an influential reading of Aristotle. On Becoming also see Hegel (1999) [1812] pp.82-83. For similar readings of Hegel on Heraclitus see Mure (1967) p.29, Harris (1970) p.133, Taylor (1975) p.233 and Pinkard (1985) p.94.

33 Hegel (1999) [1812] p.85.

has a property, we must also state it is not *x* and grant it has immediately lost that property. Every instant is both the first and last instant in which any object has any given attribute.[34]

Working back from Becoming to the judicative use of language returns Hegel's Heraclitus to "it is and it is not." This slogan, referring as it does to how we should use language, is Hegel's version of the narrow Doctrine of the Unity of Opposites; specific examples of how we should speak would be components of the wider Doctrine of the Unity of Opposites, e.g. we should always say "it is and is not a river," "it is and is not a bow," since these objects are all Becoming, just as is any property these objects have. We should also say "it is and is not muddy," "it is and is not well-strung", etc. But I will leave discussion of other perhaps more enlightening ways the Doctrine of the Unity of Opposites might be read until Chapter Three.

The influence of these thinkers was enough to ensure the existence of other prominent traditional commentators on Heraclitus between Plato and Hegel, and until the time of Burnet. Wiggins (1982) does gesture at the Heraclitean decree made by the philosopher-emperor Marcus Aurelius which in Burnet we read as fr. 25: "Fire lives the death of air, and air lives the death of fire; water lives the death of earth, earth that of water." [35] Wiggins cites this decree to suggest that closer to Heraclitus' epoch and co-existent with tradition, there were ideas supporting Wiggins' own reading of Heraclitus, one stressing transformations and which will be discussed in the coming section. What Wiggins does not mention is that the emperor also absorbed tradition. For Marcus Aurelius the transformations come so fast and in such a way that no such object lasts longer than a moment.[36] Tradition had a tight hold, and from an early point the traditional "no persistence" conclusion dominated understandings of Heraclitus.

In other instances of Heraclitean scholarship, we find tradition causing problems. For instance after Hegel and before Burnet, influential thinker Ferdinand

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[34] See Hegel (1955) [1831] p.283 ff for Heraclitus' use of these points.

[35] Wiggins p.14.

[36] For Aurelius' traditionalism see Bussell (1910) section III.V.A: "The Perpetual Flux and Monotony of the World Processes."

Lassalle, while interested in further thoughts he credited to Heraclitus, clung to tradition. Lassalle says of Heraclitus: "As in the Hegelian philosophy laws are conceived as the realisation of the universal actual Will."[37] On Lassalle's reading Heraclitus is convinced not just of the Hegelian role for law in society, but also the traditional theory of flux, and would have had to reconcile apparently incompatible ideas. Under a traditional theory of flux there could be no lawmakers as person-objects lasting more than a moment in the material world, while for Hegel's traditionalism "will" exists only to judge that the world is in ceaseless transition.[38] A traditional commentator who wanted Heraclitus to have broader interests could suggest that Heraclitus went through different stages of intellectual development. Hegel, Plato and Marcus Aurelius are all evidence of a further idealist response which was to emphasize the role of abstract objects not partaking in the physical flux. A "will" might be such a thing. None of this weakened the firm grip of tradition for many centuries.

As I see it, Burnet was crucial in loosening this grip. It is not my intention to defend the historical accuracy of Burnet's (1971) [1892] reading of Heraclitus, which as a work of classical scholarship has long been eclipsed by more thorough attention to the Greek sources (e.g. Marcovich (1966)). Hegel was the last great traditionalist, and what is important to note is that Burnet confronted Hegel's reading and impugned Hegel's often unquestioned classical scholarship. So while this does not ensure Burnet himself historically accurate, the next chapter can consider how Burnet began the move away from tradition by seeking sameness and stability in Heraclitus where the tradition had only found constant difference. This is why Burnet is important here, for to do so Burnet relied upon an alternative dating to that he found in Hegel and which thought of Heraclitus as responding to Anaximander more or less as read here. Burnet's Heraclitus then had to account for the origin of the opposites. This Heraclitus enlarges on the details of change; describing how it is the opposites came to meet.

Burnet's importance is manifest when we bear in mind that it is the approach to change via Anaximander that crucially separates off the traditional from the post-

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37 Quoted in Bernstein (1970) [1893] p.30.

38 Hegel (1955) [1831] p.286.

traditional readings that interest me. Rather than denying persistence, on such a reading the theory describes persistence, if not in individual cases. More important for me than the support for this approach in terms of the translation of fragments an ancient Greek, and the allied exercise of historical methodology, is the metaphysical utility of such a 'Burnetian' reading. By setting out the further components of any change, on a reading like Burnet's, Heraclitus is all the closer to a statement of the Problem of Change, and I shall argue, provides the rudiments of an account of it.

I think the reasons why the traditional reading eventually lost prestige have been drawn out in the foregoing discussion. Beside the instances of poor scholarship he would have found around the personage of Heraclitus, Burnet certainly would have been given extra confidence to break with tradition because he believed Parmenides responded to Heraclitus and not the other way around. Of course even if his dating was correct it would not alone debunk tradition as a reading of the historical Heraclitus. As in the traditionalism associated with Cratylus, Heraclitus may have come to the traditional conclusion other than by listening to the words of Parmenides. Or Parmenides may have come to his ideas when quite young, and Heraclitus responded as a much older man. But the strong possibility of an error here would have made the traditional reading of Heraclitus, entrenched since Plato, seem all the more fallible.

The extremism of the traditional conclusion gives a good indicator how unattractive the traditional reading is as a proposed metaphysic. It is incompatible with most other theories if we grant that other theories postulate persisting objects. The Lassalle case shows just how difficult it is to fit any other ideas attributed to Heraclitus into its inhospitable metaphysic. Given the Principle of Charity, that alone brings into question the historical plausibility of tradition. Moreover the metaphysical value of the ideas involved is questionable too, something I will discuss as I proceed. A rebellion against Hegel's system occurred not long before Burnet wrote, as I will mention next chapter.[39] Without the authority of names like Hegel to blind many to its failings, tradition would come to seem all the more problematic. There are versions of the traditional reading to be found even today, but often these are kind of mirror images of

[39] See Engels (2003) [1886] Part 1.

my own project — metaphysical investigations of ideas of complete instability associated with the traditional Heraclitus.[40]

Nevertheless I cannot resist reiterating that many historical serious question marks hang over such traditionally–orientated projects, and that the metaphysic invoked is a highly problematic one. After Burnet there was the attractive possibility that the study of Heraclitus could give us an interesting view about objects persisting through change. In the end this is why I am interested more in the reaction to tradition than the tradition itself. The tradition will never tell us anything about persisting objects other than that such things are impossible.

To follow recent scholarship and shift the focus of the theory of flux onto objects that persist though any number of moments and any number of changes, let us think how Heraclitus might have responded to Anaximander instead of Parmenides. The theory of the *apeiron* ruled out any kind of principle to guide change, leaving change as unable to be understood other than as a tumultuous clash of opposites. Fr. 44 begins with "War is the father of all and the king of all." The fragment is one that makes plausible the idea that Heraclitus was searching for some kind of guidelines by which to understand change; War as the battle of opposites is the Milesian idea of change, and a king suggests an ordered dominion, and some kind of law instead of just randomness. In Chapter Three this Heraclitean project will be shown to lead to a description of what it is like for any object to persist through change. It is this description that I will argue can give us a reason to prefer one of the existing accounts of the Problem of Change, once we introduce the required logical notions into the discussion in Chapter Four. For now, let us turn to consider a post-traditional reading of Heraclitus.

2.2: Wiggins on Heraclitus' Response to Anaximander

I take up the story I left off in Chapter One regarding Anaximander's random, atheoretic ideas of change. Wiggins (1982) takes up this story as well, and over the next

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40 Richardson (1994) p.290 (the Heraclitean cosmos as nothing more than ceaseless flowing) and Priest (1998) p.119 (the Heraclitean cosmos as ceaseless difference) both explore tradition, the former to draw aesthetic conclusions, the latter to draw logical ones. Burns (1997) p.4 lists some other more recent scholars sympathetic to tradition, but does not comment on these. I have already mentioned Barnes.

section (where I focus on Wiggins), and into the next chapter, we will find he also consolidates a number of post-traditional themes that can lead into later discussion of Heraclitean persistence. I will argue that Wiggins' interpretation of the fragments gives us a plausible reading of Heraclitus' theory of flux, and is part of a recent scholarship that is, if anything, more plausible as an account of history than is tradition. There is, of course, no reason why the newer strand of commentators would agree on all things. Discussion of their differences, I will continue to assume, can give us a more coherent post-traditional approach to Heraclitus. But before we get there, let us reconsider Milesian philosophy.

Wiggins thinks one thing Heraclitus and Anaximander had in common was the Principle of Sufficient Reason. It would be one of the basic rules for dealing with the problematic Anaximander had set later thinkers. Wiggins formulates the principle as "if *p* is true something must be true which explains why *p* is true." Further, because "then it must be possible to argue backwards — albeit against the direction of implication — and infer from *p*'s truth whatever best explains *p*,"[41] Anaximander then validly derived another ground rule: Inference to the Best Explanation: "if *q* is the best explanation of why *p* holds then if *p* is true *q* must be true too."[42]

Cherniss thinks it implausible that Sufficient Reason, and hence Argument to the Best Explanation was in use by Anaximander. He thinks that as late as Anaximenes it was lacking since this last Milesian cosmologist did not give sufficient reason for his processes, but only sought to detail Anaximander. Anaximenes' processes rested on assumptions since felting, condensation etc. are just added on to fill out the theory. The evidence for the processes is only by analogy with atmospheric events, and these have no explanatory power, most obviously failing to come to terms with Anaximander's theory which left change as random. Cherniss then claims sufficient reason was read into Anaximenes much later — as a Peripatetic reconstruction.[43]

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41 Wiggins (1982) p.3.

42 *Ibid*. p.2. The convention Wiggins adopts is one in which *p* and *q* are place holders for the propositions of later propositional logic rather than as a suggestion this kind of notation was in use by Heraclitus.

43 Cherniss (1951) p.321.

Cherniss' approach does not really threaten the plausibility of Wiggins' reading. Even if Cherniss is right it does not automatically cast doubt on the use of the principle by Heraclitus who is later than Anaximenes. If only Heraclitus and not Anaximander used the principle then Heraclitus may have set himself the ground rules by which he responded to Anaximander. In any case, relevant to Wiggins' reading of the Heraclitean response to Anaximander, the use of the principle may well have been uneven and yet in use from an early stage. That is then, as today, the principle may be applied by some thinkers and not others, or unevenly applied by a given thinker. Anaximander and Heraclitus may have used the principle even if Anaximenes was remiss in its application.

It could also be objected that, if these ancients were in the childhood of philosophy, they were too early to consistently use any principle of thought. The objection could be troublesome to the ongoing discussion here since a number of principles of thought will be forwarded to make sense of Heraclitus' response to Anaximander. One thing that comes out of Wiggins' reading at this point is the idea of development; a principle of thought can be applied and even explicitly articulated to subject matter that previously lacked this application; the analogy is with the *learning* process in childhood. Further, without logical notions we can still consider Heraclitus child-like; his value to us today would be that of gaining a fresh perspective from piecing together his observations and the arguments he did use.

Equipped with the Principle of Sufficient Reason, Heraclitus turns his attention to Anaximander. Wiggins points out Heraclitus is usually taken to be referring to Anaximander in claiming in fr.62: "We must know that war is common to all and strife is justice… ."[44] This is because strife is taken to refer to the battle of oppositions and so to change. When responding to Anaximander, talk of justice and injustice is indeed apposite. When the world separates out from the *apeiron* it does so mysteriously, and as random temporary portions separate from the eternally and justly indivisible mixture. Later, in the resulting world order, an opposition triumphs here and there, disturbing the balance of opposites received from the *apeiron*. Other changes tend to balance this

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[44] Wiggins (1982) p.5.

disturbance and instead of the portions taken from the *apeiron* being exactly re-established, the tendency is for over- or under- compensation. This too is unjust.

To paraphrase Wiggins, today we may say Heraclitus understood Anaximander as presenting a *modus ponens* argument. If the world separates out of the *apeiron*, then change is unjust, and the world did so Hence change is unjust. However, for Wiggins' Heraclitus change is just so we have reason to believe the world did not separate out of the *apeiron*. Without the *apeiron* two things now have to be explained: the origin of the oppositions — Thales at least attempted to explain the origins of things, if not oppositions. Also why, without the need to approximate the pre-established balance of a world cast off from the *apeiron*, change continues rather than the oppositions making a truce, yielding to each other on the basis of their respective presences.

According to Wiggins, Heraclitus deals with the second question first. Wiggins is aware Heraclitus affirms cosmic unity in fr. 1: "It is wise to hearken, not to me, but to my Word, and to confess that all things are one." This is of a different kind to the cosmic unity of the *apeiron*. If change is not unjust and there is no *apeiron*, then neither is a given world order an aberration separated from an infinite whole. Without this separateness of the existing world order, Wiggins' Heraclitus can provide an argument to the effect the cosmos is a unity. He does so by using the Principle of Sufficient Reason.[45] On earth we find the cyclical nature of oppositional battles, as in the seasons; in the sky there are also constant cyclic changes that have been there longer than most things found on earth. Cosmic unity gives us sufficient reason to believe that smaller objects are part of larger objects. The earth can partake in an object large enough to include in a celestial store of change so immense it seems eternally active. Likewise the oppositions accounting for the cycles of larger objects like the heavens are found in smaller components such as the earth.[46] Change is everywhere, causing the opposites to have to constantly retake old ground and conquer new, and all without these opposites trying to re-establish some pre-ordained proportions of their respective presences.

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45 *Ibid*. pp.9-10.
46 *Ibid*. p.9.

This leads onto the transformative aspect of Wiggins' reading. For Wiggins now explains the origins of the opposites in the absence of the *apeiron*. If a smaller object obtains the action of change from a larger object of which it is a part, what is gained would be active matter if we accept the action of change is such matter. Active matter is itself presumably transforming to allow bigger objects to share active matter with smaller objects.

Wiggins' Heraclitus does not concentrate on the details of how. Instead he notes that if the smaller object is to retain its character, and not become homogenous with the larger in which it is embedded, the active matter it receives from the larger must transform into the battling oppositions hosted by, and characterizing, that smaller object.[47] For the oppositional battles are not just found in objects large and small, these are also what characterize those objects. Thus the active matter of the greater heavens must be transformed into the oppositional battles prominent on earth: for example the light and dark of the passing days, and the actions of various oppositions found as the seasons come and go.

This yields an explanation of the source of the opposites. Wiggins thinks Heraclitus encourages us:

> to suppose that when sea changes into earth and back again, there is something that is not lost at all. And surely Heraclitus thinks the same applies in cases where fire is condensed into sea.[48]

Wiggins' Heraclitus was now able to postulate a constant amount of active matter in the cosmos. The amount of active matter circulates cyclically through all objects, but in the largest imaginable object, the cosmos itself, it neither decreases nor increases. On Wiggins' reading Heraclitus used the image of fire to put across the resulting point. Just as the amount of money in a market could be constant while that money changed hands,

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47 *Ibid*. p.5. On this reading the battling opposites can be thought of as battling abstract qualities. Fr. 39: "Cold things become warm, and what is warm cools; what is wet dries, and the parched is moistened." Wiggins thinks a more precise use of concrete and abstract opposition can be found in Heraclitus.

48 *Ibid*. p.14.

so the amount of active matter, considered as the amount of cosmic Fire as opposed to tongues of fire, remains the same in the cosmos, transforming into the oppositional battles comprising these objects. Fr. 22 reads: "All things are an exchange for Fire, and Fire for all things, even as wares for gold and gold for wares." In this way, shared between different objects, the action of change or active matter might be thought of as changing hands.

Previously we found that for Aristotle qualities were possessed outright, to the exclusion of each other. Opposed to this reading, and along Wiggins' lines, the older Milesian model of opposition discussed in relation to Anaximander in Chapter One, where less of one quality means more of its opposite, could be combined with this idea of transformation to give us a consistent Heraclitus. And this is exactly how we will find the recent scholarship in general proceeding; when the limited amount of fire transforms into things such that there is more of one quality, then there is less of its opposite in that state. A battle compares this with another state, finding less or more of an opposite in that other state. Again this gives us a Heraclitus closer to Anaximander than Parmenides (the latter conceiving of affirmative and negative verb use as contraries). The theme will be developed mainly in the second section of the next chapter. At this juncture I might note that Aristotle's model is not incompatible with the Milesian one if it is interpreted as the simplest case of opposition: either one or the other. The Milesian model of opposition then builds upon this, dealing with the problem of differences of degree.

Talk of transformation here also suggests that instead of fire as constitutive (as per Aristotle's reading), Wiggins presents Heraclitus thinking of active matter or fire as energy. This becomes clear when Wiggins indicates the similarity of his reading of Heraclitus to a view of change we could draw from thermodynamics. He starts with a similarity to the First Law of Thermodynamics.[49] Just as does energy, this cosmic Fire as energy and as the action of change circulates, instead of being created or destroyed on earth or in the heavens. Objects cannot generate the action of change from nowhere, and in fact lose it into the larger circulation. Since the oppositional battles characterising

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[49] For the first Law see Wiggins (1982) p.18 (I have changed the nomenclature). If there are two states of the cosmos such that energy is neither created nor destroyed, then these states are available, and can be attained. In other words the cosmos could make a transition from one to the other. For a characterisation of this Law see Aktins (1986) p.86.

objects are compared energy states we can differentiate from surrounding states, objects cannot exist without the input of energy necessary for those states. The result is similar to how, under the Second Law of Thermodynamics, for a system to maintain a series of specified states, the "coherent" input of energy is required.[50]

On larger scales, there is also the threat of a destructive homogeneity. Without cosmic Fire as energy and as the action of change, things would dissolve into sameness, losing energy to the vaster circulation of it across the cosmos. Fr. 43 reads: "Homer was wrong in saying: 'Would that strife might perish from among gods and men!' He did not see that he was praying for the destruction of the universe; for, if his prayer were heard, all things would pass away." If we also compare the transformative power of what Wiggins' Heraclitus conserved to the transformative aspect of energy taken up by Einstein, we come to a startling conclusion. Cosmic Fire is a basic idea of energy as is still employed in physics to this day.

This gives us an interpretation of fragments where objects are characterised by oppositional battles. Objects are the type of thing that, taking a place in the circulation of energy, exist as certain energy states, that is only given certain results of oppositional battles. For instance fr. 46 reads "It is the opposite which is good for us," and can be read along these lines as claiming that just as people are in good health when the oppositions that make them up are balanced, so all objects last in so far as the oppositions that characterize and compose these objects remain within certain parameters. In contrast to tradition we have an account of the conditions under which an object in general might persist through change. That is, change must follow certain guidelines and we find these guidelines in operation when we consider how it is possible for physical objects as a type of thing to persist through change.

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50 Wiggins (1982) p.13. According to the 1st Law, an object could spontaneously accumulate energy from its environment provided that the overall energy in the object/environment system was conserved. To do so, it must not just accumulate energy, but do so in such a way that its particles move more or less in one direction; this is "coherency." The object is then differentiated from its environment. Because the number of incoherent states is far greater than a given coherent state, just as particles and energy tend to disperse, so too coherency will also tend to disperse, and the object will become homogenous with its environment. "Irreversible change arises from purposeless drifting into the available states" (Aktins (1986) p.86), the irreversibility due to the fact that there are far fewer coherent states and dispersal occurs only from the smaller number of states to the larger. The coherent input of energy into the object/system can, against the tendency to dispersal, keep the object differentiated from its environment.

Is the theory of flux so far presented really a way of laying down rules for change against Anaximander's atheoretic conception? Well yes. Change obeys what are effectively the first and second laws of thermodynamics (hereafter The Laws), and is not just a random battle of oppositions. The so-far unanswered question is: what makes the first move in this theory possible? The Heraclitean cosmic unity used to introduce Wiggins' reading is based on little more than a declaration that change is just, and this outright denial of the *apeiron* alone could hardly have been enough to be a convincing response to Anaximander's problem of random change. Examining how Wiggins handles this will also tell us about the relationship between the theory of flux and logical notions.

We need a reason to believe that Heraclitus' has provided the best explanation of the warring oppositions by denying the existence of the *apeiron*. Neither Heraclitus' principles of thought, nor his heavenly observations carry the day when it comes to a reason to believe his alternative to Anaximander. For Wiggins the Milesians were keen astronomers,[51] so it could not have been Heraclitus' observations of the vast reserve of heavenly change that let him dismiss the *apeiron*. The evidential basis, and the advantage Heraclitus has, is, for Wiggins, an insight into how objects are the kind of thing that can persist through change.

In fr.2 we find: "Though this Word is true evermore, yet men are as unable to understand it when they hear it for the first time as before they have heard it at all... ." The Word or the logos as the true understanding of the cosmos is found in language, but only upon reflection, it is not available in superficial use. Thus Wiggins argues that Heraclitus reached beyond the unreflective experience of language to gain an insight into the very concepts upon which language depends for its existence. Wiggins considers speculative insight to be Heraclitus' great strength: "The power of Heraclitus — his claim to be the most adult thinker of his age and a grown man among infants and adolescents is his capacity to speculate."[52] In context Wiggins means this alongside the

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51 Wiggins (1982) p.9.

52 *Ibid*. p.32. On the idea of Heraclitus speculating Hegel (1987) [1831] p.142 and Hegel (1999) [1812] p.91. For some other lines of Hegelian influence on Wiggins see Ellis (2001).

use of rigorous justification by Heraclitus.

Wiggins shows Heraclitean speculation in action, referring to fr. 84: “Even the posset separates if it is not stirred.” According to Wiggins Heraclitus realised that when language developed it gave the name “posset” to that drink obtained by continually mixing wine through with grated cheese. What results from habitual usage is that the name is employed unreflectively and in a given circumstance. That name or word undergoes no appreciable change, for example as a noun as spoken by an Ephesian at the time of Heraclitus. So there is a discrepancy between static language and fluid object. When Heraclitus reflected on the interaction with the world by which the word “posset” came into being, he understood what ordinary folk neglect: language labeling a changing object. He could then realize the relatively changeless name had been applied to an object that needed the continual input of energy from a wider world of change to exist. The posset case is an observation only about a very specific object, a suspension obeying The Laws. Heraclitus needed other less specific examples.

Wiggins points to another more general speculative clue in the fragments. We name the bow and life with the same word though the bow causes death. Fr.66 reads “The bow (*biós*) is called life (*bíos*), but its work is death.” Though the words here have a slightly different spelling, this time the clue is to be found in a paronomasia: we use the word for life, all things being equal, in a relatively invariant manner. We do so unreflectively, but on closer examination a certain ambiguity appears in the name that reveals the unity of the apparently separate concepts that are named. Life is also decay; in working to sustain ourselves, we are doing the work of death as well: from the moment we are born we begin to die. So it is fr. 78 begins “And it is the same thing in us that is quick and dead…” What Heraclitus discerned in the words *biós* and *bíos* was more than a pun, it was another way to understand physical objects obeying The Laws. Wiggins’ reading also makes sense of fr. 64: “All the things we see when awake are death, even as all we see in slumber are sleep.” An acute observer, unlike a sleeper, realises how the objects around us exist only in so far as these are things tending towards dissipation, a fate that is temporarily avoided through the inputting of energy into that system, i.e. that object.

If in this context we reconsider Anaximander, we have two rival sufficient reasons for the origin of the oppositions. Anaximander's external reason (relying on a source external to the world order) and an internal reason given by Heraclitus (where the ongoing existence of battling oppositions was explained by obedience to certain guidelines). For Hesiod no reason was forwarded to explain the order of the cosmos. It was simply decreed that the world would be populated by gods and goddesses, and the reason for their existence, at best, genealogical. Once we come to Heraclitus, we find he can argue against Anaximander's explanation of the cosmos. As Wiggins intimates, at most one is the right sufficient reason, and if we should believe one is right, at the most that one provides the better explanation.

For Wiggins, Heraclitus had relied on his speculative observation to better account for the evidence. With The Laws in place, the theory of flux better accounts for the battle of oppositions than the ungoverned change required by the postulation of an *apeiron*. There is support in the fragments for this claim. The perceptive and intelligent use of the senses is required by fr. 4: "Eyes and ears are bad witnesses to men if they have souls that understand not their language." There is here a hint of a chiasmus wherein we use the senses to understand language and language (and theory) to understand (the evidence of) the senses. We then find the stability we take for granted and find in language actually results from circulation, transformation and the change inherent in oppositional battles. Fr.10 where "Nature loves to hide," fits speculation as well; the nature of words as much as of objects is hidden. In all these cases speculation is presented as theory-dependant observations explained by guidelines governing change, not by the *apeiron*.

Granted this, with the theory of flux Heraclitus uncovered new evidence and accounted for it. Heraclitus' explanation is a superior account of the speculative evidence that battling oppositions rely upon input of a conserved amount of change. The outcome is Laws for change derived from observations about how objects survive change. With this theory of the *apeiron* the only other competitor, Heraclitus could claim he provided the best explanation of the world order as the battle of opposites. For Wiggins it was the generalisation of these inspired and speculative observations of the theory to both the heavenly and earthly objects that made possible Heraclitus'

successful response to Anaximander's problematic account of change as random.

Although he has thus read the theory of flux as an account of change as integral to objecthood, Wiggins argues Heraclitus himself provided no account of the Problem of Change. For Wiggins, Heraclitean speculation does not show concern with individual objects persisting through change, but rather the very way we use language shows us why it is that we should think of objecthood as the kind of thing that requires persistence through change. Thus the Problem of Change was broached. But there was not much further Heraclitus could go. Wiggins does not think that Heraclitus, existing before Parmenides, developed the requisite logical notions to pursue the problem further. Wiggins' reading starts with observations about language use, and culminates in the isolation and understanding of a concept upon which language depends. Logic would go back the other way as it were. Once language comes to exist as a result of being able to depend on a stock of concepts, logic can then draw out the consequences of the use of language. Wiggins indicates what kind of logical concepts would be required to further pursue the Problem as I have suggested Cratylus may have done:

> Heraclitus did not have the logical equipment to distinguish opposition from contradiction (say), or identity from exact similarity. … he did not have the logical equipment to confuse them either.[53]

Without identity and contradiction Wiggins believes that Heraclitus did not worry about, for example, how an individual posset might continue through change. To imagine he did would wrongly take Heraclitus' interest in naming beyond speculative observation to intimately concern him with how a name can stick to a single object despite that object persisting through change. How can we call Odysseus' posset *the* same posset before as after Medea added the love potion? Identity is needed for a theory of what a given object *is* through change; Heraclitus only tells us why we should believe in general that objects persist through change, as well as going into how this happens in the narrow Doctrine of the Unity of Opposites, and treating how specific types of object persist in the wider Doctrine — but more on this in the next chapter.

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[53] Wiggins (1982) p.27.

To understand Wiggins' reading more closely here, it is helpful to consider Moravcsik's (1983) reading of Heraclitus. Moravcsik has agreed with Aristotle that certain philosophers around the same time as Heraclitus such as Empedocles were not able to understand objects as the kind of thing that could persist through change. For these thinkers, even without using the logical notion of identity to problematise the gain or loss of a property or attributes as Cratylus may have done, each object was a unique set of parts.[54] Another combination of such parts meant another object. Moravcsik terms this thinking the "compositional stage."[55]

Moravcsik and Wiggins could agree that Heraclitus is in some ways more advanced. On this reading Heraclitus adduces law-like facts to show why it is we should think of physical objects as the type of thing capable of persisting through changes (The Laws). These guidelines, by which Heraclitus responds to Anaximander, can be applied to the idea of objects as made up by certain oppositional battles, setting up the possibility of law-governed parameters within which objects generally and types of objects could persist through change.[56] To return again to Wiggins, none of this is about a given object such as Medea's posset surviving change. Heraclitus works in kind terms; all types of objects he is acquainted with require periodicities in nature to exist — or more simply are just periodicities in nature.

To adapt the river image, take the example of a tidal river. That means it is exactly the type of river that, in the course of the periodicities in nature, flows down stream at some times, and up stream at others. Heraclitus may well have recognised the type of object we call a tidal river; but according to this reading, his theory was not concerned with whether a given tidal river, such as The Brisbane River, was a single object, or whether, due to the regular changes a tidal river undergoes, there is no

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54 Aristotle (1922), 1.1(314b20), points to Empedocles. Cherniss (1964) p.3 defines Empedocles' "elemental component: a simple body irresolvable into different parts". Like a constitutive substance an element has a single inalienable property, since properties could be separable parts capable of being gained or lost. Objects so understood can not persist through change. As in the instance of Empedocles' theory, the elements making up an object either mingle or suffer a divorce. For Aristotle any variation is a divorce of the old combination of elements. Cherniss, p.59, agrees with this assessment of Empedocles.

55 Moravcsik (1983) p.136.

56 *Ibid*. p.139.

persisting object such as The Brisbane River. No philosopher is really concerned with any one object, they would presumably keep philosophizing even if The Brisbane River dried up. But the difference between Heraclitus and later philosophers is that they are concerned with how there could be some physical object such that this object persists through change, whereas Heraclitus is only concerned with how all physical objects are the types of things to persist through change by obeying The Laws. If Heraclitus was confronted by Cratylus he could only protest he understood how we use the category "physical object" by reference to persistence. Heraclitus would be flummoxed if he was informed that category could have no application in the world, since there could be no physical objects of the type found in his theory.

Moravcsik finds philosophers like Cratylus in a more advanced stage than the compositional stage namely the "attributional stage." In a fully developed attributional theory, single objects are taken to persist through change and so there is a logical notion of identity and pressure to provide an account of the Problem of Change. This is possible because once we know what it is like for an object to persist through change (what guidelines and law-like facts need be obeyed) we can ask what it means to say the object is the same one before and after a change, bringing out the tensions between sameness and difference that gives rise to the Problem of Change. Heraclitus, though, predates explicit recognition of logical notions, and so has neither the logical notion of identity and nor is confronted with the Problem of Change. So for Moravcsik, Heraclitus' account in incomplete. While he moves beyond the compositional stage when he adduces law-like facts about how objects are indeed the kind of things that can persist through change, without explicit recognition of a logical notion of identity this Heraclitus cannot be thought of as working within the attributional stage either.[57]

The inability to fit properly into either stage of thought gives us a sense in which Heraclitus is grasping for an account of the Problem of Change. Having explained the theory, the Problem of Change is the next problem Heraclitus should have considered. This motivates the suggestion that we should consider if and how his theory

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57 *Ibid*. For a discussion of the river fragment in this regard, 149ff. Kirk (1954) p.377 agrees it was physical objects as a type of thing that concerned Heraclitus, including types of objects like rivers, but not the persistence or identity of any given object.

could be applied to argue for such an account. For both Moravcsik and Wiggins, though, Heraclitus never arrived at this point. Wiggins writes "Heraclitus is not concerned with how it is conceptually possible for a substance [or object] to survive through change as that very same substance."[58] Equally, however, Wiggins nowhere denies that Heraclitean flux could further be developed or used to provide a reason to prefer an account of the Problem of Change.

