THE RICE INSTITUTE

FROM NATURE TO EXPERIENCE:
A STUDY IN THE PHILOSOPHY OF WHITEHEAD

by
Samuel Ellis Dunnam, IV

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IN MEMORY OF

I. K. STEPHENS
These pages represent merely a necessary pause for organization and analysis in a study of the philosophy of Whitehead that has already stretched itself intermittently over the course of five years, the interest surviving even the lull of intellectual activity to which I succumbed during an intervening period of military service. Barring unforeseen circumstances, I shall surely continue to be a student of Whitehead's philosophical writings. The reflections of this very rare and remarkable man comprise a systematic body of thought as vast and deep as the universe he sought to comprehend. I feel so far that I have succeeded only in orienting myself as to its major contours and divisions. The work of this study raised many questions and problems which lead far beyond the boundaries of the limited topic to which I here limited myself; these I have put aside for future investigations.

I have been aided considerably in what understanding I have gained of Whitehead by Professor Victor Lowe's masterful essay on his philosophical development, appearing in the Library of Living Philosophers volume devoted to Whitehead, and by Dr. Ivor Leclerc's recent book, Whitehead's Metaphysics. Dr. Leclerc was generous enough to loan to me the typescript of his book before it appeared in June of 1950, a gesture for which I remain extremely grateful. I should also like to express my appreciation to Drs. Robert Palter and V. C. Chappell of the University of Chicago, who read and criticized portions of the first three chapters, to Miss Valeta Purrington, who typed the final draft, and to my wife, who has patiently and lovingly endured the production of the entire study.
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The following abbreviations have become fairly standard among Whitehead's commentators and are used in the Notes to the chapters of this study to refer to his major writings.

<table>
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In so far as metaphysics enables us to apprehend the rationality of things, the claim is justified. It is always open to us, having regard to the imperfections of all metaphysical systems, to lose hope at the exact point where we find ourselves. The preservation of such faith must depend on an ultimate moral intuition into the nature of intellectual action—that it should embody the adventure of hope. Such an intuition marks the point where metaphysics—and indeed every science—gains assurance from religion and passes over into religion. But in itself the faith does not embody a premise from which the theory starts; it is an ideal which is seeking satisfaction. In so far as we believe that doctrine, we are rationalists.

—Alfred North Whitehead—
CHAPTER I

INTRODUCTION

The problem of experience has been, and remains, one of the central issues of modern philosophy. It became so with the great revolution in thought initiated by Descartes, whose new method of introspective doubt introduced into philosophy a private measure not only of knowledge, but of 'existence' or reality as well. With the exception of certain strains in Platonism, the philosophic tradition of antiquity and the Middle Ages was essentially objectivist in the manner of its reflections on God, the world, and the soul. From Descartes forward however, it has been necessary to consider, as a precondition of 'objective' judgements, the process of experiencing. What is the source of our experience? What are the grounds of its authenticity? How may we be certain that its deliverances deserve the title 'knowledge'? These are questions which have been at the core of modern philosophical inquiry.

They have never been satisfactorily resolved. It has thus remained an irony of modern philosophy that, while objectivist in its interests and spirit to a degree unsurpassed in intellectual history, it has been unable to overcome the subjectivist predicament first discovered by Descartes. The facile objectivism of Aristotle and of his scholastic followers was largely a product of epistemological innocence. The methods and standards of scientific knowledge were such as to provoke little interest in the problem. By contrast, the principal concerns of modern philosophy have been stimulated by the striking successes of modern science in its quest for an exacting, objective knowledge of
nature. Indeed, awareness of the subjectivist predicament arose in intimate connection with this quest and, for this reason, the problem of experience to which it leads has been felt with particular keenness by modern philosophers.

The heart of the problem consists in the establishment on the one hand of a subjectivist standard of knowledge, and on the other, of a failure to discover any satisfactory connection between subject and object. Descartes's own appeal was to the Deity, whose intervention in such capacity few of his successors have been wont to accept. The problem however remains; and it is perhaps not too much to say that a large part of modern philosophy consists in a series of unsuccessful attempts at its solution.

The classical mode of attack, instituted by Descartes himself, was to seek in the analysis of experience an assured point of contact with the objective world. Rationalists, following Descartes, have usually sought such a connection in certain 'innate ideas' whose marks of objective validation, it is argued, are their sharp-edged clarity, their logical simplicity, and their undeniably capacity for ordering large areas of experience. As the perfect embodiment of such standards, mathematics has always been the epistemological ideal of rationalism. Empiricists, on the other hand, following the 'common sense' approach of Locke, insist that all experience begins in sense-perception or in our reflections thereupon, and that here, if anywhere, must be the point of contact with the external world.

The classical criticisms of both rationalism and empiricism were raised by Berkeley and Hume. Hume's is at once the more consistent and more shocking. Accepting by and large Locke's account of 'ideas,' he
proceeded to demonstrate that (i) there is no way of correlating subjective data with the 'external objects' they supposedly 'represent,' and (ii) there is no basis for asserting necessary connections among the data themselves. The data—our 'impressions' and 'ideas'—are simply ultimate facts. The sting is in this second conclusion, for it apparently demolishes the Cartesian hope of founding the unity of the sciences on the unity of experience.

The watershed of modern 'philosophies of experience' is the Kantian criticism. Kant made the first grand effort to synthesize the opposing theses of rationalism and empiricism in a manner consistent with the scientific advancements of the hundred years or so separating his own time from the great creative period of the seventeenth century. Originally inclined toward rationalism, he found himself later compelled to accept Hume's conclusion, namely, that intuitive criteria cannot per se guarantee either the objectivity of the data or the ground of their coherence. Kant believed, however, that the empiricists had erred in assigning to the experiencing subject too passive a role. 'Experience,' as he conceived it, was essentially a synthesis of subject and object. Whatever their origin, experiential data are ordered according to certain a priori structures inherent in the subject's process of experiencing. Among such purely formal structures, Kant held, are space, time, and a given number of basic conceptual categories that we find necessarily presupposed in all our attempts to interpret experience. Since these pervasive structural features are neither given with, nor derivable from, the more particular character of the data, they must be, Kant reasoned, a priori conditions of the very possibility of experience.
So impressive was the Kantian solution that virtually no significant development in nineteenth century philosophy escaped being profoundly influenced by it. But toward the close of the century, revolutionary advances in the foundational sciences—the work of Lobachevsky and Riemann in mathematics, of Clerk Maxwell, Lorentz, Minkowski, and Einstein in physics—demolished the illusion of finality long associated with classical geometry and Newtonian physics, and thus drew into serious doubt some of Kant's presuppositions. At the same time, philosophers were growing restive under the burden of Kant's main conclusions. He had given a searching and cogent account of the nature and structure of knowledge; but he had left unsolved—indeed had pronounced unsolvable—the problem of reality. By the turn of the century a reaction was under way in England and America, and even to some extent on the continent, against the restricted sort of phenomenalism in which Kant's famous criticism had issued. The result was a resurgence of realistic tendencies, in some respects akin to, but in many respects differing from, the older empiricism in which the objectivist spirit of natural science had first found expression. The latter, in one of its more literal developments, became the methodological cornerstone of philosophical positivism. The general tenor of the movement of which we are speaking—to the extent it may be called a 'movement'—was toward a more open view of things. Perhaps its only identifiable trait is the questing after a more direct contact with the world than Kant had declared was possible.

At any rate, the attention of many philosophers turned once again to what had been the central concern of the philosophers of the seventeenth century: the analysis of experience. Unlike their predecessors,
whose aim had been mainly to discover some indubitable point of contact with an objective 'external world,' the general approach—as exemplified, say, by Peirce, James, Bergson, and even to some extent by Bradley—was to fix upon the more immediate, concrete elements of experience, and to seek the real in these rather than as somehow lying beyond them. Temporal and dynamic factors accordingly assumed much more significance than they had formerly. (Bradley, of course, must be here counted an exception.) In all, it might be said that at the turn of the century there was in the air not only a 'revolt against dualism,' but also a revolt against the excessive intellectualism that Bergson associated with the 'spatialized' mentality of the philosophic tradition inherited from Descartes and culminating in Kant.

The philosophy of Whitehead unifies and carries to completion many of these new tendencies of thought, incorporating them finally into an extraordinarily comprehensive metaphysical system. This achievement is made particularly impressive by virtue of the fact that it originated in critical reflections on just those advances in the foundations of mathematics and physics that Kant had not anticipated. By virtue of his concern with these two most basic of the sciences, Whitehead continues the great rationalistic tradition of Descartes, Leibniz, and Kant himself, while purging it of most of the features philosophers in recent times have found objectionable. To some extent, Whitehead's status in contemporary thought is comparable to that of Kant's in the nineteenth century. Kant effected the major philosophical synthesis of the eighteenth century, combining into one generally systematic point of view the dominant themes of the age in science, philosophy, morals, and religion. In the same way,
Whitehead's philosophy has been termed by Professor Victor Lowe "the ultimate intellectual achievement of the nineteenth century." Whether his influence in our own age will be as great as that of Kant's in the nineteenth century it is too early yet to tell, although there can be little doubt that Whitehead's status as a major philosopher is well established.

Apart from such moot questions of historical importance, there is the much more interesting matter of the role of 'experience' in the final viewpoints of these two philosophers. By means of a bold speculative extension, it forms for Whitehead the basis of a solution to the problem of reality within the context of which the problem of knowledge is treated as a special case. For Kant, almost exactly the opposite is true: limitations of knowledge make the problem of reality unsolvable. The difference is that Whitehead treats 'experience' not as an epistemological category, as it had been for Kant and the British empiricists, but as the fundamental category of his ontology, in terms of which all other categories, including 'knowledge,' are ordered and defined. It is in this sense that Whitehead speaks of his 'philosophy of organism' as "a recurrence to pre-Kantian modes of thought"---closer in spirit and conception to the classical rationalism against which Kant reacted than to the traditional British empiricism which began with Locke.

The purpose of this study is to examine the development of the concept of 'experience' in Whitehead's principal philosophical writings, paying special attention to its increasing importance in the movement of his thought from problems of the philosophy of science to the central issues of metaphysics. Whitehead's initial concern was to formulate a
concept of 'nature' capable of providing a unified theoretical framework for the natural sciences. Exploration of the conditions required to bring some measure of coherence to the foundations of scientific thought led him to insights applicable to the much more general problem of the unity of experience.

As a final introductory remark, it should perhaps be mentioned that a number of conflicting views have recently been advanced concerning the relation of Whitehead's philosophy of science to his metaphysics. The position taken here is that Whitehead's attempts to formulate an independent philosophy of nature did not meet with success by his own standards, and that, especially as he probed more deeply into the epistemological problems involved, he was eventually persuaded to enlarge the scope of his inquiry from the limited sphere of 'nature' to the whole of 'experience.' In the transition, a vital shift of perspective is evident. The steps which lead from the epistemology of the philosophy of science works to the metaphysical perspective of Process and Reality constitute what shall be our special interest. Without some elucidation of the problems raised in these earlier investigations, the force of Whitehead's arguments for the conversion of 'experience' into a fundamental category of metaphysics cannot be fully appreciated.
NOTES TO CHAPTER I

1. Such violent generalizations as I am offering here are probably without any final justification except as modes of emphasis. Nevertheless, it may be of help to clarify somewhat what I have in mind. By the expression 'modern philosophy' I refer to the main currents of philosophic thought stretching from Descartes to the end of the nineteenth century. The terms 'objectivist' and 'subjectivist' I am actually using in two senses. 'Observational' approximates more nearly to the general meaning I attach to 'objectivist,' for in this sense it applies equally to the observation of one's internal life and to the observation of the world without. In this use of the term it is the factor of disinterestedness I mean to draw attention to. This is the 'objectivist spirit' of natural science. The corresponding usage of 'subjectivist' would be the engagi of an existentialist thinker like Sartre. The more restricted meaning of both terms concerns primarily the direction of attention or interest, either to the world without or to the self within. By the 'subjectivist predicament' I refer to the impossibility of avoiding a final reference to the subject who experiences, who claims to know, who decides upon and establishes criteria of knowledge. As a very general characterization, I believe there is a certain contrast to be drawn between the 'objectivist spirit' of what I understand by 'modern philosophy' and, say, the 'subjectivism' (in both interests and spirit) associated with contemporary existentialism. The 'objectivist manner of reflection' of ancient and scholastic philosophers, on the other hand, refers simply to their naïveté with respect to methods and standards of knowledge of any kind; exacting criteria of knowledge were unknown to them (unless one is willing to accord scientific exactness to syllogistic reasoning) and thus they could speak of the 'faculties of the soul' or of the 'kingdom of heaven' in an 'objective' fashion. They were 'objective' in their reflections simply because the problem of knowledge was not a problem they recognized in anything like its 'modern' proportions.

2. Schilpp, 124

3. PR, vi (italics mine)

4. This is true in spite of Whitehead's assertions to the contrary, e.g., in PR (v): "The writer who most fully anticipated the main positions of the philosophy of organism is John Locke...." Prof. Lowe expresses sympathy "with those critics who call Whitehead's piety toward [the great philosophers] excessive." Emphasizing that "the type of question raised by Locke...is infinitely narrower," he comments that "one can be thankful Whitehead's own work follows to set the reader right." (Schilpp, 117).

5. The opposing theses are stated by Dr. Nathaniel Lawrence on the one hand in his book Whitehead's Philosophical Development, University

6. I do not maintain that Whitehead's arguments cannot be properly understood apart from the earlier works, but only that they are better appreciated when seen as a development from the more specialized problems with which these earlier works deal. The thesis is a radical one to the modern mind, and Whitehead's position appears a great deal more plausible if the arguments in PR are seen in relation to the scientific and epistemological problems treated within the context of the limited doctrine of nature.
CHAPTER II

THE NEW EPISODEMOLOGY OF WHITEHEAD'S PHILOSOPHY

OF SCIENCE

Until the appearance of An Enquiry Concerning the Principles of Natural Knowledge in 1919, Whitehead had been recognized only as a great mathematician who was one of the authors of the monumental Principia Mathematica.

The Principles of Natural Knowledge, however, is hardly the product of a mind which had ever confined itself to logic and mathematics apart from the relevance of these disciplines to a larger understanding of things. In this sense, the book is a first step toward the systematic development of philosophical ideas which had doubtless been in the background of Whitehead's thought since his student days at Cambridge. In another sense, however, it is merely the enlargement of a project to which Whitehead had first given attention as early as 1905: the employment of mathematical logic in the exploration and analysis of various ways of axiomatizing ultimate concepts of physics.

