PART THREE

THE PHILOSOPHY OF ORGANISM
It was observed in Chapter V that Whitehead had, upon revising his *Principles of Natural Knowledge* in 1925, reached the conclusion that process was of central importance for metaphysics.¹ The conclusion was not a Whiteheadian novelty; it had been asserted by some Greek philosophers, and perhaps earlier by some Egyptian priests who ventured upon philosophical interpretations of the Osiris myth.²

The importance of the process motif in modern metaphysics is undoubtedly due to the discovery of overwhelming biological and geological evidence in support of the doctrine of the evolution of the species, not itself a new theory. The impact of the theory of biological evolution upon metaphysics can be considered as providing an argument for the validity of the belief that scientific discoveries do have implications for metaphysics (providing those two are distinct disciplines).

However important the notion of evolution or process

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². Cf. especially Plutarch's *De Iside et Osiride*.
may be for metaphysics, there is the danger that such evolution or process may become a glaring example of Whitehead's fallacy of misplaced concreteness. Is evolution or process really of primary metaphysical importance? An emphatic affirmative reply came from Bergson, Alexander, Morgan, and Whitehead. Recently Hermann Weyl has pronounced his doubts:

Man, whenever he awakens to ponder the riddles of existence, is prone to expect evolution to enlighten him about the essence of things.... The experience of science accumulated in her own history has led to the recognition that evolution is far from being the basic principle of world understanding; it is the end rather than the beginning of an analysis of nature. Explanation of a phenomena is to be sought not in its origin, but in its immanent law. Knowledge of the laws and of the inner constitution of things must be far advanced before one may hope to understand or hypothetically to reconstruct their genesis.3

How the "laws" and the "inner constitution of things" can be accounted for in a process philosophy is one of its central problems. It was considered by each of the four named exponents of process, and, in the opinion of this thesis, received the most satisfactory exposition of the four in the cosmology of Whitehead. For his philosophy of organism "the inner constitution of things" and their "laws" are constituted by process, yet process is so conditioned that the physical world determined by process is

a function of those inner constitutions and laws. In a sense to be discussed in Chapter IX, process and morphological laws are complementary modes of analysis. Some further suggestions directed toward this question of the primacy of process will be offered in Chapter XIII, after attention has been given to the solutions of Bergson, Alexander, Morgan, and Whitehead.

Regardless of the proper status of process in metaphysics, it cannot be denied that metaphysics has been made richer by those who emphasized its importance and constructed comprehensive metaphysical systems on its basis. Furthermore, an interest in comprehensive systems, as contrasted with piecemeal discussion of isolated problems, was concurrently revived. This is, however, an accident, and not an argument for the primacy of process.

Henri Bergson

Professor Henri Bergson, in a series of very readable contributions spanning more than forty years, entered a protest against the philosophical tradition and emphasized the importance of what came to be known as "creative evolution." The defects in philosophy, Bergson urged, were inherent in the reasoning powers themselves. For this reason, Professor Ritchie holds that Bergson's work is
primarily negative in character. 4 Neither realism nor
idealism can succeed if taken in isolation, insisted
Bergson, and both are mutually exclusive. 5

Reality is essentially dualistic; both spirit and
matter are real, but there are interrelations.6 As a
whole, reality is coherent, but the coherence is not a
perfect one; accidental occurrences are extremely nu-
merous. 7 There are two correlative types of order which
are apparent, the one vital, the other geometrical. 8 The
comparison with Process and Reality is a ready one; Part
III of Process and Reality is devoted to a genetic analy-
sis of actual entities, and Part IV analyzes them morpho-
logically.