Wiggins' reading is an example of an attitude to Heraclitus we will find throughout the recent scholarship. It is the belief in a Heraclitus in some ways less developed than the Heraclitus of tradition. He does not consciously employ the logical notion of identity as Cratylus may have attributed to Heraclitus if he claimed to represent him, nor of contradiction as I read Aristotle attributing to Heraclitus, nor that of being as Hegel did. Wiggins does not think Heraclitus understood formal logical concepts such as those employed by Aristotle and the Stoics. The type of observation we find in the speculations that lead to flux needs to be distinguished from analysis and refinement of language familiar from the linguistic turn in modern philosophy. It is analysis and associated concepts that are crucial for the post-traditional Heraclitus, not the linguistic emphasis. The subject matter does not have to be ordinary language but might be extraordinary, quite poetic speculative observations. With this in mind we might consider pivotal positivist theorist A.J. Ayer on the difference between speculation and the use of logic, one entrenched enough that Ayer believed it definitive of philosophy itself:

> the function of the philosopher is not to devise speculative theories which require to be validated in experience, but to elicit the consequences of our linguistic uses. That is to say, the questions with which philosophy is concerned are purely logical questions.[59]

Where Heraclitus' speculation is validated by observation, logic elicits the consequences of such speculation, as well as of the language this speculation requires.

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[58] Wiggins (1982) p.12.

[59] Ayer (1982) [1936] p.176.

Instead of insight into the formal use of logical notions, Wiggins credits Heraclitus with some acute and original observations. The tenor of Wiggins' reading accords with fr. 13: "The things that can be seen, heard, and learned are what I prize the most." That is, Heraclitus thinks the pinnacle of his thought is careful learning from the senses. Like the Empiricists, Heraclitus might seek to base knowledge on the senses, but if he was inclined to be a logician he would have sought to refine this knowledge, and fr. 13 would be puzzling. Learning directly from the senses would not be what he prized the most, rather it would be the refinement of his talk about the knowledge he gained from the senses.

I now turn to assess whether Wiggins' views about Heraclitus and the theory of flux can be in more than an arbitrary way associated with Heraclitus. Importance will be placed on who this story about Heraclitus compares to its main rival, the longstanding tradition. To situate Wiggins' reading in a strand of the recent scholarship where it shares in a certain consensus, and give arguments that this strand tells a coherent story about the evidence, I will return to the various topics that arise in the order I have presented Wiggins' Heraclitean arguments. Detail compatible with, but not explicit in, Wiggins' reading can be picked up along the way.

I start with the idea of objects scaled from big to small, with the smaller as part of the larger. If we follow Wiggins on this we would be able to interpret the last sentence (the first being about the oppositions) of the fr. 59 "one is made up of all things, and all things issue from the one" along these lines, rather than, for example, inconsistently as might be a traditional approach (Aristotle's or Hegel's). Along post-traditional lines, Du Bose (1972) has noted that the flame imagery in the fragments is as likely to relate to stellar phenomena as campfires, reminding us of Wiggins' economy of earthly energy drawing upon a beetling interstellar reservoir.[60]

For Karl Popper's (1966) Heraclitus, objects come out of and pass into the larger process of circulation, persisting through changes as these do so. Popper's Heraclitus describes these objects analogically as flames. The smaller flames provide

[60] Du Bose (1972) p.6.

the active material for the larger, and in turn the larger provide the fuel for the smaller to be possible in the great all-burning cosmic recycling operation. Comparatively large scale circulations take on the character of objecthood, and to illustrate this reading of the theory of flux we might (after Hubble) think how, for example, a galaxy might be considered an object.[61] Popper clearly indicates how the smaller battles put back into larger systems. The same idea is implicit in Wiggin's reading where the celestial feeds the earthly and the earth is part of the celestial.

For Popper's version of Heraclitus the cosmos in its entirety can only be the totality of all circulations, since this would be the largest and all encompassing flame-object.[62] This fits the cosmic unity of Wiggins' reading as the largest circulation. Hegel argued that if we are to take Heraclitus as a philosopher and not a mythographer, we cannot simply declare that Heraclitus thought the cosmos was a unity without forgetting the "very factor from which philosophy derives its interest," namely reasoned argument.[63] Considering Wiggins and Popper as part of a strand of commentators reaching a post-traditional agreement about Heraclitus' cosmic unity, we find they do not fall foul of Hegel's requirement. Neither simply thinks that Heraclitus simply postulated a single house or container when thinking about how the cosmos might be a unity, but rather applied arguments about the need for circulations to explain a changing cosmos all the way up the cosmic scale to a largest cosmic object. So this cosmic object too was changing, and interacting with smaller objects. Popper writes that there is a:

> difference between a flux or a circulation within a vessel or an edifice or a cosmic framework, i.e. within a totality of things (part of the Heraclitean theory can indeed be understood in this way, but only that part of it which is not very original…) and a universal flux that embraces everything, even the vessel, the framework.[64]

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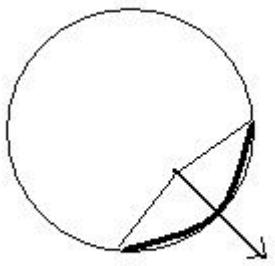
61 Popper (1966) p.207, fn.10.
62 *Ibid*.
63 Hegel (1987) [1831] p.144.
64 Popper (1966) p.205, fn. 2.

Popper's reading could draw upon fr. 69: "The way up and the way down is one and the same." We here get a consistent, post-traditional idea of a Heraclitus who thought the cosmos was a unity. It is the movements of Fire within it, from the uppermost, (largest) level to the lowest (smallest), as well as those from the lowest level to the uppermost that are the circulations unifying the cosmic whole.

The idea of circulations upon which this cosmic unity relies has also found support in Snyder (1984). She thus both adds detail and gives us a feeling for a reading it is plausible to believe is close to the historical Heraclitus. She argues our understanding of Heraclitus' ideas has been visually distorted. This is because our ideas of bow and lyres are intended to be understood graphically in a way that is not transmitted by quotes. The reference is to fr. 45: "Men do not know how what is at variance agrees with itself. It is an attunement of opposite tensions, like that of the bow and the lyre." Bows and lyres are often found depicted from the front. If we think of a bow or lyre from side-on, an additional circular overtone becomes apparent. If we consider a bow pointed at the ground in front of the archer with the following image suggesting itself:



And similarly for the lyre. Snyder thinks the association with circularity is compatible with issues of translation. For Snyder, the cycles of transformation found in the theory of flux explain the oppositional battles. These oppositions are part of a larger circular process that culminates in the battle of oppositions in an object. Hence Snyder's interesting observation supports the idea of circulations found among newer post-traditional commentators of Heraclitus.

I now move onto agreement with Wiggins' reading of the Heraclitean idea of cosmic Fire (as opposed to any mention of actual tongues of flame) as energy. Though

Popper has agreed with much of Wiggins' reading as we have already found, this equivalence has been contested by him, as will be examined below. Firstly though let us consider how this equivalence can be established. Werner Heisenberg warns against anachronistically taking the ancients to be practicing contemporary science. Yet because we can get some distance just with ordinary experience and general principles, some ancient philosophy is near to our science. Heisenberg writes about Heraclitus "if we replace the word fire by the word energy, we can almost repeat his statement word for word from our modern view."[65]

Heisenberg's claim indicates he reads the fragments mentioning fire in a similar way to Wiggins and myself to come to this quite startling conclusion. Fr.23 reads: "It becomes liquid sea, and is measured by the same tale as before it became earth." The sameness of energy as something conserved ("measured by the same tale") suggests energy that obeys the First of The Laws, and the transformations here also fit what we today think of as energy. Also fr. 20 would give Heisenberg his idea of Heraclitean energy if it is interpreted as claiming there is one world or cosmic object, eternal as energy cannot be created or destroyed, with parts that are conserved measures of energy making it up:

> Fr. 20: This world, which is the same for all, no one of gods or men has made; but it was ever, is now, and ever shall be an ever-living Fire, with measures of it kindling, and measures going out.

Fire here obeys both of The Laws as it is conserved to kindle a measure, and again suggesting energy, since energy obeys The Laws. Indeed it is to argue that Heraclitean cosmic Fire is not energy that we will find Popper attempts to prove Heraclitean Fire does not obey The Laws at all. In fr. 21 we strikingly find "The transformations of Fire are, first of all, sea; and half of the sea is earth, half whirlwind." Again, the transformational power of cosmic Fire that makes plausible Heisenberg's reading cosmic Fire as the rudimentary equivalent of a contemporary idea of energy. Fire is not just the action of change as implied by the violent transformations described

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65 Quoted in Christidis (2002) pp.170-171.

in the fragment — but capable of assuming new forms, and I will consider this more fully in a moment. In rejecting Popper's contention I will therefore follow Heisenberg to hereafter refer to Heraclitean cosmic Fire as "energy."

The idea that Heraclitean objects have a tendency to become homogenous with the environment has been supported by Barnes (1979), despite his traditionalism. He argues that fr. 39 "Cold things become warm, and what is warm cools; what is wet dries, and the parched is moistened" shows not simply the power to abstract, but also exactly this tendency.[66] Like some traditionalists, Barnes may have believed that Heraclitus held ideas that were incompatible with each other, interpreting fr. 39 by having Heraclitus assume there are objects that exist for more than a moment. On this reading of the fragment, these persisting objects are also assumed to differ from the surrounds, for instance wet objects are not usually observed to dry out under water. Where objects do differ from an environment we can observe the tendency to homogeneity with that environment most clearly. Fr. 68 suggests something similar: "For it is death to souls to become water, and death to water to become earth. But water comes from earth; and from water, soul": the soul is different from the (at times transformed) water around it, but it tends to return to the surroundings from whence it came.

Mondolfo (1958) notes that Plato (*Cratylus* 413 bc) recorded that someone who taught obscurely believed that fire is the embodied principle of action. Furthermore he notes that Plato thought that for such a person this principle governs all things, and that Plato was referring to Heraclitus, also known as The Obscure.[67] "Governance" here suggests certain rules that bear on all objects: this is compatible with The Laws, resonating with Fire as energy in Wiggins' and Heisenberg's reading. Wiggins reads, for instance, fr. 28 along the lines of the character Mondolfo finds in Plato: "it is the thunderbolt that steers the course of all things." For a recent scholarship too, the suspicion is then raised that Plato was not explicit about this character because he was confused by tradition. It is interesting as well that the passage Mondolfo selects is in a

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66 Barnes (1979) p.66.

67 Mondolfo (1958) p.76.

dialogue named after, and featuring some of the ideas of, a thinker most famous for being a traditional Heraclitean.

Turning to the transformative power of energy in Wiggins' reading, fr. 23, as noted earlier, is an example of a fragment that gives this reading plausibility. It reads: "It becomes liquid sea, and is measured by the same tale as before it became earth." It can be read as referring to transformation, with the measures postulating the guidelines governing change by which Heraclitus responded to the randomness Anaximander found in the battle of oppositions. Alongside Burnet himself, as I will indicate at the start of next chapter, Vlastos (1955) is one of the earlier post-traditional commentators to pick up on the theme. According to Vlastos' reading of the fragments, Fire remains constant in transformations, and that this invariance is what allows Heraclitus to account for cycles or patterns in the cosmos. Since if there is only so much Fire and it is always on the move, we would expect it not to accumulate for too long in one form. This suggests a conserved energy able to transform into the different active oppositions as suggested by Wiggins' reading of the fragments.[68]

Graham (1997) has argued for an interpretation of the fragments that also tallies with Wiggins' reading of Heraclitean Cosmic Fire as transformative energy. Graham indicates another way we might take Heraclitus to be responding to Anaximander besides addressing the worry about change as random. The problem with a theory of constitutive substance like Thales' is that it is hard to choose an appropriate constitutive substance. Existence in different forms is not the prerogative of water alone. We can make up our own substance, locating it outside the cosmos, but this approach, as we have found, has its own limitations (the problematic of the theory of the *apeiron*).

Graham thinks, in an ironic reference to the Milesian interest in water, Heraclitus the riddler declares Fire constitutive. But how can this be? Unlike water fire does not itself seem to assume multiple forms to explain cosmic variation. It does not take both a liquid and sold form as ice does since it is neither liquid nor solid. How, as a constitutive substance can fire then be evoked to explain solidity? In fact flames are

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[68] Vlastos (1955) p. 421.

ephemeral and cannot explain any lasting substances. Borges has graphically made a similar point:

> Heraclitus taught that the first element was fire but that is not the same as imagining beings of fire, being carved from the momentary and changing stuff of flame. This [is an] almost impossible task.[69]

For Graham the irony emphasizes the transformational, protean nature of Fire. Heraclitus resolves the problem of choosing one substance by allowing substances to convert into each other. Remembering nothing comes from nothing, Graham writes about the transformative power of this "constitutive substance":

> The world is, in its broad outlines, stable, though it is built upon a process of transformations. There then must be some constancy in the pattern of transformations, i.e. in the ratios which determine how much of one substance becomes another.[70]

Again a transformative fire obeying The Laws is suggested. If so, Aristotle's traditional contradiction is implausible as we do not get a contradiction arising from fire as a constitutive substance.[71] Nor would Aristotle's traditional contradiction that Cherniss arising in the context of *ex nihilo nihil fit* be present. The opposites would be present not as absolutes. So the transformations of fire could be described in terms of more of one opposition and less of another — the Milesian model of opposition —

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69 Borges (2005) [1957] p.116.

70 Graham (1997) p.36. Graham's understanding of *logos* is the constancy of this pattern of transformations. For Graham's ironic reading to work there has to be no reason to choose fire aside from the ephemeral nature of flame. Against this Reeve (1982) p.303 suggests "fire exists through striving with its fuel.....Thus fire offers an explanation of the order of such things as the cycle of the seasons." Reeve p.203 is also a recent scholar who has Heraclitus believing in a transforming conserved energy, but by this singling out of fire Reeve does not give us the most coherent post-traditional reading. Other substances consume and engulf things: water is regarded as the universal solvent, and floods are common enough experiences. Despite the thermodynamic aspect of Wiggins' reading, nor does heat seem that paradigmatic as a quality in the fragments, but only one of many qualities. Cherniss (1964) p.13 thinks Heraclitus must have taken fire as the most subtile element, and this seems to be Graham's point too; this is the sense in which fire is ephemeral, it is always shifting form.

71 See also Graham (1997) p.22.

where increase and decrease produces no contradiction provided the more of one opposite there is the less of its rival is also conceded to be present. There has been some suggestion that Aristotle used Heraclitus as a foil so that he could argue for a principle forbidding contradiction.[72] The idea would be that whether or not Heraclitus was inconsistent, or even whether or not Aristotle believed he was inconsistent, Heraclitus had the right reputation for Aristotle to attack him as inconsistent (via Plato, and before, perhaps via Cratylus). Aristotle's aim would have been to categorically rule out all inconsistency and insist instead on strict consistency by reading the theory of flux as a theory coming to inconsistent grief.

This line of thinking fits an overall suggestion that Aristotle prevented the theory of flux being used to understand the persistence of individual objects through change, a point I will also return to in the next chapter. Given Aristotle's important role in tradition, including his role in informing Hegel, and also given the authority of tradition, it is plausible that Aristotle could be held responsible for this. Wiggins suggests that Aristotle went so far as to use the idea of transformations found by post-traditional commentators in the theory of flux when useful in his own theories. Yet this idea is an alternative to theory of constitutive substance such as where fire is substratum to generate a contradiction with cold etc. Wiggins (1982) writes that it is:

> all the worse that Aristotle was simply helping himself in his *Meterologica* (357b28-358a3) without acknowledgment of any sort to the philosopher he belittled so frequently.[73]

Despite this, in place of transformation as a central aspect of Heraclitus' theory of flux, with the comparative idea of opposition Aristotle may have deliberately substituted an idea about change as contradiction. The idea that change entails contradiction may have some metaphysical value today as Priest (1987) believes, but it is not, on this newer scholarship, to be found in the theory of flux.

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[72] Priest (1998) *passim*, beginning p.95.

[73] Wiggins (1982) p.26, fn.1.

To move onto the second-last point in my discussion of Wiggins' reading, I have argued Wiggins' response to Anaximander relies on the idea of Heraclitus as speculating. Recent scholars who want to agree with Wiggins could point out that speculation of this sort can be found in many of the fragments. Most prominently, Heraclitus judges most folk to be like somnambulists. The conclusion of fr. 2 reads: "…other men know not what they are doing when awake, even as they forget what they do in sleep." Besides this and the other fragments mentioned so far (frs 13, 48, 66) in this regard there is also:

> Fr. 3: Fools when they do hear are like the deaf: of them does the saying bear witness that they are absent when present.
>
> Fr. 5: The many do not take heed of such things as those they meet with, nor do they mark them when they are taught, though they think they do.
>
> Fr. 6: Knowing not how to listen nor how to speak.

Heraclitus set himself apart by speculating. And not just from the masses. Wiggins admits Heraclitus shared the Milesian interests and some of their assumptions and methodology, but in his reading Heraclitus had an edge by virtue of his speculative capacities: in Hegel's words he could also refine "conceptions of the very same concepts… as are unavailable without true understanding."[74] Even Hegel agreed here,[75] but it is another post-traditional commentator who has enriched this interpretation of the fragments, putting Wiggins' instances of speculation in a more encompassing framework

Karl Popper (1966) grounds Wiggins' speculative Heraclitus in a time and

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[74] Hegel (1987) [1831] p.142.

[75] Though Wiggins' reading of Heraclitus as thinking speculatively seems closer to the fragments than Hegel's. This is due to the emphasis: speculation seems important given the fragments we have, but Hegel's version only repeats Parmenidean speculation on the unaccompanied verb (Hegel (1999) [1812] p.91). The subject matter of these speculations reads more closely in Wiggins' case: physical objects are implied by the reference to senses, and Wiggins accounts for specific examples more closely (bows, possets). In Hegel's traditionalism no specific object tells us anything, all perish in the same way determined by the arguments from the verb "to be" unaccompanied.

place, offering some historical support for Wiggins' speculating Ephesian. Experiencing radical social change, the Greeks struggled with tribalism to institute a more open form of society. Caught in the midst of this, Popper's version of Heraclitus realised even society is undergoing change. In tribal culture anthropomorphizing the universe, which went so far as to magically theorise cosmic stability as a result of social activity, social stability was the protective womb of all certainty. Inspired by its disruption Popper's Heraclitus began to theorise even apparently stable objects as by nature changing — flux.[76] This Heraclitus does not speculate on specific examples like possets. Rather through social change Popper's version speculates directly about the stasis of language and the social conventions in which it is embedded. Change lies behind the bastions of all certainty and the constancy of all everyday intercourse; all concepts are subject to it.

This fills out the approach Wiggins takes to the fragments and attempts to ground it historically. Wiggins' unusual instances of the posset, life and bow can be subsumed into Popper's grander story. Wiggins could be thought of as detailing applications to specific and revealing instances of the principle that change lies under all language, exactly as upheld by Popper's more social Heraclitus. The two forms of speculation, one about language generally and one about specific words, could, for an enriched recent scholarship here, be regarded as complementary. An instance like the posset, no matter how unique in its particulars, is only one of many words behind which change can be discerned. In fact the multiplicity of Wiggins' own examples (bow, life-form, posset) supports such a suggestion. Once, as a result of social turmoil, Heraclitus decided the concepts upon which language depended were changing, he no doubt would have gone in search of specific examples. I will not go into the historical evidence for such turmoil. Suffice it to note that in the context of this discussion we can imagine that something must have changed to give rise to Thales and those who came after him; writers I have presented as giving us something different to Homer or Hesiod. Likewise such writers presumably would have lead to questioning, and a degree of discomfort would have been inevitable.

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76 Popper (1966) p.13. Popper cross references two systems of cataloguing the fragments, conveniently including Burnet's e.g. on p.208, fn.8. Popper often goes outside the fragments to find evidence for the political point both in the details of Heraclitus' life, e.g. pp.11-12 regarding Heraclitus aristocratic background and popular stories of his arrogance.

Finally, Wiggins' view that Heraclitus did not explicitly recognise logical notions fits into a web of recent scholar's views. We can start with Moravcsik (1983), who in addition to debarring Heraclitus from using an explicit and logically refined notion of identity also thinks we have no grounds for assuming that "Heraclitus thought of knowledge as primarily propositional."[77] Of course Heraclitus may still have had logical notions without a formal propositional system of inference. Parmenides used the logical notions of being, and, to rule out certain commonsense ways of speaking, contradiction, but a more formal system of inference had to wait until Aristotle. Something has already been said about an agreement that Heraclitus did not consciously employ a logical notion of identity, so let us consider contradiction.

Kahn has remarked regarding the principle of non-contradiction:

> The principle was not formulated before Parmenides, and then only indirectly. The first explicit formulation (in terms of the incompatibility of contraries) is in Plato's *Republic*.[78]

Plato rules out assignment of exclusive contraries such found in Aristotle's idea of opposition. This is rather than going on to rule out a proposition being both true and false, but recent scholars do not think Heraclitus even went as far as Plato wants to take him. Barnes (1979), though believing contradiction can later be abduced from The Doctrine of the Unity of Opposites, and though reading the theory of flux traditionally, notes that Heraclitus did not have a word for being contrary. Barnes', partial to Aristotle's traditionalism, thinks Heraclitus then also paired statements about opposites in The Doctrine that were not after all contradictions. Without explicit recognition of the logical notion of contradiction, this Heraclitus could neither consciously invoke contradictions, nor rule out statements that cannot be held without contradiction. Tradition is beset with the problem that read without this seemingly later idea of contraries, there is a lack of evidence to show Heraclitus understood the notion of

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77 Moravcsik (1983) p.145.

78 Kahn (1979) p.192.

contradiction.[79] The emphasis in the fragments on observation may give Heraclitus little interest in logic even if he was exposed to it, at least in the theory of flux.

All of this suggests a plausible newer reading in which there is some agreement over key ideas that can be assigned to Heraclitus and the theory of flux, and which is a serious rival to traditional readings. However this section cannot conclude in all honesty without also mentioning the other point of disagreement Popper has with the post-traditional thrust presented so far. Following this will return us to Heisenberg's reading. For I consider more fully Popper's contention that Heraclitean cosmic fire did not follow The Laws. If Popper is right it must throw into doubt the equivalence to the contemporary idea of energy, since energy does follow The Laws.

Popper (1966) reacted against readings like Wiggins'. Of course Wiggins (1982) himself is too late for Popper to comment upon, but I have suggested other interpretations along similar lines that Popper could have been familiar with including those of Heisenberg, Vlastos, and crucially Burnet. Regarding finding anything like The Laws in Heraclitean flux, Popper writes of Heraclitus:

> It is in the explanation of the apparent stability of the world that he makes much use of the theories of his predecessors…But this part of his teaching …is so to speak apologetic, for it attempts to reconcile the new and revolutionary doctrine of flux with common experience as well as with the teachings of his predecessors. I believe therefore that he is not a mechanical materialist who teaches something like the conservation and circulation of matter and energy; this view seems to me excluded by his magical attitude towards laws as well as by his theory of the unity of opposites which emphasises his mysticism.[80]

The remark on mysticism relates to the inconsistent nature of what Popper believed was Heraclitus' solution to the Problem of Change handled in Chapter Four.

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79 Barnes (1979) p.80.

80 Popper (1966) fn.2, p.205.

Here note that while Popper reads Heraclitus proposing circulations, without conservation this cannot include The Laws (since the first Law regarding conservation is required for the second concerning entropy). Without The Laws, Heisenberg's claim that Heraclitean Fire is today's energy is implausible. Popper's idea is that to an ancient, the fuel that fed flames could seem dead, brought to life only by the fire. This view could be what allows Popper to reject a thermodynamic reading of Heraclitus. For Popper it is waste, not energy that feeds Heraclitean objects, with flame-objects actively gobbling inert matter in place of systems fed by vibrant energy, just as a tribal person might believe that flames consume inanimate matter.

If Popper is suggesting Heraclitus is tribal in this way, he does not stick to this suggestion strictly. Popper's version uses the image of smoke as fuel, and here we might suspect the active role of fire. For if we accept the preferred reading to date, the presence of matter conceived of as inert is a poor candidate to explain the circulations Popper does countenance for Heraclitus. It is hard to imagine how completely inert matter, even fuel consumed by fire or some other consuming process, could be thought of as having the impetus to produce larger reactions. Like the steam produced by a boiler, the refuse should be animated, energised.

Popper's interpretation of the mention of "surfeit" in fr. 24 is otherwise awkward. Fr. 24 reads: "Fire is want and surfeit." If fire is a surfeit of activity as it seems natural to assume, what could it want? Surely further activity, but what is engulfed in this wanting is nothing other than fuel. So this fuel should be considered activity, or energy. But in that case the circulations are of conserved energy (since it cannot be created the energy is wanted, or better still, required), suggesting The Laws. Fr. 37 also fits with Heisenberg's claim better than Popper's on this point: "If all things were turned to smoke, the nostrils would distinguish them." It seems more easily read as claiming that even smoke, the refuse of fire, is a transformation of energy retaining its own character. So it can be active enough to be able to produce an impression on the sense of smell. However this suggests The Laws, even if, as a concession to Popper, we imagine that Heraclitus attributed these governances a decreed Hesiodic status in a divine cosmos.

A suggestion has been made along these lines by Christidis (2002). He follows Prigogine in rereading Popper's Heraclitus as compatible with The Laws and roughly hewn regularities, but not laws of nature. By requiring only causal sequences, the laws of nature can act in both directions of time, and undo what has been done. So there is a sense in which laws of nature are reversible. On this reading Heraclitus did not accept reversibility, both he also did not accept laws of nature. So here too, at the core of the theory of flux, The Laws retain a special status that does not have to be understood in the mechanical materialist way Popper wants to avoid.

2.3: Conclusion.

With the appeal to *ex nihilo nihil fit*, and the possibility of containing Heraclitus' law-like beliefs to The Laws, Wiggins is not presenting us with a later 19th century materialist. Rather it is a Heraclitus responding to Anaximander's problematic as a man of his time. Heraclitus had a few principles of thought to do this, as well as theory-based approaches to observation. This post-traditional Heraclitus used his resources as best he could. He took the observational prowess of a poet, which in ancient times was associated with an awareness of change, and leveled it at unusual examples as the commencement point of his attempt to advance existing philosophy.

I have suggested that on a post-traditional reading, Heraclitus responds to Anaximander, not Parmenides. The Laws taken as part of the theory of flux show how this was possible; where Anaximander had change as random and, other than as warring opposites, unknowable The Laws give us definite guidelines by which change works. Heraclitus is prompted to recognise The Laws as a speculative thinker. It is true that on such newer readings of Heraclitus The Laws are as decreed as Hesiod's cosmos and the opaque, fated workings of the *apeiron*, but speculation gives us an observational reason to assume these as a way of responding to Anaximander's problematic random change. Indeed some post-traditional commentators (Prigogine, Christidis) have argued that in the way of laws and guidelines, Heraclitus believed The Laws were all anyone could assume.

This section also gives us an idea of the consensus between certain post-

traditional commentators, arising out of the consensus between them regarding the nature of the theory of flux. The newer reading has proved a more than viable rival to tradition, and as a response to Anaximander's random idea change, we have a reason as to why we should believe objects are the kind of things that persist through change. From here, in the next chapter, we will apply the guidelines found in the response to Anaximander to understand exactly how it is any object persists through change, and so be in a position to mount an argument in favour of an account of the Problem of Change.

This is not to say even those post-traditionalists agree on all the details of the theory of flux, and the younger Kirk is an example. Popper's reading is a further instance, and one initially more worrying since it is close to other aspects of Wiggins' reading. Yet even despite that, rather than the demise of tradition producing a hodgepodge of different preferred interpretations of the fragments, the agreement remains and can be defended. Popper himself can still give us a kind of grand narrative in this respect. His idea of speculation ties the isolated speculative moments of Wiggins' Heraclitus together, locating these in a broader historical context.

This chapter has also raised the renewed possibilities that can be found in turning to the theory of flux to argue for an account of the Problem of Change. The theory of flux is plausibly the first attempt to incorporate change into theory where for a time it had be considered atheoretic, and as such the theory articulates some of our most basic ideas of change. Hegel himself often made the same point. But any alternative stance claiming to emphasise the importance of change or redress its supposed neglect in thought to date has lost credibility due to Hegel's slipshod history and apparent attempt to fit the details of the theory of flux into his own philosophical system-building. The dialectical materialists are the most obvious result. What is lost is the opportunity to provide ideas about how any object persists through change that could be of value in the rigourous emphasis on change that we find coming out of the study of thermodynamics.

In the first section of the next chapter I examine this defiance of tradition. Burnet, who I will argue is so influential in the break from tradition, himself has a

somewhat different story of how Heraclitus understood change without the *apeiron*, bringing to light Burnet's differences with later commentators. By showing how certain of these recent scholars rethought some of Burnet's reading, I will show in more detail (than the discussed in the forgoing chapters) how it was they came to share a consistent approach to Heraclitean unity of opposites in a persisting object. This approach will prove able to tell us about the form of change through which an object persists: "alteration."

Chapter 3: Alteration and the Unity of Opposites

On the newer readings the Heraclitean fragments, objects of many kinds persist through change. Rivers flow, a bow is tautened, a lyre emits a musical note where once it was silent, animals are fattened, and people get drunk. Post-traditionally the point is not that these instances of persistence through change are the kind of thing about which we ought to be sceptical. Rather it is that ordinary physical objects, including large scale ones, are the kinds of things in which we can find the guidelines governing change in operation where these objects persist. The guidelines are The Laws. So far we have only these Laws as guidelines by which Heraclitus responded to Anaximander's problematic.

