

The Paradox of Phenomenal Observation

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1. Introduction.

In this paper I will argue that when subjected to a rigorous analysis, the concept of event — the concept of something happening — is somehow incompatible with the concept of time — conceived of as duration. As a consequence of this, I will argue that what “really” takes place cannot take place in time. A “real” happening cannot have a duration. The sense in which I use “real” here, is the sense in which a strong Realism uses the term: real as opposed to phenomenal.

The argument which follows aims to prove that our thought cannot conceptualise real change, but that every time thought attempts to pick out change, it can only collapse into a description of further states. The argument will throw a light on the nature of our knowledge. It will show that ultimately, we cannot talk about what really takes place, but can only offer descriptions of processes in which change is assumed. Change can never be picked out as it really happens.

This is because our thought can rationally understand only the identity of being, and whenever it thinks of a being it must think of it only as *identical*, or there cannot be anything for thought to grasp at all. This is why our thought cannot conceptualise change in the terms of a rational self-evident truth: because if this change is to be something different from the identity, it should be able to display in our thought a being that is not itself anymore, but it is not even a new identity yet: an ungraspable becoming that our thought cannot think of.¹ Furthermore, the following argument shows that the reason why our knowledge can only deal with contingent reasons, and why it can never reach a final knowledge of reality, derives from the nature of phenomenal observation and from the very nature of our concepts of time and event.

The concepts I am going to investigate, though, are so deeply engraved in the fabric of our thought, that what I am going to say will probably be taken as a misunderstanding or as a sophism built upon these concepts, and I am sure it will leave sceptical even those who are open to accept radically new theories. I expect very few, who will have an intuition of the problem at the first reading, will welcome the argument as offering an insight into the nature of our cognition. Nevertheless, I believe, that this paradox I am going to describe, should certainly be addressed by metaphysics and epistemology. Here is a brief summary of the argument.

When we think of events we think of them as happening in time, as having a certain duration. If we did not do this, we could not conceive the dynamicity necessary to the smallest event, the smallest happening. How can an event

happen without having a stretch of time *in which* to happen, a stretch of time which is filled with the happenings that constitute the event? An event is only conceivable as dynamic, and as having a stretch of time along which it can happen². In order to be dynamic, to be a happening, this stretch of time must be filled with other happenings. Otherwise the event would be an empty immobility occupying a stretch of time. And this would be a state rather than an event. So any humanly conceivable event must (a) have a duration and (b) consist of other events.³

But reflecting further on the concepts that we have been describing above, I suggest we have to conclude that those that we normally call events cannot be “really” happening in the sense held by Realism.⁴ In fact, the dynamicity of the event – and therefore its happening – always consists in what happens *in* its stretch of time. This has the result that we can never pick out what *really* takes place. Given the fact that there is only one place and one time for an event to happen, the various described sub-events cannot all be real, as this would create an overcrowded (and impossible) ontology. This means that if there has to be such a thing⁵ as a real happening (and not just phenomenal descriptions of whatever it is that takes place) and if this real happening does not just consist of whatever happens *ad infinitum* in its stretch of time, the real happening cannot have a duration. It must be conceived of as outside our temporal framework or, once again, it would not be what is really taking place, but it would just consist of what happens in its stretch of time. The ultimate event, then, since it cannot consist of further sub-events, cannot have a duration, it cannot be thought of as happening in our temporal dimension – otherwise it would have to be thought of as a duration in which nothing happens: an immobility. But an immobile event is a contradiction in terms – as is, we shall see, the idea of an event happening at an instant. We have to conclude, then, that our mind cannot conceive of a real happening taking place in time. This means ultimately that the real happening, that reality to which our mind constantly aims, whatever it is, cannot be conceived as temporal. The reality that Realism claims we can really know, is instead the *limit* of our knowledge, the limit of our temporal framework of observation.

This brief introduction outlines the heart of the argument. I will now go on to explain it in more detail.

2. The Analysis of Our Concept of Event.

Imagine an event E that falls under our phenomenal observation: that is, an event that we either perceive or think about as happening. E covers a stretch of time, however short, in which things happen or are presumed to be happening. Our understanding of E, in fact, must be such that in this stretch of time things must have happened. Otherwise E would not be happening and it would not be an event. So whenever we consider an event, this must be a happening that covers a stretch of time in which things can happen – since what makes it a happening are the things happening in its stretch of time. So

the event under observation cannot be what really takes place.

Let's call the event under observation, the **nominal** event and the things happening in its duration its **sub-events**. Now whenever we single out any of these sub-events and take it under observation, each one of them will itself be a nominal event which cannot be what really takes place, because, again, the assumption is that its happening consists of whatever happens in its duration.

Now a paradox arises, which I call the **paradox of phenomenal observation**. It consists of the following: events need time to happen, but because time consists of duration, the event occupying this time cannot be considered as really happening (in a realistic sense). If the event were what was happening, it would (paradoxically) be an empty immobility, for it would correspond to a stretch of time in which nothing happens. Instead, the nominal event always relies for its happening, for its being an event, on whatever happens in its stretch of time, whether we can observe it or not.

The conclusion from this is that what "really" happens, if there is such a thing, cannot happen in time. Someone who believes in a reality outside our own mind, and I personally believe in it, cannot conceive of it in a temporal framework. In fact, I believe that one cannot conceive of it in *any* particular way, except in a (so to speak) negative way: outside our temporal framework. Reality as the place where phenomenal events can "ultimately" happen must be thought of as extra-temporal. One can only postulate its existence as the place where whatever we observe as happening can take place — for happening, as we have seen, cannot take place in the temporal framework of our cognition.