It is of interest to note that Bergson's conception
of the proper method of metaphysics is diametrically op-
posed to that of Whitehead. For Bergson, metaphysics, as
well as science, will advance by the accretion of indivi-
dual results, and not by the axiomatic method. An

4. 1931 "New Books: Process and Reality" Philosophy, 6,
102. The same position has been maintained throughout
the lectures to Honours Philosophy classes in Edin-
burgh University, 1949-1951, as well as in supervisory
conferences with him during this period. Professor
Ritchie has, however, made an exception in the case of
Les Deux Sources de la Morale et de la Religion.
6. Ibid., 7.
7. 1907 L'Evolution Créatrice, 54-55, 114.
8. Ibid., 256.
axiomatic system, "à prendre ou à laisser," will always be in dispute, and can never command allegiance. The opinion of this thesis is that one method cannot be employed to the exclusion of the other, and that both are indispensable. In this opinion, the support of Professor Ritchie can be enlisted. It is a merit of Whitehead's writings that he emphasized the tentative nature of his system and the incompleteness of human knowledge.

For Bergson the onward flow of an irreversible time expressed the essential characteristic of reality. The use of intuition, as opposed to intellectual analysis, is the only means of knowing about the flowing stream of reality. Intellectual analysis would give at best a science bifurcated into quantity and quality, and only instantaneous deterministic cross-sections of this reality.

There is a real duration, the heterogeneous moments of which permeate one another; each moment, however, can be brought into relation with a state of the external world which is contemporaneous with it, and can be separated from the other moments in consequence of this very process.

Bergson further provided that there could be many durations, and like Whitehead, associated their process with rhythms.

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9. 1932 Les Deux Sources de la Morale et de la Religion, 266.
10. 1923 Scientific Method: An Inquiry into the Character and Validity of Natural Laws, 1.
11. 1907 L'Evolution Créatrice, 378.
The concept of homogeneous time series was a fiction of the intellect, but one useful for science, for which it becomes an independent variable. It is an imaginary division of real duration. Professor Cunningham has expressed the doubt which must necessarily arise from considering homogeneous time to be an abstraction. If duration cannot be comprehended by the intellect, there is a consequent doubt as to its ontological value. Cunningham was concerned to show that duration has a strong teleological content, and must therefore be conceived as containing a large homogeneous element. While the argument against the unintelligibility of heterogeneous duration is strong, the insertion of the teleological element does not seem to imply the degree of homogeneity desired by Cunningham.

When, however, the object of the artificial division is that of providing a framework for future action, the homogeneous time series become useful, although not strictly true.

Bergson's account of causality is somewhat comparable with Whitehead's: what is found in the effect was already in the cause. That is, some common component is maintained throughout the duration of the process under consideration. Perfect recurrence of a past state is rendered

15. 1907 L'Evolution Créatrice, 15.
impossible by the nature of duration itself, but components remain in the form of motor mechanisms or recollections of the past. There is an implied vector character of the contributory factors.

Whichever of the two, matter or mind, is considered, it is always in a state of becoming. The whole process of evolution has been an expression of this truth. Energized by the famous élan vital, the evolutionary activity produced three distinct directions of organization, exemplified by vegetation, instinctive life, and rational life. They are not successive stages of evolutionary progress, but are divergent tendencies. The operation of this genuinely empirical élan vital, using the raw materials at its disposal, produces a developing organization of life as opposed to the "reality which is unmaking itself," matter. Thus, there are two inverse movements in nature, analogous to the Heraclitean upward and downward way. The finite élan vital, which is given once for all, operates upon and against the developing tendency of matter; its finitude is responsible for its limited control over matter, and it receives no assistance from external sources.

In particular, the two most interesting products of

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17. 1907 L'Évolution Creatrice, 146-147.
18. Ibid., 269.
19. Ibid., 276.
the ‘élan vital’ are intelligence (as in man) and instinct (as in the hymenoptera). The two complementary kinds of knowledge are never totally distinct, but are mingled in varying degrees. With intelligence there is knowledge of a form; with instinct the knowledge is of a fact.\textsuperscript{20} It is not surprising then, that Whitehead’s philosophical efforts (like Plato’s) were directed towards "discovering the forms in the facts." On Bergson’s theory, that is all that any rational system could do. Whitehead was concerned with defending speculative reason,\textsuperscript{21} Bergson with deprecating it.

