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ATOMICITY AND EXTENSION¹

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Abstract

The general ontic structure of the fully concrete *res verae* is the structure of an occurring event (actual occasion). Both in its aspect of occurring duration, as well as in the aspect of its characteristic pattern, it is bound to the general condition of extension. Its occurring extendingness leads to and results in the extendedness of its characteristic pattern.

This characteristic pattern is only finally determinate in the satisfaction of the occasion. It is of the nature of a (complex) object. That is to say that it can be recognized. This means that it is an orderly appearance. It relates the occasion to the order of the universe and determines its species. During the occurrence of the occasion, it functions as regulative final end (subjective aim).

Thus it plays a role both in anticipation as well as in retrospect. Being an object, it is atomic, and as such it is responsible for the atomic aspect of reality. This atomicity, however, in no way derogates from the continuity which is implied in the extensiveness of all becoming and transition. Only by combining the theory of events with the theory of objects can the puzzles in the relation between continuity and atomicity be solved.

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1. Introduction

The formal structure of Whitehead's "actual occasion" has raised many questions. It seems as if Whitehead attributes contradictory properties to actual occasions. On the one hand, they are said to be not in physical time (*Process* 283); on the other hand Whitehead says that they are temporal ("Time" 242). This apparent contradiction points to a general problem which implies many closely related sub-questions. For example, to mention just a few of a them:

- What is the general relation of the actual occasions to time? Is time "in" the actual occasions or are the actual occasions "in" time? Are they in physical time? What actually is meant by physical time?
- Does the finality and atomicity of the actual occasions mean that they are not temporally extensive?
- If time is excluded from the actual occasions, then how can the succession of actual occasions in an enduring object form a uniserial time-system?
- Is the genesis of the actual occasion to be understood as a complex unity with an internal diversity?
- If so, is this diversity a diversity of phases? What is the relation between these phases? Are they successive? Or does the atomicity of the actual occasions mean that there can be no internal succession?
- Does the atomicity of the actual occasions mean that there is a discontinuity in the succession of them in an enduring object?

In the present article we will focus on the first four of these questions.³ They all circle around the epochal nature of the actual occasion. Many writers have been stirred into action by them. The interpretations, as well as the solutions for the difficulties are quite diverse. Chappell⁴, Sipfle⁵, Wallack⁶, Christian⁷, Ford⁸, and Neville⁹ have all given important contributions. Though most of these views were expressed quite some time ago, they are still relevant since they give shape to the basic questions involved. Therefore, although I believe that these writers have missed the key to the solution, namely the relation between events¹⁰ and objects,

I will discuss the views of some of them before explaining my own.¹¹

In order to fully appreciate the difficulties involved, we will in the first part of the present article (§§1-6) have to return to the “necessary prolegomena” (*Concept* 48), the basic concepts and distinctions concerning extension, events, objects, and physical time. These we find in *An Enquiry Concerning the Principles of Natural Knowledge* and in *The Concept of Nature* (§§3-6). In §2 I will explain my reasons for this return to Whitehead's philosophy of nature.

In part two (§§7-8) we will follow Whitehead in some of his metaphysical investigations. In §7 I will discuss the metaphysical status of extension in Whitehead's philosophy. In §8 I will discuss Whitehead's view of the epochal realisation of prehensive events in *Science and the Modern World*. In this discussion I will highlight some of the background of Whitehead's exposition in that chapter. Without mentioning them, he seems to be in discussion with Bergson and Alexander. By contrasting Whitehead's view with theirs, the very cramped exposition of the “epochal theory” in *Science and the Modern World* is explicated.

Only then are we ready for part three (§§9-10), and only then will we be able to understand the difficulties in the interpretations of the authors mentioned. I will discuss the contributions of Chappell, Sipfle, and Bradford Wallack (§9). By analyzing the difficulties in their views, I hope to make plausible that something important is missing in the discussion. More specifically, in §10 I hope to show that the theory of epochal becoming can only be understood in connection with the theory of objects.

I believe that in this way all the puzzles can be solved. It seems that Whitehead was right when he called the relation between events and objects a “struggle” for the understanding (*Enquiry* 66). But I trust that once we see the key to unscramble the code, we will gain a clear perspective. This key is to be found in Whitehead's philosophy of nature.

2. *Presuppositions and methodological preliminaries*

2.1 It is customary to discriminate in Whitehead's thinking a phase of natural philosophy before his final, metaphysical phase. It is obvious that this distinction can be made. There is, however, disagreement as to the meaning and import of the differences between these phases. I cannot here enter in detail into the discussions on this point. Summarily I can say that I hold to the view that Whitehead's metaphysics is to be understood as an *ontologia generalis*, and that in spite of ontological generalization and resulting new points of view, there are, except for some points of logic, no differences between the various phases in

Whitehead's thinking, by which insights of earlier phases would have to be replaced by later insights. On the whole, I think that there is a systematic unity throughout the different phases of Whitehead's thinking.¹²

I will at length discuss the important metaphysical viewpoint of anticipation. But I intend to show that this new viewpoint does not exclude the former viewpoints. Naturally, the new, more encompassing viewpoints and the systematic treatment of problems that were purposefully ignored in the philosophy of nature, lead to qualifications and complications. But it is precisely my purpose in the present article to show that these complications can lead us astray if we do not fully recognize and understand what it means that the former insights are fully embodied in the metaphysical insights.

2.2 In my opinion, there are only a few themes in Whitehead's metaphysical phase that are not already either dealt with, or at least hinted at, in his philosophy of nature.

2.3 Whitehead's metaphysics is a *descriptive* metaphysics. That is to say, it is based on a description of immediate data of experience. This description serves as a basis for ontological generalization. Much of this description can be found in Whitehead's works before 1925.

2.4 The basic rule for Whitehead's empiricism is that no relation may be introduced that is not given in immediate experience. This rule equally holds both for his natural philosophy and for his metaphysics (general ontology). His analyses are concerned with perception and experience (prehension) in the widest sense. The immediately given realities and relations (duration, objects, extension, cogredience, valuation, intensity, etc.) are to yield the fundamental concepts for ontological generalization. His metaphysics never rises above generalized description of experience.

2.5 A general danger in philosophical discourse, as in any discourse, is to take meanings for granted. This danger is aggravated when we tend to read Whitehead "backwards", that is to say, when we approach his natural philosophy mainly or exclusively from the side of his metaphysics. Because of the many neologisms Whitehead uses, the possibility that we lose sight of basic meanings becomes quite real. But even when generalized, we must never forget what the description is a description of.

2.6 As I wrote above, I believe that the key to the solution of the problem of continuity vs. discontinuity is to be found in Whitehead's early works. I will substantiate this claim later.

2.7 The preceding six points explain why I will often refer to Whitehead's writings before 1925.

PART ONE. PROLEGOMENA

In Whitehead's philosophy of nature we find the necessary prolegomena for the understanding of his metaphysics (*Concept 48*). We will look at the distinction between events and objects, as it can be made concerning our immediate perception (§3). We will investigate the properties and the nature of extension (§§4-5). And, in preparation for the question of the temporal nature of actual occasions, we will look at the structure of physical time (§6).

3. Perception

My claim is that the solution for the difficulties in understanding the relation between atomicity and extension is found in the relation between events and objects. What is the empirical nature of events and of objects, and what is the relation between these elements of our perception?

The world as it is disclosed to us in our sense-awareness has the character of one continuous flux of happening events. Factuality as given is a "becoming", an incessant happening and a perpetual perishing.

It is difficult for us to conceive of a material thing as a happening event. In the case of a thing with a permanent character the factor of recognition in our perception is so strong that we name such a thing after the enduring object which we recognize in the stream of events. But Whitehead makes a sharp distinction between events and their characters. Only the recognized characters are called objects by him (*Concept 189*).

Objects and events play sharply distinguished roles in Whitehead's thinking. He conceives of them as radically diverse aspects of our perception. Events are the primary and direct relata of space and time. They pass and can never return. They are unique (*Enquiry 62*).

Objects, on the other hand, are not in this sense unique. They can return. "Statue of Liberty" is an enduring and recognizable characteristic of a long series of events, each of which forever disappears once it has happened. But as an object "Statue of Liberty" returns time and again.

The same is true for the colour red, a sense-object. It can be here or there, or now and then. It can even be here *and* there and now *and* then. In other words, an object returns in space and time, and when it does, it is recognized. But its relation to space and time is derivative. It depends on the events which are characterized by red (*Enquiry 63*).

For the philosophical question concerning the structure of reality, events are more fundamental than objects. The conditions by which objects can characterize events are solely to be found in other events, "for there is nothing else in nature". A reference to an object can only be

a reference to the character of an event. Only events can cause events. There is no other concrete reality in nature than the reality of events (*Enquiry* 73).

There is a further difference between events and objects. Events are divisible, objects are atomic. It is a mistake to consider objects as divisible into parts. This follows directly from the premise that an object is not directly in space and time. The relation whole-part only holds for events.

That everyday objects have no time parts is evident to common sense. The chair today is no part of the chair yesterday, nor is either of them part of some larger whole. The chair yesterday is the same as the chair today.

But it seems different for space. It is natural to think that the chair consists of spatial parts which exist simultaneously. However, the leg of the chair is an object in itself, to be distinguished from the atomic chair-object. The leg can only be part of the chair by mediation of the leg-event and the chair-event. The leg-event is really part of the chair-event. The chair as object has to be distinguished from the event in which it is actualized (*Enquiry* 92).

It is a big problem to get a clear view of these heterogeneous relations, between objects, on the one hand, and events, on the other hand. So much so, that Whitehead calls it a “struggle” (*Enquiry* 66).

The atomicity of sense-objects is easier to understand. There is no part to red. Insofar as red can be divided, it is because of the event which is characterized by it. Like the chair-object, red has to be distinguished from the event that is characterized by it.

An important difference is the difference between simple objects and complex objects. Red can be considered a simple, or uniform, object. But a chair, or a rhythm, or some other pattern, is said to be complex, or non-uniform. Yet both kinds of objects, uniform and non-uniform, are atomic.

As I indicated in the Introduction, this difference between the atomicity of objects and the divisibility of events is the key to unlock the mystery of the apparent contradictions concerning the ontic structure of actual occasions. For Whitehead writes: “The continuity of nature is to be found in events, the atomic properties of nature reside in objects” (*Enquiry* 66). And when (as in the case of a rhythm) a certain atomic character is impressed on an event, “this ... does not imply a discontinuous existence ...” (*Enquiry* 198f). Whitehead is aware that he does not give more than suggestions when he writes that “continuity is derived from events, and atomicity from objects”. This is a theme which “requires development” (*Enquiry* 203).