This conclusion may seem quite worrying. Or to hard-nosed realists, it may even seem that I have created a tricky paradox through a misunderstanding or a sophisticated argument. But a closer look at our concepts of time, duration, event, etc., will show that what I have described is the very nature of our phenomenal observation. There is no way out of it, and only by acknowledging it can we — and especially those involved in the search for the "ultimate reality" — be led to the comprehension of many observational impasses.

3. Observation and "Real" Happening

I claim that our concept of time is based on continuity; events and changes happen in it gradually. In fact, if an event were thought of as consisting ultimately of instants without duration, we would not be able to understand the genesis of our time as duration. In this respect, let's say immediately that the "zero time" of mathematics in which "point events" are said to happen, is only a conventional concept that cannot help us out of the above paradox of duration and change. Zero time cannot be taken as the smallest unit of time because the sum of many zero time-points amounts always and only to zero, and never to the *duration* that time actually is. So the smallest unit of time

approachable will always be a duration and therefore susceptible to the above paradox.

Now, in order to provide a better understanding of the “paradox of phenomenal observation”, let’s analyse a familiar event: the rotting of an apple.

Observing an apple over a period of time we would see it rot. So we have this **nominal** event, “the rotting of an apple”. Biochemical examination of this event tells us that it consists of many sub-events involving many different types of molecules. For example the bonds within long-chain carbohydrate molecules will be broken down and the apple will become softer. This “bond-breaking” is a relevant sub-event which, when taken under observation, will become immediately a nominal event (a duration in which things must happen) because the breaking of the bond, unless miraculous (an assumption not very frequent in science) must consist of other sub-events that happen in this time. And each sub-event when singled out by our observation will become a nominal event in which other things, known or unknown, must happen, in order for us to think of it as an event. For example we will find enzymes binding to carbohydrates whose sub-events are amino acids interacting with sugar residues, and this in turn will consist of component atoms of amino acids interacting with atoms of the sugar residues. These atomic interactions are mediated by electrons, this, at least, is as far as we can infer from our knowledge of chemical interactions at the atomic level.

Thus this observation shows that every time we single out a phenomenal event, this event as happening in time, as being a dynamic event, must consist of further events and so it cannot be what really takes place.

Some, as I have anticipated, would like to argue that there are events that happen at instants: that is, they don't cover a duration of time in which other events happen. But I am going to argue here that it is a total misconception to claim that there could be temporal happenings, phenomenally singled out, at a so-called instant (where the instant is an ideal zero time of no duration to which a no further reducible happening corresponds).

Consider for example the “instant” at which someone wins a race, or even the velocity of a car at a certain “instant”. Whilst I don’t want to deny the phenomenal reality of these events, I hold that one certainly has got to acknowledge that a further analysis of the instant in which someone wins a race, if it is an event, and exists for us as such, will always be filled with other sub-events (known or unknown) and so it cannot be conceived as happening at an instant of no duration. If my argument is right, then the ultimate instant without duration, if there is such a thing, in which one “really” wins a race, must be outside our temporal framework, since it has no duration because it does not consist of further sub-events. It would be a “final event”. This, though, cannot be identified with the event which we call the “winning of a race”. This latter is only a phenomenal event – that is, it exists only at a

certain level of interpretation. When we go beyond this level and analyse what happens in the so-called instant in which one wins a race, we will find more and more sub-events, much smaller than that presumed "instant" in which one wins a race; showing in this way that also that "instant" had, in fact, a duration in which other things happened. The same goes for the velocity of a car which can never logically correspond to a time without duration, because velocity is a concept that by itself involves events and happening. Nonetheless we use these conventions and they work without any problem as long as we don't pretend to attach to them a strictly "realistic" meaning.

So we can talk of "the instant in which one wins a race" or of "the velocity of a car at an instant", as long as we don't claim that these, as events phenomenally singled out, have no duration, but that the instant is an operative value by means of which we fix, for example, the event of the "winning of a race". The winning of a race is a final event happening at an instant, then, only in the sense that at a certain level of interpretation, that of those who are in a way or in another involved in the race, it is the last relevant event. These are not interested in what further may happen in that instant, and are only interested in its value of final event. This is why we say that the race is won at an instant and it is a "point event". But it would be simple for us to point out that even in that thousandth of a second which is, for example, the time in which the diaphragm of a sophisticated instrument of detection opens to record the winning of a race, there will be things happening, for instance whatever happens to the photographic device to allow it to operate. So what one, in a certain system of co-ordinates, considered an instant without duration in which to fix the winning of a race, is in fact a duration, a humanly measurable time filled with sub-events. Beyond this duration in which we find further and further sub-events, there can only be an extra-temporal reality (in which maybe changes "really" take place), of which nothing can be said, least of all be identified with the perceived phenomenal event of winning a race.

Someone, in the name of common sense, will certainly want to ask here: why does the fact that a nominal event consists of sub-events means that the event is not really taking place? Why couldn't the nominal event and the various sub-events all be taking place at the same time?