The future trends of evolution are, for Bergson, unpredictable.\textsuperscript{22} If any element of finalism is present, it is undetectable within the system. It is on this point that Bergson finds difficulty with vitalism, which he thought asserted an internal finality which cannot be other than destructive to the ideal of coherence.

With regard to matter, Bergson defined it alternatively as "the aggregate of images"\textsuperscript{23} and as that which has "a tendency to constitute isolable systems."\textsuperscript{24} He was

\begin{itemize}
\item[20.] Ibid., 161.
\item[22.] Cunningham, op. cit., 527.
\item[23.] 1913 Matière et Mémoire, ninth edition, 7.
\item[24.] 1907 L’Evolution Créatrice, 11.
\end{itemize}
not prepared to assume the position described by Royce in *The World and the Individual* as that of a realist. With Mach, Bergson asserted the necessary interdependence of material particles; the isolation is never a complete one. When the isolation is rendered full conceptually, material particles assume spatial extension as their most general property. The nature of this extension approximates to that of Whitehead, but there is no hint of extensive abstraction, except in a primitive form; "The very admission that it is possible to divide the unit into as many parts as we like, shows that we regard it as extended." And, unwittingly, Bergson anticipated de Laguna's criticism of Whitehead's extensive abstraction of the relativity era in attacking the late nineteenth century English school; they attempted to derive spatial extension from temporal succession.

Because of the postulated mind-body dualism the problem of the relation of the two in Bergson's philosophy arose with particular urgency. His solution depended upon an analytic division directly comparable to Whitehead's distinction between the mode of presentational immediacy

27. 1889 *Essai sur les Données Immédiates de la Conscience*, 62.
28. Ibid., 75.
and causal efficacy in Process and Reality.

With regard to matters of experience...existence appears to imply two conditions taken together: (1) presentation in consciousness; and (2) the logical or causal connection of that which is so presented with what precedes and with what follows. The reality for us of a psychical state or of a material object consists in the double fact that our consciousness perceives them and that they form part of a series, temporal or spatial, of which the elements determine each other. But these two conditions admit of degrees, and it is conceivable that, though both are necessary, they may be unequally fulfilled. 29

The similarity of this paragraph to Whitehead's distinction is readily apparent. Subsequently, Bergson showed the notion of extension in sense (1) and sense (2) to merge in such a way that perception can be explained. 30 However, the use of the Whiteheadian notion of prehension would perhaps tend to increase the clarity of the discussion; but the invention of "prehension" was still a dozen years in the future.

Professor Wildon Carr, expounding the Bergsonian philosophy in the University of London, sought a more precise solution of the problem in the concept of action, 31 a hint supplied by Bergson himself. 32 By asserting a solidarity of mind and body, probably questionable to Bergson,

29. 1913 Matière et Mémoire, ninth edition, 159.
30. Ibid., 200.
Professor Carr could regard the problem of perception as the relation between two subservient components contributing to the activity of the individual. Mr. William McDougall objected that the notion was nothing more than interaction, but Carr insisted to the contrary.

One small point of contrast with the cosmology of Whitehead occurs in what Whitehead would call a negative prehension. Bergson held that the notion was really an attitude of the mind in making an affirmative proposition about an affirmative statement. A negation is really thus an affirmation twice removed from the object itself.

With Whitehead a negation consists of a rejection of the object itself, and not of a proposition about the object.

The problem of the nature of God becomes prominent when Whitehead's final question of *Process and Reality*, "What does it all come to?" is asked. As could be expected from the Bergsonian emphatic statement regarding intuition as the key to existence, any knowledge of God must be acquired via the mystic's route. When thus conceived, the universe is a visible product of love, the basic creative emotion. Furthermore, it is possible to regard this love as the essence both of a person and a creative power.

34. 1907 *L'Evolu¿on Cr€atrice*, 311-312.
35. 1932 *Les Deux Sources de la Morale et de la Religion*, 257.
"Creation will appear...as God undertaking to create creators, that he may have, besides himself, beings worthy of his love."36 Implied, then, is the proposition that there can be communication of some sort between God and his creatures.