We also have to describe what structural features are present every time any object persists through change if we are to understand persistence. By this I mean that arguments are required to tell us what concepts we must use to understand persistence, and how these concepts are to be used. I think the theory of flux can tell us about these concepts. Further, a flux theoretic understanding of the form of change through which an object persists can enable us to mount an argument for one of the currently debated accounts of the Problem of Change. To show how this is possible I turn to The Doctrine of the Unity of Opposites (hereafter The Doctrine). To take the theory of flux as able to contribute today to a metaphysical understanding of change, I have classified the Doctrine in two ways to describe the structural features any object exhibits when persisting through change.

To recap the distinction between the narrow and wider Doctrine, we must turn our attention once again to the question of how an object persists through change. As noted I do not expect either version of the Doctrine to give us an account of this difficulty, but it is the narrow version that describes the conceptual components of both the difficulty and an account. This is because it gives us a description of how objects in general change. Why think this? Well in response to Anaximander's idea that change is not worth the theorist's time, the theory of flux gives us change as the result of the circulation of a transformative substance — fire or energy. The transformations explain the origins of the oppositions, the description of circulation tells us how these meet. The narrow Doctrine can make good metaphysical sense if we construe it as describing the

results of the meeting opposites, and that this is in keeping with ideas quite closely associated with Heraclitus. The narrow Doctrine builds on what Anaximander did say — that any object is changing *qua* a battle of opposites, we in turn can go beyond ideas associated with Heraclitus to describe a given object surviving change. The wider Doctrine is, oxymoronically, more specific, and so will not prove so important here.

So the narrow Doctrine is the real point of interest. The Doctrine of the Unity of Opposites claims that the battles between opposite qualities determines how we think about any loss or gain of properties. In this chapter I will argue on the most coherent version of trends in the new scholarship, this story is derived from the theory of flux. The wider Doctrine on the other hand claims that given specific subtypes of objects, it is a balance of specific opposed qualities that is conducive to persistence, though this balance does not have to be an even one. The wider Doctrine tell us how the laws govern the oppositions found in specific types of objects like human persons, bows and seas, and it is here that Heraclitus' poetic observational prowess is given free reign.

Though this 'wider' observational aspect of Heraclitus is orthogonal to my project, the two forms of The Doctrine can be found in many of the same fragments (since examples are used illustratively). The first part of fr. 59 is a good example of the narrow: "Couples are things whole and things not whole, what is drawn together and what is drawn asunder, the harmonious and the discordant." Fr. 58 is more specific, as well as wry: "Physicians who cut, burn, stab, and rack the sick, demand a fee for it which they do not deserve to get." Doctors are supposed to be on the side of the quality of health, instead they are often on the side of its opposite. Unless stated otherwise, I will take The Doctrine to be the narrow Doctrine of the Unity of Opposites and I will not be concerned with how The Doctrine works in more specific cases (the wider Doctrine), other than as an illustration of an underlying conception of how opposites are always unified.

By criticising Burnet's contrary claim the first section of this chapter will argue that the narrow Doctrine should be derived from the theory of flux granted a newer approach. With this established I move back to Wiggins' reading in section 2. Wiggins does not explicitly use the name 'The Doctrine of the Unity of Opposites.' Nevertheless I will argue the Doctrine can be derived from his reading of the theory of flux, and in a

manner congruent with an interesting direction in the post-traditional scholarship. I contend this version of the Doctrine has all the key concepts needed to understand the definition of the form of change through which an object persists, and hence from which the Problem of Change arises.

It is also true that Heraclitus himself, lacking an interest in the individual object, never used the Doctrine in this way. Because I think an argument for an account of the Problem of Change comes out of the narrow Doctrine, I want to show the Doctrine comes out of the theory of flux. The way I will do this is to show that key ideas in the Doctrine can be used to follow the standard definition of alteration found in Aristotle, even if Heraclitus did not himself do this. I will suggest, in fact, that it is plausible that Heraclitus' theory informed Aristotle on this point.

3.1: Burnet's Doctrine

John Burnet is a commentator I have taken to be crucial in the challenge to tradition. The main point of this section, however, is that The Doctrine can be derived from the theory of flux, and that this is the reverse of Burnet's position. Of course the recent scholars, even ones as influential as Burnet, do not all have to agree in all details to maintain a post-traditional coherence that can lead to an argument for an account of the Problem of Change. The Doctrine can tell us how physical objects obey the guidelines for change by which Heraclitus responded to Anaximander, and do so by drawing in the concepts we need for a definition of change that allows that these objects may survive: properties (heretofore only understood as qualities), time and oppositions. I will argue Burnet's reading of the Doctrine cannot do the same, and does not tell as coherent a story about what is agreed upon in the recent scholarship that he himself founded. Burnet's reading of Heraclitus is also useful background. It would, however, be off topic to go into all of Burnet's Doctrine. For instance I will not dwell on reading his of Heraclitus' ideas about astronomy, or how in Burnet's reading the wider Doctrine might be thought to come out of the narrower.

In turning to Burnet let us consider his own background. In the break with tradition I suggested that the possible misdating of Parmenides played a role, but I also did not neglect a reaction against Hegel. In fact the two issues are intertwined since

Hegel upheld that Heraclitus responded to Parmenides. Hegel's ideas about Heraclitus can be traced back as early as 1805, and he first publicly articulating his results in a series of lectures immediately before his death in 1831.[1] Shortly after Hegel's death German thinkers in particular reacted against his idealist system.[2] Edward Zeller was influenced by this reaction, and published his reading of Heraclitus in 1889.[3] Burnet then gave his influential critique of Zeller. (Though I have relied upon the 1971 edition of Burnet's *Early Greek Philosophy*, as the verso of this work indicates, the most influential edition dates from 1908 while the work was first published in 1892).

Kahn follows Zeller's reading, showing how it proved pivotal in the rereading of the theory of flux to think of physical objects as the kind of things that persist through change. Kahn reads Zeller as thinking that Heraclitean objects were transitory, disappearing and reappearing instantaneously within a fiery cosmos — what I have termed the traditional conclusion. Kahn also finds Zeller laying the ground for a move away from the tradition, by finding that Heraclitus postulated an unchanging fiery source of objecthood.[4] According to Kahn, Burnet took Zeller's cue. Burnet interprets Heraclitus as observing flames drawing upon fresh matter that then passes into smoke, at the same time being able to keep a relatively fixed shape. The observation led Burnet's Heraclitus to the conclusion that "the structure and pattern of things remains constant" despite an incessant flow of matter.[5] Burnet thus renounced the traditional conclusion by having a degree of constancy and hence stability in the theory of flux. If objects were somehow structures or patterns, these persisted both through time and change.

However Kahn's account of the break with tradition does not give Burnet the credit he deserves. Zeller's Heraclitus recognises constancy to the extent that he does think of fire as the unified source of all other objects (*ecpyrosis*), but this 'big flame' lasts but a moment. It instantly produces diverse objects, just as separate tongues of fire,

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1 See Blunden (1996) in the section entitled "Hegel's Works".

2 Fredrick Engels is an outspoken witness and participant in these events. See Engels (2003) [1886] Part 1.

3 See Zeller (1948) [1889] pp. 44-49.

4 Kahn (1979) pp.147-148.

5 *Ibid*. p.149.

smoke and fuel are among the diverse forms produced by common fire. None of these diverse objects last longer than a moment. *Ecpyrosis* reasserts itself when the part of cycle that produces this cosmos obeying the no-persistence rule of tradition flux comes to an end. Then that homogenous fire again and instantly reverts to a diverse cosmos without persistence to repeat the process eternally. The traditional conclusion is not here mitigated, because even if we take the cosmos in the homogenous state of *ecpyrosis* it fails to persist more than a moment, and there are no other candidates for persistence. [6]

Burnet follows Zeller in reading Heraclitus as a direct response to the Milesians, but Burnet is left to his own devices to argue for a Heraclitus who had objects persist through change. To do so, Burnet confronts a weakness in Zeller's reading, namely that Zeller's reading uses a fire image to juxtapose sameness and variety. The use of the image is proffered in lieu of an explanation of what Zeller is telling us Heraclitus preached: that states of variety and sameness are incompatible and present a contradiction. The contradiction arises for Burnet when he agrees, as a general consensus had (and has) long supposed, that Heraclitus used the principle *ex nihilo nihil fit*. Variety must then itself be present in sameness to avoid coming out of nothing, and *vice versa* for sameness should this sameness come from variety. But sameness is exactly that which is not varied, and variety is exactly that state where sameness is not in evidence. To understand the contradiction more closely we can imagine sameness at t_1 and variety at t_2. As is this seems consistent, but given *ex nihilo* at t_1 the cosmos must at once be with and without sameness to have variety at t_2, and if sameness follows t_2 then, again, at t_2 the cosmos must be both with and without variety.

Burnet responds quite incisively that even if Heraclitus deliberately theorised some contradictions, it does not follow he set about describing and accepting this particular one.[7] Also why choose fire? Zeller's Heraclitus seems mystical about fire. I have put an emphasis on charity in determining how we can avoid accusations of arbitrariness when associating ideas with Heraclitus. Burnet found Zeller's mystical Heraclitus, who was in part entranced by the visual cues provided by, for instance, a

6 Zeller (2003) [1889] p.1. See also Mondolfo (1958) pp.76-77.

7 Burnet (1971) [1892] p.145ff.

camp fire, implausibly uncharitable.[8] Zeller follows the dating popular in the tradition when he puts Parmenides before Heraclitus,[9] but with a different dating Burnet is better positioned to read Heraclitus as responding directly to Anaximander. To do so, Burnet simply has to invoke the Milesian aspect of Heraclitus admitted by Zeller and already found in Aristotle. Fire is a universally constitutive substance since Burnet's Heraclitus thinks, unlike water as the constitutive substance, fire makes opposition possible. This means, as with other newer readings, there is no need for the *apeiron*; fire explains in itself the origin of the opposites. Importantly, without the *apeiron* we are not compelled to think of change as random and outside the domain of theory.

This reading of Heraclitus prefigures readings that were to become more popular in the twentieth century by also interpreting what is meant by 'fire' here to avoid the Anaximander argument against constitutive substance. In a fiery world we could not account for change, thus the world cannot be fiery. Burnet writes:

> The quantity of fire in a flame burning appears to remain the same, the flame seems to be what we call a thing [or object]. And yet the substance of it is continually changing… This is just what we want. If we regard the world as an "ever-living fire" (fr. 20), we can understand how it is always becoming all things while all things are returning to it.[10]

On the above quote, Burnet seems to have Heraclitus embracing a theory on which fire is a constitutive substance. On Burnet's reading, though, what is "continually changing" is not the type of actual fire that is normally doused by water, but Cosmic Fire, which is only figuratively speaking fire, and which is the true compositor of the

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8 Kahn (1979) p.147ff. Kahn thinks Zeller understood the theory of flux "as an explicitly metaphysical thesis, the derivation of all phenomenal things as transitory appearances of a single entity." Du Bose (1972) p.5 fn.2 reads Zeller as thinking Heraclitus spoke symbolically, but then cryptically notes Zeller's Heraclitus did not distinguish the symbol from the thing symbolised. The point would be that Zeller's Heraclitus was unable to go beyond the analogous (symbolic) function of the fire image, constructing his view of the cosmos solely on the basis of what he perceived in flames. Du Bose also claims reliance on visual cues, such as Zeller's, is not based on the evidence but on later commentators gazing at the candle flame in their own study and mistakenly thinking Heraclitus would have been similarly engrossed in the appearance of flames. Even if this is right, Heraclitus could have been more loosely inspired by flames.

9 Zeller (1948) [1889] pp.44-45.

10 Burnet (1971) [1892] p.145. Throughout this discussion, a divergence from Zeller is to be found in that Burnet rejects *ecpyrosis*. The issue will prove of secondary importance.

cosmos. Thus we find a differentiation in the types of fire, and Burnet sets up the post-traditional themes of transformation and conservation by having the cosmic Fire as conserved and transformative. This cosmic Fire can become moist and air can become fiery, as in the Greek idea of a fiery hurricane water-sprout. Fr 21 reads "The transformations of Fire are, first of all, sea; and half of the sea is earth, half whirlwind." Actual tongues of flame are only one stage in the process of transformation into different forms of matter.[11] Zeller's contradiction alluded to by Burnet is avoided in that cosmic Fire is never a sameness on this reading; it, and so the cosmos, always has a natural variety, and never need produce variety from sameness *ex nihilo*.

On Burnet's reading an object can persist through change as part of its substances convert from one to another, and it is this conversion process that gives his reading of the Doctrine. I have so far minimally characterised the Doctrine as found in the post traditional reading influenced by Burnet as at least telling us how objects might persist given these are composed of battling oppositional qualities. For Burnet himself, the opposites are the opposite directions of flow of matter. These opposites are unified to give us a unity of opposites in so far as objects are what these are by virtue of whether these have been pushed higher or lower in the flow. Higher means these objects are composed of a greater quantity literal as opposed to cosmic Fire. Lower and these contain more earth, with other qualities in intermediate positions. What is crucial to objects is how strong the opposing flows are at some place and time; it is this that determines whether an object has been pushed higher or lower and so determines the nature of that object. The direction of flow tends to be roughly seasonally synchronized. But despite a certain antiquated aspect here, we do get a theory of persistence involving the opposites on Burnet's reading. This does then give us a version of The Doctrine, but it is the seasonal theory that takes the place theory of flux.

It is The Doctrine that is primary. There is some leeway allowing variation in the measures of substance without destruction of the objects. So an objects can persist through change conversion between the substances occurs but within allowed parameters. Again for Burnet this is as a type of thing, there is no concentration on the

11 *Ibid*. fn.1 p.149.

persistence of single entities.[12] We can all be thirsty because without enough water, or drunk on wine, and yet not die. In this way persons as a type of thing can persist by being made up of the right balance of different forms of energy, all the while dependant on where we have been pushed or pulled to in the great cosmic tug of war. In terms of the direction of flowing cosmic fire up or down, there are certain places allotted to us in the cosmic scheme of things, and we trespass outside of these at our own peril, or, more accurately, certain of our demise. In this process we find the post traditional themes of conservation and transformation, but Burnet does not present these developments as a theory of flux. An object is made of a unity of different opposed substances in the right measures because these are at the right place. This, then, is The Doctrine.

Objects are the kind of things made of different substances pulling in opposed ways. The substances resist each other's flows by heading in opposed directions, pressing against each other. For this Heraclitus the "two halves of everything are being drawn in opposite directions."[13] The resulting opposite tension "keeps things together and maintains them in an equilibrium."[14] The balance of differently acting forces can create the tensions that all objects require, and that give these objects character. Certain types of objects make this clear, for instance bows or lyres. Unconstrained it would simply cease to be.

So it is in the view of objects as resulting from the tension between the flows taken by opposed substances that Burnet finds the Doctrine. The theory of flux is then derived from this; it is a recognition of the presence of opposite qualities allows Heraclitus to postulate cosmic flow or flux. Popper has rejected this derivation of the theory of flux from The Doctrine:

> universal flux is the central doctrine of Heraclitus. As opposed to this Burnet holds that this 'is hardly the central point of in the system' of Heraclitus… that Heraclitus' fundamental discovery was the abstract

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12 Though in the wider Doctrine Burnet's Heraclitus does take an interest in how certain types of objects are a balance of forces, such as a bow or a lyre.

13 Burnet (1971) [1892] p.151.

14 *Ibid*. For the attunement as hidden p.163. Burnet's Heraclitus in this way declares change the highest justice pp.144-145.

> metaphysical doctrine 'that wisdom is not the knowledge of many things, but the perception of the underlying [Doctrine of the] unity of warring opposites,' as Burnet puts it. The [Doctrine of the] unity of opposites is certainly an important part of Heraclitus' teaching, but it can be derived…from the…theory of flux.[15]

On Popper's approach, The Doctrine has to provide an account of the Problem of Change only when the possibility of persistence is found in the theory of flux as a theory of objects as the kind of things that do persist through change and this is derived as a consequence.[16]

In the framework of a newer reading, Burnet's approach suffers some serious weaknesses. It relies upon an innate variety present in cosmic Fire to get to opposition, and this is the main problem. Really Thales' water is just as innately varied (e.g. ripples compare to tongues of fire, springs as fuel), and arguably so too other seasonal substances (perhaps earth).[17] So why choose fire as the cosmic substance? The only answer seems to be fire mysticism. Of course literal fire is different from cosmic Fire in this reading, but the point is that only fire mysticism "explains" Burnet's Heraclitus' arbitrary choice of a substance he found around him to provide an analogy with the originating cosmic substance. As a result Burnet does not really remedy the fault he found in Zeller's reading; Burnet's Heraclitus is still assigning mystical significance to actual tongues of fire. Though there has been some more recent search for traces of fire mysticism in Heraclitus, with little material to go on the result is tenuous. As we will find, this theoretical point of departure also leads into a less appealing, because more primitive, theory of flux.

Accepting Popper's critique of Burnet's direction of derivation (and thus supposing that the Doctrine is to be derived from the theory of flux) gives us a more

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15 Popper (1966) p.204, fn.2. Stokes (1971) p.89 also observes Philo, reasonably historically close to Heraclitus, believed The Doctrine to be central to Heraclitus' thought. However Stokes points out Philo had a theological agenda and failed to impartially reconstruct Heraclitus' ideas. Mourelatos (1967) p.33 also finds traditional derivations of the theory from The Doctrine to be unconvincing.

16 Popper (1966) p.205. Nevertheless in the second section of Chapter Four I will argue that Popper's own version of The Doctrine is inadequate.

17 Graham (1997) p.32 agrees. Reeve (1982) p.302 believes fire evokes heat loss and thus oppositional battle between hot and cold, but as Graham points out, many substances evince heat loss.

charitable and more metaphysically interesting reading of Heraclitus. Cosmic Fire can still be read in terms of the conservation and transformation that Burnet influentially found in Heraclitus' thought. Burnet must contentiously add that Heraclitus thinks fire is in some special way innately varied so as to be able to furnish an analogy with an originating cosmic substance. By contrast the starting point for the theory of flux on the best newer readings, is I have suggested, speculation, and as I have found Popper stressing. Relying on mysticism to explain Heraclitus' point of departure, Burnet is even less able to account for the emphasis on speculation in the fragments than Hegel.[18]

This speculation is akin to trained observation.[19] The result is, I have argued, a theory that is centrally concerned with the object persisting through change, and that rests on observation, not mysticism. But the speculative observation is not about the unity of any opposites and cannot be said to be about The Doctrine. Instead it uncovers The Laws, core to the theory of flux, and at least The First of which Burnet also had to attribute to Heraclitus. Once these guidelines are set, then we can consider how it is the opposites meet. Post-traditional readings of the type Burnet himself pioneered make more sense if The Doctrine can be derived from the theory of flux.

Emlyn-Jones (1976) acknowledges and interprets the speculative fragments in much the same way as Wiggins agreeing that speculation led to the conclusion about the

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18 Kahn (1979) p.301 finds a "ritual and mythical role for fire in Iran, India, and Greece." He also finds Heraclitus had a recycling view of the cosmos akin to that in Popper and Wiggins. Kahn p.146 marries the two findings arguing Heraclitus would require that cosmic flames provide fuel for still other fires, yet the ancient Greeks did not observe smoke fuelling other fires. Kahn's Heraclitus assumes fires can feed other fires because of a mystical view of fire as a source. Note though that Heraclitus could have observed the blackened results of fire used for other more subdued fires for e.g. coals for cooking or embers for heat. Mysticism just does not seem to fit, and Kahn does not, beside this remark about fire, find Heraclitus to be a mystic. In fact when Burnet (1971) [1892] p.132 supports his reading of Heraclitus as a mystic by finding Heraclitus' style oracular, Kahn pp.91-92 takes issue with him. Kahn argues that where one puzzles through oracles to find a dogmatic revelation of the will of the Gods, Heraclitus is puzzling because he more philosophically uses language that works on many levels (for e.g. the personal and inanimate) to argue a point (for instance about the unity of opposites). Heraclitus is philosophical, not oracular; it is a weakness of Burnet's reading that he makes Heraclitus sound too religious.

19 As Wiggins (1982) notes, p.9. Speculation would require an intelligent use of the senses to discern change where it is not apparent. Similarly for Popper who only casts Heraclitus as mystical in comparison with later thinkers in his supposed embrace of contradiction (Popper on this is considered next chapter). Barnes' (1971) p.67, despite his traditionalism and inconsistent Heraclitus, believes "the theory of flux was no *a priori* intuition or piece of fanciful imagery; it was...founded upon and supported by a series of empirical observations." Moravcsik (1983) p.137 more tentatively notes Heraclitus explanation of objects as changing "comes close to being, at least in part, testable." Moravcsik p.145, thinks that the logos "governs the unity of things that are partly perceptible. Thus we have in Heraclitus a contrast between perception and intellectual comprehension."

need for objects to be fed energy.[20] However, as a challenge to the reading preferred so far, Emlyn-Jones denies the derivation of The Doctrine from the theory of flux, preferring to shatter the Doctrine into a variety of at best loosely related ('wider') concerns. It is not a theory, nor part of a theory, nor derived from a theory.[21] Emlyn-Jones points to a fragmented and even meaningless series of Heraclitus' observations about oppositions. This explains the fact that Emlyn-Jones' also rejects the theory of flux. There is no coherent theory here, just some observations about objects and energy.

However, with the wider interests, we might expect Emlyn-Jones is referring to the wider Doctrine. Because he severs the theory and the Doctrine we might also expect he has failed to recognise a viable interpretation of Heraclitus where the narrow Doctrine links the two. I have followed commentators who argue that from a speculatively established theory of flux we can derive the narrow and then the specific instances of the wider Doctrine. To be sure Heraclitus does have a host of concerns. We can agree with Stokes (1971) where he concedes Heraclitus was not a writer of 'Priamels' wherein any given good is described as part of a one greater good. Stokes, however, also points to Heraclitus believing he has shown that unified understanding of the whole superior to piecemeal knowledge with something like The Laws.[22] For his reading to work, Emlyn-Jones would have to unconvincingly ignore Stokes' point about unified understanding to quite artificially keep the various post-traditional themes separate.

While crucial aspects of the recent scholarship were present in Burnet's break with tradition, his own reading is both metaphysically unappealing and uncharitable. It is to remedy this by deriving The Doctrine from the view of the theory of flux preferred so far that we turn to the next section. The derivation I undertake leads to the conclusion that any commentator who starts with a reading of cosmic Fire as energy in the theory,

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20 *Ibid*. p.91 and p.95. For Emlyn-Jones' thermodynamic Wiggins-style conclusion where object must be fed energy to continue to change and hence exist, see p.110. Speculation here finds the oppositional concepts behind language. Emlyn-Jones' idea of speculation here sounds a little mysterious since it flirts with contradiction. Really though, Emlyn-Jones' Heraclitus finds the kind of opposed forces in an object Wiggins' did, and any contradictions are, at most, to do with isolated specific cases.

21 Emlyn-Jones (1976) *passim*.

22 Stokes (1971) pp.87-88. For Du Bose (1972) p.5 Heraclitus' deprecation of Homer, Hesiod and others in the fragments is partly intended to show "familiarity with many opinions does not confer wisdom."

and so includes The Laws, would inevitably arrive at a version of the Doctrine we can find in Wiggins' reading. The prospect is then that, with the Doctrine as an account of how any object persisting through change obeys the guidelines Heraclitus thought governed change, we can today discern an argument for an account of the Problem of Change. To do so, having derived the Doctrine from the theory, I will argue the theory of flux can accommodate the standard definition of the form of change through which an object persists: alteration.

3.2: Alteration and The Doctrine

Even someone cynical about the theory of flux would agree that oppositions cannot be ignored when we come to the question of how any object might persist through change. Setting aside interpretations of opposition as affirming and denying unaccompanied verb use, or as affirming and denying the presence of some quality, it seems that if any object is to persist through any change it does so in respect of opposed qualities. Embers that were once hot take on an opposed quality to become cool, water that is heated takes on less of this opposed coolness, a fattened animal loses the thinness that it is natural to oppose to fatness.

I maintain that the concept of opposition needed to understand alteration can be found in the Doctrine. We have already encountered opposition in the theory of flux, but in deriving the Doctrine from the theory of flux, I will argue we can also extract a view on times and properties, and this will prove important in subsequent chapters. I will follow recent scholars who have derived a version of the Doctrine from the key aspects of the reading of Heraclitus we found primarily in Wiggins, and as I have suggested were important for Burnet's break with tradition (though some of these ideas are in older readings, e.g. Marcus Aurelius' idea of transformations in Heraclitus). Doing so can give us the conceptual resources to understand Aristotle's standard definition of the form of change from which the Problem of Change arises, alteration. While I cannot follow the reading I have and believe Heraclitus was concerned to use his own theoretical resources to understand alteration, we can use these theoretical resources to understand alteration. And once we delineate the logical notions needed to set up the Problem of Change in the next chapter, I will argue the understanding of alteration we can gain from the Doctrine will allow us to mount an argument in favour of one

particular account of the Problem — indexicalism.

For Wiggins' Heraclitus objects are the types of things that require energy to persist. Without energy objects tend to become one with the larger objects (or environment) in which these are embedded. In some unusual and informative cases we can observe the coherent input of energy. In fact in the posset example we enact that input in so far it is usually an agent that is responsible for stirring the drink and so contributing the energy the oppositional battles require to give us a suspension. Clearly, though, not all objects are the types of things that survive change specifically by the actions of a human agent, and other ways by which these may be sustained are more obscure. Heraclitus lived before convincing theories of heat conduction, and certainly long before the study of electromagnetism. With no comparable resources at his immediate disposal, the actual process by which energy was transformed to create and sustain objects was not an area Wiggins thought Heraclitus could develop.[23]

Instead Wiggins thinks Heraclitus developed his ideas of the nature of the oppositional battles. To begin we might recall the discussion of opposition in Chapters One and Two. If we have qualities simply present or absent as does Aristotle with the 'contraries' or 'extremes' mentioned in Chapter Two, talk of more or less is trivial. More will simply equal "present," while less will equal "not present." Heraclitus could agree some opposed qualities were binary in this way. But a single state that has undergone a transformation might also be described by a comparative or what we might term a 'Milesian' model of opposition mentioned in Chapter One.[24] An object is the kind of thing that can persist through change to be in such a state; in which case if it is hotter we must consider it less cold, if harder we must think it less soft. But we have no reason to remain with a binary use of such comparative terms. Temperature, for

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[23] Wiggins (1982) pp.19-20 fn. 20 and p.21. fn. 21.

[24] And that, confusingly, Aristotle sometimes favoured. In Aristotle (1955) 5 (466a20) ff, aging is argued to be the result of a battle of opposed qualities over time, namely moistness and dryness. Aristotle thought that for the body to age was for it to literally dry out. Since all parts of the body do this, and at a fairly even rate correlated with the age of a person, this could suggest not that body parts are either wet or dry, but the body has degrees of wetness and dryness. Like Wiggins' *Meteorologica* example this may be the uncredited influence of Heraclitus.

example, comes in gradations.

Note here as well that the battles are not just evident in the exertion of contrary forces we encounter in pushing versus pulling, though prominent examples do suggest such forces: the posset and the bow come to mind. So does fr. 40: “It scatters and it gathers; it advances and retires.” Other examples are different though: fr. 39: “Cold things become warm, and what is warm cools; what is wet dries, and the parched is moistened.” This does not immediately suggest forces pushing and pulling, and raises a problem. When thinking of pushing and pulling, we simply use vectors to determine how it is forces act in opposed directions. If we are to talk of opposed qualities more broadly and more abstractly, we open up the question how these can be opposed. On a newer interpretation of the theory of flux we have an object as an energy state, a transformation of Heraclitean Fire. A smaller object differentiates itself from a larger by hosting a different battle of oppositions to that found around it. How this happens will tell us what idea of oppositional battles must come out of a reading of the Doctrine derived from the theory of flux.

Let us take an object in an energy state s_1 and say that this state can be described as more hot than it is cold, more dark than light: if so we might say the object is warm and gun metal grey. The outcomes of the battles will be fixed at a given moment: s_1 is a measurable temperature and is a shade of grey that can be located on a light spectrum. Take another energy state s_2, even if there is more or less energy in s_2, we may be able to compare s_1 and s_2. The fortunes of the battles just described differ somewhat: s_2 is cooler and lighter where s_1 was warmer and darker. Perhaps s_2 is tepid and dirty white. These results for s_2 are due to the relative fortunes of the opposites involved as these were for s_1, and these could again be subject to strict measurement. Tepid could be expected to have a specific value on a temperature scale; there are objective facts about being dirty white.

Degrees introduces a complexity into the idea of opposition, one we do not have if we just have one quality or another and no other possible cases. By dint of having to account for these additional states, any model of opposition that acknowledges degrees is faced with a problematic we never find in the Aristotelian model or in a case where there are no degrees of difference to be modelled. But by

being able to incorporate both the Aristotelian scenario as well as the complexity of further degrees of opposition, the Milesian model comes to terms with the problem.

To take some further examples, the more energy that is transformed so that an object is hard, the less an object will be soft. Perhaps there can be states of absolute hardness or absolute softness and it is not possible for there to be more of one of the qualities. Generally though, the result of less softness or more hardness will be a surface of an object yielding to a greater or lesser extent. Consider also the example of 'off-ness' versus 'on-ness'; in it there are only two incompatible distributions of energy throughout the object. These opposed qualities oppose each other along a binary Aristotelian model, but the Doctrine is not restricted to this and would insist that even here the opposites compare states as the kind of thing that persist through transformation.

The fortunes of any pair of opposites in one state, or balance of these opposites, may come to differ by degrees from those in another state. In fact on a reading like this, such a comparison is just what it means for an object to be the kind of thing that is a periodicity, or part of the circulation of energy in the cosmos. Here we come to what Wiggins' calls this Heraclitean idea *enantiodromia*; an idea of objects as energy states in which qualities battle, and we will find other recent scholars taking up similar themes.

The reason Wiggins uses the nomenclature '*enantiodromia*' rather than The Doctrine, is because this reading does give us "processes running up against each other."[25] The "process" refers to the fact that to single out an oppositional quality of an object is to describe its possibly ongoing relation with the enemy of this quality. A quality "runs up against" its opposite in the competition for available energy; it is limited by how its opponent can describe the state of energy that is an object. Energy then assumes different discernible forms as we find in the image of fr. 36: "…fire, when it is mingled with spices, is named according to the savor of each."