In *Science and the Modern World* and in *Process and Reality* this development *is* given, but it is never given in terms which point back to this announcement in *An Enquiry Concerning the Principles of Natural Knowledge*. Even more can be said: in no later place where the atomicity of actual occasions is discussed do we find the reference to the object as being the real reason for the atomicity of the occasion. Yet I hope to prove, in §10, that this really is the key for understanding the atomicity of actual occasions.

A few things in this account of Whitehead's view so far need to be emphasized: (1) Objects are defined as recognita. This implies that the locus where objects are found is the experience of some subject. (2) The very fact of objects appearing at all, points to the order of nature. Recognizability is a form of order.

It is also important to notice (3) that there is an indefinite variety of types of objects in nature (*Enquiry* 82, *Concept* 162). There are body and thumb (*Science* 120), a drop of water and a swarm of flies (*Enquiry* 182), there are molecules and electric charges (*ibid.*).

And (4), what is an object for one percipient, is another object for another percipient. What is a drop of water to us, is like a swarm of flies to an electron (*Enquiry* 182, cf. *Concept* 163).¹³

4. Extension

The divisibility of events, as well as their atomicity, points to the relation of extension. According to Whitehead, this relation is given in perception. Extension is one of the most fundamental and most simple features of nature. Events are experienced as extensively related. They “extend around us” (*Enquiry* 63).

The name of this relation is derived from the Latin *extendo*, which means to stretch, or stretch out, or spread out. The first meaning of extension is indeed a dynamic one. An event “extends into the future” (*Enquiry* 62). Extension carries the connotations of tension and effort. In this primary meaning Whitehead uses the expression for the all-sided propagation of energy.

The second meaning of extension, directly related to the first, is indicated by the divisibility of events. This divisibility points to extension as the relation between *part and whole*. For the interrelation of space and time it can easily be recognized: The car that drives through the street is part of the whole reality of that street. The passing of one of the wheels is part of the passing of the whole car (*Enquiry* 75).

In this epoch of the universe extension is differentiated in space and time, that is to say in simultaneity (juxtaposition) and succession. The

simultaneity of (spatial) extension points to completed facts, while its time-

aspect points to the “becomingness of nature” in its creative advance. This becomingness of nature is “extension in the making” (*Enquiry* 61f).

In the third place, extension points to the *assimilation* between space and time. Although the distinction between space and time is inherent in nature, it is relatively superficial. Space and time are each partial expressions of the one relation of extension between events, which is in itself neither temporal nor spatial (*Enquiry* 61, *Concept* 185). Spatial relations extend through time (*Enquiry* 6), and since the discovery of electromagnetic relativity we know that that which is simultaneous in space for one percipient, is successive in time for another percipient. So what will be space, and what will be time, is a relative matter, dependent on the relative state of motion between diverse percipient subjects.

Naturally these three meanings are closely related in the one concrete relation: the extensive all-sided propagation of energy is an activity of successive divisible events. In this succession earlier events become parts of wider, later events, while the creative advance, in our epoch of the universe, can be distinguished into successive spatial achievement and achieving temporal succession.

The relata in the relation of extension are the events. When event X is superseded by event Y, X is finished and past. Yet, by the birth of Y, X gets a new relation. This is called the passage of X. It is extension in the making (*Enquiry* 62).

By this extension in the making new events, like Y, become. So extension is an integral aspect of the creative advance of nature. Wherever and whenever there is process there is extension. It is required by process (*Enquiry* 202).

The parts of an event A form the set of events over which A extends. The unity of an event, however, is more than the logical sum of these parts. It is a *concrete physical unity* (*Enquiry* 77, italics mine).

Nor can the sum of parts of event A be considered as one set of non-overlapping events of which A is the sum. The parts that are encompassed by A form an inexhaustible complex of overlapping and non-overlapping events. When B is extended over by A and C is extended over by B, then both C and B are parts of A. This constitutes the continuity of nature, because each event is part of a larger whole and each event encompasses smaller events. If C is smaller than A, then there is an event B which is smaller than A but larger than C. This continuity is based in the concrete physical unity of an event. And this continuity forms the basis for the precise mathematical laws of continuity for space and time (*ibid.*). It is to be noted that Whitehead was from the start aware

of the concreteness, the definiteness, and the unity of events.

We can conclude that extension relates events both internally, as between and over their parts, as well as externally, as a relation “between” events (cf. *Process* 286f, 309).

5. *The prehensive nature of extension*

The last thing we have to notice about extension is that it is the very condition for our subjective awareness of nature. In philosophy we cannot abstract from our own percipience. In concrete reality there is no “mind-watching-things” situation, that is to say, our percipient event is not outside nature. The very subject-object relation, by which weprehend external reality, is an extensive relation within nature. It is a relation in which energy is extensively transferred through space and time.

So extensive relations appear to be internal relations of percipient (or prehensive) events. Without extension a prehensive event cannot be itself. The relation there-here is a relation between the event over there and the percipient event here. This prehensive aspect of space-time expresses one of the senses in which events can be said to be together in space. (*Science* 64).

It is analogous in time. An occurring event has a direct past which leaves its traces as immediate memories: I am sensitively aware that I was angry a moment ago. And an occurring event also has a future: I am about to read the next sentence. This is anticipation. Without such reference to its future, the present would not be what it is (*Science* 72f, *Process* 215). The relations between past, present and future are internal extensive relations (*Science* 122f).

This idea of extensive prehension sheds a completely new light on the subject-object relation. In the “mind-watching-things” philosophy, which originated from the substantialistic thinking in terms of subject and predicate, the relation between subject and object was in many respects problematic. But when we drop the metaphysical presuppositions of Aristotelian logic and start afresh with our examination of the way nature is given, the subject-object relation simply falls into our laps: “there” is given “here” in the form of *sensa* and “here” is given as related to “there”.

Extension as a prehensive scheme overcomes the dichotomies of inside-outside and subject-object. As a constitutive relational scheme, it binds the events together and invests occurring prehensive events with the objectified reality of immediately past events.

6. *Physical time*

Whitehead says that the genetic passage from phase to phase in the actual occasions is not in physical time (*Process* 283). In order to understand this we have to look at what he means by physical time.

Relativity theory has taught us that there is no unique space-time. What will be time, and what will be space, is different between observers when they are in motion with respect to each other.

According to Whitehead these differences are systematic. That is to say, each observer, or rigid body defines its own system of reference (*Enquiry* 31). With respect to his proper space-time system each percipient has an absolute position. This appears from the unambiguity that is presupposed in the questions: “When?”, “Where?”, “Whither?” (*Enquiry* 78).

What is the structure of a space-time system? To discover this we have to look at the absolute position of a percipient event within its duration. This absolute position is expressed by the word “here”. It means “here in the present continuum of nature”. This implies that the percipient is at rest. Only then is the meaning of “here” unequivocal. In that case Whitehead calls the percipient “cogredient” with its associated duration (*Enquiry* 70). This Latin word means “to go together”. The relation that is meant by it, is the directly given natural relation between perceived events and a percipient event at rest. It is the relation which for all practical purposes can be equated with the relation between ourselves and the “timeless” space of daily life around us. This everyday space remains the same space while time goes on.

In physics the same structure is used for the reference of motion to a position at rest. In such a space-time system, space through time is parallel to itself. What is a point at one moment, is the same point the next moment. It will not have formed a line by changing its position. Points (“puncts”) will be points, straight lines (“rects”) will be the same straight lines, rather than planes, etc. Every position remains identical (*Principle* 57).

Cogredience between the percipient event and its associated duration presupposes that the temporal extension of the associated duration extends over the percipient event. But the two relations, extension and cogredience, should be clearly distinguished. For a duration can also extend over events that are not cogredient with it. For example, the duration of the percipient event can extend over a perceived motion. Then the question “where?” no longer allows an unequivocal answer.

It is to be noted that though the two relations, extension and cogredience, are to be sharply distinguished, cogredience is *not* an *additional* relation to extension. Rather, it is a specification of extension.

It points to a *certain form* of extensive relation, namely the “flat” or Euclidean form of extensiveness (*Enquiry* 120, *Concept* 95, *Principle* 76).

So from this structure of the space-time system, we can now understand something of physical time and of the difference between physical time and passage.

What is called time in physics, and what is usually projected into space by means of spatial positions with equal distance from each other on a straight line, is an abstraction of a very high degree. In the first place we have abstracted from all concreteness and real diversity of character in the passage of nature. Instead we have directed our attention towards the idea of passage in general. Next we have abstracted from the passage of awareness. Instead we have focused on the passage of external nature. Third, we have limited ourselves to the space-time system of one percipient only. And the last step is the conception of measurable serial time, by setting up a time axis in space. So physical time is at least an abstraction in the fourth degree. Later (§10) we shall see that there is a fifth abstraction involved in the time of physics, namely the abstraction from anticipation.

This conceptual structure of physical time gives us the necessary framework for the coordination of our time measurements. It forms the structure of *measurable* time. It is to be noted that *measured* time always concerns *objectified* moments of time, namely the moments of perception at which we clock our stopwatch. So the framework of measurable time (conceptual physical time) is the conceptual framework for potential measurements, and hence concerns (potentially) *objectified* time. Descartes made a clear distinction between measurable time and duration of existence (*Science* 145). As we shall see, this distinction was very important for Whitehead.

PART TWO. METAPHYSICAL REALIZATION

The profound importance of extension in Whitehead's philosophy of nature has become clear in the first part of the present article. In the second part we will investigate the metaphysical status of extension (§7). This status will appear to be of the same fundamental importance. Also (§8), we will investigate the so called “epochal theory of time”. Time, according to Whitehead, is in some way atomic. It will be our business in this paragraph to clear up some of the very cramped exposition of Whitehead in the seventh chapter of *Science and the Modern World*.

7. *Extension in Whitehead's Metaphysics*

As in his natural philosophy, in his metaphysics, too, Whitehead is

driven by his search for coherence in our concept of reality (*Concept* 185, *Process* 3). According to him, incoherence results from the Fallacy of Misplaced Concreteness; that is, the fallacy by which *abstracta* are taken for *concreta*.

To find this coherence, Whitehead investigates the structure of *res verae*. They are the most concrete entities, with existence in the fullest sense of that term (*Process* 75). The complete ontic scheme must be read off from them.

While natural philosophy investigates the ontic characteristics of the present, physical epoch of the universe, metaphysics searches for the general characteristics of *res verae* that hold for any epoch. Therefore Whitehead's metaphysics is an *ontologia generalis*.¹⁴

As such it remains bound to the demand for coherence. Its method is the descriptive generalization (*Adventures* 234). That is to say that in metaphysics, too, no relations are to be imported that are not found in experience. General ontology applies the described relations to the ontic scheme in general (*Process* 4f).

Following Plato, Whitehead mentions seven fundamental factors that together make up the complete being, the *res vera*. Among them we find the mathematical relations, the forms and the extensive receptacle (*Adventures* 158). All three of them imply extension. This means that also for metaphysics extension is fundamental.