Our interest in this study concerns those portions of the book which are decidedly philosophical in their import, namely, those portions in which Whitehead undertakes to develop a new conception of 'natural knowledge' which in effect will serve as a philosophical foundation for the unification of the natural sciences. But these portions cannot be divorced from his earlier interest in the systematic formulation of alternative systems of physics. For this reason, it will be helpful to consider as an introduction to the new epistemology
developed in this work two earlier efforts of Whitehead's to deal with more restricted, but closely related problems.

The first of these is a memoir entitled *On Mathematical Concepts of the Material World* (1905). The object of this little known but ingenious piece of work is to initiate the mathematical investigation of various possible ways of conceiving the nature of the material world. In so far as its results are worked out in precise mathematical detail, the memoir is concerned with the possible relations to space of the ultimate entities which (in ordinary language) constitute the 'stuff' in space. \(^1\)

Professor Lowe has called this paper "an excursion in mathematical cosmology," and cites it as an indication of the scope of Whitehead's philosophic inclinations even at this early date. The approach to cosmological questions in this attempt is however kept strictly mathematical; all philosophical issues are deliberately excluded from consideration.

In the period 1911-1914, during which the second and third volumes of the *Principia* appeared, Whitehead launched a new attack on the problem of the logical analysis of space. His original aim was to produce a fourth volume of the *Principia* dealing with geometry. The book never appeared. The reason is that Whitehead now became explicitly concerned with epistemological considerations which had been carefully avoided in the memoir of 1905. If a time in his career can be pinpointed in which he ceased being a mathematician and commenced being a philosopher, it must fall somewhere between 1913 and 1917.

The first fruit of his epistemological reflections is the famous 'class theory' of physical objects, developed in conjunction with
Russell. The motivating concern of the class theory is to place physics on an observational basis. The method prescribed for accomplishing this end is to conceive the ultimate data of physics as elementary sensory 'particulars' which may be 'constructed' into various sorts of objects, then manipulated according to the formulae of mathematical logic. The epistemological foundation of this theory is a standard variety of the classical empiricism which, since Locke and Hume, has claimed England for its native home.

In the resolve to place physics on an experiential basis Whitehead never wavers. The class theory, however, failed to meet with his satisfaction because of its piecemeal character, a feature which never seems to have disturbed Russell. On the basis on the class theory, only the data are properly extracted from experience; spatio-temporal and other purely physical relations are supplied from elsewhere without explanation. To place physics on a strictly observational basis requires that the sum of its systematic relations, physical as well as mathematical, be somehow derivable from observation.

In The Principles of Natural Knowledge Whitehead extends the context of this problem, itself peculiar to physics, to take in the whole of natural science. The aim of the book is to seek a rational connection between geometry and experience in terms of which a systematic foundation of all the sciences may be established. Previous investigations into the foundations of geometry, Whitehead observes, have dealt with the subject wholly "as an abstract science deduced from hypothetical premisses." His concern is "with geometry as a physical science." The starting point for such an investigation is the question, "How is
Whitehead saw in the theory of relativity in which space and time are conceived as an unified, four-dimensional continuum, "the possibility of a new answer to this question." Actually, the full comprehension of the question should be, How is space-time rooted in experience? Classical physics, which was based on Euclidean geometry, relegates time to a rather secondary status. The first task in establishing geometry as a 'physical science' is to elevate time to a status commensurate with that of space. This is Whitehead's point of departure.

The book opens with a trenchant criticism of the concepts of classical physics, the brunt of which falls on the conception of "nature-at-an-instant." According to the Newtonian view of the world, the ultimate fact embracing all nature is...a distribution of material throughout all space at a durationless instant of time, and another such ultimate fact will be another distribution of the same material throughout the same space at another durationless instant....No room has been left for velocity, acceleration, momentum, and kinetic energy, which are certainly essential physical quantities.

The classical concept, in other words, deals with space and time solely in terms of extensionless mathematical points and durationless instants. The result is that it can make no provision for actual physical relations between separate instants of time and isolated points of space. Hence no reason can be given for the succession of instantaneous (static) mathematical spaces in terms of which motion is conceived, nor similarly, for the sustained identity of a material particle (symbolized by a point) reappearing in any succession of such spaces. By the same token, there is no provision for physical relations between two material particles in the same space. Absolute time and absolute
space, as well as the identical endurance of impassive bits of matter, are simply assumed as ultimates. This means that strictly physical concepts such as velocity and acceleration find no place in the ultimate foundations but must be added later almost in the way of afterthoughts. Nature is likened to an endless series of static motion-picture frames, each one exhibiting a frozen distribution of material, each one independent of and disconnected from its predecessor and successor. Time is merely the uniform serial order in which the succession of spaces follow one another.

Such a conception of the ultimate facts fails to supply a coherent system of physics. In addition, Whitehead observes that it can never supply an adequate basis for sciences whose data are not translatable into purely mathematical notions such as 'point' and 'instant'—biology for example:

in biology the concept of an organism cannot be expressed in terms of a material distribution at an instant. The essence of an organism is that it is one thing which functions and is spread through space. Now functioning takes time. Thus a biological organism is a unity with a spatio-temporal extension which is of the essence of its being. This biological conception is obviously incompatible with the traditional ideas.

The basic difficulty consists in this: the concepts of space and time in terms of which the system was framed were taken over uncritically from mathematics and have no evident correlation with the space and time of immediate experience. It is obviously from the latter that our notions of 'change' and of 'continuity' are drawn. But these ideas, whose source is experience, find no rational justification in the mathematical scheme. In this respect Einstein's Theory of Relativity suffers exactly the same defect as the classical physics; it is based on a
purely mathematical conception of spatio-temporal relations whose ultimate relata are points and instants. Dispensing with Newton's absolute space and absolute time does not overcome this more fundamental difficulty. The result is that both systems involve what Whitehead calls a "bifurcation of nature." Nature is split into two systems of reality, one conceptual and mathematical, the other immediate and experiential. This situation creates an insuperable problem for epistemology. It means that science can supply no ground of rational connection between these two worlds, though it must draw upon both for its concepts and its data. It lacks indeed a standard for deciding the even more elemental question of which one is 'really real.' These vague, uncertain relations between 'nature conceived' and 'nature experienced' leave the status of natural knowledge in grave doubt.

Such is the problem. Its solution calls for a drastic reorganization of fundamental concepts, and this is what Whitehead proceeds to undertake. His approach is to attempt to supply a rational connection between geometry and the fundamental concepts of physics which is in principle observable. This rules out from the beginning conventional notions of geometrical points, lines, and spaces.

In the past, Whitehead notes,

valuable work on the foundations of geometry...proceeded from the assumption of points as ultimate given entities. This assumption, for the logical purpose of mathematicians, is entirely justified. Namely the mathematicians ask, What is the logical definition of relations between points from which all geometrical theorems respecting such relations can be deduced? caret

If an absolute theory of physical space is adopted, "there is nothing more to be said. For points are ultimate simple existents, with mutual relations disclosed by our perceptions of nature." caret But absolute space
has been abandoned in modern physical theory. Einstein's investigations revealed that motion (and therefore space and time) is relative to the position of the observer. Hence,

if we adopt the principle of relativity [as physical theory], these [mathematical] investigations do not solve the question of the foundations of geometry. An investigation into the foundations of geometry has to explain space as a complex of relations between things. It has to describe what a point is, and has to show how the geometric relations between points issue from the ultimate relations between the ultimate things which are the immediate objects of knowledge. Thus the starting point of a discussion on the foundations of geometry is a discussion of the character of the immediate data of perception.

Whitehead's analysis of perception thus has as its immediate object the discovery of a new derivation of the foundations of geometry. But such an analysis requires a more general description both of what is perceived and of the nature of our perceiving it. Considerable portions of both The Principles of Natural Knowledge and The Concept of Nature (the second book of his philosophy of science series) are devoted to such description. The former--what is perceived--is the doctrine of Nature Whitehead develops in these books; the latter--the nature of our perceiving it--is the point of departure for the new concept of experience he will elaborate in much fuller form in Process and Reality. It will undergo considerable modification in the process of expansion into a general metaphysical concept; nevertheless, the essentials are laid down in these earlier books.

Whitehead strives to avoid in these books the introduction of any sweeping metaphysical theories. Nevertheless he is working from the standpoint of a very bold and direct form of realism. His object is to short-circuit the phenomenalist interpretation of the data of science, which conflicted on the one hand with his strong sense of the
concrete, and, on the other with the essentially monistic direction of his theoretical instincts. He refused to recognize a two world doctrine, of which he considered the phenomenalist theory of sense perception a particularly flagrant example. On this subject he is outspoken:

now I assume as an axiom that science is not fairy tale. It is not engaged in decking out unknowable entities with arbitrary and fantastic properties. What then is it that science is doing, granting that it is effecting something of importance? My answer is that it is determining the character of things known, namely the character of apparent nature. But we may drop the term 'apparent'; for there is but nature, namely the nature which is before us in perceptual knowledge. 10

Whitehead will later find a very good meaning for the term 'appearance.'

In these books however, nature is defined in terms of direct perception, and it is defined realistically.

Nature is that which we observe in perception through the senses. In this sense-perception we are aware of something which is not thought and which is self-contained for thought. This property of being self-contained for thought lies at the base of natural science. It means that nature can be thought of as a closed system whose mutual relations do not require the expression of the fact that they are thought about. 11

He is careful to make clear that "This closure of nature [to thought] does not carry with it any metaphysical disjunction of nature and mind." 12 Metaphysics, as Whitehead conceived it in these books, is that which takes into account "the synthesis of the knower with the known," and this subject he wishes to exclude from the present inquiry. His way of doing this is simply to define 'nature' as 'that which is perceived;' in other words, as the terminus of sense perception. On this hypothesis, the foundations of geometry are to be sought in "that which we observe in perception through the senses."
What, then, are the immediate data of perception? Whitehead's answer to this question amounts to a sharp break with the traditional empiricism on which the class theory had been based. An orthodox empiricist would have answered this question in terms of sena or sense-objects; or, if he were of a Kantian bent, in terms of phenomena. Whitehead distinguishes instead two kinds of primitive entities: 'events' and 'objects.'

Events are required by the consideration that we do not perceive anything 'at an instant.' Whatever is perceived is perceived through a duration of time.

Accordingly it is admitted that the ultimate fact for observational knowledge is perception through a duration; namely, that the content of a specious present, and not that of a durationless instant, is an ultimate datum for science. Events, however, are not just temporal. Whitehead conceives an event as a four-dimensional spatio-temporal 'volume.' In other words, an event is 'extended,' but it is extended temporally as well as spatially. There is no definite magnitude for events, nor are they disconnected. For the fact is, "We do not perceive isolated instantaneous facts, but a continuity of existence...." Therefore for Whitehead,

the fundamental assumption...is that the ultimate facts of nature, in terms of which all physical and biological explanation must be expressed, are events connected by their spatio-temporal relations, and that these relations are in the main reducible to the property of events that they can contain (or extend over) other events which are parts of them. In other words, in the place of emphasising space and time in their capacity of disconnecting [as in the classical scheme], we shall build up an account of their complex essences as derivative from the ultimate ways in which those things, ultimate in science, are interconnected. In this way the data of science, those concepts in terms of which all scientific explanation must be expressed, will be more clearly apprehended.
Nature thus conceived as a system of interconnected events which contain or 'extend over' other events, the problem is to find some way of arriving at—directly on the basis of this description of what we in fact perceive—the mathematical concepts of 'point,' 'line,' and 'instant.' Whitehead's way of going about this is entitled the Method of Extensive Abstraction. Briefly, this method consists in conceiving the system of events in terms of sets of spatio-temporal volumes, inclusive of, and converging toward, smaller and smaller sets, each of which is a member of sets larger than itself, somewhat in the manner of the boxes in a Chinese puzzle. In respect to any given set, a larger set is always presupposed, although any number of larger sets relative to the set in question in no ways alters the convergence-properties of the smaller sets that are members of it. There is no limit assumed at the convergent end of the scale. The basic relation is that of 'containment' or 'extending over,' such that given two events a and b and the symbol K for the relation, a's containment of b is simply expressed \( a \Rightarrow b \). The smaller end of the scale converges to a 'point,' or rather, to use Samuel Alexander's term, a 'point-instant.' The more technical details of this method need not concern us in this study. What is important from the standpoint of the problem of experience is Whitehead's contention that this way of conceiving nature is a more direct and faithful abstraction from the concrete texture of immediate perception than the conceptual frame-work currently employed in physics, either Newtonian or Einsteinian. Space and time, according to Whitehead (in these books), are simply abstractions from the more fundamental fact of Extension. In his metaphysics he will accord the funda-
mental place to Process and account for our perception of extensiveness (or extensive continuity) in a much more complicated way. But that is several years distant.

We must take up now the nature of Whitehead's other species of primitive entity: objects. What is an object? and What is the relation between objects and events? These questions have both an epistemological and an ontological aspect. Concerning the ontological aspect it is essential to keep in mind Whitehead's bald realism. He assumes expressly and from the very beginning the reality of nature as something apart from our perceptual and mental processes—'apart' but not disconnected or unrelated. Accordingly he assumes the reality of objects and events, including an event which he terms the "perceptual event." On Whitehead's interpretation of the theory of relativity, the perceptual event is simply the standpoint of the observer; he posits it merely as one event among others, though as an event which happens to be perceiv- ing. Space, or rather the extensity of nature, consists in the complex of extensive relations which hold among the totality of events of which the perceptual event is one.

The epistemological aspect consists in the fact that the data of which we are immediately aware are limited, namely, to those data or 'objects' present to our psychological field. The only events we can know are thus those events which are known by or through the objects which, in this case, we may say they support or sustain. In this sense, an object is the character of an event or group of events. In Platonic language, we would say it is the form. But Plato's Forms and Whitehead's objects (both here and in the later works) are in
several respects significantly different and the comparison is at best a rough one. At any rate, the question arises as to how we distinguish events from the objects which characterize them. How, in other words, can we know anything about events if we can only know them mediately through the objects which they sustain? Before we can answer this question satisfactorily we must pursue further the separate natures of objects and events.