Taken as *enantiodromia*, the Doctrine can be derived from the theory of flux as

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25 Wiggins(1982) p.11 takes the phrase from Diogenes Laertus.

we have found it in Wiggins' reading. The theory of flux told us that objects were made of opposites governed by The Laws. Recall that according to the 1st Law, an object could spontaneously accumulate energy from its environment only if the overall energy in the object/environment system was conserved and the object accumulates energy "coherently." The 2nd Law tells us that because the number of incoherent states is far greater than a given coherent state, just as particles and that coherency will tend to disperse. Turning to the narrow Doctrine we have it that this is true for any objects; the wider Doctrine telling us how the laws govern the oppositions found in specific types of objects. Continuing with the focus narrow, the first Law tells us the opposites must compete for the limited transformative energy of an object, and so The Doctrine imposes a negative correlation on how that state is described synchronically. If it is a dark grey and more black, we must perforce say it is less white. The First Law also tells us that energy must come from somewhere, in the theory of flux this is as part of the oppositional battles of the larger object of which the smaller is part. And The Second law tells us that if the opposites that characterise an object are to continue to battle in a way different to the opposites in the surrounds, we need this energy to be (in the right kind of way) inputted. Thus applying the Second Law, The Doctrine imposes the negative correlation on how states are described diachronically.

Wiggins is never explicit about the Doctrine, and no recent scholar is as explicit as I have been. But since this is what Heraclitus *should have* committed to, at the very least he is most charitably interpreted in this way. There are thus already good reasons to go further, and to believe that the Doctrine as presented here can be plausibly associated with the historical Heraclitus, and of someone who was on the verge of stumbling upon the Problem of Change. This includes the reasons we have to be wary of tradition and to find the recent scholars attractive, and to find that Heraclitus was concerned with Anaximander's idea of opposites, and not Parmenidean logic. But let us consider how other commentators point to how features of what Wiggins called *enantiodromia* can derived from flux, and how Heraclitus himself derived these.

For Du Bose (1972), Heraclitus understood that any energy that is inputted into an object has to be active there, it cannot just disappear or lose all character.[26] Reeve

26 Dubose (1972) p.8.

(1982) notes energy has to be transformed since it cannot be created or destroyed, something which Heraclitus also understood.[27] Objects just are where the opposites meet, each being part of the periodicities found in different circulations of energy. This allows Kahn (1979) to point out that the oppositional battles in objects are transformations of energy, an understanding he finds pioneered by Burnet,[28] and what would be required by the theory of flux since the energy must enter objects coherently. With these transformations having to be negatively correlated to fit the idea of comparative opposition, a reading of the Doctrine as *enantiodriomia* is derived from the theory of flux.

Also stressing transformation and conservation, Christidis has of the opposites that they "do not co-operate, they are mutually destructive."[29] This is the sense in which these qualities 'battle.' It is over the descriptions of the limited energy of an object considered as an energy state. If we describe any given state by invoking the relative fortunes of the oppositional qualities, we will find these qualities are negatively correlated. Every set of opposed qualities an object has can be a negatively correlated description of the single energy state that is the object. In the case of privations like cold, we can expect less energy will manifest as a greater amount of the qualitative privation, only so there will be more of the qualitative non-privation (heat — Aristotle, Categories 14 uses "privation" in another way when discussing objects persisting through change. In this context he can be taken to simply mean a greater amount of a quality requiring less energy).

Stokes (1971) has an objection to the reading of the Doctrine I have preferred. He thinks that talk of battling oppositions will not give us the Heraclitean sense of unity and so a plausible interpretation of the fragments. We indeed need an idea of unity for a Doctrine of the *Unity* of Opposites. After all, "unity" does appear in the fragments, and in a deeper way than to tag a collection of themes. Consider fr. 1: "It is wise to hearken, not to me, but to my Word, and to confess that all things are one," or for instance where it is claimed it is folly to forget that "day and night are one" (fr. 35). For Stokes a battle

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27 Reeve (1982) p.203.

28 Kahn (1979) pp.148-149. Kahn alludes to this idea of transformation *passim*.

29 Christidis (1997) p.62.

is not a unity, but instead presupposes three separate moments: two separated oppositions and the meeting of these, separate again.[30] Battles such as those found in *enantiodromia* will not account for the unity we find in for instance fragment 1. If we consider the cosmic object then (on the basis of 'all things") it cannot be a unity simply because within it there are oppositional battles, and likewise for any smaller objects that are part of it. So for a start Stokes raises a historical difficulty, suggesting that the foregoing *enantiodromia* interpretation of the Doctrine has moved away from ideas associated with the figure of Heraclitus because it has moved away from the "unity" nomenclature associated with that figure.

In the more recent scholarship there is a sense of unity applicable to objects as things persisting through change. Following how can also give us a better metaphysical understanding of ideas more recently associated with Heraclitus and that I am suggesting have metaphysical value today. If we understand the opposites in comparative terms, then negatively correlated descriptions will be equivalent. Thus if I claim an object is more hot, this is equivalent to claiming it is less cold. The descriptions are in this way the same and the opposites are in this sense one, even though terms are used (like 'hot' and 'cold') that imply radical incompatibility. These are a single kind though to differing degrees, different determinants of the same determinable (in this case 'heat').

We can now state what the Doctrine is given it is interpreted along the lines of Wiggins' *enantiodromia*:

> The narrow Doctrine of the Unity of Opposites tells us that the opposed qualities characterise an object as negatively correlated ways of describing the energy states of that object. The wider Doctrine of the Unity of Opposites gives instances of how different opposed qualities may characterise different objects.

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30 Stokes (1971) p.101. Taking "unity" to mean a battle, and "monism" meaning "unity" in the sense Stokes is concerned to save, Barnes (1979) p.64 similarly thinks that from oppositions meeting in battle we cannot infer "monism." Thus Heraclitus' proposed inference along these lines "is gross: from [this supposed] unity there is no reasonable path to monism."

I will not argue that the division between the narrow and wide doctrine is important to get closer to the historical Heraclitus, only that it is found throughout the literature surrounding this figure. Here we find a segregation between ideas concerned with how objects in general change (the narrow Doctrine) and those about how specific types of objects, for example fishes, lyres or perfumes change (specific instances of the wider Doctrine). The narrow doctrine is then the right kind of the subject matter that could be used in an argument for an account of the Problem of Change. I will be suggesting, the version of it coming out of the more recent scholarship has as much if not more claim to accompany the name Heraclitus as rival versions. Certainly in terms of this recent scholarship I shall show that we can find what we want in the narrow Doctrine: a cohesive stream of ideas capable of giving us an insight into the structural features present in any time a physical object persists through change.

So let us now move to discussion of how The Doctrine can help us understand the form of change through which an object persists, and in such a way as to offer us an account of the Problem of Change. Aristotle, who was concerned with an individual object persisting through change, termed the form of change through which an object persisted 'alteration.'[31] To gain a definition of alteration from Aristotle's work, we find him bringing up the empirical point that we experience alteration when we see diminution and growth. However, this is not the suggestion that a change of the quality of size is an example of, and evidence for, alteration. *Categories* 14 makes it clear Aristotle distinguishes increases and decreases in size from alteration.[32] Indeed, there is no reason to always classify such changes simply as alterations. To stretch a person could be to destroy them, as could starving someone. Along these lines Aristotle states alteration:

> takes place in respect of certain qualities: and these qualities (I mean, e.g. hot-cold, white-black, dry-moist, hard-soft, and so forth) are all of them differences…Since therefore it is not possible for Fire to become Water, or Water to become Earth, neither will it be possible for anything white to become black, or anything soft to become hard; and the same argument

31 Aristotle, (1922) 1.4 (320a1).

32 Aristotle (1984) p.23.

> applies to all the other qualities. Yet this [difference in opposed qualities] is what alteration essentially is.[33]

This passage is written as a response to Empedocles, and I will not go too far into Aristotle's position on Empedocles' theory. By substituting four substances, each capable of opposition, for the one constitutive substance we find in for e.g. Thales, we can here understand Empedocles as attempting to get around the problem pointed out by Anaximander. Recall that this is that a theory of a single constitutive substance cannot adequately explain an ongoing variety of changes. Granted he can explain for instance heating as well as cooling, Empedocles must then be able to describe the ongoing variety of changes. For not then requiring Anaximander's *apeiron* as an alternative to constitutive substance, he is not prone to regard change as unfit for theory. Granted Empedocles does not deny persistence he must the do what I have suggested Heraclitus had to do, and at least come to terms with the possibility objects are the kind of thing to persist through change. We can be satisfied to note here that Aristotle believes Empedocles did not so adequately, as was also briefly mentioned in section 2 of Chapter 2. Faced with the same explanatory task as Empedocles' theory, can the theory of flux do better?

For any theory to do better Aristotle is indicating it must come to terms with opposition as a structural feature of any change through which an object persist. Rather than growth and diminution in size simply possibly being examples of alteration, and certainly examples of reciprocity between the opposites of smallness and largeness, Aristotle also thinks recognising reciprocal growth and diminution between other opposites is how we recognise alteration. One opposite must become less, the other more, and this requires growth or diminution. The terminology here could suit both the Milesian model of opposition, as well as Aristotle's 'extremes' or contraries. In the latter case "more" would be "present" and so on as discussed above.

From Aristotle's view we can extract a standard definition of alteration.[34]

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33 Aristotle (1922) 1.1 (314b20).

34 Iannone's (2001) p.99 definition we will find in use: "the partial or total replacement of one property."

Alteration = df: The replacement of a property of an object by another property over time.

There are other forms of change through which an object persists beside alteration. Prominently Aristotle recognises changes of place through which the object persists, and differentiates these from alteration. In the terms of the discussion so far, a change of place involves a variation in positional relations an object holds to other objects or variation in relations to absolute space. This is different from alteration in that it does not involve the loss or gain of an intrinsic property of that object. So it will not concern me here as it does not raise the version of the Problem of Change I address. Aristotle could also be interpreted as differentiating growth and diminution from alteration, but since growth and diminution can involve the change in intrinsic properties, these can be subsumed under alteration as I have followed Aristotle as actually doing. Growth and diminution can raise the Problem of Change.

Even though it is not the case that Heraclitus was concerned with a given object persisting through change, I will show it is the case that on the newer readings as followed so far he has all the key concepts invoked in Aristotle's definition. This means we, if not Heraclitus himself, can have a flux theoretic understanding of alteration. I will also continue to suggest Aristotle may well have been indebted to Heraclitus for some of these ideas. As in the *Meteorologica* case, this suggestion stands even in the absence of acknowledgement by Aristotle himself. Let us begin by considering the notion of 'property' and 'replacement' in the definition.

For Moravcsik (1983), Heraclitean objects as the kind of things that host law-governed oppositional battles are also the kind of things that have properties as a result of these battles.[35] What is possessed by an object at some times is the specific result of the outcome of a battle; a 'property' would be a given result of the clash of opposed qualities in a given object. Granted this, 'replacement' of a property is a concise way to describe the results of the warring oppositions in an object. For the Heraclitus preferred so far, at different points either opposition can have the upper hand. Once this happens, different properties instantiate different states of play in the conflict between those

35 Moravcsik (1983) p.139.

opposed qualities. We can then talk about something becoming drier or moister as the replacement of a property in an ongoing opposition between the qualities of dryness and wetness. Some properties are wetter (a certain degree of dampness of example) other drier (what we might mean when we say 'parched' is an example). One property is replaced by another property in the one object as the fortunes of the oppositional qualities come to differ. Aristotelian opposition here is restricted to a binary understanding of opposition, but clearly both philosophers share an underlying idea of property replacement.

It should be clear by now that both Aristotle and Heraclitus as read here share an idea of physical objects as a type of thing distinct from constitutive substances or elements. Constitutive substances and elements we have found (in the Chapter One discussion of Thales, and Chapter Two mention of Empedocles respectively) to have an unalienable quality, whereas objects are capable of property loss and gain. Heraclitus in this way shares an idea of the 'object' with Aristotle consistent with the definition of alteration.

A definition of alteration also needs to appeal to the key concept of time, something Aristotle acknowledged. Aristotle thinks alteration requires a time t_1 when a property F was not possessed by an object a ($\sim Fa$), and a time t_2 when it was (Fa). Indeed, without consecutive times t_1 and t_2 change makes no sense as diachronic difference, and alteration is a form of change. Alteration must then occur across times, and so for it we need an idea of temporal passage.[36]

On the readings I have followed Heraclitus is able to a certain idea of temporal passage. We can then accept that the theory of flux has the resources to understand 'time' in the manner required by the definition of alteration. On the reading preferred to date, Heraclitus believed that the transformation of energy drove the oppositional battles in an object, as per the Doctrine. Fr. 79 reads: "Time is a child playing draughts, the kingly power is a child's." We have found the image of a game of drafts in fr. 78: "And it is the same thing in us that is quick and dead, awake and asleep, young and old; the former are shifted and become the latter, and the latter in turn are shifted and become

36 See Waterlow (1982) p.140 for related discussion.

the former." Burnet footnotes fr. 78 by noting "shifting" has the connotation of a move from one division of a draught board to another. Here though it is not time doing the "shifting." Instead "shifting" is an image of the oppositional battle, one quality then the other getting the upper hand like Aristotle's "turn"; playing games today we might say each side has a "turn."

Burnet's footnote can allow more recent commentators of Heraclitus to read fr. 78 as compatible with fr. 79 and thus get a clear enough Heraclitean idea of temporal passage to fit the definition of alteration. As early as Anaximander the possibility of subsequent reversals in the oppositional battles can provide a clear idea of temporal passage. Thus the comparison of different states of play in the battles gave the Milesians an idea of temporal passage: the precession of day by night gives the idea of a day, summer by winter of a season, season by season of a year. Kahn (1979) makes much the same point about Heraclitean time, beginning by admitting that a given moment of opposition evidences synchronic difference by virtue of the difference in the opposites across space, and therefore also timeless.

> Now the unity or harmony of opposites can also be exemplified in states or processes envisioned at a single moment, as in the case of the bow…where the archer's arms and the parts of his instrument are stretched in opposite directions at the moment of maximum tension.

However, as the battle continues, we gain an idea of temporal passage:

> The assumption of a temporal sequence is obvious in the term *tropai* 'reversals'[:]…of the sun at… the extreme points of sunrise and sunset…or… the two times of year (in June and December) when the sun reaches these points and begins its movement back in the opposite direction. [37]

It is the transformative power of energy, manifest as oppositional battles that thus give us the Heraclitean idea of change and temporal passage. It is all we need for a

37 Kahn (1979) p.145 and p.140.

contemporary and recognisable definition of alteration. Note as well though that we could express the role of oppositional reversals in relations to time by claiming that a change in an oppositional battle must indicate a change in instants; and in this way oppositional battles can be claimed to be 'indexed' to times. This very intimate association between our observation of battling oppositions and our idea of time will be taken up in the next chapter, and there it will prove crucial.

3.3: Conclusion

Construed along the lines of the reading preferred above, *enantiodromia* gives us more than just a reading of how the Doctrine should be derived from the theory of flux (as this chapter established it should). Given this theory, The Doctrine as read here also tells us how we should think about the features always present in alteration, the type of change through which an object persists. While no-one thinks Heraclitus himself thus used ideas derived from the theory of flux to understand alteration, from the time of Aristotle it has been possible to so use the ideas concerned. When we do, we get an idea of property replacement, and also importantly, an indexing of reversals in oppositional battles to times. It is these two outcomes, I will argue, that gives us a position on the Problem of Change appealing to alternative thinkers concerned with thermodynamics.

So these conclusions already take us beyond Heraclitus, and most of the next two chapters will to a large extent leave the historical personage of Heraclitus behind. The first section of the next chapter details how the Problem of Change arises around individual objects persisting through change, something with which Heraclitus was not concerned, not even on the newer readings I have followed. There is the question of Popper's supposed Heraclitean solution to the problem of change, rejected in the second section of the chapter. Then the last section of the next chapter moves on to how it is possible to use the theory of flux in a new way, and that is to mount an argument for one of the accounts of the Problem of Change. This account will then be defended in Chapter Five.

Chapter 4: Accounting for the Problem of Change

With the theory of flux able to accommodate alteration, I will here demonstrate that it can provide an account of the Problem of Change. Of course the theory of flux has not been thus associated with the Problem before, for it has not been associated with any attempt to account for the Problem other than the one we will find in Popper's reading in this chapter. Over the millennia it has traditionally been thought that the Problem of Change simply does not arise in the theory of flux since absolutely nothing persists through change for that theory.

The first section of this chapter will follow Haslanger (1989) in arguing the Problem of Change arises out of conflicting commitments; one to the difference found in change, the other to the sameness required for identity. The second section criticizes Popper's (1966) reading of Heraclitus' Doctrine as offering an inconsistent account of the Problem of Change. This reading is reminiscent of the dialectical materialist version of Heraclitus. Finally the last section of this chapter argues that 'indexicalism' is the account of the Problem of Change for which the theory of flux as read along thermodynamic lines gives us an argument. I will defend this account in the next chapter.

4.1: The Problem of Identity through Change

Haslanger (1989) distinguishes those changes involving 'intrinsic' properties, as defined in the first chapter, through which an object survives from those through which it does not. The changes an object does not survive are of two types. There are those that abolish, destroy, obliterate or 'corrupt' the object (or cause it to 'pass away'). As well there are those that 'generate' or create that object. Both types of change are successions. Then there is a further form of change, alteration though which an object is taken to survive, raising the difficulty of re-identifying an object despite a change in intrinsic properties, to then give us the Problem of Change.[1] A tree loses its leaves, a wall is painted. Afterwards there is still numerically the same tree and the same wall.

For the traditional Heraclitean no wall or tree lasts through change; indeed nothing whatsoever lasts through any temporal duration. The most influential versions argued that since every object is at every moment losing all its properties, we never have the same object

[1] Haslanger (1989) p.3.

for more than moment, the less influential Cratylean version requiring just the loss of one property and a concept of identity such as we will now explore. In either the influential or Cratylean case all changes are successions. Either case we also have the traditional conclusion that every change is a succession, creating an object where there was not one, and in the next instant destroying that object.

Against this Haslanger finds Aristotle arguing in *Physica* 1.7 that we should accept the idea of alteration, and should not have all changes as successions. Aristotle does argue that there must be some underlying nature undergoing alteration for us to have scientific knowledge of form where an object comes and to where it goes, so that succession-only explanations lack explanatory power (190a 5-10). A similar thought has been more recently been expressed by Campbell (1976). If we suppose that a change is strictly a succession:

> Then what has happened is not that some object A has changed from state *x* to state *y*. Rather, situation S has been not changed into but replaced by situation S'. And because nothing is preserved there is no underlying mechanism or process in terms of which we can understand the alteration. One situation has ceased to exist, another has taken its place. Why or how this has happened we will never grasp, for there is no lasting basis in terms of which to account for it.
>
> We cannot even appeal outside nature to God's will, for example, for that would be to make God the continuing basis underlying the change. And our hypothetical example is one in which there is no continuing basis. …Pure replacement, in which nothing is preserved, must remain…an impenetrable mystery.[2]

Nothing lasts forever, but the point is not to deny succession changes are real or even that the idea of succession alone is a coherent one. In fact it is relatively easy to imagine a succession in isolation; simply picture an object appearing or vanishing. What is attractive about this principle? The point is we want to avoid what Campbell terms an "impenetrable mystery" and commit to at least some changes being alterations. The reason is that in the vanishing or appearing case is alone it is mysterious where the object comes from and to where it goes. In so far as alteration allows us to substitute whatever story we are telling about a persisting

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2 Campbell (1976) pp.35-36.

object for an acknowledgement something has come into existence, or gone out of existence, alteration avoids mystery.

So we should accept the idea of alteration. Haslanger continues:

> (t)he distinction drawn here between alterations and successions is not precise. The distinction may be neither exclusive nor exhaustive. For example it may turn out that some changes are both successions and alterations and some changes do not fit conveniently into either category.[3]

In suggesting "that some changes are both" Haslanger has in mind the fact that a single change might be describable as both a succession and an alteration. Depending on which of the objects we are describing as losing or gaining a property, we may be describing the one change as a succession or an alteration. To use an example of Haslanger's:

> [M]y going out of existence (or coming into existence) is a succession, and yet also involves an alteration in some physical material. Take my death: my body alters and ceases to be alive; I (the person) thereby cease to exist. Do you want to call this one change or two?[4]

It is but one change, and there are different descriptions of it. The death is an alteration in a body, but the succession of a person. The bodily alteration can help us understand the death, where we must simply say, at least on some views, that the person is no more.

Alteration can facilitate a causal story about change since it implies changes occurring to some object. Successions considered as arising from alterations in objects that exist before or after the object undergoing succession would be able to draw on such a causal story where there seems to be nothing further to be said about a succession occurring alone. If I take my generation to be an alteration in my mother's body that pre-exists mine, I can explain how a certain causally linked sequence of events causes me to come into being as a person (when I am conceived and gestated in my mother's womb). If we think of change only in terms of successions of my personhood we cannot give such explanations, I could not refer to any explanation of my existence that predated that existence. Though alteration may not be

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3 Haslanger (1989) fn.5 p.25.

4 Haslanger (2002).

the only way of getting around the explanatory paucity of pure succession (Campbell also mentions God, but we need not go that far), it is a useful and common one.

The categorizing of changes as alteration/succession does not have to be exhaustive either. 'Mere Cambridge changes' mentioned in Chapter One are not successions since there is no generation or corruption; and not an alteration either since there is no variation in intrinsic properties. Of course this is no argument against the idea that we want to be able to talk about alterations.

So we want to disagree with Cratylus when he claims that no (physical) object whatsoever can persist through change. Against his reason to reject belief in persisting objects, we need to have some way of accounting for the problem he has raised to acknowledge alteration and tell a satisfactory story about change. We thus want to endorse what Haslanger terms the persistence principle:

> PER: there are some objects that persist through alteration, i.e. through the gain and loss of a property.

"Gain and loss" can here be taken as 'replacement' found in the definition of alteration, for the object has a property replaced when it loses one property and gains another.

The discussion must now turn to identity if we are to address persistence through change. If *a* and *b* are identical these are only one thing. In Haslanger's words "whatever features, properties or aspects that *a* has or relation *a* stands in *b* also has and stands in." So where Φ is a property:

> LL: If $a = b$, then for any Φ ($\Phi a \equiv \Phi b$).[5]

The Problem of Change arises when we find that the existence of changing objects forces us to accept seemingly incompatible commitments. We find the one altering but persisting object *d* identical with something *a* before change and identical to something *b* after change. So $d = a$ and $d = b$, hence $a = b$ (PER). Since we want the explanatory power of

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[5] For all these principles see Haslanger (1989) pp. 4–5. For continuity I have read "thing" for "object." For discussion of the Problem of Change I will take Φ to only stand in for intrinsic properties.

alteration, we want to accept PER, since a change that kept these principles would fit the definition of alteration found in Chapter Three. But this requires that an object undergoes a property replacement, that is to say the property Φ that the object formerly possessed is replaced by some property $\sim\Phi$. The problem is that this is in contradiction with LL that tells us $a \neq b$ since they differ on some Φ. If a river is muddied, then the property of cleanness is replaced by the property of uncleanness; and the river lacks a property it once had. But is this not the same river? Are we to say a river is destroyed when it gains any such new property, even when it swells? That a new animal is created when a donkey becomes hungry if it was once sated?

We are threatened with being unable to make sense of alteration and not just the explanatory benefits it brings, but our ordinary view of the world that registers it happening all the time. On the other hand the concept of numerical identity as governed by LL does seem to rule out the loss or gain of property. The Problem of Change is manifest when we find well-grounded beliefs thrown into conflict and contradiction looms. Contradiction is not something we can easily tolerate here since it requires that we admit contradictory properties throughout the life of an object in every respect that object changes. I am young and not young, old and not old, black-haired and not, grey-haired and not, etc. Contradictions abound. We should seek a consistent theory of possible.

At this point then we have the logical notions required to phrase the Problem of Change that we found absent from the theory of flux: identity and contradiction. With tradition set aside, we can begin to employ the preferred reading of Heraclitus' ancient analysis of change to provide an argument for a consistent account of the Problem. Before turning to such an account however, we turn to Popper's inconsistent Heraclitean account. He described an account of the Problem of Change permitting contradiction. I have already suggested in Popper's reading that the mistake of denying Heraclitean Fire steered by The Laws must be set aside to incorporate his insights into a strand of recent scholarship. I will now argue that the same applies to the inconsistent account of the Doctrine he finds in Heraclitus.

4.2: Popper's Flux Theoretic Account of the Difficulty

If the admission of widespread contradictions did not worry us, then perhaps anyone could keep both PER and LL, and so get to some account of the Problem of Change. We have found that The Doctrine of the Unity of Opposites had been taken to express contradictions. Although this exact nomenclature for The Doctrine is not always used, even under similar naming, mention of 'opposites' has been taken to refer to an affirmation and a denial, and 'unity' taken to mean that this affirmation and denial is of the same proposition (e.g. Hegel's "it is and is not"). Such an inconsistent reading of The Doctrine also occurred to Karl Popper. In this section we will find Popper presents us with a Heraclitus logically proficient enough to state and account for the Problem of Change by embracing the contradiction that arises when we keep PER and LL.

I will reject Popper's proposal as not in keeping with the otherwise coherent story he tells about Heraclitus, and as metaphysically undeveloped. This section is a bridge, linking the discussion of logic with the account of the Problem of Change I propose the theory of flux should adopt in the next section. Popper agrees The Doctrine is derived from the theory of flux. It follows that if I can show that Popper's point of derivation is faulty, we can be suspicious of his association of the Doctrine as an inconsistent account of the Problem of Change with Heraclitus, even though I have earlier drawn upon his insights into developing a coherent theory of flux as read along post-traditional lines. Because my concern is ideas that have been associated with Heraclitus, I am honour-bound to examine it metaphysically in any case. But the lesson will be here, as elsewhere, that there is another story that can be associated with Heraclitus just as closely, if not more closely given Popper's derivation problem, and that is more metaphysically promising.

Popper thinks Heraclitus believed there is a big flame-object into which smaller tongues of flame-objects feed. Within this cosmic burning process, alterations occur, both within the cosmic object, as it gains or loses properties in the form of its parts altering, and in the life of smaller objects where these experience some duration in the unending circulation. Popper writes:

> Flux or change must be the transition from one stage or property or position to another. In so far as flux presupposes something that changes, this something must remain identically the same even though it assumes an opposite stage or

property or position.[6]

Popper's Heraclitus recognises that if there are persisting objects in his system, these will change. Thus he is committed to PER. So this Heraclitus, if only in respect of The Doctrine, takes up a concern with individual objects persisting through change. There is an altering flame-object *d* identical with something (*a*, say) before it changed and identical to something after it changed. So $d = a$ and $d = b$, hence $a = b$. However, this Heraclitus also recognizes that if for some property Φ, Φa yet $\sim\Phi b$ then $a \neq b$. He thus recognises the following contradiction:

$$(a \neq b) \,\&\, (a = b)$$

He accepts it. The opposite unified in this inconsistent interpretation of the Doctrine is the incompatibility of the logical notions of identity and difference. In this way, Popper's version of Heraclitus accounts for the Problem of Change. This Heraclitus believes if you are puzzled about how we can have the same object once a property is lost or gained, then you have failed to realise that conjoined to any assertion that we have the same object on our hands, is the assertion we also have a different object. He also believes if you are puzzled about how we also have a different object every time a property is lost or gained, then you have failed to realise that conjoined to any assertion that we now have a different object, is the assertion we have the same object. Either way, blinded by the consistent routine of everyday discourse, the contradiction has been overlooked. Inspired and shocked by social upheaval, Popper's Heraclitus declares alteration to be a brute, if contradictory, fact.

Popper thus has Heraclitus attack not just his favorite targets, the common folk, but the philosophical fraternity for stupidly clinging to one side in oppositions that are unified (either the identity or difference conjunct of the contradiction). All such people unjustifiably divide off one of the conjuncts in the contradiction around identity and difference. Fr. 35 reads "Hesiod is most men's teacher. Men are sure he knew very many things, a man who did not know day or night! They are one." On Popper's interpretation of the Doctrine, Heraclitus thinks Hesiod was right that day and night are different (Hesiod understood the difference conjunct of the identity and difference conjunction), but forgot these are also one (Hesiod

6 Popper (1966) p.207, fn.10.

forgot the identity conjunct).

Popper allows that Heraclitus used the logical notions of identity and contradiction. However since he permits contradiction, Popper thinks Heraclitus understood the notion of contradiction imperfectly. Contradiction is only fully understood when forbidden. For Popper the Doctrine therefore is "more abstract, as a kind of a forerunner of logical or methodological theory (as such it inspired Aristotle to formulate his law of contradiction)."[7] Guthrie, in discussing The Doctrine, which he also takes to be about the same contradiction as Popper, remarks about Heraclitus:

> What was for him an exciting discovery was only possible at a stage of thought when many logical distinctions, now obvious, had not yet become apparent. By baldly stating the absurd consequences of neglecting them, he unintentionally paved the way for their recognition.[8]

There is an immediate problem with this reading of the Doctrine. On the other post-traditional readings as we have these, Heraclitus did not use the logical notion of contradiction, even imperfectly, and nor did his theory harbor unintended inconsistency. Popper relies heavily on Heraclitus' legendary arrogance to carry the claim that Heraclitus did intentionally use contradiction in his theory, even if crudely. For Popper, Heraclitus arrogantly aims The Doctrine at those around him. Heraclitus was arrogant because he believed his audience fools who would find an inconsistent Doctrine unacceptable. But if Heraclitus could only permit contradiction due to his early position in the history of philosophy, and consequently imperfectly understood it as a logical notion, there is no reason why his audience would be any better placed to find the proclamation of contradiction unacceptable; so why were they fools?

Certainly some of the fragments do suggest Heraclitus has a low opinion of most people, and so would not expect them to take up any wisdom he has on offer. For instance fr. 5 reads, "The many do not take heed of such things as those they meet with, nor do they mark them when they are taught, though they think they do." And likewise for the Hesiod case; it is easy to read the fragments and get the impression Heraclitus thought the multitude mistaken and mislead by facile bards and popularists. Fr. 111 reads "For what thought or wisdom have

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7 *Ibid*. p.205, fn.1.