The answer is in the question itself. There is only one place and one time in which these series of sub-events could happen. This is, incidentally, what it must mean to be a realist as opposed to a phenomenal description of reality. So how is it possible that they all take place, that they are all really happening? None of the events singled out phenomenally can be a real event, an event really taking place, or we would have (ontologically speaking) a crowd of events, all happening at the same time and place as the original nominal event. For example in the case of the "rotting apple", for the same place and time there would be, candidate for "reality", at least five series of

sub-events. In fact, if what we have called “enzyme binding” was really taking place it would be, absurdly taking place at the same time and place as “amino-acids interacting with sugars”. These events, in fact, do not happen in a temporal succession, but each series simply consists of another.

At this point we obviously need to sharpen our Occam’s razor, and this will consist of denying reality in the sense of intrinsic reality, to any event phenomenally described. In fact these will have to be either all real, as they are of the same observational nature, or none of them will be real. Obviously, they cannot all be real, as this would lead to an unacceptable redundancy in our ontology, or better in the ontology of Realism.⁶ So we have to conclude that none of them is real. One cannot even claim, from a realistic point of view of course, that each series is real at a different level, as a realist cannot accept that there are several levels of reality. Reality must be now a fully fledged concept or it loses its specificity in contrast to our phenomenal approach to reality is useless. Only at a phenomenal level of discourse we can talk of different levels of reality. This is because by “reality”, here, we intend what we “describe” as such, “creating” it, in an idealistic sense, in our cognition. This is why, more specifically, one cannot simply argue, as an objection to the paradox, that these sub-events are the same event under different descriptions. For if we do that we must either accept a phenomenal approach that does not invest these sub-events with a strong intrinsic reality – the one I endorse – or, if we persist in a strong realistic approach, what we are really saying is that these sub-events are all competing for the same place and the same time (the place and time of intrinsic reality). But this is clearly a nonsense and can only be entertained as a reasoning *per absurdum*.

In a phenomenal framework, then, no sub-event is more real than another, but they are all “unreal” in a strong realistic sense, and all real in a phenomenal sense. Every sub-series will provide us with a contingent reason for why things are in a certain way, without ever being possible for us to acquire any certain truth about reality, as to acquire this, we would need to come to the end of the series of contingent reasons and this, as I have argued, is impossible.

To acknowledge the paradox of phenomenal observation, means to acknowledge that reality in itself is in an extratemporal dimension, and it is, therefore, out of our cognitive reach and will never provide us with an understanding of what is really taking place in it. To accept this paradox, though, does not have to issue in an extreme scepticism; on the contrary, it means to believe in many more things as true and real than a realist would, without regarding them as minor truths. This is simply because any other concept of truth and reality is and will always be out of the question for us, it is simply a figment of our imagination, an illusion of reason, in the Kantian sense. To accept this paradox means, most of all, to accept the phenomenal nature of our theorising, and therefore value it equally in its entirety, as there cannot be in it aspects that are more or less close to reality. Rather there are

simply different ways to interact with reality, and therefore, different ways to describe it as effect of a different kind of interaction. So atomic interactions, in a rotting apple, are not closer to reality than the simply watching an apple rot, nor than the writing of a poem about it.

But before I conclude this section I would like to provide another example of this "paradox", one that deals more directly with a temporal reduction, whereas the apple was more typically an example of substantial reduction.

Imagine the breaking out of a short sharp sound. You want to know when this event happens along a certain length of time. You allow yourself an arc of time, quite short, made let's say of three seconds along which you will have to place the sound. Suppose it falls at time $t-2$, suppose now that you will divide $t-2$ into three further parts, and that the sound will cover all three of them: this is an example of continuity at the phenomenal level. Suppose now you want to know more precisely when the sound starts. You will have to divide the first part of $t-2$ into further parts; phenomenally speaking you can place the start of the sound along one of these fractions of time. But this, we are aware, can only be an approximate correspondence. In fact we could always imagine for further precision, even though it could be not feasible, dividing the time into smaller fractions and place the start of the sound at a smaller more precise time. But as long as this time has a duration necessary for a phenomenal event to happen, this event will always correspond only to a description, the nominal event, and not to what is really happening. The reason is that what is "really" taking place cannot be conceived in a duration — or, because it does not consist of further happenings, it would be an immobility, or more plainly, a piece of nonsense.⁷

The point of this impasse is not to describe, as I am going to say, the paradox of the infinite divisibility of time. What it really means, as we have seen, is that whenever we have an event that corresponds to a stretch of time in which this event is said to happen, this event, as a duration, must consist of other events that happen in that time. Otherwise it would be, as a static "event" covering a duration, an immobility rather than an event.

It is probably useful, as a conclusion to this section, to spell out again the paradoxical nature of time and event in relation to reality: to conceive an event as happening we need to conceive it as covering a stretch of time or duration in which things happening constitute the happening of the event. But because this same duration is always necessary for an event to be happening, any event singled out, will never be what is really taking place, because this event will consist of sub-events that happen in its time and so on, potentially *ad infinitum*. So it is important to say that the infinite divisibility of time is a consequence of the nature of our observation and not vice versa, as one may simplistically think. It would be a wrong way of reasoning to think that in order to grasp the final, "real" happening, if there is such a thing, we should be able to divide the time until there would be no duration anymore, until we get to the famous instant. This is absurd reasoning: to look for the

absence or the end of time within the temporal dimension. Time is only phenomenal and at the level of phenomenal events, there will always be a time that as such can be divided so that these events consist of dynamical happenings. Beyond these, there is maybe only the extra-temporal dimension of reality. But this is something which we cannot investigate.