We may begin by saying that Whitehead considers these two types of entities—objects and events—as elements necessary to an adequate description of the full texture of what we perceive, i.e., nature. Events express the actual relatedness of nature, and this nature has a temporal as well as a spatial character. This general fact of spatio-temporal relatedness is the perceived "continuity of existence" which is simply a fact of our experience of things. On Whitehead's theory, it is the underlying uniformity of nature, which, as we have seen, is anchored in the basic relation of extension ('K') of which actual events are the ultimate relata. Thus,

events are essentially elements of actuality and elements of becomingness. An actual event is...divested of all possibility. It is what does become in nature. It can never happen again; for essentially it is just itself, there and then.21

Thus we say that events pass but do not change. The passage of an event is its passing into some other event which is not it.

An event in passing becomes part of larger events; and thus the passage of events is extension in the making.22

Events therefore express the passage of nature into a scheme of settled fact which exhibits the character of uniform relatedness. This settled, irrevocable fact is what 'is there' for perception. The aim of science
is the analysis of this scheme of uniform relatedness anchored in the extensity of actual events.

Objects, on the other hand, express what is repeatable in nature. They are the 'variables' which, though they maintain their individual identities, recur at different times and different places. Thus, objects convey the permanences recognised in events, and are recognised as self-identical amid different circumstances; that is to say, the same object is recognised as related to diverse events. In The Principles of Natural Knowledge Whitehead expressed the relation of objects to events by saying that objects are "situated" in events.

In The Concept of Nature he introduces the term "ingression."

An object is an ingredient in the character of some event. In fact the character of an event is nothing but the objects which are ingredient in it and the ways in which those objects make their ingression into the event.

The ingression of an object into an event is the way the character of the event shapes itself in virtue of the being of the object. Namely the event is what it is, because the object is what it is; and when I am thinking of this modification of the event by the object, I call the relation between the two 'the ingression of the object into the event.' It is equally true to say that objects are what they are because 'events' are what they are. Nature is such that there can be no events and no objects without the ingression of objects into events.

Objects, then, are elements of form which, by virtue of their "ingression," are determinants of the complex texture of events in passage. The use of the terms 'ingredient' and 'ingression' is intended to make clearer the intimate relation of objects and events—that is, to remove any suggestion that this relation might be merely incidental, a misunderstanding that might easily arise with respect to "the relation of situation," Whitehead's earlier phrase (i.e., in The Principles of Natural
Knowledge). This feature of the relation of objects and events is especially stressed in the last sentence of the passage above, that "Nature is such that there can be no event and no objects without the ingression of objects into events" calls for some additional comment.

This statement affirms the unity of nature as well as the unity of our experience of it, which for Whitehead are one and the same thing. There is no separate realm of objects in a Platonic sense; events and objects are different kinds of "natural elements," but they exhibit no ontological disconnection. That is to say, neither kind of entity can be without the other. In this respect, objects are more like Aristotelian substantial forms than Platonic Ideas.

The most important feature of the relation between objects and events is seen in Whitehead's 'field theory' of objects. This development is the crux of the epistemology of the philosophy of science books, and it exhibits more clearly than anything else the validly Platonic aspect of Whitehead's earlier thought. Whitehead found it necessary in the philosophy of science books to distinguish various kinds of objects—'sense objects,' 'percipient objects,' 'perceptual object,' and 'scientific objects.' For the purposes of this study we may ignore their specific natures and differences, except to say that their relations to each other and their separate modes of ingression into events involve considerable complexity. One thing which all objects have in common however is that they are not only repeatable in time but can be present at different places at (apparently) the same time. This is explained by virtue of the fact that an object is not a thing (i.e., entity) in the usual sense, but rather the manifestation of an influence
exercised throughout a 'field.' Whitehead believes that in the past, science and philosophy have been apt to entangle themselves in a simpleminded theory that an object is at one place at any definite time, and is in no sense anywhere else. This is in fact the attitude of common sense thought, though it is not the attitude of language which is naively expressing the facts of experience. Every other sentence in a work of literature which is endeavoring truly to interpret the facts of experience expresses differences in surrounding events due to presence of some object. An object is ingredient throughout its neighborhood, and its neighborhood is indefinite. Also the modification of events by ingression is susceptible of quantitative differences. Finally therefore we are driven to admit that each object is in some sense ingredient throughout nature; though its ingression may be quantitatively irrelevant in the expression of our individual experiences.}

This is a remarkable passage. Whitehead is thinking of course of the electromagnetic fields of physics, but the reference to literature at once reveals the much wider range of human experience he is holding in the background. Significant of what is to come is his subsequent comment that,

this admission is not new either in philosophy or science. It is obviously a necessary axiom for those philosophers who insist that reality is a system. In these lectures we are keeping off the profound and vexed question as to what we mean by 'reality.' But I suppose that in this case the less follows from the greater, and that I may claim the support of these philosophers.}

Also extremely significant is his remark, "It is evident that the ingression of objects into events includes the theory of causation."

But he prefers at this point "to neglect this aspect of ingression, because causation raises the memory of discussions based upon theories of nature which are alien to my own. Also, I think that some new light may be thrown on the subject by viewing it in this fresh aspect." A full treatment of causation must await Process and
Reality, although as we shall see in Chapter III, he lays the foundation for this fuller treatment in one of the essays we interpret as 'transitionary' between the limited perspective presented here and his later metaphysics.

For the moment, let us briefly consider the epistemological situation in the light of the 'field theory.' For utmost simplicity, we shall confine the number of events considered to two, one of which is any event 'e,' the other of which is the percipient event 'p.' Both of these events have definite characters which have been 'shaped by' their respective objects 'E' and 'P.' According to Whitehead, the events 'e' and 'p' are the focal centers of their objects 'E' and 'P,' which are influencing the whole area in which 'e' and 'p' are situated, and in fact, to some extent, all of nature. Thus 'E' will have ingress into 'p' and 'P' will have ingress into 'e;' such that, if we are asked where 'E' and 'P' are, we must say that 'E' is at both 'p' and 'e,' and that 'P' is at both 'e' and 'p.' These events 'e' and 'p' we can fix at definite times and places; but the objects 'E' and 'P' are not thus limited; they are pervasive throughout the entire 'field' in which they can be said to exert an influence. Now let us translate 'eE' and 'pP' respectively into the standard epistemological terms 'object' and 'subject' and we have some idea of what Whitehead has in mind. It is in this way that Whitehead seeks to end the 'bifurcation of nature' in scientific thought.

You cannot cling to the idea that we have two sets of experiences of nature, one of primary qualities which belong to the objects perceived, and one of secondary qualities which are the products of our mental excitements. All we know of nature is in the same boat, to sink or swim together. The constructions of science are merely expositions of the characters [i.e., objects] of things perceived.
Whitehead is thus denying a division of nature into 'psychological nature' which is 'in the mind,' and on the other hand 'objective nature' which is 'out there.' The being of the 'characters' of things must be conceived as the sum of their various influences at various times and in various places at the same time, and the 'characters' and the 'things' cannot be torn apart.

How far Whitehead has left behind the traditional empiricism on which the class theory was based should now be evident. The traditional empiricism holds that there is only one class of primitive entities, namely, sense-objects. Whitehead maintains that there are two, objects and events. The traditional empiricism holds that objects are simple and that they are just where they are—that is, they share the spatial fixation Whitehead assigns to events; their relationship to time is of secondary importance, sometimes even irrelevant. For Whitehead an object is complex and must be conceived as located throughout its field of influence, which is ultimately all of nature. Whitehead omits discussion of the relation of objects to time in *The Principles of Natural Knowledge* and *The Concept of Nature* because he wishes to postpone for a while the discussion of causality; however, as we shall see, the field of an object is always future to its focal event. Without specifically discussing the aspect of temporality however, the traditional empiricism, according to Whitehead, commits the fallacy of "simple location" in its appraisal of objects. And apart from objects and 'reflections' engendered thereby, it has nothing else to work with. Finally, the traditional empiricism, when driven to the wall (Berkeley, Hume), can assign to objects only a psychological status; its only legitimate view
towards nature must therefore be scepticism. For Whitehead, there is no such thing as 'the merely psychological or mental.' This consideration will emerge in his metaphysics as the Ontological Principle.

So far we have been considering events and objects as Whitehead describes them theoretically, that is to say, 'objectively' (in the usual sense of that term). The percipient event was discussed simply as one event in an 'objective system.' This was necessary in order to depict clearly the nature of objects and events. Whitehead's own exposition is filled with examples and illustrations which refer his theoretical description to the immediate experience of the reader. His purpose is to formulate a philosophy of nature based upon our immediate experience of nature; unless he can convince on this level, the theoretical structure purportedly drawn from this immediate experience loses the ground of its appeal. We must therefore consider Whitehead's description of the direct experience of objects and events from the standpoint of the percipient event, that is, in our own capacity as experiencing subjects.

In *The Principles of Natural Knowledge* Whitehead describes the direct perception of events by pointing to them as those elements of experience which are "lived through,"

they extend around us. They are medium within which our physical experience develops, or, rather, they are themselves the development of that experience. The facts of life are the events of life. 31

Objects, on the other hand,

enter into experience by way of the intellectuality of recognition. This does not mean that every object must have been known before; for in that case there never could have been a first knowledge. We must rid our imagination of the fallacious concept of the present as instantaneous. It is a duration, or stretch of time; and the primary
recognition of an object consists of the recognition of its permanence amid the partial events of the duration which is present. Its recognition is carried beyond the present by means of recollection and memory. The 'enduring character' of objects that Whitehead speaks of in this passage follows necessarily from the stark individuality of an event. "It is impossible to recognize an event, because an event is essentially distinct from every other event. Recognition is an awareness of sameness." 'Sameness' requires that whatever is recognized 'to be the same' be in some sense independent of a precise locality in space and time—or, in terms of relativity physics, in space-time. Recollection and memory consist in the recognition of objects associated with events other than the percipient event designated 'here now.' Thus we might say that an object, a color or a sound, for example, is recognized as 'situated' in an event 'there now' but from the standpoint of 'here now;' thus the same object is both 'there now' and 'here now.'

Sometimes we recognize an object but are vague as to its location.

For example, Where was your toothache? You went to a dentist and pointed out the tooth to him. He pronounced it perfectly sound, and cured you by stopping another tooth. Which tooth was the situation of the toothache?

Whitehead explains such instances by the fact that objects, unlike events, do not enjoy 'simple location' but exert an influence throughout an indefinite region. Other examples are found in illusory and hallucinatory experiences: for instance, a man has an arm amputated, and experiences sensations in the hand which he has lost. The situation of the imaginary hand is in fact merely thin air. You look into a mirror and see a fire. The flames that you see are situated behind the mirror. Again at night you watch the sky; if some of the stars had vanished from existence hours ago, you would not be any the wiser. Even the situation of the planets differ from those which science would assign to them.
But we cannot call the pain in the hand, or the flames in the mirror, or the stars in the sky 'unreal'; they are as real as anything else we call 'real.' Our confusion, according to Whitehead, stems from vagueness or error as to the location of the events of which such objects are the characters. In the case of the stars these events are (from the standpoint of the percipient event 'here now') in the past.

Thus objects have a relational character; though independent (in one sense) of particular times and places, they reveal determinate relations between diverse events which are themselves precisely fixed as to their spatio-temporal location. Moreover, by means of objects which are recognized 'here now' (e.g., the stars) we are able by mathematical methods to determine with very respectable accuracy the location of the events these objects 'signify.' In the case of the stars the events thus signified may be events in the remote past. The direct experience of objects, however, is always 'here now.' These are the immediate, subjectively experienced data from which theoretical science must take its leave and to which it must return for the verification of its principles.

We may summarize the discussion of the 'field theory' by marking this signifying function of objects. Objects signify for the percipient event a vast complex of events to which it, in Whitehead's theory, is determinately related. Whitehead's theory of significance, according to Professor Lowe "cannot be safely assimilated to any other development in modern philosophy." 36

For Whitehead, 'significance' is the experiential side of the extensive relatedness of nature. It is through the significance of
objects directly perceived that we are aware of the extensity of nature beyond us. Within the limited context of the philosophy of nature, significance is experience. And, "To say that significance is experience, is to affirm that perceptual knowledge is nothing else than an apprehension of the relatedness of things, namely of things in their relations and as related." Thus in terms of immediate experience, the signifying character of objects expresses our direct awareness of other events as related to ourselves 'here now;' and again it must be emphasized that, for Whitehead, the objects are intimately bound up with, and hence just as real as, the events they signify. To think of them as 'merely psychological creations' is a sheer mistake. The doctrine of significance thus forms the experiential foundation of Whitehead's theory of internal relations, which is clearly implicit in these earlier works.
NOTES TO CHAPTER II

1. Anthology, 11
2. PNK 5
3. PNK 5
4. PNK 2
5. Briefly, Whitehead's criticism strikes at four assumptions:
   (i) Time considered disjunctively
   (ii) Space considered disjunctively
   (iii) Space and time conceived in disjunction from one another.
   (iv) Space and time conceived as non- or at the most quasi-physical mediums.
6. PNK 3
7. PNK 5
8. PNK 5
9. PNK 5
10. CN 40
11. CN 5
12. CN 4
13. PNK 8
14. This term of course applies normally only to space. Here its meaning is stretched to include temporal 'size' as well. The usage is borrowed from Prof. Lowe, Whitehead and The Modern World, Lowe, Hartshorne, Johnson, Boston, The Beacon Press, 1950. cf. pp. 3-24.
15. PNK 7
16. PNK 4
17. This relation is more complicated than that of simple part to whole by virtue of the introduction of the temporal dimension (which brings to bear the 'successor-predecessor' relation as part of its meaning) and other purely logical considerations.
18. This analogy is also borrowed from Professor Lowe's article, cf, Note 2 above.
19. Cf. PNK, Part III

20. Neither Newton nor Einstein claimed to have drawn the space of their respective systems from experience. This is what makes the problem. Newton assumed absolute space because such an assumption seemed to have required by the theoretical distinction between absolute and relative motion, of which the swinging bucket experiment, for instance, offered empirical evidence. Newton gives as reason (Cf. the Scholium to Def. 8 of the Principia) merely that such a distinction (i.e., between absolute and relative space) "is convenient..." Einstein, on the other hand, regards the spatio-temporal system adopted in physics on a neo-Kantian basis. Such systems are products of the pure reason or logical imagination, and are, at bottom, fictitious.