8 Guthrie (1962) p.443.

they? They follow the poets and take the crowd as their teacher, knowing not that there are many bad and few good…"

All of this, however, can be explained without reference to contradiction, and with reference to Popper's own reading, as well as to the newer readings with which Popper is otherwise quite compatible. If Heraclitus was a speculative thinker there was a sense in which everything he wrote would have been counterintuitive to those around him. As Wiggins stresses (following Hegel), speculative thought reaches deeper conclusions than we find in the unreflective and so common use of language. It is true Heraclitus famously laughed at Hesiod for writing about day as the offspring of night when The Doctrine claims these are a unity (fr. 35), but an inconsistent Doctrine is not needed to explain this and similar acts of scorn. Hesiod was a mythographer. Hesiod's error is more likely the use of the unreflective personifications of Greek myth, an inferior mode of thought that fails to utilise principles of thought informing the theory of flux and from which The Doctrine could otherwise be derived.

Wiggins found principles of thought utilized by Heraclitus to include The Principle of Sufficient Reason and Inference to the Best Explanation. On the reading I have preferred where Heraclitus personified time in The Doctrine (a reading of fr.79) he applied the theory of flux that had come out of the use of these principles of thought to careful observation. In so doing he redirected imagery from myth to communicate a position on temporal passage that, rather than being an exercise in mythography, philosophically treated the argument regarding change as oppositional battle inherited from Anaximander. For instance anthropomorphism of time as a king like Chronos fades into the background if we follow Burnet in rendering fr. 79 congruent with fr. 78 and emphasize 'shifting.' On this reading the fragments in fact call attention to the limits of mythical thinking.

There is no reason on a post-traditional reading to suspect Heraclitus used the logical notion of contradiction. Rather, one reason Heraclitus was disdainful is he saw himself as part of something new and little-understood: philosophy itself. At this stage though, the recent scholars tend to agree that neither Heraclitus as a thinker nor philosophy as a discipline of the mind were differentiated by the use of formal logic, not even a crude use of the notion of contradiction. Heraclitus may well have been arrogant. But if we take the move away from the contradictions found in the traditional, more Parmenidean readings, then, *pace* Popper's similarity to such readings in interpreting The Doctrine, Heraclitus did not embrace

contradiction.

And there is no reason on a post-traditional reading to suspect Heraclitus used the logical notion of identity. Guthrie goes on to attribute to Heraclitus the notion of identity on the strength of assertions Heraclitus derives from the narrow and wider Doctrine that opposites are the same.[9] However it does not follow from any assertion of sameness that there was an examination of the logical consequences of such an assertion. I have supplied a different idea of unity: the sameness of negatively correlated descriptions. Right from the moment he defied tradition, Burnet had noted that those who wanted a Heraclitus using logical notions gave no good reason to suspect the presence of the logical notion of identity.[10] Kahn has emphasised that the Milesian and Heraclitean cosmic unity was a single source such as the *apeiron* or energy rather than concerned with any identity relation.[11] Kirk (1954) writes that the unities of The Doctrine do not refer to a logical notion of identity but

> are more concrete than this – e.g. Summer-winter, the young-the old, the straight-the crooked (regarded not as abstractions but as real things). Those examples are clearly described as such.[12]

That is, Heraclitus is not concerned with logic, but with the way we can think about what the cosmos and the things in it are like.

The Doctrine as construed by Popper cannot be derived from Popper's otherwise commendable reading of the theory of flux. It has nothing to do with the emphasis on circulation we find in Popper's reading. The Doctrine is compatible with the reading, as it could be compatible with many different theories, but not derived from it. From a more coherent post-traditional perspective Popper's reading of the Doctrine is more like a declaration that accompanies Heraclitus' speculations. Without any traditional reason to

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9 *Ibid* p.445.

10 Burnet (1971) [1892] p.144. While Heraclitus taught that reality is at once a unity and a manyness, this was not intended as a logical principle. Unity just means the sameness of Cosmic Fire, and is not about logic. For Burnet this pre-logical Heraclitus is not concerned with the identity relation or with contradiction arising from it.

11 Kahn (1979) 131. On p.134 Kahn backs up this view of Heraclitus' "big flame" cosmic unity by pointing out Heraclitus' world order has a non-cosmogenic sense as a market place of fire. For Kahn this strict insistence on the oneness of things is "monism with a vengeance" p.137. This position is compatible with preferred readings of unity to date.

12 Kirk (1954) p. 377. Kirk could be leaning too far towards a concrete Heraclitus. As I read it fr. 39 shows us a sense in which Heraclitus could abstract. An intermediary reading is attractive. We allow Heraclitus abstraction in The Doctrine, but admit there is no logical notion of identity in the fragments.

suggest that the fragments are concerned with logical notions, it lacks justification.

This takes us into the metaphysical assessment of Popper's version of the Doctrine. There is no reason to take up an inconsistent account of the Problem of Change, when, as the next section of this chapter will show, there are several apparently viable consistent accounts. Even if, like Graham Priest, one associates some inconsistencies with change, Popper's Doctrine does not tell us why we should believe a single object persists through change just because it also tells us that the object does not so persist. We intuitively believe objects persist, and granted what has been claimed as the explanatory advantages of alteration, there is good reason to believe in persistence. But Popper's Heraclitus could be criticised on the grounds that this does not do away with the Problem of Change, or prove it nothing more than a philosopher's conceit that can be dismissed. Instead we need an account that can explain how we can keep all the commitments embodied in principles PER and LL.[13]

Mortensen (2002) has developed such an account from Hegel's reading of Heraclitus, and again there are similarities here with the dialectic materialist positions on Heraclitus and a dialectical materialist contradiction. Mortensen does not mention Popper's reading of Heraclitus, but he does give an argument as to why we might keep both the identity and difference conjuncts.[14] If we are watching a movie, we are unable to distinguish individual frames because these move so rapidly. Our minds are 'fooled' into thinking the frame is in motion. The movie *Predator*, for example, is made up of a number of frames. In it the lead character ducks to avoid a blow from the Predator. Let us take three consecutive frames that make up the movie. In the first frame the lead character is in an upright stance. In the second he is half way between such a stance and a crouching position. In the third he is in a crouching stance. We do not see these frames as separate, but rather see one moving frame in which the lead character performs the action of ducking.

Mortensen proposes that the change in what we think of as a persisting object takes place so quickly that the observer is confronted with a contradiction. Let us take two consecutive frames of the above example. In one of the frames there is no property replacement, in the other there is. The limits of the mind and the senses are such that the observer perceives but a single frame, just as we run together the still frames to watch a

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13 Browning (1988) pp.105-107 criticises other philosophers who have done likewise. Lewis (1986) p.204 observes "It is not a solution just to say how very commonplace and indubitable it is that we have different shapes at different times. To say that is only to insist — rightly — that it must be possible somehow."

14 Mortensen (2002) section 5.

movie. For the observer there is one frame, and here the object is both the unchanged and changed. This would give us both the identity and the difference conjunct found in Popper's Doctrine, but as the result of an illusion. Subsequently we could have the impression of this same object lasting through any number of changes.

Mortensen's account might be plausible if we accept inconsistency as did the thinkers who inspired his idea: Hegel, and so indirectly Heraclitus as read traditionally.[15] The argument is that since the right kind of contradiction could be found in thought about persistence, then there is nothing preventing persistence of physical objects also being contradictory. But equally as things stand we have positive reason to assume these contradictions are present in persistence. Lenin (2005) [1916] seems to endorse this line on persistence and even attribute it to Heraclitus more directly, but characteristically when it comes to dialectical materialism, he does not provide the required argument. This is not to say the advent of such an argument is impossible or even unlikely, but without it to hand I will not pursue this account. Without the argument the metaphysic I have pursued as Heraclitean is both more metaphysically attractive and in any case is tell tenuously associated with Heraclitus.

So I turn to explore five more mainstream accounts that none of which require the argument linking contradictions in thought with those in the world. The foregoing section has uncovered an attempt to associate the theory of flux with an account of the Problem of Change. Such an attempt is natural enough if we agree with Moravcsik (1983) that such was the direction for the theory. But recent scholars could claim that reading the logical notions needed (identity and contradiction) back onto Heraclitus has often been with ulterior motives. Hegel used Heraclitus to found his inconsistent system, Aristotle as a foil to argue for the prohibition of contradiction. I believe that in his inconsistent reading of The Doctrine Popper has a tendency to exaggerate Heraclitus' arrogance to the point of meglomania. In part Popper seeks to make a point in political philosophy by associating Heraclitus with the dialectical materialists.

Popper is more historically thorough than Aristotle or Hegel, but the results remain inconclusive. Inconsistent versions of Heraclitus that with ulterior motive, rely upon the (originally Aristotelian) idea that Heraclitus recognized the logical notion of contradiction tend to be straw targets, unsurprisingly unhelpful in accounting for the Problem of Change.

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15 *Ibid*.

Mortensen does give a long overdue argument for the possibility of the 'dialectical' contradiction found in Popper's reading of the Doctrine. He actually argues that the right contradiction can be found in thought and so could well also be in persisting physical objects. But a compelling argument that the right contradiction is in the world is yet to arrive on the scene. Mortensen also does not improve upon how tenuously the idea is associated with Heraclitus, and indeed, this was not his aim. In the next section I will argue that as a better alternative to longstanding obfuscation around Heraclitus the post-traditional reading of the theory of flux provides an argument for one of the five main (and consistent) accounts of the Problem of Change. By association with thermodynamics, this account can really be claimed to come out of a renewed and well-argued emphasis on change.

4.3: The Accounts

There are four main accounts of the Problem of Change that do not accept the Cratylean alternative of denying persisting objects, nor that alteration gives us a contradiction involving identity. All rely upon the idea that a single object construed in some way or another can have different properties, provided we properly take into account the need for temporal passage that we found in the definition of alteration. We use time to qualify how we are talking about the one persisting object, and thus avoid contradiction. Somehow we must factor time into the idea that an ordinary physical object has ordinary properties that can be replaced and the object persist through this replacement.

One result is that all of the accounts to be discussed in this section have been subject to 'no change' objections.[16] If we factor time into the idea that an ordinary object undergoes property replacement, the objection suggests that the picture we get seems to leave no room for the difference that change requires and which made persistence through change problematic in the first place. We offer accounts of the Problem of Change in so far as there are always certain facts at times or a time.

'No change' objections remain irrelevant but understandable. These are irrelevant because I have argued the type of change we need to retain is alteration, and all the accounts retain that form of change. This will become clear when I show that these accounts retain PER, and that is sufficient to provide a sense of alteration. 'No change' objections are

16 Lombard (1994), Merricks (1994) pp.166 and 169, Hawley (2006) pp.4-5.

understandable because all of the accounts do seem to do some violence to what we intuitively mean by persistence; usually we think there is no more to alteration than property replacement, but all the accounts qualify this understanding in temporal terms.

Each account will be shown to trade off certain intuitions, or attractive commitments, leading each to have its own problems. The ability to retain an intuition that seems commonsensical will then count in favour of an account. Relevant to this, the main way in which an account of the Problem of Change is tested against common intuitions around persistence is by determining whether or not it is an endurantist approach. I agree with most philosophers that this is the folk-friendly approach. Of course it would be good to be able to meld folk intuitions with a rigorous philosophical argument. For in the absence of an argument why we should believe endurantism and an argument as to why endurantism is intuitively attractive, alone folk friendliness is not much of an advantage. I will be using the theory of flux to provide such arguments.

One way to understand endurantism is to contrast it with perdurantism. For a perdurantist, an object consists of temporal parts, the most basic of which exist for but a moment. Key ideas from the theory of relativity can explain what it is to have temporal parts. For this reason, though it does not appear any of the arguments from the theories of relativity (general and special) are conclusive in favour of this account or against rival accounts,[17] perdurantism is often regarded as relativity friendly.[18] Just as time is understood as space-like according to the theory of relativity, so as a fourth dimension alongside the three more familiar dimensions of height, length and breadth, persistence through time could be understood as analogous to extension in space. As objects have different spatial parts in different places, so these have different temporal parts at different times. "Your spatial parts are things like your head, your feet and your nose, your temporal parts are things like you-yesterday, you-today and you-tomorrow."[19] The accepted definition of such a temporal part is as follows: "*x* is an instantaneous temporal part of *y* at an instant *t* iff (1) *x* is part of *y*. (2) *x* exists at, but only at *t*. (3) *x* overlaps every part of *y* that exists at *t*."[20]

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17 Hawley (2006) p.13, Miller (2005b) pp.110ff. Also Carter and Hestevold (1994) unconvincingly argue that theories of tensed and untensed time require endurantism and perdurantism respectively: see Merricks (1995) p.523, Koslicki (2003) pp.109-110, Miller (2005b) pp.93ff, and Hawley (2006) p.13.

18 Parsons (1999) pp.401ff.

19 Hawley (2006) p.2.

20 Miller (2005) p.313.

Because the object thus viewed by perdurantists is comprised of temporal parts spread out across time, the perdurantist denies that at any one time the object is ever wholly present at some time. "A four-dimensional object lasts over time by way of having distinct temporal parts existing at distinct times."[21] So:

> Perdurance = df: an object *perdures* iff it persists over time by having temporal parts, each part existing at a different time.

Thus "not all of a perduring object's parts could exist at the single time which it is present."[22] We can draw an analogy with how a road continues through space, and all we ever encounter is a segment of that road. Because it relies on the idea of an object as extended in four dimensions, I will term the standard perdurantist account, discussed below, "standard four-dimensionalism." Because whatever lies along the fourth dimension does not have to be divided into temporal parts, and in fact may not be divided at all, there are other forms of four-dimensionalism, one of which I will discuss below, namely "stage theory".

Let us turn to the folk-friendly rival to perdurantism, namely endurantism. In addition to conventional spatial parts, perdurantists are committed to temporal parts, "while endurantists only have spatial parts." For the endurantist:

> Objects have no temporal parts and last [or persist], not by perduring, but by *enduring*. Enduring objects lack temporal extent and have three dimensions instead of four. If a three-dimensional enduring object lasts from one time to another, then there is a three-dimensional objecting existing at one of those times which is literally identical with a three-dimensional object existing at the other.[23]

To define endurantism more formally, endurantists usually claim the rejection of the doctrine of temporal parts means that an object is wholly present at any given time during the course of its life. "An object *O* is wholly present if and only if all of *O*'s parts exist"[24] at any time at which that object exists. The object may be spatially extended and so does not have to

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21 Merricks (1995) p.525.
22 *Ibid*. The foregoing definition is adapted from the same source.
23 *Ibid*.
24 Merricks (1994) p.181.

be wholly present at some place, but that object is not extended over time. Invoking three dimensions instead of four, endurantist accounts of the Problem of Change are forms of 'three-dimensionalism.' A formal definition of endurantism might intuitively be obtained by concentrating on the idea that all of an enduring object exists at every time at which that object exists.

> ID: An object *O endures* through interval *T* iff for any two times *t* and *t*' contained in *T*, *O* at *t* is identical to *O* at *t*'.[25]

But what the enduranist holds about *O* here, the perdurantist can hold about *O* taken to be a four-dimensional object that always has the same temporal parts. This shortcoming of ID suggests an alternative to rule out a perdurance-friendly interpretation:

> S: An object *endures* iff it has only spatial extension.

This says no more than that an object is wholly present at every time at which it exists. And we need to say what it is for an object to exist only three-dimensionally at some time. A way of doing this is to define endurance by combining the idea of whole presence with the rejection of temporal parts:

> Endurance df: = objects *endure* iff any object is wholly present at each moment at which it exists and at least some objects are wholly present for more than one moment, where an object is wholly present at a time iff (a) it exists at *t* and (b) it is not the case that there is a *y* such that *y* is a temporal part of *x* at some time other than *t*.[26]

The definition combines the idea that endurantism is a theory of whole presence at different times that must then talk about objects at some time or the other. This may seem odd since it seems anyone could talk about (for instance) Heraclitus or Parmenides without mentioning the dates of their lives (indeed, we have had some indication there is uncertainty around these dates), and the fact is there is no equivalent need on the behalf of the

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25 As found in Miller (2005) pp.312ff. In what follows S is taken from the same source.
26 *Ibid*. slightly modified.

perdurantist. What this means is the perdurantist can talk about the temporal parts that make up a four-dimensional object without needing to explicitly mention any particular time, not even the time at which the temporal part exists, since invoking a temporal part involves implicit appeal to time. Certain temporally-indexed parts always make up an object *d*, always arranged in a certain order. What the reliance on whole presentness means is that the endurantist predicates a property of an object, she must believe that the predication can only be true or false at some particular times at which the object is wholly present; the predication may be true at some times, false at others. The definition can then allow us to understand a fundamental difference between the way the perdurantist and endurantist understand parthood. To do so, we must first note a problem with endurantism.

Unlike perdurantism, endurantism does not immediately suggest an account of persistence through change. On the contrary, like Cratylus may have done with his traditional Heracliteanism, endurantism as it stands throws the Problem of Change into stark relief. The one object is wholly present at different times, and yet in contradiction with our idea of identity, has undergone property replacement if it has altered. Perdurantism on the other hand, does not seem susceptible to the Problem of Change because temporal parts do not undergo alteration; only the four-dimensional object can be claimed to alter by virtue of the differences in these parts. I will furnish further details of a perdurantist account shortly.

Because the endurantist has to talk about the object at different times, she can import a story about how objects are related to temporal passage that does offer an account of the Problem of Change. There is more than one such story, and hence the different enduranist accounts I will discuss below. All fit the endurantist rejection of temporal parts, but not of parthood. Endurantists talk of different parts at different times, but must do so in relation to the time at which the part was part of the object. Hawley (2006) has the endurantist claim "some of your former [spatial] parts lie in the past and some of your (future) spatial parts lie in the future, but that doesn't mean you are somehow less of a whole person, right here and now," and Merricks (1994) similarly writes of an enduring object O at some time t:[27]

> If *t* is present it follows that all of *O*'s parts exist. If t is not present, however, there may be parts of *O* at *t* that do not exist. But this does not mean that *O* has a part that does not exist — that is that *O* is not wholly present. Why not? Because

[27] Hawley (2006) p.2.

O can have *P* as a part at *t* without having *P* as a part [*simpliciter*]….[28]

I have inserted '*simpliciter*' here in reference to what (immediately following the above quote) Merricks terms a more 'general' point about endurantism vis a vis perdurantism. You-yesterday is a temporal part *simpliciter* of a perduring object in that no further information is required, and if you-yesterday had a beard it would be equally as simply a part of that temporal part. An analogy with spatial parts is useful; it can be enough to state something has a spatial part, we relate that part to the rest of the object, not to the specific areas of space through which it might move. For an enduring object matters are different; you have no parts *simpliciter* but can only have parts like your possession of a beard as indexed to yesterday.

Understood like this, perdurantism and endurantism seem to be exclusive positions, with the former endorsing and the latter rejecting temporal parts. However if talk of a part possessed at some time can be inter-translated with the possession of a temporal part *simplicter*, then at least two of the accounts of the Problem of Change here presented as separate could be metaphysically equivalent.[29] Even if this is right, it would only make a small difference in what follows. Given the equivalence means that the metaphysics of two or more accounts cannot be distinguished, and these accounts are metaphysical theories, in arguing for indexicalism as one of the accounts I will be arguing for any account equivalent to it, and not any other non-equivalent account. The inconsistent account offered by Popper's Heraclitus is an example of another clearly non-equivalent account (given perdurantism and endurantism are consistent).

So we return to the idea that endurantism is regarded as the "'folk-friendly view, a view that significantly pre-dates"[30] perdurantism. Certainly contemporary physics is not particularly helpful in assisting us to understanding endurantism. The folk friendliness of endurantism is often taken for granted today, but Hegel did argue for something like it. For him, the easiest and so default way of thinking of an object was as something that is complete at all the times of its existence, since such an idea of the object does not require any further abstraction or ideas. Hegel writes "we do not usually understand by an 'object' merely something that *is* abstractly… but something-independent, that is concrete and complete

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[28] Merricks (1994) p.181

[29] Miller (2005b) pp.99-100, Prior (1976) p.80.

[30] Miller (2005) p.314.

within itself."[31] Endurantism fits here; wholly present at a given time, no 'abstraction' to temporal parts at other times is required to conceive of an object. Recently David Armstrong (1980) explains the folk-friendliness of endurantism more cynically. It "appeals to us because of our deep emotional interest in the continuing of ourselves and other things that we cherish." [32]

It may then seem odd that I have understood endurantism by contrast with perdurantism. How was endurantism conceived of prior to perdurantism? Kristie Miller notes that perhaps before the formulation of perdurantism, endurantism "was indeed no more than a vague conception…[this does not mean endurantism is] not the more intuitive view, or that it is in some way inferior to perdurantism."[33] On the contrary, folk-friendliness should be taken as an advantage. It promises a way of dealing with the problem that avoids as much as possible violence to our existing ideas.

With the exception perhaps of Popper's reading, no version of Heraclitus presented so far would be concerned with endurance, since the versions so far either dismiss persistence or are not concerned with individual objects. But the status of the approach as older and folk-friendly suits the idea that the theory of flux, the oldest theory capable of understanding alteration, could be used to provide an argument for a version of endurantism. And it suits the more down to earth version of Heraclitus emerging out of the collapse of tradition as well. In place of sometimes quite bizarre ideas about the impossibility of persistence, we would have a folk-friendly account of persistence coming out of an ancient attempt to theorise the guidelines by which changes can occur and objects can survive.

To understand how we can rely upon temporal passage to escape the contradiction found in the Problem of Change by retaining PER and LL, take an object *d* with a property *Φ*. In the case of any of the properties so understood, we shall write *d*'s possession of *Φ* as

(1) *Φd*

As about an enduring physical object with an ordinary property as found in common experience, (1) could be indexed to times to offer an account of the Problem of Change and

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31 Hegel (1991) [1817] p.268.
32 Armstrong (1980) p.68.
33 Miller (2005) p.314.

escape the contradiction arising between change and identity in a single object by noting that while Φd obtains at one time, $\sim\Phi d$ obtains at some other time.

4.3.1: Presentism

Presentists hope that by claiming there is the present, but no future and past, they can avoid the Problem of Change. Roughly, the appeal of presentism then lies in the fact that the difference in property possession that gives rise to the Problem is found in objects at a number of different times, but of these only the present exists. The best presentists will also seek to avoid sacrificing the ability to talk about the future and past as well as talk of alteration (and hence keep PER). The former is threatened since if only the present is real it is problematic how propositions about the future and the past can be true. The latter is threatened since we need multiple times rather than just a single time for change, including alteration (and PER). So let us consider how better presentists might index (1) to times in an effort to allow multiple times, PER and also LL.

Presentists, in accepting that only the present exists are anti-realists about the past and future. Presentists can still talk about the past and the future, but they cannot believe the past and the future to have an existence independent of our minds. To sustain this anti-realism, presentists require an alternative to the analogy between space and time we encountered when discussing perudantism. Since all parts of space are equally real, if time was simply analogous to space, the presentist insistence that only one moment in time is real would come out false. Given that past and future tense operators function like modal operators, then non-present times could be akin to modal language that allows talk of possible, but non-actual, worlds.

Presentists use the analogy between time and modality. For instance the sentence "all human beings will be lousy" could be translated in one of two ways if we use Hx for "x is a human being", "Lx" for "x is lousy" and **F** is a tense operator that we interpret as "it will be the case that":

(i) $\mathbf{F}\ (\forall x)(Hx \rightarrow Lx)$

(ii) $(\forall x)\ \mathbf{F}(Hx \rightarrow Lx)$

"It is possible that" is analogous to the operator **F** as in (i) and (ii), and also the **P** operator: "it was the case that."[34] If the presentist wanted to discuss non-present times, she would then use modal-like operators to index entire sentences. For example:

> **P**(*Φd*)
> and
> **F**(*Φd*).

The operators **F** and **P** are used on the basis that there are intrinsic properties of pastness and futurity, and that by having such properties, objects are past or future. There would be

> a continuum of such properties stretching from the distant past to the distant future, as if…pastimes were coloured deeper and deeper shades of blue and future times in deeper and deeper shades of red.[35]

These properties would be the intrinsic properties of belonging to non-present times like t_1, t_2, t_3. The different times would correspond to different properties on the continuum, and could be used to define operators in place of the **F** or **P** operators if we wanted a statement to be indexed to a given future or past time. So if a presentist wanted to index (1) to non-present times in order to try to retain a sense of persistence she would do this:[36]

> (2) (*Φd*) at- t_1.

Where 'at- t_1' is now taken to be a sentential operator 'It was (will be) the case that…'

There are now two options open to the presentist when it comes to accounting for the Problem of Change. One is that with anti-realism about the past and future in place, she claims there is no Problem of Change. Objects cannot persist through change because these do not persist through time. Parmenides for instance does not persist, even though he lived to be quite old. The name Parmenides is just shorthand for collections of utterances, actions and the like. As for present actual objects, the presentist reminds us that the present too is but a

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34 Parsons (2001) p.116.

35 Parsons (2003) p.6. See also Prior (1962) p.8.

single moment. Without persistence, there is no PER to fall into contradiction with LL.

A presentist aiming for the best possible theory could do more. She could claim that demanding that persistence involve multiple existing times begs the question in favour of a non-presentist endurantist or perdurantist. She claims a present object persists if it has a past or a future,[37] and explains how present objects persist by finding the following invalid:

$$\frac{\begin{array}{l}(\Phi\ a)\\ (\sim\Phi\ b)\ \text{at-}t_1\end{array}}{(a\neq b)}$$

and insisting that this, properly understood, is how the argument against persistence must be cast. The first line is a statement about property possession in the present. The statement about the non-present time (namely "$(\sim\Phi\ b)$ at-t_1") is indexed to a specific past or future time with the sentential "at-t_1" operator at the end of the statement. The argument's invalidity is then obvious: we can no more infer $a\neq b$ from the premises than we can from '$\Phi\ a$' and 'possibly $\sim\Phi\ b$.' The presentist finds the argument invalid because there need be no contradiction where an object both has and does not have a property if one of the statements about property instantiation are qualified. Qualification is a way of escaping from contradiction. If I say you are tall, but you say you are short and qualify this by adding "in comparison to the mast of a ship," we have not contradicted each other.

I have placed a value on accounts that soften the impact the indexing of (1) has on our intuitions. Being a perdurantist account of the Problem of Change is a disadvantage, and the presentist account avoids this. To realise how, let us grant the following plausible mereological principle: "An object cannot have another object as a part if that other object does not exist."[38] So for instance, we would not think that the transparent spheres that Aristotle held were responsible for the motions of the stars could be actual parts of the cosmos if these did not exist. If presentism was a perdurantist account, then an object has temporal parts, but all but the present temporal part do not exist. The possibility of such non-present parts actually being parts is ruled out by the mereological principle. But Presentism can not be endurantism either, since while it captures the intuition that the whole

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36 Parsons (2001) p.63.

37 *Ibid* p. 112.

38 Merricks (1995) p.524. This is Merricks' thesis (3).

of the object is present when that object exists, this existence is only at a single time, and endurance requires multiple times.

Presentism does try to make sense of ordinary use of tensed versions of the verb 'to be' rather than introduce a technical relation as some of the other ways of indexing (1) to times I shall discuss.[39] However any presentist claim to match the way ordinary language deals with persistence must deal with the tremendous diversity of language, and presentists are not licensed to assume everyone speaks Oxbridge English. In Chinese, currently probably the most spoken ordinary language, there are no tense markers at all. The ancient Greeks did not speak of the past as having gone and the future as yet to come, so their language may also not be obviously presentist.[40] The presentist could reply that tenses were assumed, somehow built into communication, including by the Chinese, and so that Chinese, like all languages, should be interpreted along presentist metaphysical lines.

Nevertheless the existence of tenslessness talk should restrain presentists from claiming there is a close match between their position and existing language. For instance when he claims presentism is "written into the grammar of every natural language, and is still assumed in everyday life even by philosophers who officially deny it,"[41] Bigelow (1996) gives the impression that he has failed to account for the diversity of language. Bigelow's claim about presentism being assumed in everyday life is likewise too hasty. Lewis (1986) has been able to use an *ad hominem* argument by pointing out that presentists do not act as though only the present is real since we have regrets and dreads, suggesting presentism is false because no one does, or can, take it seriously.[42] Such an argument is not conclusive, since for many reasons many people, even philosophers, act in ways at odds with what they believe to be true, or what is true. But it is an indicator that presentism is at odds with daily practice. Since neither is presentism folk-friendly endurantism, it could not be said to unproblematically account for the Problem of Change, and I move onto to consider the next account.

4.3.2: Four-dimensionalism

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39 Merricks (1994) p.170.

40 Trask and Mayblin (2000) p.79 and p.54.

41 Bigelow (1996) p.35.

42 Lewis (1986) p.207 ff.

Another way we might make the temporal dimension of the Problem of Change explicit in claims like (1) is to index the object to a time and claim statements like (1) implicitly involves talk of d-at-t_1. The standard way of taking up this account of the Problem of Change is that of the standard four-dimensionalist, and who for now I will refer to simply as a four-dimensionalist. A sentence like (1) can only be true of the temporal parts of such object, and must be understood as:

(3) $\Phi(d\text{-at-}t_1)$

Change does mean that the temporal parts of an object are different. If we take a and b to be temporal parts of an object for e.g. d-at-t_1 and d-at-t_2 respectively, this argument for their distinctiveness does go through since:

$$\frac{\begin{array}{l}(\Phi\, a)\\(\sim\Phi\, b)\end{array}}{(a\neq b).}$$

We can infer that d-at-$t_1 \neq d$-at-t_2. So change shows the distinctiveness of the relevant temporal parts. A temporal part of d is distinct from another temporal part of d after change.

However if a and b are taken to be the names of a four-dimensional object with different temporal parts at different times, we can easily diagnose the flaw in the following invalid argument:

$$\frac{\begin{array}{l}\Phi(a\text{-at-}t_1)\\\sim\Phi(b\text{-at-}t_1)\end{array}}{(a\neq b).}$$

Despite the fact that the object considered at one time (t_1) is Φ while the object at another time (t_2) is not Φ, it is nonetheless the same object. Since we cannot conclude ($a\neq b$) we can accept PER. There is no contradiction arising from LL: temporal part (a-at-t_1) is not identical to temporal part (b-at-t_2). We have persistence because a is the four-dimensional object before the change, and b is the object afterwards, and ($a=b$) because there is one invariant four-dimensional object through the change, namely d. If time is analogous to space, then the one object having different properties at different times is no more

problematic than that object having different properties at different places. The ass is hungry at time *t* before it eats the straw, but by time *t** it is sated; it persists through change in so far as it has a hungry temporal part and a sated one, just as it may have a brown spatial part and a white one. The replacement of properties across temporal parts of the one four-dimensional object explains alteration.