But according to Ivor Leclerc, the approach to the ultimate fact from the idea of extension is one thing, the approach from the idea of process is another thing. Leclerc cites Whitehead's notes to the second edition of *An Enquiry Concerning the Principles of Natural Knowledge* (1925). Whitehead there writes that the book [*Enquiry*] was dominated by “the idea that the relation of extension has a unique pre-eminence and that everything can be got out of it”, but that “the development of the theme” made it clear that this was not the case and that “the true doctrine, that 'process' is the fundamental idea, was not in ... (his) mind with sufficient emphasis” (*Enquiry* 202).

This seems to imply a contradiction between extension and process, as Leclerc suggests: “Making 'extension' fundamental is inconsistent with the conception of events as 'elements of actuality and elements of becomingness’”.¹⁵

However, when we carefully re-read the context of the above quotation from page 202 of *Enquiry* and check “the development of the theme” (*Enquiry* 68-81, with a climax on 70f), it becomes clear that the primary contrast that is meant here by Whitehead concerns the relation between extension and cogredience (*Enquiry* 70f), and that “extension ... is required by” process (*Enquiry* 202). It follows that there is no process

without extension. The differentiation Whitehead makes here concerns the distinction between extensive process as such and cogredient extensive process. (Cf. §6).

Leclerc's opinion that the specious present "solely with regard to extension" is no "element of actuality", but an abstraction, is correct. The specious present is more than just extension. But that does not mean that "[m]aking 'extension' fundamental is inconsistent with the conception of events as 'elements of actuality and elements of becomingness'".¹⁶ Extension includes "extension in the making". Extension *in actu* is identical with process ("passage", *Enquiry* 62). The "specious present", that is the present duration of our perception, models for the complete being, its extensive properties included. That "extension is derivative from process, and is required by it" (*Enquiry* 202) precisely indicates that extension is an inherent "fundamental notion concerning the nature of reality", and that it cannot be extracted from the "interweaving" of the components that together make the process of a complete being (*Adventures* 158).¹⁷

The fact that Whitehead counts the forms, the mathematical relations, and extension as fundamental notions of reality means that in their generalized form the fundamental notions of natural philosophy have a metaphysical significance. It would be a misunderstanding to omit the fundamental factors and relations of natural philosophy in their generalized forms from metaphysics. That would detract from the complete concreteness of *res verae*.

The condition of extension is the fundamental aspect and the most general scheme of real potentiality (*Process* 67, 80). This clearly shows the metaphysical, ontically general significance of extension, according to Whitehead.

The general metaphysical properties of extension, the relation of part-whole and what is connected with it, are eternal (*Process* 66, 96, 288). Therefore, it is well-founded to regard extension together with creativity as two sides of the same metaphysical coin. Extension is a relation *sui generis* and, like creativity, "ultimate" (*Process* 288). It is presupposed by creativity (*Process* 289) and springs from the general character of the world (*Process* 66).¹⁸

W.A. Christian considered it "an important fact" that the term "extension" is not used in Whitehead's scheme of categories at the beginning of *Process and Reality*, and is only introduced under the title "Some Derivative Notions".¹⁹ According to him, the extensive character of an actual occasion, its region, is derivative from its character as act of experience.

It is to be doubted that these remarks by Christian carry much weight. As F. Bradford Wallack correctly indicates, the absence of extension from the categorial scheme does not necessarily imply that extension is ontically inferior. It is quite possible that extension is an aspect of those categories that are mentioned.²⁰ According to A.H. Johnson, Whitehead was willing to admit that the absence of continuity from the “Categories of Existence” can be considered an omission.²¹ And J.L. Nobo very convincingly argues²² that the “omission” of extension both from the discussion of formative elements in *Religion in the Making* and from the categorial scheme of *Process and Reality* does not mean that extension is not a metaphysical principle. It is to be “understood not only as a metaphysical and as formative element but also as an aspect of an ultimate reality of which creativity is another aspect”.²³

An actual occasion is here and now. The inverse of this is its transcendence. This makes it a relatum in extensive-prehensive relations. The being of an actual occasion “consists solely in the fact that it is a prehending thing” (*Process* 41). Extension is not mentioned in the “Categories of Existence” because prehension, which is presupposed in all categories of existence, had already been defined in terms of extension (*Science* 64-73, §7). The prehensive is the extensive.

All actual occasions are internally and externally extensive (*Process* 77, 287f). Since actual occasions are the only agents (*Process* 31), they are identical with *res verae* (*Process* 128). Therefore all *res verae* are extensive. All other entities are functions of actual occasions. A coherent explanation of Whitehead's metaphysics will have to take this fundamental character of extension into account at all points of explanation.

8. *Epochal Temporalization*

Now that we have laid down the necessary groundwork, we must recur to the questions concerning the relation between an actual occasion and time from which we started. Whitehead first touches on this topic in chapter 7 of *Science and the Modern World*. This discussion is quite condensed. It has all the features of a first draft. That is one of the reasons why it is at points quite difficult to understand. In this section I will explain this original version of the “epochal theory of time”, mainly by placing it in context and by highlighting its historical background.

Whitehead makes a sharp distinction between passage and time. Passage is the continuous-extensive happening in which different time-systems²⁴ permeate each other. Whitehead also refers to this mutual permeation by

the term “extensiveness” (*Science* 125).

Time, on the other hand, is the unambiguous uniserial system of before and after in which present spaces are grouped parallel to each other into a “timeless space” for a percipient object.²⁵ In this timeless space, which is the presupposed space of our perception of motion, the succession of parallel momentary spaces is said to be cogredient with the percipient object for which these spaces are successively present (§6).

Difference of time-system means relative motion. Every enduring object is at rest in the space of the intrinsic time-system of its duration, and is in motion in every other system.

In actuality the distinction between time and space, or, which is the same thing, the way in which a time-system distinguishes itself from other time-systems and from passage and extensiveness, is constituted by enduring objects. The duration of an enduring object binds its characteristic pattern, a complex object, to a certain state of motion which, with a view to this pattern, can be defined as rest. Reproduction of the same pattern through successive time parts is only possible on the basis of this cogredience and parallelism through time.

The question is: How is such endurance achieved? Endurance is not to be understood only in retrospect. In retrospect we think only of the result of the endurance. That is our common sense way of looking at it. The ontological question, however, is: how does the endurance come about? This is “genetic analysis”.²⁶

How shall we conceive of this genesis? Is it a continuous process in which one part of time seamlessly joins itself to another part of time? Or is such a conception nothing but the old abstract-mathematical view of time, or the conception of undifferentiated material endurance?

How are we to conceive of the parts of time? Does a continuous process have parts? Doesn't each continuous part of time consist of other parts of time? How can there be parts if every part is infinitely divisible? This is the question implied in several paradoxes of Zeno of Elea.

This question as to the possibility of enduring objects and the real endurance of its associated time-system is complicated for several reasons.

Modern physics has made it clear that enduring material objects are derivative from vibrating energy. This has two consequences. The first is that the endurance of an object will have to be explained as the result of creative action. Secondly, because of the vibrating nature of this creativity, the explanation will have to allow for differentiation in the endurance.

In the third place, the endurance takes place in successive presents, that is to say as a series of happenings (actual occasions). Because these

events are related to each other by extension, and this relation is prehensive in nature, the analysis of the possibility of an enduring object will have to bring us back to the nature of prehending events.

But there is a fourth complication. The idea of the actual occasion cannot be understood in full abstraction from the idea of organic order. Therefore, Whitehead emphatically relates his theory of the genesis of the enduring object to the presupposed organic character of nature, that is to say to the idea of order (*Science* 119). We have to take into account that there is an indefinite variety of mutually harmonious objects in nature. That is to say, there is an equally indefinite variety of species of enduring objects and hence of actual occasions. It is very important to remember that “actual occasion” is not a specific, but a generic notion.

An actual occasion must necessarily interact with its environment in an orderly way. If it does not, it will soon reach its end. The endurance of an enduring object therefore indicates that some value has been established which is both in favour of the environment as well as of the enduring object itself (*Science* 104, 109).

Because of the necessary adjustment with its surroundings, an event not only has an external aspect, in the environment, but also an internal aspect. The event has some kind of valuating “envisagement” (*Science* 105) by which it reckons with itself under the conditions of its direct future environment (*Science* 72f). “An event has anticipation” (*Science* 73). This anticipatory function is decisive for the atomicity of the event. Its understanding is the key to the solution of the complications in the genesis of the enduring object.

The analysis of the conditions for endurance, that is to say for the retention of character, leads to the well-known, but difficult to understand “epochal theory of time”. Briefly formulated, this theory means that the being of enduring objects consists in concrete durations of becoming. This theory comprises Whitehead's theory of the time of the organic subject. It is the development of the theory of the present duration in *Enquiry* and *Concept*, and the germ of the theory of the actual occasion in *Process and Reality*.

The Greek word *epochè* means an activity of postponement, hence of refraining from another activity. As a sceptical philosophical term it means “refraining from judgement”. The meaning of the term therefore comprises: refrain, hold up, sustain what has begun, postpone completion, arrest. From this the meaning of period has emerged: an epoch is a coherent period of time with an internal unity.

In a graphic way Milton's image of the creation of the lion expresses the essence of the epochal theory of time:

“The tawny lion, pawing to get free
His hinder parts ...”²⁷

This image suggests the questions: how are real things, *res verae*, brought about? How can a thing become definite, as long as it is not that thing yet? In other words: why does not all indefiniteness continuously and incessantly pass into other indefiniteness? Creation, how does it happen?

The answer to this question amounts to this: creation, the genetic, orderly process of becoming, is not at random, by chance, or without order. Genesis is always organic. That is to say, it takes place in a given context with which the new creature has to comply. The potentiality of the new becoming is not indefinite. Therefore the future is not nothing and not fully open. The creature which has to emerge is bound to conditions which are set by the environment. For the realization of the required synthesis, retention and anticipation are necessary. Without retention no synthesis at all would be possible, and without anticipation the synthesis would be blind and at random. Therefore, the genesis of a concretely definite being can only come about in epochs of becoming-by-anticipation-and-retention.

In its original form the epochal theory consists of the following parts, which will be elucidated below

(§§8.1 -8.4): (1) the realization of an enduring object is a process which has to be considered both from the aspect of epochal unity as well as from the aspect of temporal diversity. The realization of an enduring object comprises both the unity of genetic epochs as well as the diversity of the succession of these epochs. (2) An epoch is not without space. (3) Time is a succession of epochal units. (4) An epoch is a minimum duration.²⁸ It is not realized *via* its successive parts, but it is given to its successor *with* its parts. The problems involved in the mutual relations between these parts of the epochal theory will be discussed at length in §§9-10.