21. PNK 61
22. PNK 62
23. PNK 62-3
24. CN 143-4, italics mine.
25. CN 144
26. CN 145
27. CN 145-6
28. CN 146
29. CN 148
30. Cf. SMW 84
31. PNK 63
32. PNK 64
33. CN 143
34. CN 147
35. CN 147-8
36. Schilpp, 79
37. PNK 12
 CHAPTER III

THE TRANSITION TO METAPHYSICS

The doctrine of significance leads Whitehead beyond the philosophy of nature to a true metaphysics of experience. His criticism of the traditional empiricism, as developed by Berkeley and Hume, is that it denies significance. This barren result follows from a doctrine of objects founded on the fallacy of 'simple location' and from an analysis of experience in terms of objects alone. For, "if we commence with a knowledge of things, and then look around for their relations we shall not find them." On this basis, "causal connection" is merely one typical instance of the universal ruin of relatedness.

Whitehead contends that

we are quite mistaken in thinking that there is a possible knowledge of things as unrelated. It is thus out of the question to start with a knowledge of things antecedent to a knowledge of their relations. The so-called properties of things can always be expressed as their relatedness to other things unspecified, and natural knowledge is exclusively concerned with relatedness.

In a later work, Science and the Modern World, his assertion of this same point is somewhat more emphatic:

no statement, except one, can be made respecting any remote occasion which enters into no relationship with the immediate occasion [i.e., 'percipient event' in the language of the earlier works]...The one 'excepted statement is:--If anything out of relationship, then complete ignorance as to it. Here by 'ignorance,' I mean ignorance...

Whitehead's theory of objects as relational entities and of events as the objective relata avoids both of these difficulties of the traditional empiricism.

But it also involves him in another. The idea of an essential
relativity of all nature requires that every event in nature be determinately related to every other; also, according to the doctrine of significance, there is an awareness of this totality of relatedness by way of the recognition of objects in sense-perception. But the objects recognized in sense-perception are a very limited number in comparison with the totality of things. Thus Whitehead must explain how it is possible to know something without knowing everything.

To a certain extent the doctrine of significance itself affords such an explanation. By means of the significication of a limited number or objects directly 'recognized' in perceptual experience, the infinite totality of events is known indirectly "by relatedness." The objects of these events known indirectly are not recognized; nevertheless, they are in some sense 'there' for recognition. In other words, there is an awareness of unrecognized events merely as bare relata, without the discrimination of their individual characters via their objects.

In The Concept of Nature Whitehead speaks of this difference in ways of knowing as the difference between "the discerned" and "the discernible." "The discerned" he terms a "factor" which is discriminated (i.e., recognized) within the total "fact" which is nature. In The Principles of Natural Knowledge he had called the process of discriminating such factors "the diversification of nature," which he described as "the breaking up of a whole which is the subject matter of perceptual experience, or is the given presentation which is experience—or however else we prefer to describe the ultimate experienced fact." This process of discrimination is how we discover objects.
He had spoken also in this earlier book of the entry of objects into experience "by way of the intellectuality of recognition." In \textit{The Concept of Nature} he desires to get away from the mentalistic connotations of "intellectuality."

I use recognition for the non-intellectual relation of sense-awareness which connects the mind with a factor of nature without passage.... Probably 'sense-recognition' would be a better term for what I mean by 'recognition.'

Though he adds the qualification,

I am quite willing to believe that recognition, in my sense of the term, is merely an ideal limit, and there is in fact no recognition without intellectual accompaniments of comparison and judgement. But recognition is that relation of the mind to nature which provides the material for the intellectual activity.

The importance of this qualification will become clearer later on.

Presently Whitehead is trying to hold his subject within the limitation 'nature' and wishes only to strip from 'recognition' the connotation of active, conscious thought.

The question as to whether sense-perception involves thought is largely verbal. If sense-perception involves a cognition of individuality abstracted from the actual position of the entity as a factor in fact, then it undoubtedly does involve thought. But if it is conceived as sense-awareness of a factor in fact competent to evoke emotion and purposeful action without further cognition, then it does not involve thought. In such a case the terminus of the sense-awareness is something for mind, but nothing for thought. The sense-perception of some lower forms of life may be conjectured to approximate to this character habitually. Also occasionally our own sense-perception in moments when thought-activity has been lulled to quiescence is not far off the attainment of this ideal limit.

What Whitehead has in mind is a state in which there is awareness, but an awareness which is diffused and vague. All that can be said of such a state is that it is an awareness of something, but that what that something is, is not discriminated; to discriminate the
What will require a focus of attention, or, as we sometimes say, 'concentration.' Knowledge by relatedness, then is an awareness on this level, awareness without the discrimination of the what.

Now Whitehead is claiming that both kinds of awareness are present in sense-perception: there is a direct recognition in limited number of objects (or factors), and beyond, a much less vivid and indirect awareness of other things, 'there' but undiscriminated. This undiscriminated mass or 'fact' of 'things beyond' has the character of a total event. It includes the macrocosmic fact of passage, or more abstractly, time, as well as the character of merely 'being there.' What Whitehead calls in The Principles of Natural Knowledge "the diversification of nature" is

this whole event...discriminated by us into partial events.
We are aware of an event which is our bodily life, of an event which is the course of nature within this room, and of a vaguely perceived aggregate of other partial events. This is the discrimination in sense-awareness of fact into parts. 10

Recognition thus becomes the direct awareness of the individuality of other things, and of our individual relations to them, temporal and spatial. Things recognized (i.e., via their objects) carry the significance of other things beyond them; they are recognized as embedded in a background of enveloping fact and as related both to the percipient event 'here now' and to an infinity of undiscriminated relata 'beyond and around.'

The doctrine of significance reaches its fullest development in two essays which close out Whitehead's philosophy of science period and make way for his transition to a complete metaphysics. The first
is entitled The Relatedness of Nature and was delivered on June 5th, 1922, to Royal Society of Edinburgh. It appears later in print as Chapter II of The Principle of Relativity (1922), the last of the philosophy of science books. The second is entitled Uniformity and Contingency and was Whitehead's inaugural address as president of The Aristotelian Society for the year 1922-1923; it appears in the Proceedings of that body for the same year. The theme of both essays is a continuation of the theory of the essential relativity of nature in terms of a system of internally related events, but now with greater emphasis on the analysis of experience than had appeared in either The Principles of Natural Knowledge or The Concept of Nature. The analysis is extended along the lines indicated by the concept of significance. More than likely these essays were written after the main outlines of Process and Reality had assumed fairly definite shape in Whitehead's thought.

He had become now fairly certain about the chief error both in Newtonian science and in modern epistemology. In The Concept of Nature he attributes it to "the influence of Greek philosophy on science."

That influence has issued in one long misconception of the metaphysical status of natural entities. The entity has been separated from the factor which is the terminus of sense-awareness. It has become the substratum for that factor, and the factor has been degraded into an attribute of the entity. In this way a distinction has been imported into nature which is no distinction at all. A natural entity is merely a factor of fact, considered in itself. Its disconnection from the complex of fact is a mere abstraction. It is not the substratum of the factor, but the very factor itself bared in thought. Thus what is a mere procedure of mind in the translation of sense-awareness into discursive knowledge has been transmuted into a fundamental character.
of nature. In this way matter has emerged as being the metaphysical substratum of its properties, and the course of nature is interpreted as the history of matter.\textsuperscript{11}

Aristotle, according to Whitehead, had in his logic conceived the substratum as always the ultimate subject of propositions and attributes as their qualifying predicates. On this logical model, a metaphysical disjunction of the substratum and its attributes follows on the logical disjunction of subject and predicate. As an ultimate substratum, the concept of matter attained in science a metaphysical status more ultimate even than that of space and time—with the result that the latter were conceived as mere external conditions or 'settings' of the former. By Whitehead's account, these metaphysical presuppositions are at the bottom of the difficulties connected with the notion of matter in science:

first philosophy illegitimately transformed the bare entity, which is simply an abstraction necessary for the method of thought, into the metaphysical substratum ['substance' or 'matter'] of these factors in nature which in various senses are assigned to entities as their attributes; and...as a second step, scientists (including philosophers who were scientists) in conscious or unconscious ignorance of philosophy presupposed this substratum, qua substratum for attributes, as nevertheless in time and space.\textsuperscript{12}

According to epistemology, we can, on this theory, know only the attributes. Such was the conclusion of the epistemological criticism of Berkeley and Hume. As long as science conceives space and time in the Newtonian manner, or more subtly, in the Kantian manner, there is at least the maintenance of a neat two-world doctrine, albeit relations between 'appearance' and 'reality' (or between 'phenomena' and 'noumena') remain a mystery. But if a relational theory of space (or space-time) be adopted, as in the theory of relativity, Whitehead
insists that

it is a fraud to slip substance into space on the plea that
space expresses relations between substances. On the face
of it space has nothing to do with substances, but only with
their attributes.  

A 'bifurcation of nature' still obtains; hence Einstein's concept of a
relational space-time cannot purport to be the outcome of relations
between material particles (i.e., substances) but only of relations
between attributes or phenomena. Science must continue to deal in
here phenomena,' avowing utter ignorance of reality.

Whitehead proposes in opposition to this view a theory that seeks
a correct reassessment of abstraction for what it is, namely, a pro-
cedure—or as he will say in the later works—a function, of thought.
Our higher conscious experience is conceived as a result of, and as
consisting in, a process of abstraction; this is central to the position
he expounds both now and in his metaphysics. In the two essays pres-
ently under consideration, the view advanced is that the structure of
experience discloses, and is in fact one and the same with, the struc-
ture of nature. Such a view, Whitehead believes, is essential to the
reorganization of the theoretical sciences. His belief in the primacy
of such a reorganization is strongly reflected throughout both essays.

Whitehead introduces in them three important innovations not found
in the first two of the philosophy of science books: (i) the concept
of limitation, (ii) the concept of aesthetic contracts and intensities,
(iii) the 'control theory' of perceptual objects. Let us examine each
in the order given.

In the first essay (The Relatedness of Nature) Whitehead opens
with a statement of the essential relativity of nature in terms of
'fact' and 'factors.'

Fact is a relationship of factors. Every factor of fact essentially refers to its relationships within fact. Apart from this reference it is not itself. Thus every factor of fact has fact for its background, and refers to fact in a way peculiar to itself.14

Next he proceeds to translate this doctrine directly into the language of immediate experience.

I shall use the term 'awareness' for consciousness of factors within fact. A converse mode of statement is that awareness is consciousness of fact as involving factors. Awareness is itself a factor within fact.

I shall use the term 'cogitation' for consciousness of factors prescinded from their background of fact. It is the consciousness of the individuality of factors, in that each factor is itself and not another. A factor cogitated upon as individual will be called an 'entity.' The essence of cogitation is consciousness of diversity. The prescinding from the background of fact consists in limiting consciousness to awareness of the contrast of factors. Cognition thus presupposes awareness and is limited by the limitations of awareness. It is the refinement of awareness, and the unity of consciousness lies in this dependence of cogitation upon awareness. Thus awareness is crude consciousness and cogitation is refined consciousness.15

An important thing to notice about the latter two passages is that Whitehead now directly violates the self-imposed boundaries of his original inquiry: he has moved from the consideration of 'nature' simply as the terminus of sense-awareness to the consideration of thought (or 'cognition') in relation to nature. Henceforward, the experience of nature, which was his original topic, will be pursued in terms of an analysis of the nature of experience.

Whitehead is careful to point out that fact in its totality is not an entity for cogitation, since it has no individuality by its reference to anything other than itself. It is not a relatum in the relationship of contrast....Fact enters consciousness in a way
peculiar to itself. It is not the sum of factors; it is rather the concreteness (or embeddedness) of factors, and the concreteness of an inexhaustible relatedness among inexhaustible relata. ...[This] inexhaustibleness is the prime character of factuality as disclosed in awareness; that is to say, factuality cannot be exhausted by any definite class of factors.\(^{16}\)

Fact, then, cannot be recognized and cannot be cogitated upon "in its totality." Nevertheless it is 'there' as the inexhaustible ground of all else, and its character is that of 'concreteness' or 'factuality.'\(^{17}\) The recognition or discrimination of factors within fact occurs by way of limitation or concentration (in the root sense of this word) of the more primitive state of awareness that Whitehead has called "crude consciousness."

This is only one facet, however, of the general concept of limitation which is fundamental to an understanding of Whitehead's philosophy. In this essay is his first explicit formulation of the general principle.

The finiteness of consciousness, the factorisation of fact, the individualisation of entities in cogitation, and the opposition of abstract to concrete are all exhibitions of the same truth of the existence of limitation within fact. The abstract is a limitation within the concrete, the entity is a limitation within totality, the factor is a limitation within fact, and consciousness by its reference to its own standpoint within fact limits fact to fact as apprehended in consciousness. The treatment of the whole theory of limitation has suffered by the introduction of metaphors derived from a highly particular form of it, namely, derived from the analogy between extended things, such as that of whole to part and that of things mutually external to each other.

I use the term 'limitation' for the most general conception of finitude.\(^{18}\) He calls attention to the closeness of his notion of 'limitation' and Bergson's use of the term 'canalisation.' 'Canalisation' is more positive and connotes a narrowing or compression of content in some
definite way or direction in order to achieve a rise in effectiveness.

Thus...finite consciousness is a limitation of fact, in the sense that it is a factor canalising fact in ways peculiar to itself. We must get rid of the notion of consciousness as a little box with some things inside it. Consciousness is a canalisation of a more primitive, diffused awareness for which there are no objects but merely undifferentiated fact or 'factuality.' With 'concentration' there is a drawing into sharper focus and a consequent increase in intensity of this awareness, which reveals a narrowed field of vividly specified factors. For 'recognition' these are 'entities.' But this process has also involved abstraction; for the "concreteness (or embeddedness) of factors" within fact has undergone limitation. That is to say, the factors have been "prescinded" from their background.

'Cogitation' involves a further limitation, and therefore, a further degree of abstraction from the concrete factuality of fact. The result is that with each step of limitation "there is a gain in clarity, or definition, or intensity, but a loss of content." But it must be emphasized that what is abstracted (or "prescinded") for cogitation is 'there' for awareness as a factor in fact. The act of abstracting or canalizing—in order that there may be a limited number of definite factors (or objects) for conscious recognition—has the effect of 'blocking out' the complexity of the general fact of relatedness in which each factor is embedded. This 'blocking out' is precisely what abstraction amounts to.