4. Zeno's Arrow

From the confusion between the phenomenal dimension of events and the extra-temporal dimension which we have to postulate for a "real" change to take place, are born some challenging paradoxes. I want to briefly discuss here Zeno's Arrow and demonstrate how this is a paradox that springs from our concepts of time, events and duration, when these are applied to reality in itself, in this case to the conceptualisation of "real" change. This discussion should throw a retrospective light on what I have been talking about until now.

Zeno's intuition was that at an instant in time, movement and immobility are the same: since, for the most basic law of logic, when we think of an arrow we have to think of it as identical, we have to think of it always at rest. This is, in fact, what it means, for Zeno, to think of the arrow at an instant. But since all we can think of are successive instants in which the arrow is always at rest, we cannot logically conceive the movement of the arrow.

It seems just fair, towards Zeno, to say that with his argument he didn't want to deny movement altogether – that wasn't his concern – but to show the problematical nature for our mind of movement and, therefore, change: these having to meet the requirement of identity necessary for anything to be, or to be thought of, as Parmenides taught him. It is probably useful to recall, here, the reason why our thought can only think of being as identical.

Something to be must be in any moment identical with itself, it cannot be at the same moment A and not-A (principle of non-contradiction) and what is most important it cannot at the same time be not itself anymore and not even something else, a new identity (principle of the excluded middle). This means that as soon as something stops being itself, it must be, for us to be able to think of it, immediately something else, a new identity. The problem, then, is: how can we conceive of change?⁸ If all we always have must logically be an identity? How can we conceive of the passage from an identity to the next which is properly what we understand as change? A change which is conceived as a gradual passage from a state to another, from an identity to another. But if we reason according to these compelling laws of logic, we cannot find a time in which change could happen because what we will always have is an identity without the possibility to conceive the gradual passage required by the conventional concept of change or movement. What Zeno asks us, then, is to reflect on the problematic nature of our phenomenal concept of change when considered in logical terms.

The key to understanding Zeno's paradox is, of course, the concept of an

instant. This latter is supposed to represent in its indivisibility, the indivisibility of being which makes it possible for us to think of it at a certain point and at a certain moment. With this Zeno intended to deny the possibility, held by the Pythagorean pluralism,⁹ for the phenomenal world of modification to be real, that is to be rationally thought of. This is not just an excursion through history of philosophy, but these are important notions, if we are going to understand the relevance of Zeno's argument in relation to our previous discussion. In fact with his paradoxes Zeno intended to polemicise with the "pluralistic" position that, mocking Parmenides' intransigent principle of identity,¹⁰ postulated the reality of the plurality, where "reality" means the logical thinkability of something (in this case change). Zeno shows with his paradoxes that trying to conceive movement and change in the theoretical framework of the "many", produces, from a logical point of view, results just as laughable as the Parmenidean identity of the "one" produced for the pluralists.

The Eleatic school, has the invaluable merit of having pointed out the impossibility for our thought to conceptualise change – because what is, must be always an identity, or we could not think of it as being. The way out of this impossibility to conceive of movement or change, is for me, as we have seen, to place what is "really" taking place, outside our temporal framework, whereas Zeno falls, as we are going to see, in the paradoxical concept of instant, as a *time with no duration*.

Before I go ahead and explain why Zeno's instant is itself paradoxical, I need to spend a few words about two classical solutions to Zeno's paradox which have both misconstrued the problem that Zeno pointed out, and left unresolved the conceptual difficulty to conceive at the same time movement and being, in one word change. In fact, as we have seen, the reason for talking of instants from Zeno's point of view was that only at an instant can we conceive the arrow as in its identity necessary for the arrow to be and, therefore, to be thought of. A "really" moving arrow is, from the point of view of its being, inconceivable because it lacks identity. In this situation, if time can only be made up of such instants we will not be able to logically conceive movement or any kind of modification, but only the immobility of each instant in which it is given us to think of the arrow. This means denying altogether, as in fact Parmenides had already done, the existence of time, as a duration and as a flowing of modifications. These latter could only be, as we have seen with Parmenides, inferior aspects of reality, or inadequate versions of reality which in fact did not deserve the name of Being or Reality at all. They were mere opinions, fallacious because induced by senses and not reason.

Now, some interpreters of Zeno's paradox propose that if the arrow is always in a place identical with itself at each instant, this does not prevent it from being at different places at different instants.¹¹

Well this interpretation, that I would call that of the common sense means

to take a short cut, a lamentable short cut, since what is at issue here is not whether there has been or not been movement but if movement is thinkable within the framework proposed by Zeno. This says, I repeat, that only the instant assures the identity necessary to think of the arrow, as being that is to say, the only way the arrow can exist and be thought of is at rest in a position in which we can think of it at an instant. To be really moving means to be nowhere, to not have identity, to not be logically thinkable as being. So if we accept, so to say, Zeno's logical rules, and it seems hard to refuse them, which is why this is a challenging paradox, then we cannot choose the common-sense view and say that we can think of it at different places in different instants, because since Zeno's time is made up of these instants, it loses the possibility of being thought of as a duration in which an event like movement could ever be thinkable. All that is logically thinkable for Zeno is the arrow at rest at a so-called instant. What is important to understand is that Zeno's instant could never make up a stretch of time, a duration, within which movement could then be thinkable. It is also a misunderstanding of Zeno's argument to conceive his instant as a mathematical point, which could work as a useful operative and reconcile being and movement as it does in classical mechanics.