8.1 Unity and Diversity

The realization of an enduring object occurs in the present of each of its temporal parts. The realized characteristic pattern has to be presented in each present duration. By the repetition of this pattern in successive present durations the enduring object acquires endurance.

The character of the pattern depends on the organization of the enduring organism in relation to its environment. The realization of the

pattern in each successive present requires an epochal duration with a certain lapse of time.

This accounts for the first part of the epochal theory of time. The realization of an enduring object involves two aspects: an aspect of epochal unity and an aspect of temporal diversity. The epochal unity is the unity of the present, the temporal diversity is the succession of present epochs.

8.2 Present Space

A present duration is given spatially. As such it forms a temporal part of a time-system. It shares in the one discrimination between space and time that is typical for that space-time system. Only in this way can the pattern successively be given in an unambiguous spatial manner.

On this issue, the spatial character of the epoch, Whitehead differs from Bergson. Bergson denied all spatiality to duration. According to him the “spatialization” of our experience in no way agrees with the true nature of time, which we come to understand by starting from the immediate data of consciousness. In them we find nothing of spatial juxtaposition. The duration that we find in time “perceived and lived through” is only characterized by sheer qualitative heterogeneity.

Whitehead agrees with Bergson that spatiality should not be taken as an expression of the fundamental nature of concrete reality. Nevertheless, he does not agree with Bergson that such a “Fallacy of Misplaced Concreteness” is unavoidable for logical thinking. There is certainly spatialization. This, however, should be taken for what it is: an abstraction in which the character of more concrete factuality is partially expressed (*Science* 50f).

According to Whitehead, Bergson, by dismissing all spatiality, does not give an adequate description of the immediately given character of perception. Perception is always characterized by an immediately given pattern. “I am the apprehension of ... a whole simultaneity” (Luft 282). “A duration is spatialised; and by 'spatialised' is meant that the duration is the field for the realised pattern constituting the character of the event” (*Science* 125, cf. *Process* 220). *In the unity of the realized pattern lies the character of the duration that is characterized by it.*

8.3 Succession of Epochs

Time, in the sense of (space-)time system, is a succession of epochal units. On the basis of the electromagnetic theory of relativity, Samuel Alexander, in his book *Space, Time, and Deity* (1920), acknowledges the necessity of the assimilation of space and time. This leads him to an opinion opposite to that of Bergson.

If, according to Alexander, time had not in itself something of space it could not be continuous.²⁹ The successiveness of time implies that in the present the past is over: it “is dead and gone”. This successiveness by itself therefore would make time discontinuous.

“If it [succession] were nothing more than bare Time it would consist of perishing instants. Instead of a continuous Time, there would be nothing more than an instant, a now, which was perpetually being renewed. But Time would then be for itself and for an observer a mere now, and would contain neither earlier nor later. And thus in virtue of its successiveness it would not only not be continuous but would cease even to be for itself successive”.³⁰

Hence there has to be a continuum other than time itself which can yield the togetherness of earlier and later. “This other form of being is Space”.³¹

Whitehead too acknowledges the necessity of the assimilation of space and time. But he rejects Alexander's conception. He considers it to be a confusion between extensiveness, on the one hand, and space and time, on the other hand. In the extensiveness which is implied in the passage of nature all time-systems permeate each other. But this does not mean that one time-system cannot be distinguished from another. The plurality of simultaneousness of the whole bundle of time-systems in the extensiveness of passage is not found in time, that is, in one time-system. Therefore we have to distinguish time from the plurality of systems in the extensiveness of passage. “Accordingly we must not proceed to conceive time as another form of extensiveness. Time is sheer succession ...” (*Science* 125).³²

Nevertheless, it is evident that time can never be disjoined from the field of extension since the latter is the locus of the realization of the enduring object. Therefore: “Realisation is the becoming of time in the field of extension” (*Science* 126). And thus, this sharp distinction between extensiveness and sheer succession *does not mean* that relations in time would be non-extensive. The relation of whole and part, including the continuity that is thereby implied (*Enquiry* 77 and §6 of the present article), continues to hold. Time as sheer succession is only distinguished from extensiveness, with its plurality of space-time meanings, by its singularity of space-time meaning. In distinction from the field of extensiveness, time has only one axis.

As indicated, the enduring objects are the reasons for this differentiation between extensive passage and extensive time. Concrete

endurance requires a definite meaning of time with a definite meaning of space. These are the necessary conditions for the reproduction of the pattern throughout the successive parts of time. In this repetition of the pattern time separates itself from extension (*Science* 125) and thereby forms the space which is distinguished from it by the relation of juxtaposition rather than succession. In this way time is sheer succession. Just as there is no reason to deny all spatiality to time (as Bergson does) there is no reason to muddle space and time (as Alexander does).

8.4 *Whole and Part*

In the endurance of a recognizable enduring object one and the same spatial pattern is passed on from epoch to epoch in the spatial retention of one and the same time-system. On the basis of the wave-theory of matter, it is obvious that before the completion of the period required for a typical wave pattern, the pattern cannot be considered to be there.

This has two consequences. In the first place the realization of the pattern (e.g. iron) requires some time, however short. Therefore, during this realization the characteristic “iron” is postponed in *epochè*. In too short a time iron cannot be real. In the second place it means that iron can only continue to be iron if its characteristic spatial pattern is passed on as a whole to the next epoch. That is why an epoch is not realized *via* its successive parts but is given *with* its parts (*Science* 125).

At this point we touch on the complication of continuity and discontinuity. For the question can be asked: how does this spatial pattern arise? This question concerns Whitehead's distinction between causality and the immediacy of the given pattern of perception. Even though the immediately given pattern is *given* with its parts, it has to *arise* by ways of causality. Therefore, “the pattern requires a duration involving a definite lapse of time, and not merely an instantaneous moment” (*Science* 124).

Apparently the duration of the enduring object consists in the succession of epochs which are themselves durations. Now, if a duration were composed of durations, as is the case with the enduring object, and if it is a general rule that durations are composed of durations, then there would be no smallest durations.

That would agree with the continuity of time as an extensive whole-part relation and with Kant, as quoted by Whitehead: “This peculiar property of quantities that no part of them is the smallest possible part (no part indivisible) is called continuity. Time and space are *quanta continua*, because there is no part of them that is not enclosed between limits (points and moments), *no part that is not itself again a space or a time. Space consists of spaces only, time of times*” (*Science* 126).³³

We have seen (§6) how Whitehead explains in *An Enquiry Concerning the Principles of Natural Knowledge* that the basis for this continuity is to be found in the properties of extension and that extension is an integral aspect of the ontic structure of all occurrences, in every epoch of the universe. Each event is part of a larger event and each event extends over smaller events. If C is smaller than A, then there is an event B, which is smaller than A but larger than C. This forms the foundation for the continuity of nature. So, indeed, space consists of space only, time only of times. Time and space are continuous.

On the other hand, it is not directly evident how this squares with the point at issue in the epochal theory, namely that the occurrences which make up the life history of an enduring organism “enter into realisation as whole atomic blocks” (*Science* 136). How is the atomicity of these blocks compatible with the continuity of time?

At this point the difference between *An Enquiry Concerning the Principles of Natural Knowledge* and *Science and the Modern World* emerges. In *An Enquiry Concerning the Principles of Natural Knowledge* Whitehead only incidentally mentioned the concreteness of things. All attention was directed towards the abstractions of physical science. Time therefore was only considered as measured time, that is, time in retrospective, or in coordinate analysis. But in *Science and the Modern World* Whitehead takes his first steps on the road of genetic analysis. Here we think “along with time” about the epochal genesis of concrete enduring objects.

Accordingly we can provisionally formulate our answer to the above question as follows: the unity of the epoch, from which the discontinuity of concrete time flows, lies in its prospective direction; the continuity lies in its retrospective direction.

These two points of view, prospective and retrospective, complement each other and herein lies the key to the reconciliation of continuity and discontinuity. From the retrospective point of view there are no smallest durations, hence there is continuity, but from the anticipatory point of view there has to be a minimum duration. The realization of the characterizing pattern requires a certain lapse of time. In time spans shorter than this everything remains more or less indefinite and no orderly creature becomes. This is the reason why the epoch is not realized *via* its successive parts, but is given *with* its parts.

Therefore succession cannot without qualification be considered as the unfolding of a continuum. “I express this conclusion by the statement that time is ‘epochal’“. The succession is only possible if the epochs are passed on to their successors as wholes. Succession, or supersession³⁴, is not a continuous unfolding of a continuum (“Time” 246). *It might be the*

discontinuous unfolding of a continuum.

PART THREE. EXTENSION AND EPOCH

In the preceding parts the fundamental status of extension in reality and the basics of the epochal structure of realization have become clear. In the present part I will discuss some of the questions that have arisen in connection with the relation between time and actual occasions (§9). Finally, in §10, I will describe my own proposal for a solution to these questions.

It appears that the understanding of the structure of actual occasions as epochal is full of difficulties. These difficulties have led to much debate.

It looks as if Whitehead contradicts his statement that the epoch requires a lapse of time by several other statements, which seem to indicate that the epoch is not extensive and not temporal.³⁵ Therefore, we have to look more closely at the question of the relation between extensiveness and atomicity in the actual occasion.

In this section I will discuss the views of V.C. Chappell, D.A. Sipfle, and F. Bradford Wallack. For a full appreciation of the difficulties involved in Whitehead's theories, I deem this discussion very fruitful. It will help us find the relevant questions, and will prepare one for the full understanding of my proposed solution.

I will proceed in the following manner. I will first describe the different interpretations. After each description I will formulate the relevant questions as accurately as possible. In some cases I will directly give an answer to them, in other cases my answers will only appear in §10. There I will bring the different questions together. Then I will discuss them in their mutual relations and I will formulate my final answer to them.

Before we start it will be helpful to itemize the fundamental organismic presuppositions and theses of the epochal theory of time. The numbers 5-8 will only be fully understandable at the end of §10.

(1) There is no time by itself, or an absolute time. Time (succession of before and after, via past, present and future) is only a *relation of happenings*. "There is time because there are happenings, and apart from happenings there is nothing" (*Concept 66*).

(2) Time is an *internal* relation of happenings. That is to say: time is primarily subject-time. For this reason real time is present time.

(3) Time is an *orderly* relation of happenings, namely that relation in which succession with inheritance of an identical pattern is accomplished. Therefore time is always the succession of parallel

durations in a time-system (*Enquiry* 112ff).

(4) Hence time is a *concrete* relation of happenings. The successive diversity of past, present, and future is determined by the happenings in which it is found. "Pure succession" is an abstraction, to be compared with the abstraction colour (*Symbolism* 35).