Bergson had, therefore, prepared a path toward accounting for the existence of a God worthy of worship. However, it is the opinion here offered that Bergson's philosophy has by no means demonstrated the metaphysical necessity for a religiously satisfactory God in his system. He had only made it possible to have one. It is further suggested that none of the process philosophies here considered have adequately accounted for the existence of a God worthy of worship, and at the same time metaphysically necessary. At best they have offered metaphysical Gods worthy of reward "for exemplary services." The extremely urgent problem, "Can a religiously satisfactory God be demonstrated to be a metaphysical necessity?" will be considered at greater length in Chapter x of this thesis.

36. Ibid., 273.
The three ablest British exponents of process philosophies had the peculiar privilege of being able to expound those systems at length through the Gifford Lectures in the Scottish universities.

In 1916-1918 Samuel Alexander delivered his series of lectures to Glasgow University, aptly characterizing his subject as "Space, Time, and Deity."

Tracing his foundations on what Whitehead could have demonstrated as an instance of the fallacy of misplaced concreteness, Alexander believed that it was not extravagant to suppose that "all the vital problems of philosophy depend for their solution on the solution of the problem what Space and Time are and more particularly how they are related to each other." Alexander then assumed the reality of a fused absolute Space-Time, but of a very different character than the space-time of the relativists. Space-Time was, for the Manchester professor, the simplest component of the natural world, and from which everything, either material or mental, was derived. The abstraction of Space from Time demonstrated several characters of the world: that Space has three dimensions because of the peculiar characteristics of Time (successive, irreversible,

37. 1927 Space, Time, and Deity, second edition, 1, 35.
and uniform in direction). 38 Space, although generated in time, is not enlarged, but simply reshuffled to another perspective, although maintaining a historical pattern. 39 Professor Ritchie, Alexander's immediate successor at Manchester, summarized: "...Alexander's Space-Time seems to be called upon to bear too great a burden." 40 With this conclusion this thesis is in agreement.

Attacking the epistemological problem, Alexander attempted to demonstrate the matching character of mental space and time and physical space and time, and eventually their unification into the total Space-Time. 41 Thus, Alexander was at odds with Bergson regarding the nature of duration, extension, and their apprehension. Again, too, there is the aboriginal attempt at distinguishing the mode of presentational immediacy and causal efficacy, although it was still expressed in the traditional mind-body dualistic phraseology. It is also to be noticed that spatialization is no longer a necessary evil of rational thought, but a fundamental character of the universe.

Certain minor points in the consideration of Space-Time are of interest in a comparison of Space, Time and

38. Ibid., l, 57.
39. Ibid., l, 61-68.
40. 1948 Essays in Philosophy and Other Pieces, 190. The chapter from which this statement was extracted was originally published under the title of "Samuel Alexander" in the 1941 Manchester Memoirs.
41. 1927 Space, Time, and Deity, l, 93-107.
Deity with Process and Reality. First of all, the world is a world of events. This sounds so much like Whitehead in the relativity era as to tempt the reader into making a ready assimilation between the two. Apparently there was tendency to do just that, inasmuch as the second edition of Space, Time, and Deity carried the warning that this system was merely descriptive, and had nothing in common with "the great mathematical or logical constructions, such as that of Mr. Whitehead." In discussing that which is experienced, Alexander suggested that the name "object" might be conveniently retained. In this sense, Whitehead in Process and Reality similarly allowed the word "object," in contrast with the "object" implied by an eternal object. Also, for Alexander, every object implied "a selection from the world of being," a phrase which could be used to characterize any of Whitehead's writings, from the earliest to the latest.

In addition, Alexander was prepared to admit the necessity of extensive abstraction, as was Bergson. Like the French professor, too, he did not indicate what results its use might have on his philosophy.