Zeno's instant was none of this, it was a logical "absolute", the no-duration necessary for the identity, and for something to be, because duration implies modifications which are not thinkable as being. To give it a reductive less absolute meaning is to take a short cut that does not get us out of the paradox which is not, if we ever become aware of it, about factuality, but about thinkability of being and movement at the same time. Only in this light does Zeno's argument acquire the dignity that it deserves and does not become a self-complacent intellectual game.

There is another way to ignore Zeno's paradox though, and that is to deny his first instance: which is in fact that we should think of time as indivisible instants. Only in this case, only if time consists ultimately of indivisible units, would we find ourselves in the impasse of the immobility, whereas movement, the supporters of this view think, is perfectly conceivable in time if we abandon this last atom of time, the instant, and consider time as potentially divisible *ad infinitum*. This was Aristotle's¹² reaction to Zeno's paradox, and it is not by chance that he didn't have any respect for him as a philosopher. This is also the view which should be taken up by all those who believe, and I am aware that it is probably the majority of us, that movement or modification can happen in a divisible time or a time made of durations, or in one word: in Time. I am going to demonstrate, using my argument about time and reality, that the arrow could have not moved even if we considered time not as an instant, but as an always further divisible duration.

As I have tried to show in fact, events as modifications that really take place and, therefore, also the moving of the arrow, cannot happen in a duration because this just corresponds to sub-events which in their turn to be

dynamic events will correspond to other sub-events, these as durations then will always be descriptions of further sub-events. In this way we will never get to what is really happening: the final movement.

In Zeno's view, the duration as a presumed flow of modifications (what I have called an "ungraspable becoming" for our thought) will never allow me to think of the arrow as being and, therefore, will never allow the arrow to be. As an alternative to this unrealised pluralistic picture there is the arrow at rest at an instant; but here comes the legitimate complaint of the pluralistic school: if we have to think of being as immobility what can explain the event and modifications of the phenomenal world, those that we witness and that no logic can deny? Since the Eleatic school cannot justify a phenomenal happening or the events that we observe in our temporal framework, these must be self-justified and therefore are described by the Pluralistics as the "real" being. But I have argued, in the previous section, that what happens in time cannot be real in the sense of being what really takes place, and that we can think of modifications only if we place them in an extratemporal dimension. Let's now think in this direction.

If we consider the movement of the arrow from a position P2 to P1 from time T2 to T1, we will have a movement represented by a segment that unites the two points in space and time. Space cannot account for movement because either in movement or at rest a body always occupies a space identical with itself. What we are left with then is a segment of time. The question again is what sense can we make of this segment or so-called duration in which a movement has supposedly happened? I claim that the movement has not taken place in this duration, or, better, that we cannot conceptualise a movement as taking place in this duration. In fact we are faced with several alternative choices that all discount the possibility of movement.

If the segment is made of further positions and further instants of no duration, at each one of which the arrow is not moving, we have Zeno's solution. If it is a segment of time long enough to allow the movement then we will have two choices: a) it will be divisible in sub-segments until we get to an ideal instant, the mathematical instant, which is not Zeno's instant, or b) it will be virtually divisible *ad infinitum*. If we chose a), the mathematical instant, this cannot offer us any help out of Zeno's paradox because it just assumes that movement does happen in time; this instant is in fact only an ideal approaching zero which conventionally ascribes a velocity and a position to a mobile object at a certain time. But whereas the mathematical instant is a convention that reconciles being and movement, Zeno with his paradox intends to expose just this contradiction. As I said, Zeno's instant is not a conventional operative at all, but represents the immobility and the identity necessary for being to be thought of; whereas the mathematical instant makes an operative sense of the mobile object having a velocity at a time, Zeno's logical instant wants to deny just that: that the arrow at any instant of no duration necessary to think of it as being, has also a velocity. It

follows that, since time is only made of such instants, it cannot explain the movement.

The alternative b), the divisibility of this segment *ad infinitum*, which is Aristotle's solution, means that every smaller segment of time that we will consider can be further divisible. So, for example, we can consider the segment of time T3 correspondent to three seconds, in which the arrow has travelled for thirty metres. Zeno's question at this regard will be: how can we adequately conceive the movement of the arrow across this space in time? We know, it is evident to us, that the arrow has covered this space, but when we go with our concepts of time and change, to analyse the movement of the arrow we have to admit, with Zeno, that movement is inconceivable.