(5) The present of time is both in its character as well as in its temporal "thickness" determined by the concrete happenings which result in an enduring object. Temporalisation is the realisation of a complete organism. The sizes of time atoms vary indefinitely with the indefinite variety of objects.

(6) The subjecttime of the successively present occasions in an enduring object is objectified *ad intra* via successive satisfactory objects.

(7) The subjecttime of an enduring object can be objectified by an external subject and can be measured, that is to say compared with other objectified durations.

(8) The epochal subjecttime is not inconsistent with the continuity of physical time.

9. *Extensive Atoms?*

Our main questions concern the atomicity of the actual occasions and the question of whether they are extensive. I will discuss three conceptions concerning the relation between extensiveness, atomicity, and time, namely the conceptions of V.C. Chappell, D.A. Sipfle and F. Bradford Wallack. They agree that the actual occasion has a teleological structure, but while Chappell thinks that this teleology does not exclude extension, Sipfle is of the opinion that it does. Sipfle thinks that the actual occasion forms a duration, but that this duration is not extensive, and therefore not divisible. Wallack is of the opinion that no actual time is to be found in the actual occasion, except in retrospect.

9.1 *V.C. Chappell*

Whitehead's epochal theory, according to Chappell, means the following. Time can be divided in units which in themselves are indivisible. Therefore time is a succession of time atoms. A time atom is the realization of an actual occasion. It has the character of a process, but a process of a very peculiar kind; it is a "microscopic" process. Time, the "macroscopic" process, consists of the succession of the microscopic units.³⁶

Chappell notes that at times Whitehead points to the indivisibility of these atomic units by writing that the genetic act of an actual occasion "is not extensive" (*Process* 69), that is to say, not temporally extensive. Whitehead even says that the act "is not in physical time" (*Process*

283).³⁷

But, Chappell continues, although the becoming of an actual occasion is indivisible and not extensive, the occasion, once it *has* become, *is* temporally extensive and hence divisible, according to Whitehead. Thus there is a contrast between the process of becoming and its product.³⁸

According to Whitehead, Chappell writes, the conclusion that time must be atomic, is forced upon us by Zeno's dichotomy paradox.³⁹ The meaning of this paradox is that a body which traverses a certain trajectory, first has to pass through the first half of that trajectory; before that it has to pass through a quarter; before that, through an eighth, etc. This amounts to the conclusion that in an infinite regression no first term can be found, and that consequently the body can never begin to move. Whitehead generalizes Zeno's argument. He not only applies it to motion, but to becoming in general, including the becoming of an enduring object.⁴⁰

In addition, according to Chappell, Whitehead adds a premise to Zeno's argument. Zeno's paradox has no force, unless it is assumed that "in a becoming something (*res vera*) becomes" (*Process* 68), more precisely "something with temporal extension" (*Process* 69).

With this generalization and addition, Zeno's argument leads to a dilemma, in which its force resides: *either* in a process of becoming nothing with temporal extension becomes, *or* that which becomes is not infinitely divisible (*Process* 68).⁴¹

Whitehead rejects the first lemma. In a process of becoming something becomes which has temporal extension. Therefore we must deny the infinite divisibility of each part of that process. Zeno's argument *proves* that some processes of becoming are indivisible, or rather: it shows that the succession (the macroscopic process) is discontinuous, and, more fundamentally, that the actual occasions are not extensive. This is precisely the meaning of the epochal theory.⁴²

According to Chappell, Whitehead's theory is untenable for two reasons. In the first place because it contains an inner contradiction: it amounts to one and the same thing being both extensive as well as not extensive. And in the second place, the basis of the theory is unsound: the argument Whitehead derives from Zeno is invalid, even with Whitehead's addition.

Concerning the first point, the inconsistency of the theory, Chappell makes the following remarks. If the genesis of the actual occasions is not extensive in time, only one possibility is left: "instantaneous becoming", becoming in a moment. This cannot be, according to Chappell, and is probably also not what Whitehead meant.⁴³

But there is something else. Even if the acts of becoming of actual occasions are without duration, they are in any way dated, and so are their products. These products are events with an extensive duration. They have a beginning and an end, and an extensive time in between. So, what is the relation between the date of the process of becoming and the dates of the product?⁴⁴

Chappell sees only one possibility. Since it is impossible that a product even partially precedes its origination, the supposedly instantaneous act of becoming must coincide with the moment at which the actual occasion starts to exist extensively as a product. This extensive product must then be supposed to exist from t_0 to t_1 , because its act of becoming occurs at t_0 .⁴⁵

But, according to Chappell, in the case of an event or occasion, becoming and existence, cannot in this way be taken apart.⁴⁶ To say that an event becomes, is to say that it happens. Hence, if we substitute “happening” for “becoming”, we get: an actual occasion exists from t_0 to t_1 , because it happens at t_0 ; the occasion, which is temporally extended, begins at the time of its happening, and its happening is itself instantaneous.

This is clearly senseless. An event does not differ from its existence, nor from its happening. Being and becoming coincide in the case of an event or occasion. Only in the case of things or objects does becoming precede being.

By unravelling this illegitimate distinction between becoming and being, the unintelligibility of Whitehead's view becomes clear:

“Actual occasions, Whitehead says, are temporally extended, but their acts of becoming, which is to say their happenings, are not. But if an occasion is its happening, if it exists by happening, then Whitehead's doctrine ends in a contradiction: one self-same thing both is and is not extensive.”⁴⁷

In the second place, Chappell argues, the way in which Whitehead uses Zeno's argument is not valid. Zeno's argument by itself does not prove that no motion at all occurs. Therefore Whitehead added the premise that “in every act of becoming there is the becoming of something with temporal extension” (*Process* 69). Zeno's argument is understood to say that nothing at all would become if the act of becoming were infinitely divisible. But that contradicts the added premise. Therefore Whitehead concludes that they are indivisible.⁴⁸

But Whitehead's addition offers no solace, according to Chappell. All that Whitehead adds, is the condition that the product of the becoming

has temporal extension. But if that is the only condition which has to be satisfied by the result of the becoming, then there is no reason why a part of that result cannot be extensive too. Half of something extended is still something extended.

Now, let us suppose that the act of becoming, which issues in something extended, were itself extended. Then there is no reason why there would not be for each part of the result one part of the becoming, nor why for each part of the becoming there would not be one part of the result, nor why any part of the becoming would not itself be an act. Then the act is extensive in the same sense in which the product is extensive, and then it can be divided precisely in the same way as the product can be divided.⁴⁹

Chappell concludes that Whitehead's conclusions are unfounded. The premise that from a microscopic act of becoming something becomes with temporal extension, does not lead to the conclusion that such an act is itself indivisible, non-extensive and not in physical time.⁵⁰ The actual occasion is indivisible in a different way, and for a different reason, namely, because it is finally caused. But this has nothing to do with Zeno's dichotomy paradox. Therefore Zeno's criticism is irrelevant, according to Chappell.

We can summarize Chappell's view as follows. (1) The actual occasion is atomic because of its final intention. (2) In spite of this atomicity, the actual occasion is temporally extensive. (3) Therefore the act of becoming of an actual occasion is divisible in physical time. Each extensive part of the act is the becoming of something with temporal extension.

Chappell's exposition gives cause for some remarks and some questions. It is to be noted that Chappell identifies the premise "that in a becoming something (*res vera*) becomes" (*Process* 68) with the thesis "that in every act of becoming there is the becoming of something with temporal extension" (*Process* 69).

But this identification is unfounded. That a *res vera* becomes, is Whitehead's starting point (*Process* 68), while it is part of "the conclusion" (*Process* 69) that something becomes with temporal extension. Also, Chappell does not mention Whitehead's attributive adjunct to the *res vera*, namely "in its character of complete satisfaction", nor does he pay attention to Whitehead's clause by which he restricts his "conclusion", namely "that the act itself is not extensive, in the sense that it is divisible into earlier and later acts of becoming which correspond to the extensive divisibility of what has become" (*ibid.*).

So, this leads to the question regarding what that “something” that becomes “in a becoming” actually is (*Process* 68). What is the “creature” (*Process* 68, 69) that becomes in the occasion? Is it the temporal extension, or is it the *res vera* in its character of concrete satisfaction?

It may be doubted whether Chappell reads Whitehead's text with sufficient accuracy. Whitehead does not just say that the “act of becoming that constitutes an actual occasion 'is not extensive'”, as Chappell writes.⁵¹ Careful reading of *Process* 68 renders: “the act is not extensive in the sense that it is divisible into earlier and later acts of becoming which correspond to the extensive divisibility of what has become”. This is a significant difference: Whitehead indicates a restriction in the way in which an actual occasion is not extensive, and thus leaves room for a way in which it may be, namely in the sense that “extensiveness becomes” (*Process* 35). I will return to this point later.

We shall now look at the views of D.A. Sipfle concerning the relation between extension and atomicity in an actual occasion.

9.2 D.A. Sipfle

Sipfle agrees with Chappell that the atomicity of the actual occasions is founded in their finality.⁵² But he rejects Chappell's opinion that the actual occasions are divisible in physical time. According to Sipfle it is possible to assume that the process of the actual occasion is in physical time, *only* if the finality of the occasion is denied. But the act of becoming is not in physical time, because “physical time makes its appearance in the 'coordinate' analysis of the satisfaction”, that is to say, only after the genesis is completed. Before the actual occasion is completed there is no physical time. “Physical time” can have no reference to the genetic process, because “it is only the physical pole of the actual entity which is thus divisible. The mental pole is incurably one”.⁵³

If, according to Sipfle, we abstract the temporally divisible pole from the indivisible mental pole, that abstraction can be divided into temporally extensive parts. But the concrete process by which an actual occasion becomes, is never just physical.

“Since the mental pole is indivisible and there is no actual occasion without a mental pole, there is no occasion and, *a fortiori*, no physical pole to divide until the process is complete”.⁵⁴

Therefore the concrescence is not divisible in parts with temporal exten-

sion.