Alexander anticipated, however, the method of Process

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42. Ibid., I, vi.
43. Ibid., I, 15.
44. Ibid., I, 15.
45. Ibid., I, 41.
and Reality by exhibiting his categorial (spelled "categoreal" by Whitehead) scheme. The categorial characters of existents were those which were the necessary, a priori, non-empirical characters of existents, as distinguished from the variable, empirical characters. For Alexander, the categories were characters of every portion of Space-Time. "All existents are in relation because events or groups of them are connected within Space-Time."\(^{46}\) A statement such as this shows the inversion of the position of Process and Reality, where the statement would become, "All events or groups of them are connected within Space-Time because all existents are in relation."

Alexander approximated more nearly the Whiteheadian statement of causation: the causal relation holds between two existents, one agent, the other patient (a terminology favorite with Whitehead), and between which the causal relation is immanent. However, after this point there is another divergence; Alexander denied the efficacy of the whole as a causal relatum: "The whole system of things does not descend into the arena and contend with one of its creatures."\(^{47}\) It will be seen in the following chapters that Whitehead affirmed the very thing Alexander had denied.

\(^{46}\) Ibid.; I, 238.
\(^{47}\) Ibid.; I, 288.
The categorial scheme admitted degrees of rank: existence, universality, relation, and order formed the first group of intercommunicating categories against which the rest of the categories must be judged.

The final distinctive character of Space, Time, and Deity, and that which qualified it as a process philosophy, was Alexander's notion of emergence. Professor Ritchie has observed that, although Alexander always credited Morgan with inventing the notion of emergence, it was Alexander himself who employed it most systematically.48

Just as the quality of mind emerges from life as a living being with consciousness, so perhaps life is an emergent from material existence. And material existence itself is emergent from Space-Time. Each of the various stages have been evolved through the reality of time, which has left room for producing higher emergents or levels of existences. The next higher empirical quality above mind is defined as Deity.49 Accordingly, in each of the lower stages of existence, if generality of definition is to be maintained, there is a relation to the next higher stage analogous to that of mind to Deity. Deity in this general sense is a character which varies as a function of time, or more directly, the stage of progress of

49. 1927 Space, Time, and Deity, 2, 345.
the universe. Within Space-Time itself is a nisus toward Deity, which has been responsible for the development of the successive stages of existence, and will presumably continue to exert its creative influence in the future. There is a certain, although not a complete, analogy between Alexander's nisus and one component of Whitehead's "creativity," which will be discussed in the next chapter. Perhaps, however, it is even closer to what Whitehead demominated the "subjective aim" of actual occasions. What the nature of Deity is, however, is unpredictable from the level of mind. Certain it is, however, that it is not mind, or anything associated with a mental state. This notion of Deity is unique with Alexander, although it has attracted much sympathetic attention. Neither Bergson nor Whitehead would agree with the way in which Alexander explained the place of Deity in the Universe.

However, when Alexander began describing the nature of his metaphysical God, he used some phrases which could be equally applicable to Whitehead's God. For example, slight changes in terminology would transform this statement by Alexander into one descriptive of the consequent nature of Whitehead's God: "As an actual existent, God is the infinite world with its nisus towards Deity, or, to adopt a phrase of Leibniz, as big or in travail with Deity." 51

50. Ibid., 2, 348.
51. Ibid., 2, 353.
God as infinite is purely an ideal notion for Alexander. An existent possessing Deity, the requirement placed by the lecturer on his metaphysical God, would need to be finite. However, the God as object of religious worship Alexander identified with the "actual infinite, the whole universe, with a nisus to Deity." This "actual infinite" is assigned individual form by the religious consciousness, but does not itself possess it. Accordingly, Alexander's God is never fully realized in the Universe which generates Him. It is only in God's function as the "actual infinite" that He is creative; strictly speaking, it is the action of Space-Time which is primordially creative. It is only in his function as "actual infinite" that he conserves values.

Offering four criteria for testing the religious adequacy of a metaphysical God, it was easy for Alexander to assert his success in accomplishing the identification. It is, however, suggested by this thesis that these criteria are not definitive, and that the intended identification had not, in effect, been made. As previously promised, the question will be more fully considered in Chapter X.