In fact the arrow in its moving from P2 to P1 can cover the distance of thirty metres only if it has previously covered smaller distances. For example it has travelled first for one metre, then for five, then ten, twenty and so on. That is, the movement of the arrow in these three seconds is comprehensible only as consisting of movements corresponding to smaller segments of time. The arrow, in other terms, does not move in a sudden and discrete way from P2 to P1, but has to pass through all the points between P2 and P1. These correspond to smaller and smaller distances that the arrow gradually covers, presumably. Now, Zeno points out that if the arrow has to pass through all the points between P2 and P1 and must be in each of these points identical with itself, that is in each point must be in an identical position or it would not be at all, in each of these points the arrow is at rest. Now, because apart from all the points between P2 and P1 in which the arrow is at rest, there are no other points between P2 and P1, when and where can the arrow be thought of as moving? The arrow does not "really" move, is the answer of the Eleatics. Still... the arrow moves. Therefore, the movement and not the identity is the real being, claim the pluralists on the other hand. But this movement, we have to acknowledge, has become, at least, problematical as we cannot give a logical explanation of it, but simply swear by its evidence or as those opponent of Parmenides once did, start stubbornly walking up and down to prove that movement does exist. But if we have understood Zeno's point, we will not do any such thing, because Zeno's argument is not about factuality, but about the adequacy of our concepts in giving a logical account of this factuality. Zeno's point is that an explanation of movement that starts from the given plurality of our concepts of change, is, as far as an understanding of reality goes, as much a failure as is the Parmenidean identity (but this at least did not try to explain change). In fact we cannot deny that the arrow transiting through all the points between P2 and P1, is always, when we think of it, at rest in one of these points, because there is nothing else apart from these points, between P2 and P1 and all the space between P2 and P1 correspond to a certain point where the arrow must be found at rest. It is again the principle of the excluded middle, as an extension of the identity principle that comes back to bring a constraint on our capacity to

conceptualise the plurality or change.

Now, what we have to say, to go back to Aristotle's "solution", is that, while for Zeno each of these points corresponds to an instant with no duration in which the arrow can be thought of as identical and therefore as being, for Aristotle each of these points is always a further divisible segment of time, so that the arrow does not have to be at rest. Aristotle's "solution" then, only delays the real problem which is: how to conceive movement in a duration? and it is directly open to the objection of my paradox of duration and happening. In fact, we can see immediately that each of these segments, being a certain duration cannot be covered by the arrow simultaneously, but the movement of the arrow, corresponding to this duration, will be reducible to smaller and smaller segments of time and space, which, for being themselves always a duration cannot be covered simultaneously, but always consist of smaller segments through which the arrow has to transit before it covers a certain distance. This, obviously, *ad infinitum*, because, as long as there is a duration, this cannot correspond to a real event or movement, or this would be a movement occupying a duration in which nothing happens, in which there are no sub-movements. But this is a contradiction in terms that does not provide a logical concept of movement. In fact, we have seen in the previous section, if this duration corresponded to a real event or a real movement taking place in it, this paradoxically would not be a movement but, not consisting of further sub-movements and covering a duration, it would be a rest, an immobility. In other words, a non-sense.

So I am not arguing against Aristotle that time is not potentially divisible *ad infinitum*. I am rather saying that because of this unavoidable divisibility, as the only alternative to the immobility of the Zenonian final instant in which the arrow is at rest, movement cannot be reached within our concepts of duration and extension. This is because each further divisible segment will represent a duration in which the arrow is either at rest or is moving. Obviously we don't want it to be at rest. But if it is moving it cannot avoid my objection that each of these segments, through which the arrow has to transit, being divisible *ad infinitum* will not allow us to reach within our temporal framework the movement that for this reason lies outside our phenomenal perspective of duration. The potential divisibility *ad infinitum*, therefore does not help us in grasping movement. Instead it proves more poignantly that movement is out of our temporal dimension as it stresses that only if we could find a change that happens without further subchanges could we talk of real change. But this cannot happen in time because time, as duration, is potentially divisible *ad infinitum*.

So, once again, we find that a segment of time as duration, makes it impossible to conceive of something really happening, really taking place in it, because an arrow to move must move from one point to the next one, but if these points correspond to an always virtually divisible time-slice, the arrow can never be thought of in its actual movement because there will always be a

smaller duration with a smaller movement and then a smaller one and so on, *ad infinitum*, for the arrow to cover in order to cover any considered distance, however small. So we can never track down the time-slice when the movement has really happened simply because it is inconceivable that to a duration could correspond a real movement and not just a description of sub-events. I claim, therefore, also in the light of Zeno's paradox, that we can think only of a phenomenal movement which consists always of sub-events, none of which is real because it is happening in a duration in which if there aren't further sub-events, there is immobility.¹³ Asking for more than this, that is pretending that the movement we observe and by which "phenomenal" evidence we could swear, is "real" in the sense of Realism, creates the paradoxes we have just described.

All that is left to say about the arrow paradox is that while Zeno points out the impossibility to conceive of movement as really taking place, on the other hand he himself falls in a paradoxical concept: that of an instant as absence of time, as no duration in a temporal framework, since this is the framework where Zeno still places change. The problem is that Zeno needs the instant to think of the arrow as being, but, he points out, there is no rational way to think of the movement of the arrow the way we can think of its being. Zeno himself, then "confuses" in his paradox the two levels of being, the Parmenidean identity, and of phenomena. The arrow that is in the instant identical with itself, cannot be the arrow that moves. The arrow at an instant, is an ideal, an abstraction of our thought that never exists in the reality that we experience and in which we experience movement: the phenomenal reality. Because in this reality there aren't Zenonian instants, but only Aristotelian time-slices further and further divisible, at least in theory. So, for Zeno, changes or movement are inconceivable because we can only think in terms of instants, that is we can only think in terms of rational being, while changes need duration and plurality to happen.