Here Whitehead is describing limitation in terms of psychical functioning. Later he will describe it in purely ontological terms, as the process of becoming of an 'actual entity.' It is by limitation that
any definite value is achieved. 21

The second innovation (also in this essay) is Whitehead's mention of the principle of contrasts. There is seldom the recognition in consciousness of just one factor against a massive, undiscriminated background. Our conscious perceptive field is composed of a pattern of aesthetic contrasts--of colors, sounds, smells, and of subtle to not-so-subtle distinctions of feeling which are more or less vivid according to the level of intensity of awareness. When awareness is dull, the contrasts lose their strength; and with further diminution of intensity they fade into an undiscriminated blur. For Whitehead, 'contrasts' depict the welter of physical relationships of the percipient event to the inexhaustible totality of other events which, like the percipient event itself, are factors in fact. Certain ones of these factors stand out in sharp relief with increased intensification of their individual characters. The physical reasons for their vivid prominence constitute the ground of the notion of importance. Two distinct and quite different meanings attach to this word. There is practical importance, such as the presence of a tiger or a rapidly approaching automobile, and there is theoretical importance, such as we attach, for instance, to the law of gravitation. Practical importance is the meaning implied in the present context. In this sense 'contrast' simply expresses the fact that "We habitually observe by the method of difference." For example, "Sometimes we see an elephant, and sometimes we do not. The result is that an elephant, when present, is noticed." 22 The presence of the elephant is a physical fact, and, on occasion, may be one of considerable practical importance to the
percipient.

There is another dimension to the notion of contrast which at this time we shall only mention briefly. This is the contrast between actuality and ideality, between that which is and that which is not. Whitehead later describes consciousness in terms of the 'tension' of this mode of contrast or comparison.

There is however a reference to 'ideality' in this essay which deserves comment. It occurs in connection with an effort to add precision to the definition of 'nature' as the 'terminus of sense-awareness.' Whitehead probably felt the need for a tighter definition as a result of his growing realization that the term 'awareness,' stripped of all qualification, approximates to the more general notion of 'experience;' and that the latter is a vastly wider category than 'sense-awareness,' in terms of which 'nature' had previously been defined. Whatever the reason, he now declares that 'sense-awareness can only be defined negatively by enumerating what it is not.'

Divest consciousness of its ideality, such as its logical, emotional, aesthetic and moral apprehensions, and what is left is sense-awareness. Thus sense-awareness is consciousness minus its apprehensions of ideality.

In the next sentence, however, he qualified this statement:

it is not asserted that there is consciousness in fact divested of ideality, but that awareness of ideality and sense-awareness are the two factors discernible in consciousness. This definition of "sense-awareness" is suggestive of, though by no means the same as, what in a few years will emerge as "presentational immediacy." Whitehead speaks here of "cognisance by adjective;" as he says above, its prime characteristic, considered just in itself,
is that it is dissociated from the consciousness of ideality. Consciousness of ideality is what in higher experience affords intellectual interpretation of experience. This is not to say that "cognisance by adjective" as treated in the context of this essay is void of significance. Our general awareness is always significant of much that is beyond the immediate purview of attention. Whitehead is here merely pointing out that our awareness of nature (or 'fact') is a more limited aspect of experience than our total awareness, which includes an awareness of ideality. Within the narrower sphere of 'nature' there is the further limitation to "cognisance by adjective" which is a limitation of the more diffused "cognisance by relatedness." The importance of the latter consists in its disclosure of the "uniform significance" of nature's extensiveness. It is by means of our awareness of the pervasive uniformity of extensive (i.e., spatio-temporal) relations that we intuitively 'locate' ourselves in the world, and, incidentally, that we are able to distinguish between the private world of our dreams from the 'real' world external to our bodily event. Whitehead would probably say, however, that organized schemes of geometry which abstractly reflect, and thus 'interpret,' general features of the uniformity of nature require in addition a consciousness of ideality. But the 'abstract' awareness in consciousness of 'ideal' features of extensity (spatio-temporality) is only one aspect of ideality; there are in addition our "logical, emotional, aesthetic and moral apprehensions." Thus awareness of nature, in terms both of "cognisance by adjective" and of "consciousness by relatedness," is itself a considerable limitation, containing within itself further limitations.
The various gradations of awareness, or of the limitations of awareness, are of considerable importance in accounting for the almost infinite gradations of ignorance and knowledge of which human consciousness is capable. As Whitehead puts it generally,

> the finiteness of individual consciousness means ignorance of what is there for knowledge. There is limitation of factors cognised by adjective, and equally there is limitation of factors cognized by relatedness. So it is perfectly possible to hold, as I do hold, that nature is significant of ideality, without being at all certain that there may not be some awareness of nature without awareness of ideality as signified by nature. It would have, I think, to be a feeble awareness. Perhaps it is more likely that ideality and nature are dim together in dim consciousness. 25

There is, in other words, a relative ignorance of what is signified as well as an ignorance of what is there for direct recognition, that is, "by adjective." Whitehead's preference for the alternative at the end of the above passage, that "ideality and nature are dim together in dim consciousness," will become a highly important feature of the panpsychism that follows in Process and Reality.

The third innovation is found in the second essay, Uniformity and Contingency. This Whitehead calls the 'control theory' of objects. It is a further analysis of significance in which he develops now the causal implications of ingression. Though he does not specifically say so, there is evidence in this essay that Whitehead has arrived at the conclusion that 'process' and not 'extension' is the fundamental notion. The control theory itself in fact implies as much.

For facility of explanation, it will be necessary to allude briefly to Whitehead's distinction between "sense-objects" and "perceptual objects." "Sense-objects" are generally what we have so far called just "objects," while "perceptual objects" correspond to the
events or systems of events which such objects characterize. The difference, it will be recalled, is one of 'location.' Events are precisely fixed as to their spatio-temporal localities; they pass but do not change or move. Objects, on the other hand, are independent of particular spatio-temporal locations in that they exert an influence throughout an indefinite field, of which their events are focal centers. "Sense-objects," then, are objects at the percipient event (or, as Whitehead calls it here, the "sensorium"), while "perceptual objects" are, as the traditional terminology would have it, the 'physical objects' (events) with which given "sense objects" are associated.

Whitehead has argued that the recognized data of perception ('objects' or 'adjectives') are significant of a uniform texture of spatio-temporal extension which we know "by relatedness"—that is to say, by virtue of the fact that our percipient event (act of perception) is one event in the system and therefore essentially related to all other events of the system. He has also alluded to ideal elements, such as our logical, moral, and aesthetic apprehensions. His argument now is that "sense-objects" signify the "perceptual objects" (events) which, in the traditional sense, are their cause. He had previously described this situation without reference to causality by saying that an object (here a "sense-object") retains the capacity for ingression at different places at (apparently) the 'same' time. Error was explained as confusion or vagueness concerning the location of events of which certain objects (recognized in perception) are the characters. This theory is now extended into a direct attack on the problem of causation on an experiential basis.
The main theme of Whitehead's argument is that the experience of causality can never arise from a piling up and consequent 'association' of similar sequences of events repeated in 'constant conjunction'—i.e., in the manner that Hume had claimed.

Hume's philosophy found nothing in any single instance to justify the mind's expectation. Accordingly he was reduced to explaining the origin of the mind's expectation otherwise than by its rational justification [i.e., by 'habit' or 'practice']. It follows, that, if we are to get out of Hume's difficulty, we must find something in each single instance, which would justify the belief. 26

This 'something' is found in the signifying nature of sense-objects. By their ingression into percipient events, sense-objects signify—or we might say here, 'refer' or 'point back to'—the perceptual objects (events) of which they are the forms or characters. 27

How do we pass from the ingression of sense-objects to the perceptual objects? The answer is that the ingression signifies the [perceptual] objects. It is no good saying, that the accumulation of instances of 'smell and a pat' reminds a dog of his master by the association of ideas. Hume's argument applies: If no one instance is significant of his master, but is merely a smell and a pat, what virtue towards producing the master can the accumulation possess? The significance may grow clearer to perception by the accumulation of instances, but it must have been there from the beginning. 28

The percipient event or "sensorium" Whitehead now identifies as "roughly, the body or part of the body." 29 A sense-object is said to qualify the sensorium and at the same time signify the situation of a perceptual object. Now Whitehead observes that where the sense-object is a bodily feeling, there is peculiar vividness of recognition of parts of the body as perceptual objects, in that the vivid reference to the sensorium is now used with fainter, vaguer reference, of the sense-object to a perceptual object in its situation.

But, where the sense-object has its [signified] situation projected beyond the body, a difficulty arises. Undoubtedly
there is reference to a perceptual object....But this reference to a perceptual object—other than the sensorium—is apt to be vague, illusive or absent. You see double; you see the image behind the looking-glass; you hear stray sounds vaguely filling the space around you; you smell a scent. 30

The conclusion is that "The reference of the sense-object to the perceptual object is not as neat as we should desire for simplicity of exposition." 31 When there is confusion or vagueness attending the signified situation (or locus) which, if we sense correctly, would be the perceptual object, we attempt to resolve our doubts by obtaining a direct bodily sensation. It is a fact of experience that "the sense of touch gives a peculiarly vivid reference, and for that reason has been taken as the standard of verification. Doubting Thomas wished to touch his Lord." 32 Whitehead notes that "a vivid reference is also obtained by an accumulation of sense-objects of different types [e.g., visual, tactual, and auditory], whose various ingressions relegate them to the same situation." 33

Thus two prominent facts emerge: first, there is an admitted vagueness which often accompanies the reference of a sense-object to its situation; second, there is our proven ability—at least on pragmatic grounds—to pin down or verify in various ways these situations (or loci). What, then, may we conclude of the nature of sense-objects, of perceptual-objects, and of the relation between them?

Whitehead's answer is that perceptual objects are the actual characters or forms of actual physical events in the real world, and that the modes of ingestion of sense-objects in nature are the outcome of the perceptual objects exhibiting themselves. The
grass exhibits itself as green, the bell exhibits itself as
tolling, the sugar as tasting, the stone as touchable.

Thus the ultimate character of perceptual objects is that
they are [forms or characters] which are the controls of in-
gression.*34

The conception of perceptual objects as "controls" leads Whitehead to
the final reflection of his philosophy of science period, namely, the
control of the future by the present—an experiential ground of physi-
cal causation.

If the very nature of perceptual objects is to be controls,
have we not in them those missing characters of events, whose
supposed absence led Hume to remove causation from nature
into the mind? A control is necessarily the control of the
process, or transition, in finite events. It thus means,
in its essential character, a control of the future from
the basis of the present. Thus in modern scientific phraseology,
a perceptual object means a present focus and a field of force
streaming out into the future. This field represents the type
of control of the future exercised by the perceptual object—
which is, in fact, the perceptual object in its relation to
the present. But the present has also a duration. What we
observe is the control in action during the specious present.35

Which is to say that causation is directly experienced and directly ob-
served, and that such a concept is essential to the rational explana-
tion of our experience.

Thus during his philosophy of science period Whitehead was led
from an analysis of the experience of nature to an analysis of exper-
ience in general. He had presupposed from the beginning that experience
was a wider category than nature. The discovery of his investigations
into the foundations of science was that the intellectual analysis of
nature necessarily involves reference to areas of experience which,
according to his own definition of nature per se, lie outside of
nature. For instance, a reference to 'ideality' is necessary.
The transition to metaphysics thus involved merely the casting off of the self-imposed limitations under which the inquiry into a philosophy of nature was begun. The need to cast aside these limitations, however, Whitehead seems to have felt in increasing degree as his inquiry progressed. Let us review the steps this inquiry took.

First, he had begun his endeavor to formulate a new concept of nature on the assumption of a boldly realistic ontology. On the basis of this ontology, he directly identifies 'nature' with 'what is perceived through the senses.' This is his way of avoiding 'bifurcation.' Not 'phenomena' which are caused by nature are perceived, but nature is perceived; the event of perceiving is as much a part of nature as the event or systems of events perceived. Events are interconnected; that is to say, they 'extend over' or 'contain' other events. They also interpenetrate one another in terms of the mutually pervasive 'fields' of their objects, i.e., their intrinsic forms or characters. Events and objects are the two fundamental kinds of entities distinguished in the analysis of nature. But they cannot in fact be torn apart. As the 'field theory' makes clear, events and objects are essentially connected. Their manner of connectedness, interpreted in terms of the doctrine of significance, implies a scheme of internal relations. The 'control theory' is simply the 'field theory' worked out in a consistently temporalistic manner.

Whitehead's concept of nature, as a system of spatio-temporal events, interlocked by internal relations, thus provides the object of his original quest: a truly physical doctrine of space-time in terms of which an observational derivation of mathematical entities...
is possible. The notion of an essential relativity of events throughout all nature, however, makes incumbent upon him the obligation to explain how we can have "knowledge by relatedness" without having knowledge of the relata in the sense of "knowledge by adjective."

Whitehead undertakes such an explanation in terms of a general theory of limitation, under which he subsumes a theory of the nature of thought. Thought is abstraction, and abstraction presupposes something from which to abstract. It is on the basis of this theory that he interprets perception as well as thought. Thought and perception are not radically different, as the older 'faculty theories' had assumed, but are distinguished merely as different intensities of 'awareness,' made possible and accompanied by an ascending scale of abstraction. The essence of abstraction is a 'blocking out' of the vast array of detail (i.e., individual relata); its gain is an increase in clarity, definition, intensity, and scope.

'Nature,' however, was originally defined as "that which we observe in perception through the senses." This, taken in the strict sense, is merely what is recognized; its 'interpretation' would apparently require a reference even beyond what is signified by the limited number of objects disclosed in recognition; and this involves a necessary reference to what Whitehead calls vaguely in the two essays we have just examined, 'ideality.' 'Ideality' consists in the much wider sphere of interpretative elements drawn from our more general 'awareness,' of which the sense perception of nature is merely the luminous, vivid focal center. This general awareness may be equated with the sum total of our 'experience.' In the development of his philosophy
of nature Whitehead limited himself principally to the consideration only of certain features of this more general experience, namely those features of 'uniform significance' or 'extension.' Such a limitation though, aside from its mathematical and scientific interests, is almost arbitrary. Also, though mathematical or 'extensive' relationships, as Whitehead conceived them, may be found exhibited in observation, they are, as a matter of historical fact, hardly derived originally from observation. Thus, such a 'derivation' as Whitehead undertook in The Principles of Natural Knowledge retains a certain air of artificiality about it. A full consideration of mathematical knowledge itself requires an analysis of the relations between 'observation' and other areas of 'experience.' Thus the subject of 'nature' is enveloped in the subject of 'experience.'