52. Ibid., 2, 361.
53. Ibid., 2, 362.
Four years after *Space, Time, and Deity*, the Gifford Lectures, this time at the University of Saint Andrew's, again provided the vehicle of the last of the important process philosophies before Whitehead. The lecturer this time was Emeritus Professor C. Lloyd Morgan, who characterized the fundamental process at work in the universe as "emergent evolution." In certain respects, Morgan's emergent evolution approximated more closely Whitehead's Process and Reality than any of the others, but this approximation should not be overemphasized.

Having characterized Alexander's stated system by means of a pyramidal diagram, Morgan implicitly repudiated Alexander's notion of Deity by characterizing emergent evolution as strictly naturalistic, but not excluding an acknowledgment of God and Divine Purpose. Further, Morgan criticized Alexander's "misplaced concreteness" in Space-Time: "I seek in vain for evidence that spatio-temporal relatedness does exist apart from physical events."
The emergents in emergent evolution represent, not new orders of being, but novel orders of relatedness. The ascending forms of relatedness arose from protons and electrons, through atoms, molecules, crystals, on to reflective consciousness at the apex of the pyramid. Throughout the whole pyramid there is a coherent plan or relatedness which is part of the nature of the whole; the notion of disorder or chaos is evidence of improper metaphysical assumptions. Nevertheless, disvalue may operate to contribute to greater value at a higher emergent level.58

The entire nexus toward increasing richness and complexity is none other than God Himself; God is present throughout the whole universe.59 When, then, God acts as a Nexus in nature, the consequence is that the universe is to be regarded as monistic.60 Thus, although the universe when viewed naturalistically requires an ontological dualism, when considered as a manifestation of Divine Purpose it demands a monism which regards all its entities to be, in essence, psycho-physical. The analogy with Process and Reality is striking. God then manifests Himself in the emergent process in diverse modes--physical, vital, mental, social, and spiritual.

The basic conscious individual is postulated to be

59. Emergent Evolution, 13, 36.
60. Life, Mind, and Spirit, 284.
dipolar, but in a sense different from that of Whitehead. The two extreme poles are postulated to be individuality and personality (which is a sort of social value-enjoyment). The generalization of this dipolar character of conscious entities was not made to include non-conscious entities, but there seems to be no reason why it should not be effected.

Morgan's metaphysical method may be described as sympathetic with that of Bergson, as against Alexander's and Whitehead's.

It should be noted that, for Morgan, the continuity of a spatio-temporal continuum is a consequence of the process which engenders it. An elaborate theory of time or space, or a union of the two, is absent from this series of Gifford Lectures, as in contrast to those of Alexander and Whitehead. The fluency of time which Bergson had found so important was repudiated in favor of a fluency of events not derivative from the onward surge of duration.

Morgan was apparently aware of Whitehead's Concept of Nature, and issued a challenge to which Whitehead fully responded in Process and Reality, possibly without knowing that the challenge had been made by Morgan. Suggested

61. Ibid., 310.
It is...the fashion among some new realists to relegate epistemology...to a quite subordinate position. Mr. Whitehead, I think, would say that it is one for "metaphysics" and not for science to discuss. If it be a problem for metaphysics let it be metaphysically discussed, and let full references be given to such discussion so that it may be quite clear what reasons are assigned why this metaphysical solution, and not another, is to form the basis of scientific procedure.63

In the three "process" philosophies, therefore, the only major common denominator consisted in (1) the conviction that evolutionary or emergent process could provide the major metaphysical assumption for a successful philosophical system, and (2) its unending continuation. Whence process derived its importance was, in all three cases, different. Its raw material varied with each author. The status of time, the one entity most readily associated with process, was disputed. The position of God in the system was uncertain. Nevertheless, each of the three contributed substantially to the favorable reception of the most complex and comprehensive of the process philosophies, the "philosophy of organism."