Whitehead's "earlier and later phases" in the actual occasion cannot, according to Sipfle, be understood apart from its teleological nature.⁵⁵ If we take earlier and later as referring to actual temporal extension before the completion of the occasion, then we attribute an actuality to the phases which is independent of the subjective aim of the whole, and then we deprive them of their *raison d'être*.⁵⁶ This is what Chappell does, according to Sipfle, and in doing so he implicitly appeals to an absolute time, independent of occasions. However, temporality can have no other reference but to the actual occasion itself.⁵⁷ Temporal division only makes sense as the division of a process which produces time, but since "nothing short of the whole occasion is creative of time"⁵⁸, a division of an actual occasion would amount to the division of actual occasions into actual occasions, which, even in Chappell's opinion, is impossible. This proves, according to Sipfle, that as a result of their finality, actual occasions cannot be temporally divisible.⁵⁹ There is no temporal extension prior to the completed occasion.⁶⁰ The process is not extensive.⁶¹

Sipfle agrees with Chappell that the idea of a non-extensive process is quite remarkable. At first sight it seems to imply an instantaneous happening. It is very doubtful if that makes any sense. How can anything happen without endurance?⁶²

So the question, according to Sipfle, is: how is non-extensive becoming possible without introducing the impossible idea of actual moments? Sipfle thinks that it is Whitehead's intention to rectify the identification of "not extensive" with "in a moment". The indivisibility of the actual occasion has nothing to do with the moments of common sense. Moments are only found in an abstract mathematical continuum. But there is no time independent of the actual occasion, in which it can, in a moment or not in a moment, occur.⁶³ Only if we assume that time is a mathematical continuum, "not extensive" means the same as "in a moment".⁶⁴ But, according to Sipfle, the essence of the epochal theory is that moments have no actuality, and that the time in which the occasion occurs, is identical with the duration of the epoch itself.⁶⁵ "The act which is creative of time can hardly occur in time".⁶⁶

Sipfle notes that, as we have seen, in Chappell's opinion the becoming and the being of an actual occasion are identical with its happening.⁶⁷ However, according to Sipfle, it is Whitehead's intention to make a distinction between the concrete process of becoming and its product. The product, Sipfle thinks, continues to exist in an objective form, as a datum for future processes, even after the process has become past.⁶⁸ In that sense the product is temporally extensive.⁶⁹

With this distinction between process and product it becomes possible to assert both that the products of the act of becoming are temporally extensive as well as that the processes which produce these products are not extensive.

“What has become is extensive; it has taken no time to become, but it has created time by becoming. The act of becoming fails to be extensive not because it does not endure but because its endurance is indivisible”.⁷⁰

Hence Chappell's objection, that one and the same entity is both extensive and not extensive, runs out. It appears from this quotation that, according to Sipfle, the act of becoming has a certain duration without being extensive.

Sipfle's interpretation can be summarized as follows. (1) Actual occasions have a final intention. This is the basis of their atomicity. (2) Becoming itself is a duration, but this duration is indivisible. Only what has become is divisible. (3) The indivisibility of becoming implies the epochality of the actual occasion. That is to say that the concrescence is not extensive, but also non-instantaneous. (4) This combination, non-extensive and non-instantaneous, is possible because there is no time “in which” the actual occasion takes place, but because the actual occasion generates time. (5) Extensive temporality is found in the completed occasion. This continues to exist in an “objective existence”.

In my opinion Whitehead's intentions are also not well reflected in Sipfle's writings. It is true that the actual occasion generates time, but Sipfle denies that this generating is extensive. According to him, it is not extensive, even though it is a duration. This means that it is an indivisible duration. Yet, by indivisible Sipfle also means that there are no parts to the duration. “There is ... no physical pole to divide until the occasion is complete”.⁷¹

In my opinion it is very doubtful that it can be maintained that the actual occasion both is a duration as well as that, as a duration, it has no temporal parts. If only the products of originative acts are temporally extensive, there is no extensive time prior to these products. But this is a violation of the generality of extension - all happening is extensively related (*Enquiry* 61) - and hence of the continuity that is inherent in it. Between time, prior to time and subsequent to time there can only be, and there has to be time. It seems that a duration cannot mean anything else but the continuous addition of part to part.

Let it be assumed that the occasion's epochality implies a certain

atomicity. Then either this atomicity is the indivisibility of a complex unity, or it is the indivisibility of a simple unity. In the latter case the unity is by definition indivisible, since it has no parts. This is the kind of unity that is to be ascribed to moments and points. It is the kind of unity that has no actuality.

So it seems to me that for Sipfle there remains only one possibility: the complex unity. I think there is no escape from the conclusion that a duration is a complex of parts. This conclusion agrees with Whitehead's formulation that a duration is a "stretch of time" (*Enquiry* 64). This cannot mean anything else than that, in the Whiteheadian and generally accepted sense, it is extensive. It has "temporal thickness" (*Enquiry* 111). In *Process and Reality* Whitehead *identifies* duration and "temporal extensiveness" (*Process* 77).

But in what sense is this complex unity divisible? In order to answer this question we have to take into account that the occasion is a unity *in the making*. Before its completion it is not there yet as a unity. Its only unity is a potential unity. This means that during its becoming it is still divisible.

In what sense, then, is the occasion indivisible? Let us look at this question in an other way. Every duration is *eo ipso* undivided. If not, there are at least two durations instead of one. It is clear that this can only be definitely the case *after* the termination of the first duration. So the question we have to ask is: what is it which *before* the termination of the duration prevents it from collapsing into two durations? *Ante factum* the complex unity is *in the making*. However, this making cannot be an aggregation, since an aggregation never renders anything of an indivisible whole. The same is true of a continuous aggregation. It seems to me that the unity of this complication can only be secured by an atomic aim.

Although Sipfle recognizes the finality of the actual occasion as the basis of its epochal structure, his explanations do not make the true purport of this finality clear. As I will argue in §10, the epochal theory only makes sense if the anticipation (subjective aim) of the actual occasion is for an atomic *object*. Whitehead said very clearly that the atomicity of nature is founded on the properties of objects, while the continuity of nature resides in the properties of events. (*Enquiry* 66). So there is no necessity that the occasion, prior to its completion, is indivisible. Even though the objects impose a certain atomicity upon events, this does not detract from the continuity of events (*Enquiry* 66, 199). Even more: "The physical fact of the concrete unity of an event is the foundation of the continuity of nature" (*Enquiry* 77).

Extension prior to completed extension is not at all necessarily a relapse into an absolute, or empty, or mathematical time. In the

occurring of the actual occasion there is concrete “extension in the making” (*Enquiry* 62). “Extensiveness becomes” (*Enquiry* 35).

According to Sipfle there is no “physical time” before the completion of the actual occasion in its satisfaction. He seems to suggest that there is physical time of an “objective existence” after the satisfaction. However, time never occurs except in a present, and since the present is a becoming, all time is time which “is” not.

All extensive time is a becoming. There is no time which “is”. Concrete time never becomes “physical”; never in any way tangible or objective. The fully concrete reality of *res verae* allows of no real physical time. The time of physics is a conceptual time or a measured time. In either of them we abstract from the teleology of concrete reality.

In my opinion, Chappell is right insofar the actual occasion is never less than its physical pole. Therefore, contrary to Sipfle, the becoming is always divisible. However, if we divide the becoming before its completion, that is to say, when we interrupt it, it has become the becoming of another “something” (*Process* 68). Then an other object is constituted than would have been constituted if we had not aborted the process. In either case there is an actual becoming. The one case is an orderly becoming, the other a disorderly becoming. They were both actual occasions, but one is satisfied, the other is without satisfaction. It is possible that “a lion with only front paws” becomes. Such an “aborted” occasion will always show the traces of the original subjective aim: it will still be something like “a lion”.

9.3 F. Bradford Wallack

A writer who thinks along somewhat similar lines as Sipfle is F. Bradford Wallack. According to her, the time of the actual occasion is purely a retrospective affair. During the genetic process its temporality is not actual, but potential. And, even after the epoch is completed as a whole, that is in retrospect, there are only potential parts of time. Actual parts of time are never found in a temporal atom, since the atom is the unit of time, regardless of its size and complexity.⁷²

Talking of before and after can only be meaningful in retrospect, in regard to relations that have already been determined. Before the whole epochal event has taken place there are no temporal subdivisions, since the completed epoch is the unit of time, and this cannot precede itself.⁷³

Whitehead writes: “Physical time makes its appearance in the 'coordinate' analysis of the 'satisfaction'” (*Process* 283). According to Wallack this means that

“physical time does not even appear until there has been an analysis of the satisfaction. The occasion has to have attained satisfaction and perished before there can be physical time”.⁷⁴

She deems this a “remarkable fact”. “There are no actual temporal transitions or phases in process; these are only ways of analysing an epoch *ex post facto*”.⁷⁵

According to Wallack this means that “all analysis is from a retrospective perspective” since the occasion is only available for prehension and analysis as already completed in retrospect.

“This retrospective divisibility of an epoch is physical time, not the epoch's becoming. Physical time is the superimposition of the occasion as superject back onto the occasion as subject. It is the content of the satisfaction, retrospectively discerned *as if* it had occurred in a temporal order” (italics added). “This process involves no temporal order or temporal passage except retrospectively”.⁷⁶

Before the satisfaction, there can, according to Wallack, be no temporal order, since “The early phases of concrescence are only the becoming of the concrete fact; therefore they are not anything yet, only the becoming of something. They are not earlier than the satisfactions because they are not by themselves real”.⁷⁷ Therefore Wallack concludes that “the process of concrescence is becoming without being temporal”.⁷⁸

This is the upshot of Wallack's interpretation: (1) Time is a completed relation of before and after. (2) This relation presupposes the satisfaction. (3) Therefore the genetic analysis is hypothetical (“as if it had occurred in a temporal order”). (4) Prior to the satisfaction there is only potential temporality. (5) After the satisfaction there are only potential parts of time.

Wallack evokes the same question as Sipfle: does the fact that the duration is given *with* its parts mean that as long as the whole is not completed there is no time?

Whitehead writes that “[t]he epochal duration is not realised *via* its *successive* divisible parts, but is given *with* its parts” (*Science* 125). I propose for once to change the emphasis to “given”: The duration is *given* with its parts. But it cannot be deduced that it has no successive divisible parts. Whitehead only says that it is not realised *via* them. The crux for the understanding seems to be the “*via*”. It seems to me that Whitehead is saying: “The realisation is not bit by bit, first this part, then

that part. Sure, there is a succession, and hence there are time parts, and these parts are in their turn divisible. But the duration as a whole is only *given* with its parts”.

I might add that for the full understanding of my interpretation we have to assume that there is a shift in meaning of “parts” between “its successive divisible parts” and “its parts”. There is a distinction between temporal parts and spatial parts. However, that Whitehead does not make this distinction at this point might easily be explained from his view of extension as one of a kind, regardless of temporal or spatial dimensions.

If Wallack's opinion were right, namely that the epochal origination of time units would mean that prior to the satisfaction there is no time unit, and hence no time, the question would be justified whether prior to the satisfaction there is any happening. According to Whitehead extensive (spatial and temporal) happening is universal. Some extensive event is going on, everywhere and always (*Concept 78*). But, if there is no temporal extension prior to the satisfaction, all happening would come to a halt. There would be no process. The actual occasion would cease to happen and hence would be no longer an occasion at all. It would never be completed, since there would be absolute nothingness. In other words, the idea of a timeless part of time is an inner contradiction. “There is ... no part that is not itself again time” (*Science 126*).