In the Preface to the second edition of The Principles of Natural Knowledge, dated August, 1924, Whitehead announces a hope "in the immediate future" to embody the standpoint of the three philosophy of science books "in a more complete metaphysical study." Also appearing in this edition is a set of Notes in which Whitehead seeks to clear up obscurities he had noticed later, and to register several criticisms of his original thesis. Four of these criticisms are worth noting.

First, Whitehead feels he did not emphasize sufficiently the essential relativity of nature in an ontological sense. He now insists that

every entity is an abstraction and presupposes certain systematic types of relatedness to other things. There is no such thing as an entity which could be real on its own, though it happens to be related to other things."
Secondly, he notes that there are difficulties and obscurities connected with "the ingression of objects into social entities." This is the first time that the term "social entity" appears in Whitehead's writings; there can be little doubt but that he is thinking of "societies" and "nexûs" composed of ultimate "actual entities."

Thirdly, he confesses to having since arrived at the view that "process' is the fundamental idea" and that "Extension is derivative from process, and is required by it."

Lastly, he observes that space and time cannot result from the "mere relations" between objects, for objects are "at all times," and are always--at least in experience--abstractions of some kind. Space and time must be anchored in the ultimate relations between ultimate events; which is to say that "space and time must result from something in process which transcends objects."

Each of these difficulties requires for its solution a metaphysical analysis of those 'ultimate entities' which lie at the very base of reality, in terms of which everything else is explained. The third and final period of Whitehead's career begins.
NOTES TO CHAPTER III

1. PNK 12

2. PNK 12

3. PNK 12

4. SNN 38

5. PNK 59

6. PNK 64

7. CN 143

8. CN 143

9. CN 14

10. CN 15

11. CN 16, italics mine.

12. CN 20-1

13. CN 21

14. PRel 14

15. PRel 15, italics mine.

16. PRel 15

17. Whitehead employs this "inadmissible word" as more expressive of his meaning than either "fact" or "totality." "For 'fact' suggests one fact among others. This is not what I mean, and is a subordinate meaning which I express by 'factor.' Also 'totality' suggests a definite aggregate which is all there is, and which can be constructed as the sum of all subordinate aggregates. I deny this view of factuality." (PRel 15) For Whitehead, "factuality" is descriptive of the presupposed background of immediate experience. It is what he will later call "the general sense of existence" which is the "actual world" presupposed by all more specific kinds of experience.

18. PRel 16

19. PRel 17

20. PRel 17
21. Whitehead's first introduction of a theory of value as a feature of the general theory of limitation is in SMW (cf. 136-7). SMW is however a preview of the metaphysics which is much more completely and systematically set out in PR.

22. PR 6

23. Cf. PR, Part III in particular

24. PRel 20

25. PRel 20, italics mine

26. UC (SP 153)

27. The 'object' is here in both cases the same; the prefixed words "sense-" and "perceptual-" refer to the location of the 'object,' at the percipient in the first case, at the event or system of events of which it is the intrinsic 'form' or 'character' in the second case.

28. UC (SP 154)

29. UC (SP 155)

30. UC (SP 155)

31. UC (SP 155)

32. UC (SP 155-6)

33. UC (SP 156)

34. UC (SP 156), italics mine

35. UC (SP 156-7)

36. Some critics, notably Prof. A. A. Bowman in the third chapter of his A Sacramental Universe (1939), hold that Whitehead's distinction of two types of entities, 'objects' and 'events,' itself amounts to a bifurcation. Prof. Lowe has answered Bowman's criticism in his essay on Whitehead's development (Cf. Schilpp, 88). Lowe contends that "if a philosopher disbelieves...Whitehead's Platonism, he must criticize the doctrines of Process and Reality; he must not rest content with demolishing the special form in which that Platonism appears earlier—the theory of the 'recognition of natural knowledge objects'—and then referring to PR merely in passing." Bowman's criticism, Lowe says, rests on such a mistake. "His reference to Process and Reality as 'a speculative completion of the train of thought which began on a different place with the Principles of Natural Knowledge' is useless to him unless it means—what is not
true—that *Process and Reality* is describable with sufficient
accuracy, as the completion of that train of thought only. The
phrase, 'on a different plane,' is quite accurate. The planes being
different, the assumption underlying Professor Bowman’s criticism,
namely, that 'Yet the conclusions of the later work are dependent
upon premises supplied by the earlier, and must stand or fall with
these' becomes a mere assertion, supported by the single word,'Yet.'" The charge that Whitehead himself has fallen prey to 'bifur-
cation' under a different guise thus seems difficult to support.
Bifurcation occurs by way of the erection of a *metaphysical dis-
junction* between the thing perceived and that which 'causes' the
perception, such that one set of metaphysical properties are
assigned to the former, another, mutually exclusive set are assigned
to the latter. Descartes’ system provides the classical example,
of course. This is not the case in Whitehead’s system. In PNK how-
ever, Whitehead was making a special effort to avoid the discussion
of metaphysical issues. Even here the distinction between objects,
and events does not entail bifurcation; cf. this study, Ch.I, pp.
12-3; Whitehead takes pains in the passage quoted here (ref. in
note 27, Ch.I) to make clear that objects and events are ontologi-

cally interdependent. In Part III of PR he works out in great detail
the process whereby there is a transmission of form and feeling. It
is here that one would have to attempt to prove Whitehead guilty
of bifurcation.

37. The word 'scope' is perhaps somewhat puzzling here in company with
'clarity,' 'definition,' and 'intensity'—all of which signify
characteristics which result from 'limitation.' 'Scope' however
refers to the gain in logical extension. The more detail blocked
out by abstraction, the more uniform and the more extensive both
concepts and precepts become. We say the mountain in the distance
is blue, and in fact it appears uniformly blue; going a step higher,
we say both the mountain and our companion's shirt are blue. We
Thus abstract and ignore differences in shade.

38. PNK ix (2nd ed.)

39. PNK 201

40. PNK 201

41. PNK 202

42. Whitehead had claimed originally that space and time were derivable
from the extensive relations immediately observable among events;
but this would have to be 'among events via their objects,' which
alone are the 'percepta' directly 'recognized.'

43. PNK 202. It is interesting to note that this objection holds
equally against any relational theory of space or space-time.
Neither space nor time, nor a four-dimensional union of both can result from large-scale entities; they must result from relations between the 'ultimate entities.' The force of this objection drives Whitehead to the 'epoch theory of becoming' discussed in the next chapter (Cf. pp 69-70). It is on the basis of this theory that Whitehead is able to offer a solution to Zeno's paradoxes (Cf. PR, Pt. II, Ch. II, Sec. II).
CHAPTER IV

WHITEHEAD’S PRINCIPAL METAPHYSICAL CATEGORIES

The metaphysical system of *Process and Reality* takes its leave from the same criticisms of the foundations of thought that we have encountered in the philosophy of science books. As we have seen, Whitehead's main protest in these works is against the "ingrained tendency to postulate a substratum for whatever is disclosed in sense-awareness," that is, "to look below what we are aware of for the substance in the sense of the 'concrete thing.'" This tendency he traced to Aristotelian logic and to the substance-quality metaphysics modeled upon it which, until recently, had gone virtually unchallenged for more than two thousand years.

The basic difficulty with this way of conceiving things centers in the problem of relations. 'Factors' discriminated in sense-awareness are separated from the 'total fact' of which they are factors and are transformed into predicable attributes. The result is (i) that nothing can be said as to relations between attributes and the substratum except that such-and-such attributes are either predicable or not predicable of it, and (ii) that nothing whatsoever can be said of the 'individual substances' or 'particles of matter' which compose the substratum; for only the attributes can be known. The difficulties which arise as to space and time, as to causality, and finally, as to knowledge and perception, are all consequences of what Whitehead has termed the "universal ruin of relatedness."

The positive program of the philosophy of science books began in effect with a rejection of the substance-quality conception of reality.
and in its place, the substitution of a novel analysis of nature in terms of 'objects' and 'events.' Whitehead's purpose was "to remove the metaphysics and start afresh on an unprejudiced survey of nature...." For reasons we have noted at the close of the last chapter, he later became convinced that the theory of nature he attempted to construct independently cannot be ultimately divorced from a metaphysical frame of reference. What is needed is a reformed metaphysics.

Whitehead had defined 'nature' as "that which we observe in perception through the senses." By virtue of this definition, his philosophy of nature retained an empirical air, that is to say, its frame of reference was the directly observable. Accordingly, as we have seen, its two basic categories--'objects' and 'events'--were designed to refer primarily to the observable. They were not necessarily limited to the observable; but they were anchored in the observable to the extent that they were intended to specify observable relationships which, it was assumed, were universally pervasive, and, on this account, suited for extension into regions of the unobservable in the direction of either microcosm or macrocosm. The Method of Extensive Abstraction was to serve as a formal instrument by means of which such extension could be effected.

One of the principal difficulties, however, is that 'events' are observable only in a very questionable sense. They are the 'facts of passage' in nature; and while 'passage' is undeniably an aspect of nature, one observes directly only the consequences of passage, such as 'motion' and 'change.' What moves and what changes are always 'objects.' This is why in the explanation of 'extension' events had to
be abandoned. As long as the empirically observable is taken as the primary frame of reference, a theory of extension along the lines of Whitehead's original version requires formulation in terms of 'objects.' And the difficulty in this is the overpowering complexity of the diverse kinds of relationships between diverse kinds of objects—between, say, electrons and atoms ('scientific objects') and the color blue (a 'perceptual object'). Notwithstanding, the formal aspect of Whitehead's metaphysics, especially the early version of the doctrine of eternal objects presented as Chapter X of *Science and the Modern World,* is essentially an attempt to work out the principal kinds of relationships involved.

However the difficulty is not merely formal. The concrete fact of 'passage' must also be accounted for. And the difficulty of accounting for the peculiar concreteness of 'passage' is manifest in Whitehead's early attempts to describe 'events.' Events, he says, are "lived through;" they are "chunks of the life of nature;" they are, in short, "the concrete facts of nature." None of these phrases—despite their aptness—describes anything that is empirically observable. It would seem, then, that Whitehead is back precisely in the predicament of Aristotle: 'events,* it could be objected, are merely 'individual substances' in a different guise.

This, in a sense, is true. It is true in the sense that Whitehead is trying to designate, as Aristotle had tried, the 'stuff' or 'substance' out of which things are made. It is not true if what is meant is that Whitehead falls into the same difficulties that Aristotle did. Whitehead is a mathematician and a Platonist, and in his earlier and
later writings alike he is acutely aware of just these difficulties. The heart of the problem is that of concrete relational structure. Aristotelian logic was not suited to deal with relations; and hence, a metaphysics which takes as ultimate in an ontological sense the subject-predicate structure of Aristotelian logic will fail at exactly this crucial point. Whitehead believes that the breakdown of the major metaphysical systems since Aristotle is in fact a result of the presupposition that the subject-predicate form of statement conveys a truth which is metaphysically ultimate. According to this view, an individual substance with its predicates constitutes the ultimate type of actuality. If there be one individual, the philosophy is monistic; if there be many individuals, the philosophy is pluralistic. With this metaphysical presupposition, the relations between individual substances constitute metaphysical nuisances: there is no place for them. Accordingly—in defiance of the most obvious of our intuitive prejudices—every respectable philosophy of the subject-predicate type is monistic. The task of a reformed metaphysics, then, is (i) to account for the relatedness, or more generally, the coherence, of things; (ii) to explain adequately the fact of their concreteness; and (iii) to do so in a way which does not do violence to our intuitive experience.

Whitehead's aim in Process and Reality is therefore an attempt to reconstruct our most fundamental notions concerning reality. Just as in his philosophy of the natural sciences, it begins with a rejection of the category of 'substance' as an adequate representation of "the ultimate type of actuality." This means some other category must take its place. For 'substance,' apart from its intimate connection with Aristotelian logic, is the concept that traditionally has been used to designate the ultimate 'stuff' of things—that which is 'real' or 'fully
concrete* in a final or ultimate sense, "beyond which there is no other." In the doctrine of nature, 'events' had taken the place of 'substance.' But as we have seen, apart from the 'objects' which exhibit them, events are vague, elusive entities. They are 'chunks of actuality,' but they cannot be the 'ultimate type of actuality.' Nor had Whitehead ever taken them for such; events are merely the 'concrete facts' of the observable sphere of 'nature.'

In Process and Reality Whitehead's category for the 'ultimate type of actuality' is that of 'actual entities' or, as he also terms them, 'actual occasions.' We can best approach the question of what an 'actual entity' is by referring back for a moment to Whitehead's remark in the 1924 Notes to The Principles of Natural Knowledge in which, after reconsideration of his original thesis, he concludes that not 'extension' but 'process' is the fundamental idea. The main advance of the notion of 'events' over that of 'substance' is that events incorporate space and time into their very nature; they are not merely 'in space' or 'in time;' the latter are conceived as abstractions from the extensive relations of events. Still, the structure of events as Whitehead first conceived it retains the character of a 'static morphology.' Space predominates over time. The notion of 'process' amends this situation by accentuating the aspect of temporality—that is to say, of 'passage.' And because Whitehead believes that to do justice to "the most obvious of our intuitive 'prejudices'" many individual actualities are required, 'actual entities,' as the ultimate type of actualities, are conceived as units of process. Each one, in other words, is a minute occurrence, a happening, a microcosmic ripple of activity. In the ancient termin-
ology, becoming replaces being as the fundamental characteristic of concrete existence.

But 'process,' 'activity,' 'becoming,' are themselves wholesale abstractions that convey little more about 'reality' than the static 'Absolute' of monistic theories. What becomes? What is the 'concrete' nature of an atomic process? How do such processes come into being? How do they end? In what do they result? How are they related?