As the temporal part does not itself persist, the going out of being of each one and the coming into being of the next one is a succession (though the four-dimensional object itself only suffers successions with its first and last temporal part). As argued in the first section of this chapter, descriptions of change as succession alone involve us in the loss of explanatory power. Along these lines Haslanger has thought it a problem that a further alteration does not ground the relations between the distinct parts, and Thomson (1983) thinks the idea of objects made of temporal parts coming and going out of existence violates *ex nihilo nihil fit*.[43] The four-dimensionalist though, does not have to come to grief here. Alongside the successions of temporal parts she can rely upon the explanatory power retained by the alterations in four-dimensional objects. If it seems counterintuitive to have the temporal parts come from nothing, she can claim that this is because we tend to use alterations to explain the coming and going of properties. We then naturally want to have the same explanation for temporal parts as the possessors of those properties, yet there is no real problem if we do not come by this explanation; there is no reason temporal parts have to be like properties in this respect. The idea of a temporal part may not fit our intuitions in the way of more familiar things like properties.[44]

More recent proponents of four-dimensionalism have examined ways there can be causal stories to supplement the succession of parts. The idea would typically be that the laws of nature would tell us what temporal parts should be linked together as a single persisting four-dimensional object, and how later temporal parts enter into causal relations with earlier ones. So the four-dimensionalist seeks to tell a story about a causal substratum, and four-dimensionalism would not have a succession-only component. The right causes would depend on the kind of object in question.[45] For a person as a four-dimensional object, we might want the kind of causal relations that give us psychological continuity between that person's temporal parts. The persistence of a bow, a lyre or a posset will require different

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[43] Haslanger (1989) pp.16 ff. Thomson (1983) pp.211-213.
[44] Parsons (2001) p.77-78.
[45] Hawley (2001) pp.69 ff, Sider (2001) pp. 216-218, pp.224 ff.

causal relations. This also explains properties that are manifest over time like "flaky" or "erudite." A number of suitably linked temporal parts have properties that give us the flakiness or erudition of the complex persisting object.

With parts spread through time as we normally consider parts spread through space, four-dimensionalism is a perdurantist account. If it is to persist, the object is not wholly present at any one time. This makes the account unappealing. Another unappealing aspect of standard four-dimensionalism becomes clear if we consider the property of being spherical. On four-dimensionalism as we have it so far, the object is not spherical since objects considered as four-dimensional entities are not the subjects of property predication, only the temporal parts of these are and any number of these could be spherical.[46] A sphere is a three-dimensional object, not a four-dimensional one.

A variant on standard four-dimensionalism, stage theory, solves this difficulty by taking each part as an object, a stage, in its own right. We think of each three dimensional time slice of the fourth dimension as an object, a stage. Instead of temporal parts of a further four dimensional object, properties could be predicated of (instantaneous) objects. As a modification of four-dimensionalism, the stage theorist thinks all times are real, just as all spatial parts of an object are real, or more suitably to stage theory, as different objects spread throughout space are real. Ted Sider writes:

> Stages don't *continue*. If persons are instantaneous stages then no person lasts more than an instant… However … the stage view includes a counterpart theory…according to which stages may nevertheless have temporal properties such as *being F in ten minutes*. … [T]he truth condition of an utterance of Ted was once a boy is this: there exists some person stage x prior to the time of utterance, such that x is a boy, and x bears the temporal counter part relation to Ted…There is a close analogy here with modal [realism]… The temporal operators 'was' and 'will be' are analogous to the modal operator 'possibly.'[47]

Stage theory can now give us an account of the Problem of Change. The theorist acknowledges the existence of objects, stages, which despite being instantaneous can be said

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46 Haslanger (1989a) p.119.

47 Sider (2001) p.216. See also Hawley (2001) pp.38-41.

to be *F* in the future or to have been *F* in the past, not by being identical to something that exists in the future or past and is *F* (as endurantists hold), nor by being part of a four-dimensional object one of whose future or past parts is *F* (as standard four dimensionalists hold), but by having as a temporal counterpart something that exists in the future or past and is *F*. In this way we can predicate properties of objects (*contra* standard four-dimensionalism) like 'being spherical', while also being able to predicate 'will be cylindrical' of these without committing to the enduring objects of the endurantist. The properties of a stage are invariant so the stage theorist has no difficulty with LL, and gives sense to PER by referring to earlier and later invariant stages as how that stage 'was' and 'will be.'

Accepting stage theory incurs its own costs, however, as did accepting standard four-dimensionalism. Where we intuitively found but a single louse on a relatively hygienic child, over time there are as many louse stages as there are temporal parts under standard four-dimensionalism, so over time there are many louse stages needed in place of the everyday louse of common sense.[48] This is an unparsimonious and counterintuitive multiplication of objects in the cosmos. Furthermore stage theory does not give us the folk friendliness of endurantism any more than did standard four-dimensionalism. Like presentism it can claim to capture the endurantist intuition that an object is wholly present at an instant, but it also runs foul of the endurantist demand that at least some objects be wholly present at more than one time. So given these counterintuitive outcomes, no type of four-dimensionalism is an unproblematic account of the Problem of Change, and I move onto a third account.

4.3.3: Indexicalism

So far none of the accounts of The Problem of Change detailed have been satsifactory. We now move onto two accounts that are endurantist, and since I believe that one of the accounts is superior to the other, and further that the theory of flux can provide an argument for it, I will urge that it should be accepted and will show it can be defended. The account I favour is indexicalism and I will deal with it first.

Indexicalists claim statements like (1) can only be true if by Φ we really mean something like "Φ-at-t_1." The term 'indexicalism' applies to this option because of this

48 Hawley (2001) pp.48-68.

indexing. An object possesses a property, but not *simplicter*. It possesses that property at a given time, and in relation to that time. When we say the wine is cheesy, what we mean is not simply that it is cheesy; this is just short for the wine being cheesy-at-the-present-time. If we say the children Homer meets by the sea are lousy, we are not only talking about the uncomfortable relationship the children have with the lice. The children are lousy-at-a time. Indexicalists often think one reason we drop the temporal indexing is that it is usually too cumbersome and conversationally implied anyway; if we mean a child has lice now or today, we usually just say a child has lice, and the same is often true of other times. Yet there must be a time involved; children do not have lice no-when. Even if we are not explicit we at least implicitly commit to something having a property at some time or times. We think of the property as possessed 'recently' or 'tomorrow.'

The indexicalist intuition is that while we could talk of an object without explicitly or implicitly considering the time at which it is located, we do not do the same with properties. It is an intuition the endurantist rival to indexicalism, adverbialism, also shares, but for the indexicalist it is best expressed when (1) is indexed to times via property possession.

So the indexicalist recasting of (1) is this:

(4) (Φ-at-t_1) d

Clearly properties of the type "lousy-on-Tuesday" are not the type we can have or lose; if a child was lousy-on-Tuesday it is hard to imagine how this temporally indexed fact could ever change. If wine is cheesy during a certain day of a certain ancient Olympiad, we still today say it is cheesy at that time.

To show how this can lead to an account of The Problem of Change, consider an analogy with a property we ordinarily consider relational. When I claim a Homer is ugly in relation to a god, but beautiful in relation to an ape, I am not claiming Homer is simply both ugly and not ugly *simpliciter*, and no contradiction that issues from the claim where Homer both has and lacks a property *simpliciter* is forthcoming. The inclusion of a qualification to the effect that Homer is ugly only in relation to one object, not in relation to the other, gives us the claim that he has different relations to different objects, not that he has and lacks a property. Instead of different objects (the ape, the god), let us think of the *relata* as different times t_1 and t_2, and consider the properties of a physical objects such as Homer as being

relational to those times. The indexicalist claim is then that a persisting object has a property in relation to one of those times, not in relation to the other. It has different relations to different times; it does not have and lack properties *simpliciter*. Merricks writes that an indexicalist qualifies what she means by property:

> there is of course, no contradiction in saying a single object exemplifies both being-red-at time *t* and not being-red-at *t**, or in saying that a single object stands in the being-red-at relation to one time but not to another.[49]

The indexicalist then charges those who would argue from the fact of change to the distinctness of objects before and after change with ignoring the relevant temporal indexing, which, when made explicit yields the following invalid argument:

$$\frac{\begin{array}{l}(\Phi\text{-at-}\ t_1)\ a \\ (\sim\Phi\text{-at-}\ t_2)b\end{array}}{(a \neq b)}$$

According to PER there is one object, *d*, that is supposed to persist through change. If we refer to it as *a* before the change and *b* after the change then ($a=b$). It is invalid to conclude ($a\neq b$) even if we accept LL, since an object that stands in different relations to different times does not simply have and lack a property. So there is nothing to prevent us from recognizing persistence. With persistence thus defended, we get the sense in which an object persists through time for the indexicalist. Indexicalism is a form of endurantism, since with properties temporally indexed, properties and parts must be spoken about with reference to the time. The object is wholly present at the time at which its properties are indexed. There is no impediment to these times being sequential, so for the indexicalist an object endures through time. Thus the assertion that an object is Φ is a denial that it is $\sim\Phi$. If $t_1 = t_2$ then we would have a contradiction. The imposition of the additional relation to time has to give us some explanation of why this does not happen.

There is a commitment to an extra place relation for properties given indexicalism. Returning to Cambridge change discussed in Chapter One we can discern an immediate problem. All of the main accounts of the Problem of Change involve commitment to temporal

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[49] Merricks (1995) p.527.

indexing of one sort or another, but indexicalism seems to jeopardize the very concept of property required to set up the Problem of Change. We required, remember, intrinsic properties, and these are usually thought of as non-relational, expressed by monadic predicates: if we predicate an intrinsic property of a given object, as defined we require that the property be related only to the object by means of a two-place instantiation relation. Given indexicalism, we could ask if any properties were intrinsic. Properties of changing physical objects are now related to an object and a time, while property instantiation comes out as a three-place relation between objects, properties and times.[50]

As the next chapter will further demonstrate regarding various reservations about this commitment, the issue of the loss of temporary intrinsic properties is not as acute as it might seem. We can redefine intrinsic properties as those properties that aside *from a relation to time* are non-relational, and the instantiation of which, beside the relation to time, is only a two place relation between the object and the property.[51] It would be good, of course, to have a reason to have to take this step, and in this chapter I will also provide an argument to justify conceiving of properties in this way, in terms of an extra place relation to times. Doing so will also circumvent problems supposedly incurred if indexicalism is taken to be an *ad hoc* response to the Problem of Change. Rodriguez-Pereyra (2003) takes indexicalism to preserve persistence by an "ad hoc maneuver whose true effect is to remove all credibility" from the account.[52] Indexicalism could not be taken to be *ad hoc* in the way in question, since beside the need to account for the Problem of Change there would be independent reason to believe it.

4.3.4: Adverbialism

Adverbialism is the second of the two endurantist accounts. It is not one I favour, and I will briefly argue why not. Given indexicalism, the adverbialist is worried that endurantism demands the loss of temporary intrinsic properties, the replacement of these with relations, and the requirement of a three- instead of two-place relation for the instantiation of properties in an object. Adverbialism hopes to get around the perceived problem by claiming that attributions of properties to objects, like (1), involves an implicit appeal to times by indexing the possession or having of a property to a time, claiming (1) can only be true if

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50 Haslanger (1989a) p.122, Lewis (1986) p.203 ff.

51 Hawley (2001) p.22 ff.

52 Rodriguez-Pereyra (2003) p.193, see also Browning (1988) pp.113 ff.

when we say 'Φd' we mean 'd is Φ' and subsequently explicitly index the copula 'is' to some time t_1.

(5) d (is-at- t_1) Φ.

It is sometimes thought that here the adverbialist modifies the copula 'is' in order to index statements about property instantiation to times.[53] But when we consider that the 'is' here is just a matter of convention, then adverbialism so understood is in danger of not being able to get a grip on the Problem of Change. The adverbialist could find it difficult to be convincing about her account if for instance it was insisted that property instantiation be expressed simply as Φd; there is no copula here to index. She might claim that we should simply translate property possession into Φd (d is Φ) so we can index it as in (5). But not only do most natural languages not have the verb 'to be' as a copula linking an object and a property predicated of it,[54] tense being marked in some other way, logically it also is unnecessary. Standard quantificational logic, for instance, does not use it. A better option is for the adverbialist to consider her account to be a version of indexicalism, but with the instantiation relation relativised to time, and also promise to tell us a metaphysical story about the reason why.[55]

So expressed, the adverbialist would find the following invalid:

a (instantiates-at-t_1)Φ
b (instantiates-at-t_2)$\sim\Phi$
$(a \neq b)$

We can now see that LL does not apply and we need an explanation of why since LL would apply if $t_1 = t_2$. An object always instantiates certain properties. But instead of instantiating a property Φ *simpliciter*, the object instantiates, at some time, a property Φ, and at some other time, fails to instantiate that property. It could be objected that, just as modifying the way I do something does not defuse contradiction, neither should we think temporally modifying the way a property is instantiated will eliminate a contradiction arising when the one object also

53 Parsons (2001) p.95.
54 Afro-American English, a language spoken on both American continents, is an example. It uses a form of the verb "to be" only as an indicator of longer term prospects. See Mayblin and Trask (2000) p.81.
55 Parsons (2001) pp.95-96.

loses that property. I cannot sleep and be awake at the same time, and to claim I slept soundly and woke brightly at the same time highlights rather than removes the initial contradiction.

But the same is not true if the property instantiation relation is relativised to time. There is no contradiction in claiming I was asleep but am now awake, in fact this may be perfectly true without me simply having and lacking the property of sleepiness. Thus we can have *a* as the same object at t_1 when it (is-at- t_1) Φ as *b* at t_2 when it (is-at- t_2) $\sim\Phi$; the one object *d* was Φ and now it is $\sim\Phi$. The object before the change and the object after the change can be one and the same and persist through change (PER). Thus too, adverbialism is an endurantist account. Instantiated properties must be spoken about with reference to the time to which the instantiation of this property is indexed, and so the object is wholly present at the time to which the instantiation relation is relativised. The adverbialist also believes the object exists at multiple times. [56]

A problem adverbialism has faced is the worry expressed earlier with the extra relation we find in indexicalism. Instead of a two-place instantiation relation between an object and an intrinsic property, (5) leads adverbialism to a three-place instantiation relation between, the object, a temporal index and the property.[57] In response adverbialists have insisted the relativised instantiation relation can be translated into tensed uses of the copula such as 'was,' showing how there is no real additional place in that instantiation relation, just as the use of 'was' carries no more relations with it that the use of 'is.' It is a two, not three, place relation.[58] However the conventional nature of the copula bodes ill for this response since it throws the adverbialist back on the untenable position that she is modifying that copula.

Even more seriously, Parsons has pointed out that the object has the relational property of instantiating a property, and a question arises about this relational property. So if an object *a* (instantiates-at-t_1)Φ then *a* stands in a relation to Φ such that is has the relational property of (instantiating-at-t_1) Φ. But what does the possessive mean here — how can we claim *a*, an object, *has* this relational property? The only way an adverbialist can answer the question of how it is an object has any property is by invoking an instantiation relation. But now it seems the object has a second relational property, that of instantiating the relation

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56 Merricks (1994) p.169 for the avoidance of contradiction, Oaklander (1999) p.316 for endurantism.
57 Merricks (1994) p.170.
58 Haslanger (1994a) p.120.

property of instantiating a property, and the same question of how an object *has* this second relational property arises. It has to be answered by invoking a third relational property. And so on, leading to the conclusion that adverbialism generates an infinite regress of instantiation relations. [59] Parsons has shown us that if we analyse the instantiation relation we find that adverbialism is incoherent.

Because endurantism is folk friendly I think we should prefer an endurantist account of the Problem of Change if one can be found that is coherent, and especially if there is another reason to prefer it. But of the two endurantist accounts I have canvassed, indexicalism is the superior. I will now suggest that the theory of flux gives us a further good reason to accept indexicalism, and I have already indicated I will be defending its coherency in the coming chapter.

4.4: The Flux Argument to Indexicalism

The way I have presented theory of flux, it is a rationally recommended theory. It is mandatory for anyone who believes in contemporary ideas of energy and the role of opposites in change to believe in the theory of flux and its corollary, The Doctrine. Further, I claim that *the theory of flux can give us an argument for indexicalism*. This is because the theory of flux gives us a reason to believe that properties are just the kind of things that are related to times. If this is right, and I think it is, then we should all be indexicalists. To make the argument, in this section I am going to discuss 'battles,' a concept that seems to irredeemably ancient to convince contemporary metaphysicians of anything. However confronted with this I ask today's reader to recall how the 'battles' can be described in terms of thermodynamics.

To begin it is useful to recall Kahn's (1979) point in the second section of Chapter Three. The successive reversals in oppositional battles give us an idea of temporal passage. Consider Heraclitean properties. Properties are also instantiated as a result of the various reversals in the struggles between opposites. Properties come out of the battles between oppositional qualities that gives the theory of flux an idea of temporal passage, and so the basic Heraclitean idea of times. This is possible because oppositional battles have both a synchronic and diachronic character. At any one moment we will have the instantiation of a property, and over successive moments that can be labeled t_1, t_2, t_3 etc there may be a series of reversals in the battles. Some reversal in fortune in some opposition in some object

[59] Parsons (2001) p.97.

somewhere in the cosmos (or if you prefer to take that cosmos as itself the largest object) in the cosmic object is a sufficient condition for a new instant of time.

Consider this in more historical detail, also recalling the earliest idea of temporal passage coming out of the philosophy of Anaximander and discussed in Chapter 1, section 2. The first measures of temporal passage were days (and hence nights), and seasons (and hence years). The battles of seasonal opposites gave Anaximander an idea of time as well as change. As the battles raged, so there were different points that could be classified as different times, and as the results of the battles went one way then another. Anaximander had his idea of change and his was a basic understanding of time, the transformation of the day into the night, the coming and going of the seasons. It is shared by Hesiod and Homer, if not articulated by them into a theory of change and the cosmos. The seasonal and diurnal experience of time it is found in the myths upon which these writers draw; it is possibly more ancient than language itself.

But the experience of the seasons is not just the experience of temporal passage. The times register reversals in oppositional battles; basic natural periods present us with different properties in different objects. At night the sky is dark, during the day it is lit by the sun. Night is cold, day is warm. Winter too is cold, and also (depending on where you are) wet, while summer is warm and might be dry. So we experience properties across a range of objects; the to-ing and fro-ings of nature give us both properties and times. With both coming out of oppositional process, properties should be indexed to times. Just as properties cannot be disassociated from oppositional battles, these cannot be disassociated from the times at which these properties are instantiated. As we delve into this further claim we will find the theory of flux tells us properties are relations to times.

If the theory of flux only provided the following weak argument it would not be of much interest: change in properties over time gives rise to the idea of properties and times, therefore properties should be indexed to times. However there is more to what comes out of the theory of flux than this. Let us take the relation of 'being indexed to.' This is at least part of how we 'relate' properties to times, and it was to make this clear that I adopted the use of the term 'indexicalism' to describe the relational account of The Problem of Change. If *d* is indexed to *f*, an objects changing in respect of *d* must mean a change in respect of *f*. So, for example, if redness is indexed to time, an objects changing in respect of redness (or colour, more generally) must mean a change in respect of time.

Before considering this relation in greater detail, recall that in the theory of flux properties *d* are indexed to oppositional battles *f*, since a change in oppositional battles is *f* required for a new property *d*. Further, as we found in discussing the need for temporal passage in the definition of alteration, a temporal sequence of events is required if we are to have an idea of a change in a battle of oppositions somewhere in the cosmos. So we find that properties are indexed to battles, and battles are indexed to times. I am not here defining indexing as a relation whereby *d* is indexed to *f* iff a change in *d* means a change in *f*. Rather I am interested only in the weaker thesis that *d* is indexed to *f* if a change in *d* means a change in *f*. It is this that allows me to begin with the claim that if we consider the nature of indexing, as well as the idea that battling oppositions gives us both properties and our basic idea of time, the indexicalist result is extremely appealing.

This is because if *d* is indexed to *e* then an object's change in respect of *d* means a change in *e*. But note as well that the relation of 'being indexed to,' is a transitive relation. If *d* is indexed to *e*, and *e* is indexed to *f*, then it follows that *d* is indexed to *f*. An object's change in respect of *d* must mean a change in *f*. Thus to take another example, if the cost of living was indexed to interest rates, and interest rates were also indexed to inflation (no matter whether positively or negatively), then the cost of living would also be indexed to inflation. We may not talk about the cost of living being indexed to inflation, for to do so invites the *cum hoc ergo propter hoc* fallacy either that changes in the cost of living cause changes in inflation or vice versa when there is a third factor (interest rates).[60] Yet with an awareness that a *cum hoc* fallacy is to be avoided, it would be quite proper to talk of the cost of living being indexed to inflation. Two lessons can be drawn for indexicalism.

Firstly, since properties are indexed to battles, and battles are indexed to times, it follows by transitivity that properties are indexed to times. Secondly I offer a reason why we do not normally talk about properties as indexed to times, though I believe our ancient ideas of change do in fact lead to this conclusion. Rather than, as we will find some philosophers suggesting, because it is wildly counterintuitive that there is a further connection between properties and times than that we find in ordinary language, it is because we are intuitively aware of possible *cum hoc* fallacies that imagine changes in times are the cause for changes in

60 *Post hoc ergo propter hoc* is a more usual form of fallacy related in that whereas for *cum hoc* the co-incidence is simultaneous, in *post hoc* the coincidence has an earlier to later relationship to the coincident. Here indeed it is indeed the relevant relation is simultaneous.

properties or vice versa. We are aware, on some intuitive level that properties and times do not have to be causally related. However with an awareness that a *cum hoc* fallacy is to be avoided, it is perfectly justified to talk of properties as indexed to times.

To consider the value of this result, while we find that it sets the stage for an argument from the theory of flux to indexicalism, more is required to give us the indexicalist account of the Problem of Change. If an object loses one property and has it replaced with another, say the blueness of a part, few would deny time must have passed. What the theory of flux so far is tells us that the reason for this is that our idea of property replacement is linked to our basic idea of times, and in fact indexed to that basic idea in the way just described. This is good for the indexicalist; she needs there to be an indexing. She would not be comfortable with a view on which the replacement of a property allows us to simply gauge that time has passed, since that would suggest no abiding connection between properties and times. Raising the possibility of a *cum hoc* fallacy makes such a connection more intuitively plausible. But to get to indexicalism the theory of flux must go beyond an indexing of properties to times to give us properties as relations to times.

The indexicalist really needs to relate properties directly to times irrespective of changes in either. Indexicalism requires a metaphysically robust relationship between properties and times. To give us this relationship the theory of flux must not allow for perdurantism, where the object is the sum of different temporal parts or is a series of interrelated stages at different times, but must give us an endurantist account wherein the object endures by being wholly present at different times. The theory of flux would then mandate indexicalism since indexicalism is the only coherent endurantist account.

If we consider objects in the theory of flux, these are the kind of things that persist as oppositional battles in the cosmic circulation of energy. It is oppositional battles as the description of the energy state of an object that allow us to predicate properties of that object; one pair of oppositional qualities enjoin the battle for each property of the object. To be more precise, any conflict of opposed qualities as negatively correlated descriptions of an energy state will give us an object. A battle taking place over time and capable of including reversals in the fortunes of various oppositions certainly will if we accept the Heraclitean account of how objects are the kinds of things to persist through changes; but then again at any single point in time we will also have an object. This is because we will have a snapshot of opposed qualities locked in conflict and hence an object. The object is a battleground on which the

opposed qualities conflict, and in through my comparison with thermodynamics and Aristotle, I have argued this is a compelling view of objecthood. Questions now arise as to whether this view of the object settles anything in regards to the competing accounts of the Problem of Change, and if it does whether it mandates a perdurantist account or an endurantist account and hence the indexicalist view. Let us consider the last question first.

It may seem as though a perdurantist could accept the views that have come out of the theory of flux and the Doctrine regarding objects as the circulation of energy and oppositions. But we will find that each type of perdurantist can only grasp part of the story. The standard four-dimensionsalist can point to the battles over time and call this a four-dimensional object. The problem for her is then that when she examines any instant of any such battle, she is forced to term what she finds at that instant a part, namely a temporal part. But the theory of flux does not tell us that a battle of opposed qualities at a given instant is such a part. It tells us that at any time any energy state that can be described as having properties by virtue of having less of one opposite and so more of the other must be an object. This is not changed if we think of that object only at a single instant or as a moment in a battle. As is a site of conflicting oppositions it is an object, not merely a part. The standard four-dimensionalist does not remain within the parameters of the theory of flux if she terms any instantaneous battle a part, she is in fact helping herself to ideas she has loosely taken from the theory of relativity, and not abiding by an understanding of objecthood in which any battleground is an object. The theory of flux is then incompatible with standard four-dimensionalism.

The stage theorist is better positioned to represent a perdurantist understanding of the theory of flux when it comes to dealing with instantaneous battles. Stages, recall, are instantaneous objects, wholly present at some time and not to be regarded as parts even if these bear important causal links to other stages before and after. And this does seem to match the idea of objects as instantaneous battles. But then the theory of flux tells us that often battles at successive moments are not to be thought of as presenting us with different successive battles. This can happen when the fortunes of the qualities in a battle can be compared over time, giving us the idea of reversals. An energy state can be described not just as having more of one opposition and less of another at a given moment, but as having a greater or lesser amount of some quality over time. Battles over time are just as much objects as battles at an instant, and the stage theorist allows for no such temporally extended objects. Rather the stage theorist accounts for persistence by telling us some instantaneous objects are

related to others in such a way as to allow talk of these objects having pasts and futures. Perhaps the stage theorist could respond by claiming that there is no diachronic battle, only instantaneous battles suitably related, but again this is to deviate from the theory of flux wherein any co-located battles as negatively correlated descriptions of an energy state give us an object, even battles wherein the fortunes of the opposites are gauged over time.

In this way we can conclude that of the two four-dimensionalists, each can only grasp half of the import of the theory of flux, and each must find the other half of the theory incompatible with her account. So to the question of whether the endurantist, and hence indexicalist, can do better. I argue she can, and to find out how let us again attend to cases of instantaneous battles as well as to those cases wherein we find battles involving reversals that therefore occur over time.

Now the idea is that at a given instant we have an object that accords fully with the idea of whole presence as is accepted by the endurantist. The object is not part of an extended four-dimensional object for the endurantist, it is wholly there at some time even if it exists before and after that time. Likewise even if an instantaneous object is a moment in an on-going battle, as concerns the theory of flux and as a battle of oppositions, it is a fully independent object-entity at a moment. The endurantist can also accommodate, and in fact actively wants the idea that this wholly present object is present at different times, for thus can it endure. Likewise we find in the theory of flux that a battle of oppositions as a series of descriptions of an energy state able to include reversals is a single object persisting through change (at least once we develop that theory so that it can take an interest in single persisting things). To be able to agree with the compelling idea of objecthood we find in the theory of flux it is necessary to be an endurantist.

Heraclitus himself had no account of the Problem of Change, but the theory of flux slips between the two four-dimensionalist accounts and is captured by neither. Further when we examine how we find ourselves able to answer the first question as to whether the theory of flux allows us to favour any account of the Problem of Change — it does, it mandates an endurantist account, and hence on what I have argued it mandates indexicalism.

An argument can now be forwarded that proceeds along the following lines.

F1) The theory of flux is true.

Hence, F2) The Doctrine is true (from F1)).

Hence, F3) Indexicalism is true (from F2)).

We should believe F1). Assuming the recent scholars are right, then the theory of flux precociously postulates a contemporary idea of energy governed by The Laws (of Thermodynamics) in respect to ordinary physical objects. Heraclitus combined this with an idea of physical objects as kinds of things that persist through change by hosting oppositional battles that give character to those kinds. The first component of the theory is in keeping with contemporary physics, and Aristotle made it clear how we do think of alteration in terms of the shift in balance of opposed qualities. With both components of the theory true, the theory itself (thus plausibly read) should be believed.

F2) follows from F1) if we agree as I have argued in Chapter Three that the Doctrine can be derived from the theory of flux in a post-traditional reading. The theory of flux describes objects as persisting if the right energy input allows the oppositional battles that characterize those objects to continue. The Doctrine can then state that opposed qualities characterise an object as negatively correlated ways of describing the energy states of that object. The fortunes of either side can then be compared, with reversals occurring where one opposite, previously gaining ground, loses that ground or even where one opposed quality loses further ground. The ass gets darker and less light if it is wet, lighter and less dark as it gets old. It loses one property of grayness and gains another, and all its properties are bound up with similar oppositional processes.

F3) follows from F2) since reversals in the battle of oppositions give us an idea of temporal passage and therefore a basic idea of time. The same oppositional processes give rise to properties. By the transitivity of the indexing relation, properties are then indexed to times. More importantly, because both battles at a moment (surrounding us with objects at all times) and battles in which the fortunes of opposites can be compared over time count as objects, the theory of flux, as one should expect, gives us endurantism. Because indexicalism is the best form of endurantism, we should then believe indexicalism is true.

Perhaps there could be other accounts than those discussed adding other indexings to times of the terms found in (1) beside that of properties to times.[61] Or perhaps we wish to commit to the idea that one or more other accounts are equivalent to indexicalism. In either

[61] For a range of non-standard accounts see Hawley (2006) p.3 and MacBride (2001) pp.86 ff..

case the argument from the theory of flux would be an argument to other accounts as well. Be this as it may, indexicalism is most straightforwardly the account for which the theory of flux presents an argument. If other philosophers wish to add further theoretical commitments to the link between the theory of flux and indexicalism, I can only wish them the best of luck.

4.5: Conclusion

Sider (2001) claims that many philosophers through the ages have embraced four-dimensionalism. He adds that a version can be found "perhaps in Heraclitus, though this is a matter of controversy."[62] As concerns plausible and newer readings, for Heraclitus objects may well persist through time analogously to rivers. To the extent that Sider thinks the river is akin to the image of the highway often used to explain four-dimensionalism, with different parts at different places just as a four-dimensional object has different parts at different times, he could be forgiven. In the highway example the parts may be cracked or narrow, in the river example muddy or deep, and an object considered an entity extended in the fourth-dimension might have a cracked, narrow, muddy or deep temporal part. But granted the readings of Heraclitus I have followed, I think the possibility can be discounted for the reasons offered. Objects in the theory of flux are instead the kind of things that survive due to periodicities in nature, with properties dependant on those periodicities, or to return to terminology of The Doctrine, on oppositional battles. A river swells in spring or dries summer, is cold then warm. Like rivers, the properties of all objects can be indexed to the cyclical processes that are in turn indexed to time, and an endurantist reading of Heraclitus is to be preferred.