Another, in a sense opposite, question in this connection is: If, prior to the satisfaction, there is extensiveness, is there temporal uniseriality? Or is uniserial time rather excluded by this extensiveness? If present “realisation is the becoming of time in the field of extension” (*Science 126*), and extension is the complex of potential space-time systems (*Science 124, 126*), doesn't it follow that there is no uniserial time in the present? Maybe the field of the actual occasion is extensive without being temporally uniserial?

The question then arises concerning how the endurance of the enduring object can create a time system. How and where and when does the uniseriality of endurance originate? Wallack's (and others') answer would probably be: in retrospect. The uniserial time relation is the relation between a completed (past) present and an actual present. This relation hinges on the coordinate objectification of the past satisfaction.

But it is difficult to see how this uniseriality can be real if the actual present were a mere field of extensiveness, and had no internal relation with this uniseriality. Surely, it is a field of multiple time systems, but it selects for positive prehension (physical prehension) only those data which fit into its inherited and anticipated time system. In this way “the becoming of time” (*Science 126*) is itself time. The concrete time of the present duration separates itself from the field of extension (*Science*

125). In the present of the extensive actual occasion one time system is dominant by anticipation and selection. The separation occurs in anticipation.

This concludes my discussion of the question of whether the actual occasion is temporal. The outcome is that the structure of an actual occasion is the structure of an extensive, temporal duration, prior to its completion.

10. Event and Object

The least we can say, after having studied the opinions discussed in the foregoing section, is that there is definitely a considerable degree of confusion concerning the epochal theory of becoming.⁷⁹

So now it is time to wrap up the questions that we encountered in the previous section, and attempt to formulate some answers. I trust that we will be able to find a point of view which gives a consistent and complete perspective on the issues at stake.

Are the occasions extensive? If so, what does it mean that they are atomic? That is the core question around which the various other questions circle. I will argue that the answer to this core question is to be found by reference to the nature of objects.

On the one hand, Whitehead writes that the act in which a creature originates is not extensive (*Process* 69). He also writes that the genetic process is “not in physical time” (*Process* 283). We even read, albeit in a text for which Whitehead himself was not responsible, that the genetic process is, without qualification, “not in time” (Burch 205). That would mean that actual occasions are not extensive and that possibly they should not be understood as durations stretching out in time.

On the other hand, we find a great number of texts that seem to indicate the opposite. “In every act of becoming there is the becoming of something with temporal extension” (*Process* 69). The actual entity is “the enjoyment of a certain quantum of physical time” (*Process* 283). “Time-fullness is of the essence of it” (Burch 202). The present duration implies a “lapse of time” (*Science* 124). And in other places as well Whitehead attributes duration and extension to the actual occasion (*Religion* 91, *Process* 69, 77, 136).

Concerning the face value of the least qualified statement above, that the genetic process is “not in time”, we can notice that in its context “time” must mean measurable, objectified time, which Whitehead, following Descartes, distinguishes from the duration of existence of extensive *res verae* (*Concept* 54, 66; Burch 205, cf. *Process* 74). Measurable time is

the objective time of physics, the objective time for the subject, inclusive of the contrast between past and present. This measurable time is an abstraction (§6).

The concrete time of the prehensive event, on the other hand, implies the duration of its occurring and of its subjective (“mental”) functionings of anticipation and retention. “Not in time” therefore only means “not in physical time”, or “not in measurable time”. But “each occasion is temporal because it is incomplete” (“Time” 242). Apparently completion takes time.

Therefore, we must not exclude the possibility that in the concrete occurring of a subject-superject many things are going on of which the results are not yet in any way given. If that is the case, there has to be a duration with a real time lapse. But since there are as yet no results which can be given in the retrospective of objective time, the present, though it has duration, can be called a “nontemporal process of being itself”, or a “nontemporal duration” (Burch 205).

The key to understanding how the actual occasions can be both extensive as well as atomic, both timeful and not in time, can be found by differentiating between anticipation and considering it in retrospective. In organic anticipation of its successors, the epochal duration has not yet been realized. Then there is only the complex field of extensiveness. For each epoch to be realized, a duration of the appropriate uniserial time-system has to be selected and arrested (*Science* 125). This “selective activity ... is akin to purpose”, namely the purpose of expressing the endurance of the enduring objects under consideration (*Science* 107, 119f). This means that there has to be anticipation of the pattern to be realized and of the required “meaning of time” (*Science* 120, *Process* 128). In this anticipatory sense “time in its character of the adjustment of the process of synthetic realisation, extends beyond the spatio-temporal continuum of nature” (*Science* 124). That is to say that time is not restricted to the continuity of objective, measurable time, but that it also encompasses the discontinuity of the subjective, nonmeasurable “mental” anticipation.

In retrospect, time is as far as it *has* got, “that flux up to that point” (*Process* 47). The retrospect expresses the physical aspect of time, that is, time as the connection between the direct, “brute” past and the present in abstraction from the future. The absolutization of this abstraction leads to the conception of time (in physics and common sense) in which the future first has to become a present to be anything at all.

But the present, in its anticipation, does have a relation with the future, so the future cannot be nothing. It is in fact nothing less than organically conditioned real potentiality for the occurring individual. In

concrete occasions that potentiality is by anticipation prehended and selected.

By reason of this grasping of its real potentiality, the concrete genetic time of the *res vera* is more than physical. It has a conceptual side. In the genesis something originates which, as anticipated, is already there. Here we have the final reason for the abstractness of physical time (cf. §6). In physical time we completely abstract from this anticipatory function.

So a concrete genetic event has a physical as well as a conceptual pole. The link between these two is “extratemporal and yet is an instance of supersession”. In that sense supersession transcends physical time (“Time” 241).

The solution to the problems of the relations between atomicity and extension, internal and external successiveness, and continuity and discontinuity lies in this anticipatory function. The efficacy of the organically derived “subjective aim” determines that what once has begun will not be passed before the complete pattern has been realized. In this way there is a potential succession of different phases. The first phase does not pass with the beginning of the second phase, but it remains “arrested” (cf. *Science* 125) until all phases together have reached the one goal. The same holds for the second phase, etc. “Zeno's difficulty is met by conceiving temporalisation as the realisation of a complete organism” (*Science* 127, cf. the tawny lion, §8).

Therefore Whitehead concludes that in each epochal genesis something originates which has temporal extension, but that the genetic act itself cannot be divided into earlier and later acts which correspond with what has extensively been achieved (*Process* 69). Even though there are “*successive* divisible parts” in the epochal duration (*Science* 125), the genetic epochal process is more than the sum of those parts. Its indivisibility lies apparently in the subjective anticipation which dominates the unification (*Process* 69).

This, however, does not mean that there is no continuity at all in the epochal genesis: “some time-quantum is always involved ... these quanta (are) ... also divisible ... Thus there is also a continuity in time, arising from indefinite divisibility”. Therefore, though there is “no continuity of becoming, ... there is a becoming of continuity” and a “continuous transition within the duration” (“Time” 246, *Science* 135). At no point does Whitehead drop the generality of temporal extension. The actual occasions are extensive and continuous in their genesis.

We have to conclude that the general extensive scheme is not left behind when a certain discontinuity enters into the scheme. The genesis does not

contain anything metaphysical in the sense of non-experiential. But neither does it contain anything hypophysical: the genesis is not in physical time, but physical time is in the genesis. “The actual entity is the subjective enjoyment of a certain quantum of physical time” (*Process* 283).

The epochal actual occasions are said to be both divisible and indivisible. They consist of “divisible parts” and are “in themselves divisible” (*Science* 125f). At the same time, Whitehead refers to the epochs as atoms (*Science* 126). This seems contradictory since “atom” means undivided or indivisible.

Yet both qualifications can be maintained. They refer to different aspects of the same reality. Whitehead himself gave a formula which keeps these two aspects in balance: “Every actual occasion is 'in time' so far as its physical pole is concerned, and is 'out of time' so far as its mental pole is concerned” (*Process* 248).

The epochal occasion is full of time and for that reason is extensive. But *that* extension, the particular extension of a particular actual occasion, is indivisible. That concrete extensive occasion is *de facto* undivided, for the same reason why a movement is one and undivided. Otherwise it would not be that one occasion, but more than one. Neither can the occasion be divided *ex post facto*, for then the occasion has become irrevocably past and thus has gone by.

On the other hand, an occasion is not yet *that* occasion during its genesis. Before its satisfaction it is not yet determinate. That is to say that it has a potentiality which has not yet turned into determinate actuality. Therefore, during its genesis the actual occasion has a real divisibility. The partially potential, partially actual internal supersession in the present duration is an “instance of unrealized potentiality” (“Time” 241, Burch 205). The genesis can still go one way or another.⁸⁰

In retrospect, in its given atomic satisfaction, the occasion is open to objectifying analysis. Because the object of the satisfaction is given as a whole with its parts in spatial simultaneity, it is divisible *in mente*, by us.

And when we abstract from the unity imposed by the anticipatory subjective aim, the occasion before the conclusion of its genesis is in principle divisible *in mente*. Analysis of the satisfaction and analysis in abstraction from anticipation are called coordinate analysis.

Finally, when we do not abstract from anticipatory subjective aim in general, we can analyze the genesis in its general structure *in mente*. This is genetic analysis.

Actually from the beginning Whitehead was quite clear: the continuity of nature resides in events, the atomic aspect of nature is based in the

atomicity of objects. The object's atomicity does not imply discontinuity of events (*Enquiry* 66, 199, 203). But Whitehead indicates that it is not easy to make a clear distinction between event and object. He calls such attempt a “struggle” (*Enquiry* 66).

It seems that the difficulties with the interpretation of the epochal nature of the actual occasion are a clear illustration of this struggle. However, I feel that the difficulties are greatly mitigated when the part played by the intended object is fully recognized. I think that the epochal theory can only be understood in connection with the theory of objects.

The epochal realization of time is the realization of a pattern. That is, of a complex object. It involves a spatial figure and *sensa*. Because of the atomicity of this intended objective pattern, the subjective aim is atomic in a twofold sense. It is aimed at an atomic object and this object is actually aimed for once, in a single act. Its finality, actually maintained up to the satisfaction, constitutes the epoch. It dominates the genesis.

Therefore Whitehead says that

“. . . 'becoming' is not itself extensive, in the sense that it is divisible into earlier and later acts of becoming which correspond to the extensive divisibility of what has become” (*Process* 69).

“What has become” is the objective pattern of the satisfaction. This implies the origination of a duration, “the becoming of something with temporal extension” (*ibid.*).

So, there is temporal extension, but, *in a very precise sense*, this extension is indivisible. This indivisibility is defined from the perspective of “what has (to) become”. The “what has (to) become” has parts, but these parts do not correspond to the parts of the becoming in the sense that part X of what has become is the result of an earlier part A of the becoming, while part Y of is the result of a later part B. For that one pattern to arise the *whole* duration of the occasion is necessary. This much follows from the atomicity of the object.