In answer to these questions, let us begin with the fundamental hypothesis of Whitehead's system: his panchsara. The notion of the ultimate real entities as 'activities' is neither new nor shocking. It is, first, simply a metaphysical extension of the doctrine of events. But it is also more than this. Whitehead's initial question in the philosophy of science books had been, "What are the ultimate data of science?" Bearing directly on this question, in conjunction with mathematical and epistemological considerations, were reflections on "modern speculative physics with its revolutionary theories concerning the natures of matter and electricity...." In current physical theory 'energy' is regarded as the ultimate 'stuff' of things. Whitehead returns to the point in Science and the Modern World:

we find the relations of mass and energy inverted; so that mass now becomes the name for a quantity of energy considered in some of its dynamical effects. This train of thought leads to the notion of energy being fundamental, thus displacing matter from that position. But energy is merely the name for the quantitative aspect of a structure of happenings....

Thus the notion of reality as built up of ultimate atomic 'occurrences' is to this extent in full accord with modern theoretical physics.

Whitehead, however, goes a step further, and it is a seven-leagued
step of speculative genius. The notion of 'energy' does not involve
the same absolute disparity between our immediate psychological experi-
ience and what we now take as the ultimate 'stuff' as, say, was the case
when 'matter' was taken as ultimate. For example, we feel nothing
strange in saying that 'so-and so' is a man of great energy, or that
someone else is a very energetic, intensive personality. We should
never dream of using 'matter' or 'materialistic' in quite the same way.
Whitehead therefore makes the assumption that "the energetic activity
considered in physics is the emotional intensity entertained in life." 17
This, to be sure, is very bold and sweeping hypothesis, and, so far,
there is no direct scientific evidence either for or against it. Its
ground is therefore wholly speculative. What justification it has qua
hypothesis we shall not pause to consider. Our present purpose con-
sists simply in seeing what is involved in the notion of an 'actual
entity,' which task presupposes as a starting point this very funda-
mental hypothesis.

An actual entity may be considered thus far, then, an atomic
process whose more 'concrete' character is emotional energy or 'feel-
ing.' It should be emphasized here that Whitehead is using the terms
'emotion' and 'feeling' in an extremely generalized sense. Mostly, the
sort of 'feeling' he intends is 'blind,' that is to say, it is a very
primitive kind of feeling, amounting in all except a few high-grade
occasions to little more than a kind of elemental responsiveness to
the specialized conditions of the environment. In low-grade sorts of
occasions, such as those we would term 'purely physical,' it approxi-
mates to what might be called 'massive habituation,' meaning that for
all practical purposes it is uniformly repetitive.

But even in low-grade occasions, these primitive pulses of feelings are not just mere activity. They are structured or patterned activities, which is to say they consist in an organization of feelings. An actual entity is thus an organic sort of occurrence. This is Whitehead's reason for calling his philosophy 'the philosophy of organism.' Actual entities are minute organisms.

But it would seem that if actual entities are temporal processes of any kind, Whitehead runs afoul on the problem of infinitesimals. For it will always be possible to conceive a shorter time, thus why should there be minimal durations, even very small ones?

It will be recalled that, according to Whitehead, space and time are abstractions, and that they are ultimately grounded in 'the ultimate relations between the ultimate entities.' This being the case, the infinite divisibility of an abstract notion of time cannot be legitimately urged as an objection against ultimate organic occasions. On the other hand, it must be explained how 'abstract time' results as a large-scale aspect of actual entities and their relations. Whitehead's solution is what he entitles the 'epochal theory of time.' An actual entity is to be conceived as the actualization or becoming of an atomic occasion, whose process of becoming fills out as a whole a finite 'epochal' duration. That is to say, the becoming of an actual entity cannot be divided into smaller and smaller times which diminish toward some ideal 'durationless instant,' for there is no such ideal instant except in abstraction. Each actual entity 'forms' or comes into being as an irreducible (though not unanalyzable) organic atom of
process. Such a theory, Whitehead believes, is required by the notion of 'organism' itself; an organism is not a mere aggregate; it is something which must function as a whole. This is fairly obvious in the case of animal organisms. But Whitehead maintains that such an interpretation is required even in the case of the most elementary kinds of electromagnetic occurrences: "half a wave tells only half the story." Becoming thus consists not in a smooth continuity, but rather in the atomic becoming of ultimate individual 'pulses of existence.' As he puts it,

> there is a becoming of continuity, but no continuity of becoming. The actual occasions are the creatures which become, and they constitute a continuously extensive world. In other words, extensiveness becomes, but 'becoming' is not itself extensive.

Space and time are abstract reflections or 'projections' whose ultimate concrete basis is in the extensive relations of completed actual occasions which have become. Actuality is atomic; potentiality (in this sense) is the reflection of the structure of the immediate past upon the immediate future, which presents itself in the guise of an abstract continuum awaiting atomization.

The epochal theory of time leads to an important distinction between 'change' and 'becoming.' Actual entities become, but do not change. This means simply that each actual entity, upon its 'satisfaction' (a technical term shortly to be explained), is a settled, given fact, completely determined as to what it is, where it is, and when it is. 'Change' or 'motion' consists in a 'historic route'—or more likely, in an interwoven structure of 'historic routes ('nexus' and 'societies')—in which an element of common character is preserved, or gradually
modified, amid transitions from actual occasion to actual occasion. This common character or complex form is what moves or changes. The change or movement of a persistent something is what comprises an 'event' in the sense in which Whitehead uses this term in the philosophy of science books. The change or movement, or more generally 'passage,' is what the event is; the 'something' is a complex 'object' which defines a given event. "An actual occasion is the limiting type of an event with only one member." It is a pure atomic process. But 'change' or 'motion' requires a theoretical minimum of at least two actual occasions.

To say that actual entities become as wholes, however, still does not answer—although it qualifies—the question of how actual entities begin. The qualification, of course, is that an actual entity must not be conceived as beginning at some time \( t \) and becoming throughout a simple linear duration terminating at \( t \). Still, there remains a legitimate question of genesis. The first thing to be remarked is that actual entities do not become 'out of nothing.' Whitehead categorically rejects the idea of creation \textit{ex nihilo}: "It is a contradiction in terms to assume that some explanatory fact can float into the actual world out of nonentity. Nonentity is nothingness." Actual entities become out of something, and this something is the antecedent 'actual world' defined relatively to each actual entity. It is implicit in the notion of actuality as 'process' that each atomic actual occasion will have a different 'actual world' or 'perspective' comprised of the sum of things in its own individual 'causal past.' An actual entity arises out of its actual world, and its process of becoming
consists in its synthetic appropriation of the 'objective data' supplied by its immediate causal past. The becoming of an actual entity is in fact just this self-formative synthetic activity.

This explanation seems still to leave unanswered the question of how an actual entity begins. Must not there first be something which appropriates the data? The answer is both 'yes' and 'no.' There is something, but it is not a pre-existent something which does the appropriating in the way that a fisherman would appropriate fish from the sea. The creation of an actual entity occurs rather by a spontaneous growing together of 'feelings' around a 'subjective ideal' toward which the constituent feelings are said to 'aim.' The initial 'subjective aim' determines in part how the feelings shall be organized—but only in part:—first, because the subjective aim itself is necessarily conformal to the data, that is to say, the 'actual world' relatively to this particular act of becoming; and secondly, because the initial subjective aim is not itself wholly determinate, that is, it is not entirely 'given.' Within the bounds of its capacity,

the actual entity, in becoming itself, also solves the question as to what it is to be. Thus process is the stage in which the creative idea works toward the definition and attainment of a determinate individuality. Process is the growth and attainment of a final end. The progressive definition of the final end is the efficacious condition for its attainment. The determinate unity of an actual entity is bound together by the final causation towards an ideal progressively defined by its progressive relation to the determinations and indeterminations of the datum. The ideal, itself felt, defines what 'self' shall arise from the datum; and the ideal is also an element in the self which thus arises.23

There are thus operative in the becoming of an actual entity three distinct causal factors: (1) the efficient causation of the 'actual world'
from which the actual entity arises; (ii) the final causation contributed by the initial subjective ideal-of-itself toward which the actual entity aims; and (iii) the self-causation of the actual entity's own free agency which renders fully determinate the vague ideal-of-itself initially felt. These are of course 'distinctions of reason.' The efficient and final causes merge in the fusion of becoming with the organizing factor of self-causation which completes the final end in the process of attaining it. In Whitehead's more abbreviated statement, "an actual entity is at once the product of the efficient past, and is also, in Spinoza's phrase, causa sui." The difficult point to grasp is that both the synthetic operations by which, and the 'stuff' of which, an actual entity progressively becomes, are 'feelings'—or, to use Whitehead's more general term, 'prehensions.'

The termination of an actual entity—the completion of its process of becoming and hence the achievement of a determinate being—is what Whitehead calls its 'satisfaction.' By itself, 'satisfaction' is the notion of the 'entity as concrete' abstracted from the 'process of concrescence'; it is the outcome separated from the process, thereby losing the actuality of the atomic entity, which is both process and outcome. 'Satisfaction' provides the [final] individual element in the composition of the actual entity—that element which has led to the definition of substance as 'requiring nothing but itself in order to exist.' But the 'satisfaction' is the 'superject' rather than the 'substance' or the 'subject.'

'Superject' is a term Whitehead uses to signify (i) the completion (or 'satisfaction') of the entity, and with somewhat more accent (ii) what it has become—in other words, its finite, unique accomplishment as a settled individual fact. The term 'subject' signifies the actual entity in process of becoming; it refers to the 'subjective immediacy'
of its process of feeling, which for Whitehead is the fullest, most concrete exemplification of 'actuality.' The subject, in short, is an act of experiencing the actual world from its own 'given' perspective, and this act or activity of experiencing is constitutive of the 'superject' which finally becomes. Thus as Whitehead explains,

an actual entity is at once the subject experiencing and the superject of its experiences. It is subject-superject, and neither half of this description can for a moment be lost sight of. The term 'subject' [is] employed when the actual entity is considered in respect to its own real internal constitution. But 'subject' is always to be construed as an abbreviation of 'subject-superject.'

In the strict sense, the term 'actual entity' emphasizes the 'subjective' rather than the 'superjective' nature of the complete entity. As Dr. Ivor Leclerc points out, Whitehead's use of 'actual' 'is in its strict etymological derivation from the Latin actus... an actual entity is an acting entity; that is to say, it is 'acting,' 'agency' which constitutes existence in the 'full sense.' Thus it is seen that the category of 'actual entities' abolishes the inalterable character anciently associated with 'substance' conceived in terms of Aristotle's logical model as 'the unchanging subject of change.' 'Process,' not permanence, expresses the meaning of 'existence' is the most complete sense in which that term can be taken.

'Subjects' perish however, and we must now consider the status into which they pass in perishing. First, 'to perish' means for Whitehead not simply to vanish into nothingness. It means rather to become a settled, determinate fact which, in losing the immediacy of 'subjectivity,' attains the status of what he entitles 'objective immortality.' An actual entity in 'perishing' becomes an 'object' for other 'subjects'
which succeed it. It becomes a 'given' individual fact conditioning the becoming of actual occasions beyond it. The term 'object' is here used in much the same sense as in the philosophy of science books: the 'objective' side of a 'past occasion' is its determinate form or character which, in however slight a degree, is now an ingredient in the actual world of which future actual occasions must 'take account.' The 'past' is defined solely in terms of causal influence: those things are 'past' which are efficient causes relative to the standpoint of the present, and those things are 'future' which can be causally influenced by the present. Thus there are essentially two factors involved in the 'perishing' of an actual occasion: first, the final determination of what it is, which has reference to its complex 'formal' character, and second, the transmission or expression of this character into the future. The latter refers to an actual transmission of structured physical energy—what Whitehead calls 'physical feeling.' This is the manner in which objectively immortal occasions present themselves to the future while at the same time adding themselves to the body of solid matter-of-fact we instinctively associate with the term 'reality.' The matter-of-factness or 'givenness' of the actual world is rooted in the completely determined character of all that has become, which is to say, all that has perished. Herein lies the irreversibility of time.

The matter-of-fact or 'objective' aspect of actual occasions, is in no way exclusive of the 'value' that Whitehead attributes to each one individually. Although he fails in most cases to draw the distinction clearly, the term 'value' has quite obviously two distinct references in his system. 'Value' in one sense attaches to the actual
process of experiencing which is constitutive of the becoming of each actual occasion. It is the harmonization of feelings whereby the concrescent occasion becomes 'something definite,' an "end in itself,... which is for its own sake." This is the value of existence in its fully concrete, most immediate sense. It is the value of 'life' wherever life is attained. On the other hand, there is the entity as a final accomplished fact, as the outcome of its own process of self-definition. This is the value of its achievement which is also its value for those concrescent occasions which supersede it. Whitehead incorporates both of these senses of 'value' under the general principle of limitation (mentioned in Chapter III\(^\text{30}\)). An actual occasion becomes only by limiting or 'deciding' what, and in what degree, shall be admitted or rejected as a positive constituent of its nature. Whitehead is careful to make clear that

the word 'decision' does not imply conscious judgement, though in some 'decisions' consciousness will be a factor. The word is used in its root sense of a 'cutting off.'

'Decision,' as Whitehead intends it, is an ontological activity by means of which a concrescent occasion constitutes itself as a 'definite something' by making definite its relations to the remainder of things. Thus

every decision expresses the relation of the actual thing, for which a decision is made, to an actual thing by which as a casual adjunct of an actual entity. It constitutes the very meaning of actuality...[It] is the additional meaning imported by the word 'actual' into the phrase 'actual entity.' 'Actuality' is the decision amid potentiality.'

An actual entity thus 'arises' as a synthesis of feelings out of its 'given' actual world. These feelings are in fact what is 'given;"
that is, they are the actual world, and they constitute the nascent entity's 'first feelings' or most primitive 'experience' of the world. But this initial primitive experiencing undergoes in the whole act of becoming, i.e., the whole entity or 'subject-superject,' a progressive organization; and this organization, or 'organizing response' occurs by way of 'decision.' The sum of an actual occasion's 'decisions' constitutes its self-creative reaction upon the initial 'givenness' or 'potentiality' of its perspective. And this complete atomic reaction is the precipitation of a new individual fact out of the 'given' creative potential of the immediate past. It is a new 'canalization' or 'limitation' of the physical energy flowing into its perspective, limited by the responsive 'decision.' 'Decision' thus constitutes, as Whitehead puts it in *Science and the Modern World*, "the shaping of attainment."

Apart from such shaping into individual matter of fact there is no attainment. The mere fusion of all there is would be nonentity of indefiniteness. The salvation of reality is its obstinate, irreducible, matter-of-fact entities which are limited to be no other than themselves.33

Value, then, and matter-of-fact, are inseparably intertwined, both as regards their creation and their issue. But there is no general value; there is only that which is immediately experienced and passed on for what it is worth to the future. This latter only the future can decide.