63. Ibid., 272.
ALEXANDER, SAMUEL. 1920 Space, Time, and Deity. Two volumes. London, Macmillan and Company, Ltd. (C)

BERGSON, HENRI. 1932 Les Deux Sources de la Morale et de la Religion. Paris, Librairie Félix Alcan. (A)

1889 Essai sur les Données Immédiates de la Conscience. Paris, Librairies Félix Alcan. (A)

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CUNNINGHAM, G. WATTS. 1914 "Bergson's Conception of Duration" The Philosophical Review, 23, 525-539. (D)

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PLUTARCH. De Iside et Osiride. (D)

RITCHIE, ARTHUR DAVID. 1948 Essays in Philosophy and Other Pieces. London, Longmans, Green and Company. (A)

1931 "New Books: Process and Reality" Philosophy, 6, 102-106. (D)


ROYCE, JOSIAH. 1900 The World and the Individual, I. New York, The Macmillan Company. (D)

WHITEHEAD, ALFRED NORTH. 1920 The Concept of Nature. Cambridge, The University Press. (BD)


CHAPTER EIGHT

METAPHYSICAL BACKGROUNDS OF PHYSICAL COSMOLOGY
IN THE PHILOSOPHY OF ORGANISM

Process and Reality stunned the philosophical world. Whitehead's earlier writings hinted that those Gifford Lectures might appear. In fact, Science and the Modern World indicated the direction in which the new cosmology would proceed. But Process and Reality embodied the systematic metaphysics of the "philosophy of organism" within which Whitehead's cosmology operated.

Philosophers were certain that Process and Reality held much of value: some were sure that the entire system would easily surpass anything previously suggested; others more cautiously admitted that it demonstrated "flashes of penetrating insight." Most agreed with the admission of Professor Ritchie in 1931: "It is tempting to prophesy that the publication of this book will mark one of the turning points in the history of philosophy."¹ Certain it is that the impact of these 1927-1928 Edinburgh Gifford Lectures has been sufficient to justify this statement, and the impact appears to be increasing. However, only a

concentrated study of the various problems raised, and their evaluation, will settle the question. Whitehead's physical cosmology is perhaps the key problem; it is the purpose of this thesis to offer a discussion of it.

The question of the compatibility of Whitehead's earlier writings with *Process and Reality* has had able exponents at either extreme. The negative answer was championed by Professor Stebbing, and carried an implied disappointment with the new developments. Professor Emmet, who studied under Whitehead at Harvard University during the academic year immediately following his Gifford Lectures, advocated a positive answer. "The appearance of *Process and Reality,*" she declared in a volume complimented by Whitehead himself, "provides us at last with the detailed formulation of the metaphysical scheme underlying Whitehead's earlier work...." An unpublished article by Victor Lowe written in 1938 declared that "...a careful reading of the earlier books will show that there is nothing in them that precludes the logical possibility of a metaphysics of nature such as Whitehead expounded later."

3. 1932 Whitehead's *Philosophy of Organism,* 102. This volume will be denoted by the letters WPO in footnote references.
4. "The Development of Whitehead's Philosophy" 1. This essay does not represent a preliminary draft of the chapter of the same name in the Schilpp edition of 1941, but was intended to correct some of the errors in a 1936 paper by David L. Miller.
The answer to the question of the compatibility of Process and Reality and The Concept of Nature, for instance, lies, in the opinion of this thesis, in Whitehead's alterations to the second edition of The Principles of Natural Knowledge. The two views are not strictly consistent (the nature and status of time, for instance), but the points of conflict arise from considering extension to be derivative from process and from the enlarged general problem considered in the later works.