For that reason the whole duration is given with its parts in the satisfied object: Part X was formed in phase A and is propositionally retained and arrested in *epochè* up through the satisfactory completion. So phase A is not terminated by the beginning of phase B, but continues parallel to B.⁸¹ Only when B is completed can the propositionality of A be decided in XRY. (R is meant here as a symbol for the spatial relation between X and Y in the pattern of the satisfaction). In this way the how of an occasion's becoming constitutes what that actual occasion is (*Process* 23). The retention of A results from the atomicity of the subjec-

tive aim in the twofold sense explained above. For that reason the *act* is not divisible into partial *acts*. If it were divisible X would never be synthesized with Y in one pattern, but left behind in an earlier achieved “something”, probably a very irregular object.

Zeno's argument, as used by Whitehead, does no more than prove that mere continuity, continuity without anticipation, leaves us with a “dead nature” in which no reasons are to be found (*Modes* 135). If we ask “what then becomes?” (*Process* 68), or “*what that actual entity is?*” (*Process* 23), “no answer can be given.... For the subjective aim which belongs to the whole is now excluded” (*Process* 68f). So Whitehead's use of Zeno's argument means to prove that *if* there is becoming *and* continuity (indeed, there is both), still “something” (*Process* 68) is needed, namely an object in the guise of an aim. And conversely, that anticipation solves the difficulty indicated by Zeno.

It is safe to assume that for the mathematician Whitehead extensive continuity has always been the primary characteristic of creativity. Throughout he continues to maintain that there “is a becoming of continuity” (*Process* 35). *That* was the origin of his epochal theory. For by itself continuity does not at all make us understand how something concrete can come about. In continuity there is not a single indication of completion, and no single reason why anything would ever be complete. Continuity by itself only means indeterminateness.⁸² Therefore Whitehead had to appeal to organic relations. “Something” (*Process* 68), that is to say, something concrete, with a definite character that we know and recognize, can only be if it “fits”. For that reason the orderly “aim in nature” (MT 154) conditions the genesis of orderly determination.

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Notes

1. Parts of this article were originally written as a paper in preparation for the meeting of the Society for the Study of Process Philosophies at the Eastern Division meeting of the American Philosophical Association in Atlanta, USA, December 2001.
2. I wish to thank the reviewers for PSS, as well as Dr. Daniel Dombrowski, for their valuable suggestions regarding improvement of my draft. They have been very helpful in preparing the final version of this article.
3. The question concerning the relation between successive occasions has been dealt with in my article "Extension and Epoch: Continuity and Discontinuity in the Philosophy of A.N. Whitehead", *Transactions of the Charles S. Peirce Society*, Vol. 37 (Winter 2001): 59-79.
4. "Whitehead's Theory of Becoming".

5. "On the Intelligibility of the Epochal Theory of Time".
6. *The Epochal Nature of Process in Whitehead's Metaphysics*.
7. *An Interpretation of Whitehead's Metaphysics*.
8. "On Genetic Successiveness: A Third Alternative", "Genetic and Coordinate Division Correlated", "The Duration of the Present".
9. "Genetic Succession, Time, and Becoming".
10. In *Science and the Modern World* actual occasions are still called prehensive events. But in *Process and Reality* Whitehead makes a distinction between events and actual occasions. "Events" he uses for series of actual occasions in a nexus; an actual occasion is the limiting type of an event with only one member (*Process* 73, 80). However, Whitehead relativizes this distinction: for some purposes one atomic actuality can be treated as an event (*Process* 287). It seems to me that an appropriate general term to denote both actual occasions and events, is "happening". However, throughout this article I have not followed a strict rule to distinguish diverse meanings. On the contrary, since for my purposes it was important at times to emphasize the similarity between actual occasions and other happenings (they are all dated, they all form a duration, and they all occur only in their present), I have at times used the term happening for actual occasion, and at other times, as a synonym for happening, the term event (or happening event). Also, where I wanted to stress the actual nature of occasions, I used the word occurrence.
11. For a more recent discussion: Sandra B. Rosenthal, "The Divergent Intuitions of Whitehead and Pragmatism"; L.S. Ford, "On Epochal Becoming: Rosenthal on Whitehead"; Sandra B. Rosenthal, "Whitehead and the Ongoing Problem of Temporality: A Response to Lewis Ford". I responded to this discussion in my article "Extension and Epoch: Continuity and Discontinuity in the Philosophy of A.N. Whitehead". In *Process Studies* 30.1 (Spring-Summer 2001) John W. Lango joined in with "The Time of Whitehead's Concrescence".
12. See also note 17.
13. This variation has led Whitehead to investigate the mechanisms of "objectification" in (*Process*).

14. For this particular meaning of “metaphysics” I refer to Whitehead, *Religion* 82, and *Process* 3, 90. Also cf. Martin.
15. Leclerc 86f.
16. Leclerc 86.
17. In my opinion Whitehead's sustained attention to the fundamental status of extension, throughout the two latter stages of his philosophical development, gives reason to relativize the usual sharp distinction between his natural and his metaphysical philosophy. It seems that his prior work is at least an “approach to metaphysics by scanning the order of nature” (*Function* 60). Whitehead himself coins his philosophy of nature no less than “necessary prolegomena” to metaphysics. Philosophy of nature and metaphysics are so proximate to each other that the philosophy of nature leads to metaphysical excitement (*Concept* 48).
18. Whitehead seems in doubt about the general ontic necessity of extension. “Perhaps such creation (of continuity) is an ultimate metaphysical truth holding of all cosmic epochs; but this does not seem to be a necessary conclusion” (*Process* 35f). However, this contradicts *Process* 66, 67. And it appears that Whitehead has underlined the word “not” in this passage in his Macmillan copy and put two question marks in the margin, with “cf. p. 173” written above them. This reference is to *Process* 113.20. There he underlined “responsive conformity of feeling” and he referred to the page from which the above quote is taken. The responsive conformity of feeling forms the basis for the continuity of transmission. It is discussed in *Adventures* 183-186.
- Also *Process* 288 seems to express an uncertainty as to the ultimate generality of extension. However, this uncertainty only concerns the question of where exactly the line has to be drawn between the ontically general features of extension and more contingent features, some of which we know from our, physical, epoch of the universe.
19. *Interpretation* 394.
20. Bradford Wallack 295.
21. Johnson 177.
22. Nobo 206f, 252ff.

23. Nobo 258.
24. A time system and a space-time system are different names for the same structure.
25. A “timeless space” is in reality very timeful. See Whitehead, *Concept* 117.
26. Whitehead distinguishes two kinds of ontological analysis, genetic analysis and coordinate analysis. All analysis in which we abstract from anticipation is called coordinate (*Process* 283ff). Hence coordinate analysis can refer 1) to the completed satisfaction, 2) to partial satisfaction, 3) to a phase of the process of satisfaction in abstraction from the subjective aim which directs the process, and 4) to the whole process in abstraction from this aim.
27. Quoted by Whitehead in “Interpretation” 146.
28. An epoch does not mean an absolute minimum duration. There is an indefinite variety of epochal minima, resulting from the indefinite variety of objects.
29. Alexander 39ff.
30. Alexander 45.
31. Alexander 46.
32. Whitehead writes in his Preface to *Science and the Modern World* that he is “especially indebted to Alexander's great work”, which he found “very suggestive”. Nevertheless, in one of his lectures he remarks that in these first chapters of *Space, Time, and Deity* Alexander was “muddled” (Luft 297). Almost certainly Whitehead there means Alexander's view of the assimilation of space and time. Later Whitehead reported to Victor Lowe that Alexander was the philosopher of his time from whom he got most (Lowe 173).
33. *Critique of Pure Reason*, A 169. Whitehead's italics.
34. Whitehead, “Time” 241 literally has “supersession”. However, the context makes plain that succession is a special case of supersession. “Supersession is a three-way process. Each occasion supersedes other

occasions, it is superseded by other occasions, and it is internally a process of supersession, in part potential and in part actual”.

35. At least two commentators on Whitehead have written that he has contradicted himself. Chappell 73ff. Similarly _apek 142.
36. Chappell 71.
37. Ibid.
38. Chappell 71f.
39. Chappell 72.
40. Ibid.
41. Chappell 72f.
42. Chappell 73.
43. Chappell 74.
44. Ibid.
45. Ibid.
46. Chappell 74f.
47. Chappell 75.
48. Chappell 76.
49. Chappell 76f.
50. Chappell 77.
51. Chappell 71.
52. Sipfle 505-518.
53. Sipfle 507.
54. Sipfle 508.

55. Ibid.
56. Sipfle 509.
57. Ibid.
58. Ibid.
59. Ibid.
60. Ibid.
61. Sipfle 517f.
62. Sipfle 510, 511.
63. Sipfle 511.
64. Ibid.
65. Sipfle 513.
66. Sipfle 512.
67. Sipfle 515f.
68. Sipfle 516f.
69. Ibid.
70. Sipfle 511.
71. Sipfle 512.
72. Wallack 170-172.
73. Wallack 175.
74. Wallack 176.
75. Ibid.
76. Wallack 177.

77. Wallack 269.
78. Wallack 253.
79. Cf. Ford (1971) 201.
80. An apt description of the relation between potentiality and duration is given by Burch: “The potentiality of a creature is the range of alternative characters for that creature which are compatible with the efficient causation whereby the concrescence of that creature is derived from other creatures.... Curiously mixed with the notion of potentiality is the notion of endurance.... The fact of self-existence ... is an instance of unrealized potentiality” (205). That is to say that as long as the duration of the concrescence has not yet ended in a complete satisfaction, the potentiality still leaves alternatives to the free initiative of the concrescence, and conversely that the potentiality is really due to the actual becoming in the actual duration of a *res vera*.
81. For the exact meaning of “parallel” in this connection, see Whitehead, *Enquiry* 112f and 131, and §6 of the present article.
82. See Ivor Leclerc, “Whitehead and the Problem of Extension”, 117-23, and Ivor Leclerc, “Kants Antinomie der Teilung und die Metaphysik von Whitehead”, 289-301. However, from this relation between continuity and indeterminateness does not follow what Charles Hartshorne suggests: “Bedeutet die Aussage 'Möglichkeiten sind kontinuierlich' nicht gerade, daß Aktualitäten nicht kontinuierlich sind?”. (“Isn't the meaning of 'possibilities are continuous' precisely that actualities are not continuous?”, my translation). “Peirce, Whitehead und die sechzehn Ansichten über Gott”, 196. Leclerc as well, in the two mentioned articles, tries to play off continuity against actuality. But though “actuality is incurably atomic” (*Process* 61), actuality implies its possibility. For that reason actuality, besides being atomic, is also continuous.