We have now carried the general description of actual entities as far as possible without introducing Whitehead's other main metaphysical category, namely, that of 'eternal objects.' Actually we have already touched on this category a number of times in speaking of 'structure,' 'pattern,' 'form,' 'complex character,' 'organization,' and 'decision;' but we must now make these references more explicit. For in the deci-
sions by which an actual entity constitutes itself, eternal objects are what are decided upon. Thus some understanding of the nature and functioning of eternal objects is essential to an understanding of the nature and composition of actual entities.

'Eternal objects' are the metaphysical counterparts of Whitehead's earlier category of 'objects.' In the preceding discussion of actual entities we said that in 'perishing' they become 'objects' for con-
crescent occasions which supersede them. To the extent that this is correct, the notion of 'object' qua 'object' is almost identical with Whitehead's earlier notion. However, it is more proper to say that, in perishing, actual occasions are 'objectified' than to say that they are 'objects.' One reason is, as we have seen, that the 'perishing' of an actual occasion involves a transmission or 'expression' of physical energy into the future. The other, more important, reason is the greater comprehension both in scope and function of 'eternal objects.'

Whitehead's earlier 'objects' were in every case the form or character of some natural event. Although independent of the spatio-
temporal location of the event said to be their 'situation,' every ob-
ject ingredient in (i.e., having impression into) nature was presumably situated in some event. That is, it was the form of some event. Objects could in this sense be spoken of as 'permanent' in nature in that they might indefinitely recur at different times and places and in different events: once in nature, always in nature. But in any occasion of recurrence they were always regarded as elements of definition defining 'abstract' aspects of some event.

'Eternal objects' have a much wider compass. In addition to being
ingredients in actuality, they comprise as well the vast sphere of ideal-
ity. Like their earlier forebears, they function in differentiating
what has been and what is now; but they also signify through their mutual
interrelatedness the entire realm of that which might be, i.e., that which
is merely possible. Considered in themselves, then, eternal objects are
pure abstract possibilities, and their defining characteristic is that
they require for their conceptual recognition no necessary reference to
any particular actual occasion. In fact there may well be no actual
occasion (or group of actual occasions) to which a given eternal object
may be referred; that is to say, it may have no actual 'situation' in
concrete fact. Eternal objects in this category will be 'in' actual
fact only by way of their formal relatedness to other eternal objects
which are realized determinants of the actual world.

The mutual relatedness of the realm of possibility means that
every eternal object is in some degree implicated in each actual occa-
sion, no matter how remotely. The connection may be entirely implicit--
the eternal object in question having the status only of a mute alter-
native passed by and unnoticed in the actual course of things; but it
remains eternally just that alternative, and its relevance for future
occasions may either increase or diminish. At the bottom of the scale,
there is "the zero of relevance involved in negative prehension."35 For
Whitehead, lack of relevance does not imply lack of connectedness.

Presently we must examine more closely the rôle and function of
eternal objects as realized determinants of actual fact. In this capa-
city they constitute the 'forms of definiteness' assumed by actual
entities and by organized groups of actual entities. But as 'forms of
definiteness,' they are also 'forms of relatedness.' In a sense this
was also true of Whitehead's earlier 'objects.' But there is an important advance in Whitehead's conception of the relation of eternal objects to actual entities over that of his earlier thoughts concerning the relation of objects to events. In his philosophy of nature Whitehead made no attempt to treat the 'stuff' or 'substance' of events, which, in his metaphysics, is identified as emotional energy or 'feeling.' Consequently he was at a loss to describe the concrete nature of relations. The analysis of the extensive (i.e., spatio-temporal) structure of nature did not require such a description (or so he thought at the time), while the boldly realistic doctrine of perception in these earlier works was managed wholly in terms of the 'ingression' of objects. The obscurity of 'ingression' was a necessary consequence of the limited scope of the inquiry. At any rate, objects themselves seemed by way of their 'ingression' in multiple events to serve as relational bonds. But in Process and Reality 'prehensions' and 'contrasts' are "the concrete facts of relatedness." Eternal objects are merely 'abstract forms of relatedness.' That is to say, they are forms or possibilities of the ways in which actualities might be related. Whitehead expresses this by saying that there stands between eternal objects and actual occasions an indeterminateness on the part of eternal objects which must be 'solved' by a 'decision' of each concrescent subject in respect to every eternal object. What 'decision' amounts to is the way in which the concrescent occasion forms itself by its relations to the actual world out of which it arises. This occurs according to its 'ways of feeling' its actual world; in other words, its feelings are its relations, and these
feelings or relations are constitutive of what it becomes. This means that eternal objects are 'forms of the definiteness of feelings.' Thus in the 'growing together of feelings' there is the concrete synthesis of a new energetic fact, and there is also a sort of logical coalescence of forms, or better, a 'harmonization' of forms. But the forms are inseparable from the feelings that they form. The provision for novelty of feeling is contained in the fact of the relatedness of the 'realm' of eternal objects. What is felt might be felt with accentuated awareness of some alternative it suggests and with diminished awareness of what it is merely in itself.

It is evident from the above discussion of the rôle of eternal objects as 'forms of the definiteness of feelings' that the form or character of an actual entity is always complex; that is, the becoming of an actual occasion involves a synthesis of feelings, and each of the constituent feelings synthesized acquires in the act of synthesis some definite form and no other. The conclusion is that forms may be simple entities—in fact Whitehead explicitly postulates certain base groups of simple eternal objects—; but concrete actualities are never simple. Eternal objects, of course, are usually complex too. But they may be simple. Actual entities never.

In another sense, however, every eternal object is both simple and complex. For Whitehead, all relations—that is, all actual relations—are internal relations. This follows from their constitutive functioning. Thus an eternal object 'recognized' as the actualized form of a constituent feeling in the experience of some high-grade living subject, a color, for example, will appear as simple. It will
be just this color and no other. On the other hand, the situation in the actual world signified by this color may be very complex. Let us take as a concrete instance a man observing a mountain ten miles distant. Implicit in this whole event, namely, 'the-man-here-observing-the-mountain-there,' is a tremendous complexity of relationships. To name but a few--each in itself enormously complex--there is (i) the ratio between the size of the mountain and the size of the man; (ii) the distance separating them; (iii) the atmospheric conditions; (iv) the time of day; (v) the vegetation or lack of it on the facing side of the mountain; (vi) the physiology of the man; and so on. But the appearance is very simple: 'the blue mountain in the distance.' If any one of the above named conditions were altered, however, so would be the eternal object exhibiting the whole situation to the final experient. Such an eternal object, of course, is a very complex one, involving a diversity of relationships among throngs of relata. What it does in this case is to simplify for the subject the situation it exhibits. It does not mask it in the sense that 'attributes' mask the 'substance' they qualify; with enough effort and sensitive instrumentation, it might be possible to discover most of the important factors required to reproduce roughly the same shade of blue for the same man under other conditions. That is to say, all of the relationships involved in such a situation are there for discovery. But the entire situation, as naturally presented, is merely this shade of blue characterizing for the man 'here' the mountain 'there.'

Whitehead distinguishes, therefore, in the case of each eternal object, both an individual and a relational essence. The latter
consists in the sum of its relationships to other eternal objects, quite apart from the fact of whether either the eternal object in question, or, for that matter, any other, is a 'realized determinant' of the actual world. The former—its individual essence—is what the eternal object is simply in itself, as just this eternal object and no other. Both the individual and the relational essence of an eternal object may be conceived in abstraction (i) from each other, (ii) from the remainder of things. For example, the recognition of an instance of blue does not require that we call to mind its position in the spectrum or its associated wave length; similarly, consideration of its wave length does not require that we think of the definite shade of color or that we consider the infinite complex of its more abstruse mathematical properties. Yet in either instance, the sum of both the actual and possible relations of blue to the remainder of things is a fact presupposed in the background. Also, for any occasion of actual fact whatever, blue stands eternally as a potential which might characterize some aspect of its on-going experience.

Actual entities and eternal objects are the two most basic categories of Whitehead's metaphysics. As he says in Process and Reality, they "stand out with a certain extreme finality. The other types of existence have a certain intermediate character." Actual entities are the "final facts," the ultimate elements of 'concreteness' in relation to which everything else is in some degree 'abstract;' they are "all alike...drops of experience, complex and interdependent." Eternal objects, on the other hand, are the eternal forms which are implicated in the facts of the world. They are the elements of
permanence whereby in the fleeting passage of living emotion there can be the sustenance of enduring character.

Momentarily abandoning the technicalities of philosophic exposition, Whitehead finds

in the first two lines of a famous hymn a full expression of the union of the two notions in one integral experience.

Abide with me;
Fast falls the eventide.

Here the first line expresses the permanences, 'abide, 'me,' and the 'Being' addressed; and the second line sets these permanences amid the inescapable flux. Here at length we find formulated the complete problem of metaphysics. Those philosophers who start with the first line have given us the metaphysics of 'substance;' and those who start with the second line have developed the metaphysics of 'flux.' But in truth, the two lines cannot be torn apart in this way...

Fact and form are inseparably joined; but fact 'perishes,' passing on its form to the future.

In the concept of an actual entity as a synthesis of feelings arising from the actual world antecedent to itself by way of its 'organization' of those feelings, the notion of 'experience' is transformed into the most basic category of ontology. 'Feelings' are stuff of which both ourselves and the smallest fleck of dust are made. This is a sweeping philosophical stroke. Its justification resides only in the equally sweeping theoretical unification it effects: a sense of wholeness is restored without the obliteration of individuality. Concrete individual fact is conceived both as 'concrete' and as 'individual' by virtue of its feelings of the actual world from which it arises; but these feelings are given by the world and essentially relate it to the world. "The many become one, and are increased by one."
In the Theory of Prehension, which forms the whole of Part III of *Process and Reality*, Whitehead offers an analysis of the 'feeling activities' involved in the becoming of a novel occasion carried to a degree of detail and precision unsurpassed in philosophical literature. This development, however, constitutes a separate subject of study in itself. Our concern in the preceding pages has been only to trace the growth and progressive generalization of the concept of 'experience' in Whitehead's thought from his analysis of 'sense-awareness' in the philosophy of science books to its final status as the foundation of his mature metaphysics. In this endeavor we hope we have had some measure of success.
NOTES TO CHAPTER IV

1. Cf. pp. 39-40, this study

2. CN 18

3. With respect to (1), no reasons can be given for deciding which attribute is predictable and which is not. For Aristotelian science, this would be a question of fact; it would be unintelligible to speak scientifically of attributes which are predicable (possibly) but not predicated (actually). There is also the much more serious problem of distinguishing 'essential' from 'accidental' attributes. In both cases the difficulty lies in the fact that 'predication' discloses no information about relations between the subject and its predicates. Whitehead comments in CN (18): "Personally, I think that predication is a muddled notion confusing many different relations under a common form of speech."

4. CN 25

5. This does not mean that there can be no limited philosophy of nature, nor does it in any way detract from the value such a doctrine might have as a philosophy of science. All that is meant is that any such doctrine involves necessary references to metaphysics. Of course a purely verbal question might arise at this point as to what constitutes 'metaphysics.' I would be inclined to call any theory which makes definite ontological pronouncements 'metaphysical;' and by this criterion, Whitehead's 'philosophy of science' is metaphysical through and through. He, on the other hand, believed at the time that he was avoiding metaphysics by excluding considerations of the relation of the mind to nature. Probably he would not have held that opinion at any time after 1925. Metaphysics need not be 'comprehensive' to be metaphysics; thus it seems that any doctrine which attempts to deal with the fundamental notions of scientific thought will inevitably touch on metaphysics.

6. The problem of extending our knowledge from observable regions into regions beyond, (in scale of size) the capacity of even the best scientific instruments remains a paramount problem for both philosophy and science. The ability to deal with any scale of size is one of the principal advantages of mathematics over language, and over logical systems based upon language, such as Aristotle's. On the other hand, mathematics does not tell us many of the things we should like to know about entities, say, in the atomic nucleus; thus we are faced with the philosophic problem of attempting to interpret the mathematical formalism employed to explore such regions hypothetically. (Werner Heisenberg's discussion of this problem in the closing chapters of Philosophy and Physics, New York, 1958, is extremely provocative.) The lasting interest of Whitehead's Method of Extensive Abstraction is as a logical instrument of translation between different scales.
of size; whether Whitehead's discernment of the principal relationships involved is correct or not, the need still remains, it seems, for some logical scheme whereby it is explained why mathematics is in fact such a powerful instrument of scientific analysis. What relationships, in other words, are truly universal (i.e. common to all scales of size) and which are merely 'local?'

7. PNK 63
8. CN 185
9. CN 167
10. More specifically, the great systems of modern philosophy, i.e., of Descartes, Spinoza, Leibniz.
11. PR 208
12. PR 112
13. Whitehead remarks in PRel (63) that "Nature is an abstraction from something more concrete than itself...."
14. PNK v
15. PNK v.
16. SMW
17. MT 232
18. MT 191
19. PR 53
20. More precisely, the 'object' is what is 'recognized' as moving or changing; the event is the movement or change.
21. PR 113
22. PR 23
23. PR 227-8
24. PR 228
25. PR 129
26. PR 43

28. The term 'formal' is here used with reference to the 'form' or 'pattern' of the completed entity and not with respect to its 'real internal constitution,' that is, what it is *formaliter.*

29. *SM 136*

30. Cf. pp 43-5, this study

31. PR 68

32. PR 68

33. *SM 136-7*

34. Science deals with fact; thus those objects which comprise the data of science always have reference to definite, settled facts.

35. PR 224

36. Whether this is actually an 'advance' or not is questionable; it may be that Whitehead simply was not ready to offer a full analysis at this time.

37. PR 32

38. Cf. *SMW*, Ch.X

39. Whitehead speaks in *SMW* (Ch.X) of the relationship between eternal objects and actual occasions as 'external.' What he seems to mean is that, with respect to eternal objects, an actual occasion has a choice, i.e., may 'decide;' but that all actual occasions of the past are necessarily internally related to a given concrescent occasion. This is, however, only a metaphorical way of speaking; by way of implication, all eternal objects are 'in' an actual occasion, although some are 'held inoperative' as positive determinants of its formal nature, i.e., via 'negative prehensions.'

40. PR 33

41. PR 28

42. PR 318

43. PR 32
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