This concept of "instant" is the root of the paradox of the arrow and, as I said, the key to understand it. This is what we have to get around in order to get out of the impasse of the Eleatic immobility. In fact it is incorrect to assert that the arrow does not move in time, because the arrow that we know, the phenomenal arrow, we know it only in time, we never know it at an instant. If there is an arrow, then, this is in time.¹⁴ The important thing is to accept that this is a phenomenal arrow and that its movement is a phenomenal movement, therefore, a movement we cannot track down in its real taking place beyond the endless series of phenomenal descriptions which, as we have seen, cannot be all taking place in a realistic sense, as this would create an overcrowded and impossible ontology.

Zeno's arrow is, then, consigned to immobility because its "real" movement, the one we should conceptualise in its actual taking place, is still thought of in a temporal dimension, in which there can only be what we have called "nominal" events. Only by clearing up Zeno's confusion between being

and the phenomenal that his own master Parmenides had kept strictly separate, can we resolve the paradox of the arrow and save the phenomenal arrow from the immobility in which the arrow as "being", the one we never experience, had confined it. But, here, Zeno indirectly points out something important: if you want to talk about the arrow as this "being" than you have to give up the movement, that is, if one wants to talk of the "real" arrow, one has to give up phenomenal concepts. But this is something we can't do and must not try to do, as we can only talk of the phenomenal arrow and of its "nominal" movement. So we can resolve Zeno's paradox only if we acknowledge the "paradox of phenomenal observation". This says that time is the dimension of phenomenal events and that in a duration "real" change cannot take place because an event that does not simply consist of other sub-events, if it occupies a duration, is an immobility rather than an event.

An arrow that moves, then, must not be thought of at an instant because instants are abstractions which we never experience when we experience the movement of an arrow or of any other object. This is why applying the concept of instant or identity to the level of experience, Zeno confuses the two levels of Being and of the phenomena which goes against Parmenides' prohibition itself. Zeno, then, creates with this "confusion" a paradox and, in a way, rightly does so, because the Pluralistic school was claiming that the movement, not the Being, is "real" or rationally true. He demonstrates then, that movement cannot be conceptualised with the same rationality we conceptualise being with. Obviously, I believe that they were both wrong: the pluralistics for believing that movement could be rational or "real", and Zeno for bringing together in a paradox the identity of being and the phenomenal movement and so creating with this "confusion" of levels, his paradox. These two levels of the identity or rational truth and of the plurality or contingent truth, must be kept strictly separated as claimed by Parmenides (even though he didn't believe in contingent truth, which he just called false opinion).

My answer to Zeno's paradox, like my answer to the paradox of "phenomenal observation", is that real movement does not exist in time, in time only phenomenal movement exists, and this is phenomenal because it can only be described as it appears to us in an endless series of sub-events. Whereas if we could conceptualise it the way we conceptualise identity, we would then know what is really taking place in "reality", a real change, if there is such a thing. But it is not so. I do not know the reason why it is not given to us to know this "change" in itself at the end of the endless series. All my paradox shows and wants to show is that things are in this way: reality, as what really takes place, is out of our reach. If there is such a thing as Reality, where something finally takes place and does not simply consist of more and more sub-events – and I personally believe it exists – it must be in an extratemporal dimension, as our concepts of time and happening cannot account for it.

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FOOTNOTES

¹Mine is obviously a metaphysical claim. I am not concerned at this point with the existence of a specific object that falls in our ordinary perception, and of which I would not want to deny that it changes, as we commonly view change: it alters its properties whilst remaining the same object. In this conceptualisation of change that I propose to investigate, we need to go beyond this immediate experience. So imagine asking somebody who believes that something is changing whilst remaining the same thing: "Could you draw a line between a thing and its changing properties? Could you tell me, more precisely, what is the relation between the colour, the shape, the texture etc., and the thing to which they belong?" The "man in the street" (blissfully unaware of any philosophical diatribe about whole-part relation, which is in fact irrelevant here) would simply answer that the thing in fact consists of these changing properties. Pressing him more one would then ask: "Does a change in one property involve a change in the thing?" The prompt answer would be: "yes" since the previous identification between the thing and its properties would certainly imply this. What does not change, then, is our capacity to identify the thing as the same thing. We could otherwise say that the thing preserves a numerical but not a qualitative identity. Am I saying here that the thing is only its properties? Not at all. I do not want to make any such claim. In fact the present analysis does not need to get involved in this kind of debate. All I am saying and all I need to say is that in the attempt to conceptualise change – final change, real happening – the mind very briskly goes beyond the common sense opinion. Not because, as we shall see, this common sense opinion is in itself mistaken, but because it is often entangled with strong realistic claims about certain states of affairs: such as in this case it could be the underlying claim that a thing, its properties, and their changes, do not represent just a phenomenal description, to which I would have no objection, but real matters of fact. My enquiry, it will become clear, is not an argument against phenomenal evidence, but it is the attempt to scrutinise if there is something in this phenomenal evidence that can be called real in a strong sense, without us falling in logical contradictions and non-sense.

²As we shall see, in fact, events that happen at an instant are a misconception, one of the several that this paper wants to address.

³This premise or first assumption shouldn't be taken as an *hypothesis* which is given without demonstration, but as a *thesis* which awaits proof and demonstration. It works as a plausible assumption to start with and, since the development of the argument yields the maximum of conceptual coherence, it should be accepted as the most logical concept of event that our mind can entertain.

⁴By Realism I will intend here, I want to stress, that epistemological approach which claims in general that our knowledge is knowledge of reality "in itself", and not a knowledge of phenomena. I refer *only* to this strong form of realism as the one opposed to a phenomenal theory of knowledge which the reflection on the present paradox intends to support.