The main point of this chapter is then that the theory of flux provides an argument for indexicalism that is plausible today. Obscured by tradition and dialectical materialism, hitherto the theory has not been read to support indexicalism. But the association of such a folk-friendly account with Heraclitus' account of objects as the kind of things to persist through change is a proper understanding of the theory of flux as read without traditional convoluted Parmenidean assumptions or the insistence on the supposed Heraclitean contradiction found in Popper's reading and dialectical materialism.

I have found the different accounts of the Problem of Change trade off different intuitions, and each is problematic in its own way. The same is true of indexicalism, but the

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62 Sider (2001) p.3, fn.2.

argument for the unpopular and supposedly counterintuitive commitment of indexicalism, that of conceiving of intrinsic properties as also having a relation to time, is compelling. The conclusion can then only be that with a good argument for the account provided by the ancient theory of flux, we should adopt indexicalism when confronted by the Problem of Change. The conclusion will have special poignancy for those who have an interest in thermodynamics and admire Heraclitus' attitude, but are yet to commit to an account of persistence. I now turn to other objections that have been leveled against the indexicalist account, and argue that despite these, the account remains viable.

Chapter 5. Defending Indexicalism

This chapter will defend indexicalism against the two most threatening objections it faces. The first is that properties cannot be relations to times as required by indexicalism. When we talk about an intrinsic property of a physical object like being a fool or being muddy we are not talking about something that is a relation to time, we are talking about a monadic property which is a one- not two-place relation. If properties are not also relations to times, then indexicalism is indeed false. The second objection is that indexicalism cannot accommodate vagueness so should be discarded.[1]

There other less dangerous objections to indexicalism. For instance there is the Problem of Temporary Coincidence. Suppose I have a statue in a grotto made from a lump of clay. Most us are inclined to say that there is just one object in the grotto, the statue. And we say this with good reason; normally we do not think that two objects can occupy the entirety of the same region of space. There simply is no room for my hand and your hand to fit into the same glove; the different hands would have to jostle for limited available space. But the lump of clay from which the statue is made is importantly different to the statue itself. An act of vandalism that destroyed the statue may not destroy the lump of clay, the statue can be *faux* Greek, but the lump can have no such property. Under the LL identity principle we have two objects in the grotto after all. It is a problem that it is sometimes believed some variety of four-dimensionalism can help us with, suggesting that indexicalism encounters serious problems outside the Problem of Change. Since we should want our account of the Problem of Change to fit

[1] Koslicki (2003) pp.108ff thinks along these lines. She seems to assume indexicalism can defend itself against the intuitions and arguments that suggest properties are just not relations to times, to pinpoint the vagueness issue as the other important part of the "dialectical landscape" of the debate about persistence.

with our other ways of thinking about the world, the suggestion is then that we should discard indexicalism for four-dimensionalism.[2]

It is a different thing entirely for indexicalism to here and there lead to a conclusion some may find awkward than it is for it to come out incoherent or absurd in the face of some problem. In this case let us consider the standard four-dimensionalist response (applicable to stage theory *mutatis mutandis*) to this Problem of Temporary Coincidence. On such a view, the four-dimensional object the statue and the four-dimensional object the lump of clay are both made up of temporal parts. Let us assume the clay pre-exists the statue, and continues to exist after the statue is vandalised. There is only one set of temporal parts. Some of these parts, located at say $t_{5\text{-}10}$, belong to the statue where as others do not, say those found at $t_{1\text{-}4}$ before the statue was sculptured and at $t_{11\text{-}15}$ after the statue was vandalised. All of these parts at $t_{1\text{-}15}$ belong to the lump of clay, it has statue properties at $t_{5\text{-}10}$, but not before or after. Some parts belong to the statue, at $t_{5\text{-}10}$, and these have clay properties as well.

It is true that there are two four-dimensional objects (the statue and the clay). But the economy of four-dimensionalism is manifest in that we can explain the existence of these two objects by pointing to the difference in how we put together the one set of temporal parts, just some of the lump's temporal parts are also statue temporal parts and some are not. Pointing at the statue at any time is only to point at one temporal part, shared by both clay and statue. The parts do not jostle for space since at $t_{5\text{-}10}$ where the parts are shared by the two four-dimensional objects, there is only one temporal part at a time. It would be like Siamese twins sharing a hand. The one hand

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[2] Hawley (2006) p.9.

belongs to both twins. If they put it in a glove there would be no object with which it would have to jostle for space.

Let us consider the approach the indexicalist might take to this problem since as endurantists they reject temporal parts. Indexicalists could simply accept that there are two objects in the same space, but they exist in a special relation that explains why we should not be worried if we find the pair can occupy that same spatial region. The relation is that the clay 'composes' the statue. If the statue weighs 10 kilos, so does the lump of clay, but what stands in the grotto does not have to weight 20 kilos. A composition relation does not demand that the weights are cumulative. There is the same amount of matter, it can just be taken to be the statue or the stuff of which the statue is composed. But the indexicalist is committed to the composition relation entailing there are multiple objects at one time, and that it is a special relation that does not incur worries about jostling for space.

Having to take on board such commitments may be taken to be a disadvantage.[3] It should, however be recalled that where there are a number of objects for the indexicalist where we previously thought there was one, the four-dimensionalist does only have one part per moment, but because of this she has many, many parts where the indexicalist would only usually have a few objects (statute, clay, perhaps certain molecular ensembles, etc). Moreover in respect of other questions, indexicalism has some advantages.

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[3] For possible disadvantages with the indexicalist commitment to composition see *Ibid*.

For instance, indexicalism has been thought to give us a useful way of differentiating the category of physical objects from the category of abstract objects. Physical objects are just those that have properties related to times, abstract objects are those that do not, those that are in other words located outside time. An example might be the property of being prime or odd possessed by the number three. These could be intrinsic but cannot be temporary. Such omnitemporal properties would not then have to be indexed to times.[4] This contrasts with the non-indexicalist accounts according to which there is nothing all properties of abstract objects such as oddness or being prime that differentiates these from all properties of ordinary physical objects. The indexicalist could claim against such accounts that there is something special about properties such as oddness that sets these apart from properties like muddiness. Indexicalism may also be an example of an account that copes better with what we want to believe about personhood than does its four-dimensionalist rivals (see Stone (2007)).

I will not here weigh up all the possible benefits and deficits of indexicalism. I have argued that the most ancient theory to apply guidelines to how it is that physical objects might persist through change gives us a good reason to believe in indexicalism. Unless (as dealt with in section 1 of this chapter) we have good reason to believe properties are not relations to times, or unless (as dealt with in section 2) indexicalism proves incoherent in the face of some recognised problem such as that of vagueness, we should adopt the theory. If there is no direct clash with other cherished ideas, or any other strong reason to undermine our adoption of the theory in question, we should accept it and adjust our other beliefs accordingly.

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[4] Hawley (2001) p.23.

I shall argue that indexicalism can be defended from this perspective. Since it is therefore viable and we have good reason to accept it, the account should be accepted by those concerned with the Problem of Change. It is of course the case that new objections to indexicalism may surface in the future, but all accounts involve counterintuitive commitments. No theory is without anomalies, and anomalies do not falsify a theory.

5.1: The Intrinsic Property Objection to Indexicalism

Something has already been said about the reservations some philosophers have to indexicalism on the grounds that it considers even intrinsic properties to be relations. David Lewis (1986) famously wrote:

> First solution [indexicalism]: contrary to what we might think, shapes are…disguised relations which an enduring thing may bear to times…the solution to the problem of temporary intrinsics is that there aren't any temporary intrinsics. This is simply incredible if we are speaking of the persistence of ordinary things… If we know what a shape is, we know it is a property, not a relation.[5]

When Lewis claims that for the indexicalist there are no temporary intrinsics, this is not quite right, as we have found the indexicalist able to define intrinsic property albeit with the addition of a relation to time. For the indexicalist then this kind of property is dyadic, not monadic, but involves no relation to other things and is thus intrinsic. What Lewis means is that when the indexicalist does this she does not really

recognise intrinsic properties because it is counter-intuitive to say that intrinsic properties could be dyadic. Lewis takes the example of shape as a clear illustration of an intrinsic property, we just *know* is monadic.[6] But as a paradigm one-place relation, shape is invidious. As Weatherson (2006) points out "one could hold that an object's shape depends upon the curvature of the space in which it is embedded."[7] So shape could well be polyadic (at least dyadic if not involving more relata).

There is another reason to think shape is polyadic. Balashov (1999) follows Lewis on shape as monadic, only a few pages later to present the reader with a figure showing how the shape of an object changes when considered from different space-time frameworks in the theory of special relativity, with there being no 'natural' shape outside these frames of reference.[8] It seems undeniable that shape varies with different frames as these frames are described in the theory of special relativity. Because the relations to these space-time frames vary, whereas the relation to times the indexicalist requires is invariant, special relativity does not mean indexicalism is true, even for shape. Nevertheless it does mean shape is a non-obvious relation to facts involving times, and we could conclude that shape is not monadic, so it is not intrinsic in the strict sense that Lewis insists upon.

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[5] Lewis (1986) p.204.

[6] As Rodriguez-Pereyra (2003) p.187 notes. We might also note Merricks (1995) p.528 is another example of a philosopher who holds that shape is obviously monadic. Weatherson's (2006) introduction also surveys Lewis ongoing commitment to this idea.

[7] Weatherson (2006), Introduction.

[8] Balashov (1999) agrees with Lewis that shape is obviously not a relation to time on p.648, only on p.651 fig. 4 to depict the shape of an object as relative to its spatiotemporal framework.

This is a serious setback for Lewis given his certainty shape is monadic. For Lewis shape is paradigmatic. It gives us access to our deepest intuitions when we recoil with horror from the thought shape is polyadic. While shape is only one property, we might ask: if the intuitions regarding it are wrong, where are these intuitions right? Or if these are right, where are these as straightforwardly right as Lewis and others suggest? Further if shape is intrinsic and related to space and space-time frames, why should it not also be a relation to times as required by the indexicalist?

Lewis himself never provided a compelling argument to believe that properties are not relations to times.[9] There is his complaint that if any endurantist is asked to describe an object without reference to a time they will be stumped, able only to suggest an amorphous colourless blob that may be a plausible description of an entelechy, but is a ridiculous picture of what an ordinary physical object is like outside its relations to times. As Haslanger (1994a) has pointed out, this is begging the question; an endurantist is just someone who holds a time-free description of property possession is incomplete, and indeed, absurd.[10] Without further argument, Lewis's counter-intuitions just seem too strong. If we take a property like being an uncle, it is hard to deny the property is relational, yet Lewis claims to just know intrinsic properties are not relations to times.

Lewis is not denying there are relational properties such as uncle-hood. Effectively his position is just that it is strictly non-relational properties that give rise to the Problem of Change. The indexicalist claims to have accounted for the Problem only when she fails to differentiate the loss and gain of the temporary intrinsics required for

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[9] As noted by MacBride (2001) p.83.

[10] Haslanger (1994a) p.124.

the Problem in the first place, and hence the loss or gain of which is integral to what we mean by alteration, from extrinsic or mere Cambridge Changes. Like a victim of a psychological affliction that prevents the recognition of certain facts, she just refuses to recognize the Problem of Change.[11] I have agreed that we should be able to distinguish the replacement of intrinsic properties from mere Cambridge changes. MacBride (2001) understands the threat to indexicalism in this way:

> Lewis claims that change in an object *x* is extrinsic if that change consists in either *x*'s 'changing relations to other things' or *x*'s 'relationship to other changing things.'[12]

MacBride (2001) explains how this is an application of Lewis's existing intuition that intrinsics cannot be dyadic. Since the object invariantly has the same property relations to the same times, Lewis must think that what makes all change extrinsic on the indexicalist account is not an object's relationship to other changing things but, via properties, its changing relations to other things, namely times. Due to alteration between any two times an object will have different properties and hence, for the indexicalist, different relations to times. MacBride points out that if the only properties replaced are the sort of relational properties an object has to objects elsewhere, then we have nothing more than mere Cambridge or extrinsic change. However he also points out that times do not obviously fall into the category of 'objects elsewhere.' Times are not, in Lewis' words, 'things.'

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[11] Though as mentioned in Chapter One, if Rodriguez-Pereyra (2003) is right the indexicalist would still have to face the version of the Problem that arises from relational or extrinsic change, though I am not considering this here.

MacBride's response fits with the indexicalist wish to redefine intrinsic properties as those that aside from relating the object instantiating these properties, are relations only in the sense that these properties are relate objects to times, not other objects. MacBride also wants to go further, and defend indexicalism against the stronger Lewisian intuition that whether or not the additional relation is to times or to other objects, intrinsic properties are simply not relations at all.

MacBride thinks Lewis is really relying on two intuitions in asserting so firmly that intrinsics can only be monadic. Both purport to inform us that before we have an idea of a relation, we need that of an object. The view would be that objects are required for our idea of relations. Someone holding such a view could agree that there could be relations between, for instance, universals where, let us say, one shade is darker than another. She would just also hold that we need objects for our idea of this relation, so the universals would have to be instantiated before these could be related. The problem is then that for indexicalists objects depend on relations to times for the properties these objects possess, leaving us without a clear initial idea of objects that does not already involve relations. In solving this problem, the indexicalist of course has to admit that relations require things which are *relata*, but it is the nature of these things that is at issue: do we need an idea of objects that does not itself invoke relational properties?

The first intuition MacBride examines has it that objects are independent in a way that relations are not:

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[12] MacBride (2001) p.84.

> We think of objects as being independant in a way relations are not. It seems each of us can imagine the world is only a dream and we alone exist, but we find it more difficult to imagine a world where there is only a relation and no objects for it to relate.[13]

We could imagine an object that entered into no relations, such as in a simple universe involving nothing more complex than the existence of that object, but we find it hard to imagine a universe only of relations. It seems that there can be no relations without *relata*, but there can be objects without relations. The indexicalist is said to be embarrassed by this intuition because if all of an object's properties are relations to times, then the object does not pre-exist those relations as the intuition requires. MacBride writes that relations "according to our manifest view, depend on there being objects, in a way in which objects don't depend on anything."[14]

Following MacBride however we might reasonably doubt the reliability of this first intuition. Consider possible systems. In this case we may need to "posit uninstantiated relations (e.g. those that correspond to states of physically possible systems)." So these exist independently of objects or could pre-exist objects that came to instantiate these. Or again, if everything is made up of relations between fundamental particles like quarks and leptons, everyday physical objects will be composed of relations.[15] MacBride seems to have in mind the idea that since, for example, every quark is exactly alike, it is different relations between aggregates of these that permit

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[13] *Ibid*.p.85.
[14] *Ibid*.

different larger objects, and hence these objects could not, according to our best physical theories, exist without these relations. Like the existence of uninstantiated systems, MacBride thinks physical theories then challenge the intuition that relations require objects and not the other way around.

The second intuition stems from the fact that the relations we are most familiar with are spatial ones. We are then attracted to the suggestion that spatial relations could provide a template by which we understand all relations. Usually spatial relations relate objects with divided locations. It seems, then, as though spatial relations possess either divided locations like the *relata* (objects) involved, or no locations at all. We can assume MacBride means the case of the spatial relation such as 'in the same place as' is an exception to the rule, but it is not one that changes the fact that the locations of spatial relations themselves is by no means straightforward. Objects on the other hand are always straightforwardly located, and we need to relate unproblematically located things to have spatial relations. If all other relations are like spatial ones, then equally we need an idea of the object not itself dependant upon relations before we can help ourselves to those relations.

In response, MacBride concedes that because spatial relations are between straightforwardly located objects in divided locations, we have to have objects and those locations before we have spatial relations.[16] But for MacBride, this suggests we would only need to have objects before we have relations if we think of spatial relations as the template for all other relations. Certainly relations to times do not require divided spatial

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[15] *Ibid*.
[16] *Ibid*.

locations, so objects could be thought of as relations to times without presupposing an idea of objecthood independent of relations. There is no reason to suspect such a relation is less paradigmatic than spatial ones, both are equally ubiquitous: we "cannot imagine ourselves existing without properties or outside time."[17] So neither does MacBride think we should rely on the second intuition granting spatial relations special significance.

There is good reason to think MacBride is right, and that Lewis's intuitions do not carry the day. As concerns positing uninstantiated relations in physically possible systems, on a plausible theory of modality,[18] the ersatzism mentioned in section 3 of the last chapter, we do just that. Modal ersatzists are not realists about physically possible systems. As concerns the argument referring to fundamental particles, MacBride's opponents could retort that relations between quarks or leptons still have the object as primary because the quark, the lepton etc, is still fundamental. These can be taken to be objects, albeit very small ones. While I do not want to go into the physics of fundamental particles or favour one interpretation of physical theory over another, there is a tendency to think of the fundamental particles in terms of entities like fields.[19] So quarks and leptons may well be made up of entities like fields. A field is a collection of quantities of the same kind related by being instantiated at different points in spacetime. Even if these quantities are monadic, we have now discovered that some types of objects (i.e. the quarks and leptons) are primarily understood by virtue of relational

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[17] *Ibid*.

[18] On the plausibility of modal erstazism, see Forrest (1986).

[19] The general tenor of Bohm and Hiley (1991).

facts, and this primacy does not seem problematic. So why believe we need objects that are independent of relations to make sense of those relations?

Finally I agree with MacBride that we should not assume that spatial relations are paradigmatic relations. Other relations not obviously dependant on spatial relations are found in sense experience and seem just as fundamental to our understanding of the cosmos as spatial relations: ‘darker than,’ ‘louder than’ and ‘hotter than’ are examples.

MacBride has given us good reason to doubt Lewis’s intuition that intrinsic properties simply are not relations. While it might be odd to think that ordinary language usually hides the fact that properties are relations to times, the idea that properties are such relations is not inconsistent with our experiences of properties, times and objects. I have also proffered an explanation of why we might not mention this relation, or even find it odd. In the previous chapter, I suggested ignoring the relation to times for practical purposes helps avoid a *cum hoc* confusion about the nature of the relation between properties and times.

So I pass onto further arguments that properties cannot be relations to times, in search of one capable of rehabilitating Lewis’s intuition. Firstly there is the argument of Hawley (1998). She argues that we cannot make sense of the use of the term ‘relation’ to relate the properties to times because such relations are neither ‘internal’ relations nor ‘external’ ones.

These are not ‘internal’ relations, or relations between the ‘internal natures’ of

the *relata*.[20] Such natures are found in the object independently of the existence of other objects. 'Being darker than' might be an example of an internal relation. This relation can only be realised on the basis of the darkness of the *relata*, and an object is dark or light independently of the existence of other objects. Times as well would need such intrinsic natures

> if the internal relation solution is to be viable. Further a single physical object with an unchanging intrinsic nature may have different relations to different times, so different moments have different intrinsic properties… but perhaps different moments have different intrinsic properties by virtue of their different places in the time series.[21]

However even if we accept such an enriched view of time where each moment has a distinct intrinsic property due to its position in the times series, there is still trouble for the indexicalist. This is not because of the problem anyone will have in accounting for how we differentiate spacetime points on the basis of the relation these points hold to one another. Rather, Hawley continues:

> Now consider the objects, rather than the times. If as the relational solution suggests, temporary properties are relations [to times] then most physical objects will have very few intrinsic properties.[22]

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[20] Hawley (1998) p.213.

[21] *Ibid*.p.214

The problem is that most properties are disqualified from counting as an internal properties. If we take any temporary property, this property has to be indexed to times and thus is not intrinsic. So there will be very few, if any, properties that qualify as intrinsic and which could then be supervened upon to internally relate an object to a time. All other properties would have to be accounted for in terms of these very rare ones, and Hawley thinks this is impossible.

Now while for instance fewer properties accounting for many is not impossible — we find it in Newtonian physics where primary properties account for secondary ones, we can understand Hawley's position. The kind of properties we would expect to be able to account for other properties such as atomic structure (which could then account for other properties like colour) will turn out to be non-intrinsic (due to variances in atomic structure over time) and so not the right properties to be able to give us an account of other temporary and so temporally-indexed properties after all. In fact Newtonian physics itself could not be explained on the scheme Hawley is attacking. Hawley concludes that even with enriched times, physical objects "let down" a theory in which properties are internally related to times.[23]

For Hawley (1998), neither are relations to times 'external' relations, or those relations that are determined by the intrinsic properties of the fusion that results if we consider the *relata* as a single object. Spatial distance is often cited as an example of an 'external' relation. This is not determined by intrinsics; duplicates of you and I (and so that possess all the same intrinsics as you and I) could be further apart or closer

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[22] *Ibid*.
[23] *Ibid*.

together. Rather, if you and I were considered different parts of one object, and the distance between parts is an intrinsic property of that object, then the spatial distance between us would be an 'external' relation. Could the indexicalist relation between a time and a property also be an example of such a relation? For Hawley the answer is that the indexicalist must pay a high price for having the relation to time as external. It is hard to imagine what fusion of object and time would have the relation between the object and the time — say red at — as an intrinsic property. At the very least the folk-friendliness of indexicalism as endurantism is under threat.[24]

To understand why Hawley is not convincing here, and how temporally indexed properties can nonetheless be intrinsic, we might consider how the debate over the Problem of Change unfolded. Whether or not the indexing is implicit in an ancient theory of change, the fact is most philosophers do not need to consider properties as indexed to times until they are confronted with the Problem. Indexicalism responds by making a move that complicates how we might otherwise think about change: the indexicalist tells us that the intrinsic properties we might otherwise have taken to be non-relational are in fact relations. The indexicalist argues the move is mandated by the problem of change, and if it is accepted then an intrinsic property is simply a property like being red-at-*t*.

Thus the indexicalist could quite happily have relations to times as internal relations. If being red-at-*t* some time is an intrinsic property, then being red will be an internal relation between an object and the particular time involved, say t_1, to give us the internal relational property of red-at-t_1. To be sure the definition of intrinsic property

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[24] *Ibid*. p.215.

now admits of references to times but, so defined, such properties are still independent of the existence of other objects. If the indexicalist is right internal natures are not as limited as Hawley thinks and can quite easily account for the gamut of properties across the cosmos: these natures are those properties.

Let us turn then to consider an argument that springs from an apostate indexicalist, Mellor (1998). He argues that we understand the term 'relation' not to require the *relata* to share the same space or for that matter, and more pertinently, time.

> Relations generally do not require the entities they link to share locations in space or time. My being taller than Napoleon, for example, is quite consistent with his dying before I was conceived, while my conception's being later than his death positively requires it.[25]

Yet the indexicalist requires just this: that the person who is drunk and a time *t* is located at *t*, i.e. that the person and time be are related so that these are co-located.

Mellor anticipates an indexicalist response to the line of reasoning proposed above. Some relations admittedly do require that the *relatum* exist at the one time; 'simultaneity' is an example. Mellor recognises it as trivially requiring a colocation in time as 'simultaneity' is just what we mean by coincidence in time.[26]

Rodriguez-Pereyra (2003) contests Mellor's argument against the indexicalist's relating of intrinsic properties to times. To begin with the idea that relations do not require contemporaneous *relata* as does the theory that properties are relations to times,

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[25] Mellor (1998) pp.93-94.

[26] *Ibid*. p.94

he mentions other relations non-trivially requiring contemporaneous *relata* such as being 'in contact with,' and 'living in.'[27]

Mellor (2003) has responded by agreeing that there are other relations co-location, and so that co-location may be a common part of our idea of relations. However he thinks the other examples cited include an idea of co-incidence in time in their very natures. The coincidence is 'built in' as it were in these other cases. For instance both 'being in contact with' and 'living in' positively require the coincidence in time. Such coincidence, however, is not to be found in the indexicalist relation; it would be hard to imagine how coincidence in time could be required by something as unsubstantial as the relations between objects and times posited by the indexicalist. So we have no reason to believe there is co-location between the relevant times and objects.[28] However this is not a convincing reply.

The 'at' relation found in the indexicalist relation does require coincidence in time. If Homer is 'at' the jetty or 'at' the feast, then Homer and the jetty or Homer and the feast must be co-located in time. These objects must share certain times which these stand in the 'at' relation. Similarly, if I am drunk-at-a-time there must be a simultaneity between myself and that time (at least to the extent it makes sense to suppose the use of 'at' here relates items in time — a supposition inherent in Mellor's (1998) critique of indexicalism). This 'at' relation is not unique to the indexicalist; so it is not simply the point at issue. As (2)-(5) of last chapter showed, any temporal indexing uses it, the presentist as much as the four-dimensionalist. For instance in the latter case a temporal

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[27] Rodriguez- Pereyra (2003) p.191.

part is ‘at’ a time; it is temporally co-incident with that time. At least the most viable accounts of the Problem of Change seem to need this ‘at’ relation. Granted this understanding of the ‘at’ relation, we can safely conclude that indexicalism can be successfully defended against Mellor.

Finally let us turn to consider one last theme to be found in the literature that is thought to justify an intuition that properties are just not relations to times. Properties we normally consider to be the same at different times, like being some specific shade of orange, turn out to be different if these are understood to involve different relations to times.[29] Mortensen likewise believes that indexicalists cannot rely on a given universal instantiated at different times to give us the sameness of properties. The indexicalist cannot then claim it is the same universal, and another account of the Problem of Change should be adopted.[30]

Rodriguez-Pereyra agrees the indexicalist cannot talk of objects having the same property at different times. The properties of the object would be different at the later time, when the property involves a different time *relatum*. The indexicalist can, however, have different objects that have the same appearance at those times: this is how she might think of any cases of duplication proposed by the non-indexicalist.[31] Alternatively we might think about universals in the standard way and think that while an object orange-at-t_1 and orange-at-t_2 does not share the same relevant property, nonetheless orange-at-t_1 and orange-at-t_2 are alike in being orange. While this is not a

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[28] Mellor (2003) pp.234-235.

[29] Rodriguez-Pereyra (2003) p.188.

[30] Mortensen (2004) section 5. See also Miller (2005) p.324.

property it is a common 'universal' related to different times. Thus we might sever the common relationship postulated between properties and universals, with only the former temporally indexed. To be sure, the common relation between properties and universals no longer obtains, but nothing untoward follows from this. Universals are what properties that differ only as regards how their temporal index have in common. Just as the indexicalist believes the Problem of Change meant that we have to revise and complicate our idea of what counts as an internal relation, she also believes that the problem perforce complicates an older more straightforward idea of how properties are instantiations of universals.

This addresses the objection that indexicalism is non-viable by giving us an alternate sense of the word universal. Presumably we do need universals to explain the Problem of the Many wherein there can be many different instances of the one property. The response would have it that an indexicalist can still make sense of the idea of a universal, but simply a different sense to that made prior to the consideration of the problem of change made it necessary to adopt indexicalism. Note as well that the universal itself does not need to be indexed since the object does not loose or gain a gain a universal. The idea of a universal only provides a way of understanding how properties are alike. Universals would then be abstract and omnitemporal rather than indexed to times.

To conclude this section, flawed intuitions are not enough to dismiss indexicalism. Harking back to the argument for indexicalism in the last chapter, there is instead good reason to accept it, and to live with whatever other modifications to our

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[31] Rodriguez-Pereyra (2003) p.188.

web of belief are thereby incurred, mindful that all the accounts of the Problem of Change come with some degree of awkwardness. However matters are not so simple where indexicalism is argued to be an impediment in our understanding of an important problem, namely that of vagueness. So let us now turn to how the indexical account of persistence fits with the standard account of vagueness, and ask if it really is such a liability that it should be discarded, as in particular, Sider (2001) believes.

5.2: The Vagueness Objection

Vagueness is all around us. Where does the bank of a river end? Obviously where the water laps is still the bank, and perhaps where there is sand as well. But what about the mangroves? Certainly the road running alongside the river is not part of the bank, but where do we draw the line and decide that the bank is no more? When we might call a child 'infested' with lice is vague, one louse is not an infestation, nor is two, but we want to call a child hosting 1000 lice infested, and vagueness enters the picture when it is an indeterminate or uncertain matter as to where we draw the line between infested and not infested. As the lousy child example suggests vagueness also occurs in persistence. If we do not stir the posset it ceases to be a posset, but when is that? If only one particle of cheese is in suspension then we no longer have a posset, or even if only two, but if two hundred particles are in suspension surely we have the drink favored by the ancients.

Most if not all ordinary physical object terms tend to have imprecise extensions, both spatial and temporal. If it is indeterminate if certain atoms are part of me, then it is uncertain where my body ends and the rest of the world begins. There could be a period of time in which it was indeterminate whether or not I had died; a temporally imprecise

border marking off my life from the time of my non-existence. Vagueness of spatial and temporal boundaries are sometimes thought sufficient to provide an argument for 'unrestricted composition.'[32] It is this that is then supposed to commit us to four-dimensionalism.

Granted four-dimensionalism is incompatible with indexicalism, then if the argument from vagueness to four-dimensionalism is sound the indexical account must be false. I will pose the issue as that between standard four-dimensionalists (as is done for simplicity throughout the literature) and, where relevant, indexicalism (the form of endurantism that concerns me here). In this section I will argue there is no path from vagueness to four-dimensionalism, so there is no reason to believe there is a threat to indexicalism.

For the argument that four-dimensionalism follows from vagueness to succeed, two other plausible positions must be accepted, and it is not my business here to deny either. The first is that vagueness is not in the world, it is not ontic, instead it is semantic, and I will explain what this means as we enter the debate. The second position that must be accepted as an interim conclusion is that composition is unrestricted. Lewis is an example of a philosopher who claims:

> Mereological composition is unrestricted: any old class of things has a mereological sum. Whenever there are some things, no matter how disparate

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[32] I will not here consider the possibility vagueness is ontic. Ontic vagueness must be discounted for this objection to indexicalism to be worth considering.

and unrelated, there is something composed of just those things.[33]

Unrestricted composition means that any objects or parts thereof (which all count as objects) can be thought of as fused into a further object. Starting with the fusion of synchronically different things, spatial separation is no obstacle to putting together the composite object that is their fusion. Take the example of the shark-turkey, an animal melding of the lower half of a shark swimming in the river outside my house with the upper half of a bush turkey scratching for some food in my backyard. We counter-intuitively imagine the turkey's beak, neck and so on down to just below its wings, as fused with the lower half and tail of the spatially separated shark. We get a kind of 'exquisite corpse' such as surrealists created by adapting a children's game. (They folded a piece of paper and had different persons draw absolutely anything linked by lines across the fold. The piece of paper is unfolded to reveal a single startling object composed of what we usually consider to be quite separate components.)