⁵As a phenomenalist, I am not really concerned with this "real" happening, as I believe that we have to be concerned only with phenomenal happenings, that is descriptions of processes that never pick out this real happening.

⁶Neither would it be a valid objection to this occurrence to argue that it is possible to have at one place and time more than one thing, given that they are of a different kind, such as, for example, the statue and the piece of clay. (see D. Wiggins 'On Being at the same place at the same time' *Philosophical Review*, 1967) In fact the various descriptions of events we are taking in to account all share, in the realistic framework, the same kind, Reality. Therefore, they do not belong, as far as the kind at issue goes, to different kinds, but to the same one.

⁷So even if one argues that there are only events and processes and not "substances" that generate the *reductio* I have illustrated in the "rotting of an apple", one still has to meet the objection that these events and processes, to be real happenings, cannot happen in time, because if they did they would have a duration and so would generate the same *reductio* that we have observed in the case of the rotting apple.

⁸We have two concepts of change: the phenomenal one – or gradual change – and the concept of a discrete change. They are both ultimately unintelligible, as far as a true conceptualisation of change goes. The phenomenal concept of change is not a "rational" concept as it does not stand the test of the most basic laws of logic. In fact it involves, as gradual change, that something is at the same time itself and something different, or it collapses in an already new identity or state where it is impossible to talk of change. In the concept of discrete change, instead, what is enhanced is the moment when change has already happened. Words such as jump, leap, etc.,

should conceptualise change, but in fact they don't, they just cover a lack of understanding.

⁹For a discussion about the possible target of Zeno's paradoxes, see *Zeno of Elea* by H.D.P. Lee (Cambridge University Press, 1936).

¹⁰At this regard Taran writes: "We have reason to believe that his poem gave rise to an attack which pointed out the paradoxical consequences of his doctrine, for there is no reason to doubt the historicity of Zeno's remark in Plato's *Parmenides* when he says that, using the same method used by those who attacked Parmenides and starting from their own assumption that a multitude is real, what he did in his treatise was to show that even more ridiculous consequences would follow." L. Taran, *Parmenides*, (Princeton University Press, New Jersey, 1965), p.195.

¹¹This would be, for example, the interpretation provided by M. Sainsbury (*Paradoxes* (1988) Cambridge Univ. Press pp 22-24). There he argues that movement can be reintroduced if one considers that the arrow is at different places at different instants, and this should offer a way out of the paradox. In this way he puts the accent on the factuality of movement rather than its conceptualisation which was the only concern for Zeno. As in the case of those who, like the cynic Diogenes, outraged by the Eleatic thesis of the immobility, started walking up and down to assert the undeniable evidence of movement. (see pag. 20 of this paper).

¹² A.W. Moore points out that Aristotle resolved Zeno's paradox by pointing out that "the time it takes for an arrow to fly through the air is not actually composed of infinitely many indivisible instances. It is just that there is no end to the instances we can recognise within it." (A.W. Moore *The Infinite* (Routledge, 1990), p42). At this point I would like to point out that the difference between Aristotle and Zeno in this matter, consists principally of the fact that whereas Zeno, following the teachings of his master Parmenides, was specifically concerned with the conceptualisation of being and movement, Aristotle was, as philosopher, more interested in the empirical aspect of problems. Also Hegel in his *Science of Logic* points out that the Aristotelian solution, privileging concrete continuity against abstract plurality, is to be highly praised as a better understanding of the problem of motion. He writes:

To infinite divisibility (which, being imagined as actually carried out, is the same as infinite dividedness, as the atoms) on which is based the most famous of those proofs, he opposes continuity, which applies equally well to time as to space, so that the infinite, that is, *abstract* plurality is contained only *in principle* [*an sich*], as a

possibility, in continuity. What is actual in contrast to abstract plurality as also to abstract continuity, is their concrete forms, space and time themselves, just as these latter are abstract relatively to matter and motion. G. Hegel., *Science of Logic*, tr. A.V. Miller., (Humanities Press, New Jersey, 1989), p.198.

My position at this regard will become clear in the following pages.

¹³See also the paradox of the stadium.

¹⁴Bergson's position at this regard was very strong. According to him, the reality that we know is only movement and "...immobility being only the extreme limit of the slowing down of movement, a limit reached only, perhaps, in thought and never realised in nature." and so "...it is movement that we must accustom ourselves to look upon as simplest and clearest..." So, he argues, the problem of movement, since antiquity, has been misconstrued, for what we have started from is immobility. Whereas, he claims:

The positions of the moving body are not parts of the movement; they are points of the space which is supposed to underlie the movement. This empty and immobile space which is merely conceived, never perceived, has the value of a symbol only. How could you ever manufacture reality by manipulating symbols? (H. Bergson, *An Introduction to Metaphysics* (Macmillan 1913), pp 44-45.)

While I totally agree with Bergson's criticism of the abstract symbols used by metaphysics in the attempt to manufacture reality, and with the idea that the paradoxes of movement are born of a confusion between the phenomenal and the logical level, I do not agree with his dismissal of the relevance for our thought of the problematic nature of change and movement. He claims that it is movement we must accustom ourselves to look upon as the simplest and clearest, but as a matter of fact, I reply, it is not the simplest and clearest concept for our thought to grasp, as I have tried to show.