With these odd outcomes it would be good to have an argument as to why we should believe in unrestricted composition. Sider (2001) takes up such an argument along the route to four-dimensionalism.[34] He follows Lewis in noting that if we reject these surreal objects by rejecting unrestricted composition and insisting that not every arrangement of matter composes an object, then a problem arises. To understand this problem it is easiest to consider it in relation to spatial cases before moving on to the ramifications it has for persistence through time.

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[33] Lewis (1986) p.211.

[34] Sider's (2001) argument from vagueness to four-dimensionalism can be found in p.120ff. Miller's (2005a) rendition is helpful pp.319-320, as is Koslicki's (2003) pp.112 ff.

Bits of matter are arranged in certain ways to make an object — say me. But the question is: what sort of arrangements are suitable? If I am composed by one arrangement at a given time, then a very slightly different arrangement seems suitable for my composition at that time as well. In fact there are many arrangements of matter at that instant that are very slight variations on whatever we want to agree composes me at that instant, and it seems odd to rule any of these out. For instance let us say that of *x* number of arranged fundamental particles that make me up, the slight variation is a few more fundamental particles or a few less around my skin here and there. It is implausible to rule out such minute subtractions or additions when deciding what composes me and what does not. Objects are the same, however we want to think about what it is that allows us to identify these: enough contrast with the surroundings, enough cohesion of parts etc. In all cases slight variations cannot plausibly be ruled out.

Vagueness is responsible for our inability to settle on one arrangement of matter as the only one of which I am comprised. There is a continuum of cases such that at one end we are certain an arrangement of matter is my body and at the other it is not my body (e.g. the matter constituting the river next to which I am standing). But where to draw the line between what is and what is not me? There just is no way to draw a sharp line between those arrangements of matter that constitute and object, me, and those that do not.

Russell (1923) has argued that in these circumstances we have to understand the vagueness as semantic. He writes

> There is a certain tendency in those who have realized that words are vague to infer that things also are vague. …This seems to me precisely a case of the fallacy of verbalism — the fallacy that consists in mistaking the properties of words for the properties of things. Vagueness and precision alike are characteristics which can only belong to a representation, of which language is an example. They have to do with the relation between a representation and that which it represents. Apart from representation, whether cognitive or mechanical, there can be no such thing as vagueness or precision; things are what they are, and there is an end of it. Nothing is more or less what it is.[35]

The relationship between a linguistic representation and what is represented, that is responsible for semantic vagueness, is indeterminate. There is only one term, 'my body,' but it is indeterminate which of many possible candidates this phrase refers to: "vagueness is a matter of linguistic indecision: the reason why there are borderline cases is that we have not bothered to make up our minds."[36] Russell considers the similar example of redness:

> Let us consider the various ways in which common words are vague, and let us being with such a word as 'red'. It is perfectly obvious, since colours form a continuum, that there are shades of colour concerning which we shall be in doubt whether to call them red or not, not because we are ignorant of the meaning of the word 'red', but because it is a word the extent of whose

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[35] Russell (1923) p.84.

application is essentially doubtful.[37]

Sider and Lewis now argue along the following lines. If we accept that vagueness is semantic, then every arrangement of matter does form an object, but we do not usually name the surreal objects, just as language does not tell us which one of the many candidates in the continuum we are picking out when we use the terms 'my body' or 'red.'

> So there is a fusion of the members of any arbitrary set S at time *t*, where *x* is a fusion of the members of S at *t* iff every member of S is part of *x* at *t*, and each part of *x* at *t* overlaps at t some member of S.[38]

This is what it means for composition to be unrestricted spatially.

If composition is restricted spatially it is temporally as well, for the same argument could be constructed around temporal vagueness. So for Sider:

> Given some chosen sets of objects S_1, S_2, … at times t_1, t_2,…under what conditions is there some one object *x* such i) *x* is composed of S_1 at t_1, S_2 at t_2 and so on and ii) *x* exists only at the chosen times t_i? Call such an *x* a minimal diachronic fusion of the [various] S_is at the [various respective] t_is. Our question — under what conditions do minimal diachronic fusions exist?

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[36] Sorensen (2006) p.9.
[37] Russell (1923) p.85.
[38] As Miller (2005a) puts it p.320.

> — can be thought of as the question "under what conditions do objects come and go out of existence?"[39]

If unrestricted composition is accepted the answer is "always". Any arbitrary sets S_1, S_2, and S_3, and times t_1, t_2 and t_3 has a diachronic fusion. Then there is a further type of surreal object, an exquisite corpse across times that is the temporal analogue of the spatial exquisite corpses. An example might be the fusing of the upper half of Alexander the Great's steed Bucephalus as the great man traveled east, with the lower half Big Ben Clock Tower in the early 21st century.

But there are less surreal objects as well. Because she addresses a possible confusion in Sider's use of variables I will follow Miller's (2005a) description of how the argument proceeds from here to four-dimensionalism:

> 4. An object *x* is a diachronic fusion of the members of sets S_1, S_2, and S_3 at times t_1, t_2 and t_3 if (i) *x* is composed of S_1 at t_1, S_2 at t_2, and S_3 at t_3 and (ii) x exists only at the times t_1, t_2 and t_3.
>
> 5. Since composition is unrestricted, any sets of objects at times has a diachronic fusion. Following Sider, call this thesis U: Any arbitrary sets S*i*s and times t*i*s has a diachronic fusion.
>
> 6. Given U, it follows that for any y at t, there is some instantaneous object *x* that (i) is the fusion of the members of set *y* at *t*, and (ii) which exists only at *t*.
>
> 7. *y* is part of *x* at *t* and every part of *x* at t overlaps *y* at *t* (from (i) and the

[39] Sider (2003) p.136

definition of fusion).

8. … we can then move from the claim that every part of *x* at *t* overlaps *y* at *t*, to the claim that *x* is part of *y* at *t*.[40]

For some object *y* that exists at *t*, there is an instantaneous object *x* that is the fusion of the members S the set of the parts of *y* at *t*, and which exists only at *t*. Every member of the set of parts of *y* at *t* is part of *x* at *t*, and every part of *x* at *t* overlaps some member of the set of parts of *y* at *t*. Sider (2003) now claims that every part of *x* at *t* overlaps *y* at *t* to the claim that every part of *x* at *t* overlaps some member of *y* at *t*.[41]

This, however, seems to fit the definition of a temporal part provided last chapter. There we found *x* is a temporal part of *y* = df (a) *x* is part of *y* at *t* (b) *x* exists at, but only at *t* and (c) *x* overlaps at everything that is part of *y* at *t*. Since all diachronic fusions exist it follows that every persisting object is composed of these temporal parts. If this is the case then four-dimensionalism is true and indexicalism is false.

Miller (2005a) criticises this argument on the basis that just because we have a synchronic fusion, we cannot assume we also have instantaneous objects that are objects-at-a-time that can then be fused diachronically. For then we have assumed from the outset that four-dimensionalism is true and the argument simply begs the question.[42] Miller continues that an endurantist (who for me should be an indexicalist) need not concede that:

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[40] Miller (2005a) p.320.

[41] Sider (2003) p.136.

> persisting objects are diachronic fusions, nor need she understand unrestricted composition as the claim that every synchronic and diachronic fusion exists. For the general claim that any arrangements of matter at any different times compose some persisting object need not be understood as the claim that every diachronic fusion exists….[She can hold] that there exists any enduring object composed of arbitrary combinations of things at times. Even…that there exist instantaneous objects (fusions-at-times). She need not concede that persisting objects are the fusions of these objects. She could instead hold that for every synchronic fusion, there is some enduring object *x* that is constituted by those fusions at those times.[43]

Fusions-at-times are not the same as an object-at-times, the fusion could be an object in so far as it endures. Not only wholly present possibly at multiple times, the object's properties could well be relations to times. In that case persisting objects need not be thought of as fusions of these fusions-at-times. Rather, there would be enduring persisting objects having as parts enduring instantaneous objects. Miller writes

> At that time, these two objects are related by the constitution relation. The constitution relation is the relation that holds at a time between any two objects that are materially co-incident at that time.[44]

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[42] Miller (2005a) p.325ff.
[43] *Ibid* p.324.
[44] *Ibid*.

I have discussed the constitution relation in the introduction to this chapter. The point can be made as well by returning to the difference between endurantism and perdurantism. The perdurantist holds to temporal parts, and that is what the instantaneous objects generated by unrestricted composition amount to for Sider. These parts, and the spatial parts of these parts, are had *simpliciter* for the perdurantist. The endurantist on the other hand can claim that the instantaneous object is materially co-incident with the persisting object and constitutes it at that time. We might call the instantaneous object an improper part of the persisting one. It is improper because it is a part in the sense given by the unusual relation of constitution. All the endurantist has now to insist on to have the part and the object enduring and not perduring is that this part is not had simpliciter, and itself does not possess properties simpliciter, but only in relation to some time. Thus we see that the inference from unrestricted composition to four-dimensionalism fails.

5.3: Conclusion

In the last chapter we found a good argument in favour of the indexical account of the Problem of Change. In this chapter we find that its acceptance does not entail being committed to absurdity. In particular we found the position that intrinsic properties are relations to times is not absurd (in section 1) and that endurantism is compatible with vagueness viewed as a semantic problem (section 2). Indexicalism both accounts for the Problem of Change and does so in a manner prescribed by the ancient theory of flux as presented in earlier chapters. Though rigorous debate surrounds the indexical account, arguments for its rejection have been found wanting.

6. Conclusion

I believe that Heraclitus had no interest in how individual objects change, and hence in the identity of changing objects. I believe he cared no more for Medea's posset than for the identity of Homer as he walked puzzled away from the fishing children. Unless we take on board certain traditional hints, we must believe the author of the theory of flux never understood the Problem of Change. Even here, in the longstanding traditional readings, the point was to *not* offer an account of the Problem.

In Chapter One I gave a rough outline of the Problem of Change as well as an early version of the traditional interpretation of Heraclitus, as was likely undertaken by Cratylus. According to this version, as a student of Heraclitus Cratylus claimed we should not believe that any object exists for more than an instant. For something to stay the same it can not lose or gain properties, but objects change with every passing instant, so no object ever persists for longer than a single moment. Yet we do not think that small changes, like the addition of a wrinkle, destroy a person considered as an object. In order to avoid the conclusion that no object can persist through any change, no matter how small that change is, we need an account of this Problem of Change. In addition to the traditional reading, Chapter One also introduced a Heraclitus embroiled in contradiction.

Tradition and Heraclitean inconsistency (via the dialectical materialists after Hegel) were found to be a popular way of taking a philosophical stance emphasizing change. For some who considered that they thus followed Heraclitus' footsteps, philosophy had in one way or another neglected to accommodate the fact of change. However we found that more promising than Hegelian thinking was a concern with thermodynamics as a way of understanding the cosmos as in change. The second section of the chapter laid the ground for a discussion of Heraclitus' ideas along these lines by considering the Milesian thinkers, arguing that Heraclitus would have been confronted with an unanswered question that came out of the work of Anaximander: how was it possible to theorise change as anything other than random?

Chapter Two identified tradition as an essentially Parmenidean concern before

moving onto the thermodynamic reading of Heraclitus found in Wiggins. I found this to be a detailed and historically grounded reading that took Heraclitus to be responding to the concerns of Milesian philosophy discussed in the second section of Chapter One. In the reading he does so by forwarding primitive versions of the Laws of Thermodynamics as the rules governing change. The chapter also found that by contrast there were serious difficulties with the tradition as a way of understanding the historical Heraclitus.

Chapter Three examined the Doctrine; an idea of opposition I argue in the first section of the chapter can be derived from the theory of flux, and which had already been taken up in Chapter One. The second section follows the more recent scholarship to derive the Doctrine from the theory. The conclusion here is that even read as not interested in the persistence of individual objects, Heraclitus had all the resources needed to define the form of change through which an individual object persists, termed alteration by Aristotle. Crucial for my later arguments, we here encountered a Heraclitean idea of time.

Chapter Four lays out The Problem of Change in more detail. It argues that anyone accounting for the Problem has to reconcile a persistence principle with a Leibnizian identity principle. Popper has suggested that Heraclitus simply and inconsistently did both. While Popper is more rigorous than the dialectical materialists who have believed similar things about Heraclitus, I argued the ‘Heraclitean’ account of persistence coming out of Popper’s reading is historically haphazard and metaphysically underdeveloped.

The division between endurantism and perdurantism is helpful when it comes to understanding more mainstream accounts of the Problem of Change. In Chapter Four I found perdurantism tells us objects have different parts at different times. Endurantism does the opposite and has it that objects are wholly present, to the exclusion of parts at times other than the time in which we encounter that object. I argue the most convincing version of endurantism is indexicalism. Further I argue that what comes out of the analysis of The Doctrine in Chapter Three is that properties are the result of oppositional battles. The argument to this effect was twofold. Firstly that the theory of flux gives us an indexing of properties to times since properties are indexed to

oppositional battles and oppositional battles are indexed to times (the Heraclitean idea of time from Chapter Three). Secondly that aside from indexing changes, the theory of flux relates properties to times in such a way that endurantism is true, and if we are endurantists we should be indexicalists.

This link between the theory of flux and indexicalism is the original component of these chapters, and I believe that it is appealing both historically and metaphysically. Endurantism is folk-friendly, it captures our most immediate reactions to objects. The idea that an ancient analysis of impermanence and stability leads to a folk friendly account, rather than an account more associated with later developments in physics, has historical appeal. The metaphysical appeal rests in the fact that by postulating an object is wholly present at any times it is at, indexicalism is in keeping with out intuitions about objects. Indexicalism does pay a price when to do so it tells us properties we may have otherwise thought were non-relational are relations to times, and it is good to have a substantial reason to countenance this move. Not only have I given a reasons why we should do so, I also suggested that it was an awareness of a *cum hoc* fallacy explains why many have baulked at the move in the past.

Chapter Five found that indexicalism could be defended from various objections that have been raised against it in contemporary metaphysics, all of these resulting from redefining intrinsic properties as relations. Let us now consider in more detail the most important conclusions that I have arrived at along the road to this argument for indexicalism, and what we should do once we have accepted indexicalism as I recommend.

6.1 The Historical Question

Fruitfully associating Heraclitus with the relational account of change, indexicalism, rather than with a complete lack of stability and contradictions, does make appealing sense of the historical material, especially by comparison with the rival long-standing interpretations and dialectical materialism. Nevertheless there are other possibilities. We can not for certain rule out the idea that Heraclitus responded to Parmenides along more traditional lines, and the historical material regarding a more recent interpretation of the fragments and developed in the second section of the chapter

may not convince everyone. The theory of flux is amenable to various interpretations: besides a reading in which Heraclitus denies persistence or is inconsistent, some might favour a more mythographic Heraclitus, or the stolid one of the early Kirk.

If I cannot sway readers who prefer a reading of Heraclitus other than the recent one I have pursued, I only ask that they consider my first chapters as an exploration of how an alternative stance might use Heraclitus as a figurehead, and that they turn their attention to the metaphysical lesson found in the later chapters. Here at the very least there is an argument for indexicalism *inspired* by Heraclitus that is not only less confusing than many of the ideas of persistence or the lack thereof associated with Heraclitus' thought, but that stands as an argument in its own right.

6.2 Thermodynamics

For Hegel (1977) [1807] older ideas were the foundations upon which newer ones were built; without the old having been gone beyond, the new would never eventuate. This did not mean that the ideas from older theories were false. Old ideas could be incorporated into a new framework, as has happened with ancient Greek atomism. For Hegel, too, the problems we first engaged with as philosophers are the most basic. The theories by which we responded to these must be at the start of our process of theorising, the first child-like steps in the journey of reason. Turning back to Heraclitus to help chose an account of the problem of Change is then a viable project, and indeed both he and I applied ideas we found in Heraclitus to the basic question of persistence. In both cases a theme was that Heraclitean ideas were never properly taken up. But I have argued that Hegel's manoeuvring around the notion of being sounds anachronistic. By comparison, a thermodynamic reading of Heraclitus such as we found in Wiggins is not only straightforward, it relies on principles guiding thought recognised as foundational in the philosophical enterprise. These include *ex nihilo nihil fit*, the principle of sufficient reason and inference to the best explanation.

Going back to these basics has proved metaphysically worthwhile as well. The study of thermodynamics rests on these as well as acute observation, and this is far better placed to give us answers about the world than other ideas associated with Heraclitus: in particular inconsistencies and claims that there is no such a thing as

stillness anywhere in the world. With Heraclitus' name cleared of certain obscurities, those already engaged in thermodynamics and who are seeking an account of persistence by which to metaphysically ground their work, would no doubt be interested in pursuing the Heraclitean argument to indexicalism.

6.3 Indexicalism

If properties are relations to times, and indexicalism is right, where we have found a thing, a property, we now have the fact of a relation to time. The idea that properties are related to times has been confronted by strong intuitions. I have showed here not just that the theory of flux gives can give us strong reason to believe indexicalism, but that the counter-intuitions that surround indexicalism are not insuperable to the account.

As I have already stated that an original component in this thesis is an argument for indexicalism. It is derived from the theory of flux and The Doctrine, but these can be taken to be shorthand for ideas we all believe, ideas to be found in the study of thermodynamics. It would be unfair to describe indexicalism as an unpopular or desperate account of the Problem of Change, but it is fair to claim that an argument that indexicalism is certainly the right account of change is startling. Yet this is what I believe to be the case, that when we consider how it is that we can tell a story about change as something governed by rules then we are driven straight to indexicalism.

6.4 The Truth of Indexicalism and Further Research

All accounts of the Problem of Change incur some costs. We need a reason to choose one of these accounts, and bear the particular costs associated with it. I have used Heraclitean ideas to do that. In the case at hand, the theoretical commitment to something as everyday as intrinsic properties actually being relations to times has often been something philosophers have baulked at, so a reason for it is overdue. And perhaps we have not recognised that we have had such a reason for a long time; at least since the 19th century of Boltzmann and company, if not before the Problem was recognised in the early days of philosophy. There are two directions of research that are suggested by this conclusion.

Firstly if persistence is to be thus understood, then this suggests closer partnership between many important philosophical projects and thermodynamics. In particular it suggests we apply ideas from the study of thermodynamics to understand persisting objects that we care about or in which we have an interest. Societies and rational agents seeking to complexify themselves both come to mind. I have mentioned Burkett and Foster's (2006) reading of Marx in this respect. Burkett and Foster's line of thought is also made more attractive by what I have argued here with the setting aside of confusing 'Heraclitean' contradictions associated with the understanding of Marx, especially from the time of Lenin. As well, there is work such as Prigogine and Stengers (1984), which, though dealing mainly with concepts closer to physical science, also move to consider societies and agency along lines informed by thermodynamics.

Secondly since what comes from engaging with thermodynamics when accounting for the Problem of Change is indexicalism, then the implications of the account should be considered more directly. Stone (2007) does link a view of persons with endurantism (though not vice versa), but metaphysical applications would be as appealing here as appealing as the political or ethical ones I have associated with a combining idea of thermodynamics and persistence. With indexicalism accepted, we might profitably turn to reconsider a number of issues I have discussed in relation to indexicalism: Temporary Coincidence, Intrinsic natures and the nature of universals. That, however, is another story.

Addenda 1

Burnet's translation of the Heraclitian Fragments

Burnet's footnotes have been removed but are discussed by me as commentary where relevant. Capitals and numeral following each fragment refer to an older numbering system.

(1) It is wise to hearken, not to me, but to my Word, and to confess that all things are one. R.P.40.

(2) Though this Word is true evermore, yet men are as unable to understand it when they hear it for the first time as before they have heard it at all. For, though all things come to pass in accordance with this Word, men seem as if they had no experience of them, when they make trial of words and deeds such as I set forth, dividing each thing according to its kind and showing how it truly is. But other men know not what they are doing when awake, even as they forget what they do in sleep. R.P.32.

(3) Fools when they do hear are like the deaf: of them does the saying bear witness that they are absent when present. R.P.31a.

(4) Eyes and ears are bad witnesses to men if they have souls that understand not their language. R.P.42.

(5) The many do not take heed of such things as those they meet with, nor do they mark them when they are taught, though they think they do.

(6) Knowing not how to listen nor how to speak.

(7) If you do not expect the unexpected, you will not find it; for it is hard to be sought out and difficult.

(8) Those who seek for gold dig up much earth and find a little. R.P.44b.

(10) Nature loves to hide. R.P.34f.

(11) The lord whose is the oracle at Delphi neither utters nor hides his meaning, but shows it by a sign. R.P.30a.

(12) And the Sibyl, with raving lips uttering things mirthless, unbedizened, and unperfumed, reaches over a thousand years with her voice, thanks to the god in her. R.P.30a.

(13) The things that can be seen, heard, and learned are what I prize the most. R.P.42.

(14) ... bringing untrustworthy witnesses in support of disputed points.

(15) The eyes are more exact witnesses than the ears. R.P.42c.

(16) The learning of many things teacheth not understanding, else would it have taught Hesiod and Pythagoras, and again Xenophanes and Hecataeus. R.P.31.

(17) Pythagoras, son of Mnesarchus, practiced scientific inquiry beyond all other men, and making a selection of these writings, claimed for his own wisdom what was but a knowledge of many things and an imposture. R.P.31a.

(18) Of all whose discourses I have heard, there is not one who attains to understanding that wisdom is apart from all. R.P.32b.

(19) Wisdom is one thing. It is to know the thought by which all things are steered through all things. R.P.40.

(20) This world, which is the same for all, no one of gods or men has made; but it was ever, is now, and ever shall be an ever-living Fire, with measures of it kindling, and measures going out. R.P.35.

(21) The transformations of Fire are, first of all, sea; and half of the sea is earth, half whirlwind.... R.P.35b.

(22) All things are an exchange for Fire, and Fire for all things, even as wares for gold and gold for wares. R.P.35.

(23) It becomes liquid sea, and is measured by the same tale as before it became earth. R.P.39.

(24) Fire is want and surfeit. R.P.36a.

(25) Fire lives the death of air, and air lives the death of fire; water lives the death of earth, earth that of water. R.P.37.

(26) Fire in its advance will judge and convict all things. R.P.36a.

(27) How can one hide from that which never sets?

(28) It is the thunderbolt that steers the course of all things. R.P.35b.

(29) The sun will not overstep his measures; if he does, the Erinyes, the handmaids of Justice, will find him out. R.P.39.

(30) The limit of dawn and evening is the Bear; and opposite the Bear is the boundary of bright Zeus.

If there were no sun it would be night, for all the other stars could do.

(32) The sun is new every day.

(33) (Thales foretold an eclipse.)

(34) ... the seasons that bring all things.

(35) Hesiod is most men's teacher. Men are sure he knew very many things, a man who did not know day or night! They are one. R.P.39b.

(36) God is day and night, winter and summer, war and peace, surfeit and hunger; but he takes various shapes, just as fire, when it is mingled with spices, is named according to the savor of each. R.P.39b.

(37) If all things were turned to smoke, the nostrils would distinguish them.

(38) Souls smell in Hades. R.P.46d.

(39) Cold things become warm, and what is warm cools; what is wet dries, and the parched is moistened.

(40) It scatters and it gathers; it advances and retires.

(41, 42) You cannot step twice into the same rivers; for fresh waters are ever flowing in upon you. R.P.33.

(43) Homer was wrong in saying: "Would that strife might perish from among gods and men!" He did not see that he was praying for the destruction of the universe; for, if his prayer were heard, all things would pass away.... R.P.34d.

(44) War is the father of all and the king of all; and some he has made gods and some men, some bond and some free. R.P.34.

(45) Men do not know how what is at variance agrees with itself. It is an attunement of opposite tensions, like that of the bow and the lyre. R.P.34.

(46) It is the opposite which is good for us.

(47) The hidden attunement is better than the open. R.P.34.

(48) Let us not conjecture at random about the greatest things.

(49) Men that love wisdom must be acquainted with very many things indeed.

(50) The straight and the crooked path of the fuller's comb is one and the same.

(51) Asses would rather have straw than gold. R.P.31a.

(51a) Oxen are happy when they find bitter vetches to eat. R.P.48b.

(52) The sea is the purest and the impurest water. Fish can drink it, and it is good for them; to men it is undrinkable and destructive. R.P.47c.

(53) Swine wash in the mire, and barnyard fowls in dust.

(54) ... to delight in the mire.

(55) Every beast is driven to pasture with blows.

(56) Same as 45.

(57) Good and ill are one. R.P.47c.

(58) Physicians who cut, burn, stab, and rack the sick, demand a fee for it which they do not deserve to get. R.P.47c.

(59) Couples are things whole and things not whole, what is drawn together and what is drawn asunder, the harmonious and the discordant. The one is made up of all things, and all things issue from the one.

(60) Men would not have known the name of justice if these things were not.

(61) To God all things are fair and good and right, but men hold some things wrong and some right. R.P.45.

(62) We must know that war is common to all and strife is justice, and that all things come into being and pass away through strife.

(64) All the things we see when awake are death, even as all we see in slumber are sleep. R.P.42c.

(65) The wise is one only. It is unwilling and willing to be called by the name of Zeus. R.P.40.

(66) The bow (*biós*) is called life (*bíos*), but its work is death. R.P.49a.

(67) Mortals are immortals and immortals are mortals, the one living the others' death and dying the others' life. R.P.46.

(68) For it is death to souls to become water, and death to water to become earth. But water comes from earth; and from water, soul. R.P.38.

(69) The way up and the way down is one and the same. R.P.36d.

(70) In the circumference of a circle the beginning and end are common.

(71) You will not find the boundaries of soul by traveling in any direction, so deep is the measure of it. R.P.41d.

(72) It is pleasure to souls to become moist. R.P.46c.

(73) A man, when he gets drunk, is led by a beardless lad, tripping, knowing not where he steps, having his soul moist. R.P.42.

(74-76) The dry soul is the wisest and best. R.P.42.

(77) Man kindles a light for himself in the night-time, when he has died but is alive. The sleeper, whose vision has been put out, lights up from the dead; he that is awake lights up from the sleeping.

(78) And it is the same thing in us that is quick and dead, awake and asleep, young and old; the former are shifted and become the latter, and the latter in turn are shifted and become the former. R.P.47.

(79) Time is a child playing draughts, the kingly power is a child's. R.P.40a.

(80) I have sought for myself. R.P.48.

(81) We step and do not step into the same rivers; we are and are not. R.P.33a.

(82) It is a weariness to labor for the same masters and be ruled by them.

(83) It rests by changing.

(84) Even the posset separates if it is not stirred.

(85) Corpses are more fit to be cast out than dung.

(86) When they are born, they wish to live and to meet with their dooms — or rather to rest — and they leave children behind them to meet with their dooms in turn.

(87-89) A man may be a grandfather in thirty years.

(90) Those who are asleep are fellow-workers (in what goes on in the world).

(91a) Thought is common to all.

(91b) Those who speak with understanding must hold fast to what is common to all as a city holds fast to its law, and even more strongly. For all human laws are fed by the one divine law. It prevails as much as it will, and suffices for all things with something to spare. R.P.43.

(92) So we must follow the common, yet though my Word is common, the many live as if they had a wisdom of their own. R.P.44.

(93) They are estranged from that with which they have most constant intercourse. R.P.32b.

(94) It is not meet to act and speak like men asleep.

(95) The waking have one common world, but the sleeping turn aside each into a world of his own.

(96) The way of man has no wisdom, but that of God has. R.P.45.

(97) Man is called a baby by God, even as a child by a man. R.P.45.

(98, 99) The wisest man is an ape compared to God, just as the most beautiful ape is ugly compared to man.

(100) The people must fight for its law as for its walls. R.P.43b.

(101) Greater deaths win greater portions. R.P.49a.

(102) Gods and men honor those who are slain in battle. R.P.49a.

(103) Wantonness needs putting out, even more than a house on fire. R.P.49a.

(104) It is not good for men to get all they wish to get. It is sickness that makes health pleasant; evil, good; hunger, plenty; weariness, rest. R.P.48b.

(105-107) It is hard to fight with one's heart's desire. Whatever it wishes to get, it purchases at the cost of soul. R.P.49a.

(108, 109) It is best to hide folly; but it is hard in times of relaxation, over our cups.

(110) And it is law, too, to obey the counsel of one. R.P.49a.

(111) For what thought or wisdom have they? They follow the poets and take the crowd as their teacher, knowing not that there are many bad and few good. For even the best of them choose one thing above all others, immortal glory among mortals, while most of them are glutted like beasts. R.P.31a.

(112) In Priene lived Bias, son of Teutamas, who is of more account than the rest. (He said, "Most men are bad.")

(113) One is ten thousand to me, if he be the best. R.P.31a.

(114) The Ephesians would do well to hang themselves, every grown man of them, and leave the city to beardless lads; for they have cast out Hermodorus, the best man among them, saying, "We will have none who is best among us; if there be any such, let him be so elsewhere and among others." R.P.29b.

(115) Dogs bark at every one they do not know. R.P.31a.

(116) ... (The wise man) is not known because of men's want of belief.

(117) The fool is fluttered at every word. R.P.44b.

(118) The most esteemed of them knows but fancies, and holds fast to them, yet of a truth justice shall overtake the artificers of lies and the false witnesses.

(119) Homer should be turned out of the lists and whipped, and Archilochu likewise. R.P.31.

(120) One day is like any other.

(121) Man's character is his fate.

(122) There awaits men when they die such things as they look not for nor dream of. R.P.46d.

(123) ... that they rise up and become the wakeful guardians of the quick and dead. R.P.46d.

(124) Night-walkers. Magians, Bacchii, Lenai, and the initiated ...

(125) The mysteries practiced among men are unholy mysteries. R.P.48.

(126) And they pray to these images, as if one were to talk with a man's house, knowing not what gods or heroes are. R.P.49a.

(127) For if it were not to Dionysus that they made a procession and sang the shameful phallic hymn, they would be acting most shamelessly. But Hades is the same as Dionysus in whose honor they go mad and rave. R.P.49.

(129, 130) They vainly purify themselves by defiling themselves with blood, just as if one who had stepped into the mud were to wash his feet in mud. Any man who marked him doing thus, would deem him mad. R.P.49a.

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