The difficulties in the way of a more universal knowledge of Process and Reality, aside from the complexity of the object of the inquiry itself, lies in the novel terminology and the condensed statements of the volume. A third difficulty arises because Whitehead's earlier writings are, in the sense of providing the subject matter and method of the philosophy of organism, indispensable to an understanding of the latter. A fourth main difficulty arises in a misconception of the categorial scheme of Process and Reality. Other difficulties arise from a prerequisite acquaintance with subjects as diverse as relativity theory, the foundations of geometry, and aesthetics. It is as though a danger sign has been planted at the entrance to Process and Reality. This thesis does not assert that the lurking dangers are a myth, but it does assert the obligation for philosophers of understanding more fully this work by Whitehead, and it asserts that an
understandable account of Process and Reality can be given. Professor Emmet's volume and Dr. Lowe's article in the Schilpp edition have gone a long way toward accomplishing this goal.

The language customarily used by metaphysics is laden with connotations annexed by philosophers throughout its history, so that words such as "universal," "substance," "cause," "entity," etc., carry an ambiguous meaning out of context. It was Whitehead's aim to select terms which would avoid the penumbral ambiguity of the older ones; more often than not, the selection was successful.

A second difficulty regarding language encountered by Whitehead was the prevailing tendency of ordinary language to describe details, rather than to provide the generalizations demanded by metaphysics. It is a consequence of this novel terminology that isolated sentences from Process and Reality often bear all the marks of a foreign language.

Theodore Spencer has recounted an illustrative anecdote associated with one of Whitehead's evening discussion sessions in Cambridge, Massachusetts: "The first evening I met him, he was talking about Santayana; I remember only an aside. 'Santayana writes too well to be a philosopher; no philosopher should write too well.'"5

5. 1946 "Portrait...Alfred North Whitehead" The American Scholar, 16, 85.
In addition to this attempted renovation of the philosophical vocabulary Whitehead reaffirmed the value of speculative philosophy: "the endeavour to frame a coherent, logical, necessary system of general ideas in terms of which every element of our experience can be interpreted." The problem was not a new one, but it had fallen into disrepute through several centuries' work in giving attention to specific problems. It has been called the "problem of Descartes" by Sir Edmund Whittaker.

Thus his attempt was aimed at the construction of a scheme of metaphysical generalities, so related as to form a coherent pattern. Professor Stebbing has observed that Whitehead's faith in speculative philosophy thus conceived was equivalent to asserting that reality was a highly coherent system, and as such requiring further justification. The challenge is a basic one, and Whitehead's indication of the justification can be considered twofold. The first response turns on the meaning of the adequacy of the system. Adequacy must refer to the necessity for every item of possible related experience to participate as an exemplification of this pattern. Thus, metaphysical generalities are their own justification for universality of

6. 1929 Process and Reality, 4. Pagination is that of the American editions. Subsequent references to the volume will be indicated by the abbreviation, PR.
7. 1948 The Modern Approach to Descartes' Problem. The Relation of the Mathematical and Physical Sciences to Philosophy, 5.
application; they never fail to exemplify themselves. On this score, Sir Edmund Whittaker has observed that "the world is a system for which predictions can be made, a cosmos, not a chaos." 10

The second half of the justification demanded by Professor Stebbing lies in Whitehead's denial that the metaphysical generalizations man is capable of formulating are ultimate. Thus, "the accurate expression of the final generalities is the goal of discussion and not its origin." 11

The technique, then, of *Process and Reality* is the postulation of reasonable generalizations, the examination of the implications of those generalizations, the test of their consistency and coherence, and their adequate applicability to the items of experience. Then the reformulation of the generalizations is demanded, followed by their rational and empirical tests. It must not be imagined that Whitehead attached an air of finality to his system: "In philosophical discussion, the merest hint of dogmatic certainty as to finality of statement is an exhibition of folly." 12

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9. PR, 5.
11. PR, 12.
12. PR, x. The criteria for testing these generalities are repeated in a concise form in 1929 *The Function of Reason*, 53. Hereafter *The Function of Reason* will be referred to in footnotes as FR. See also Emmet, *WPO*, 18.
It is well to note the distinction that Whitehead drew between metaphysics and cosmology, in view of Dingle's identification of the two as well as for presenting Whitehead's answer. Metaphysics is a description of "the general ideas which are indispensably relevant to the analysis of everything that happens." The solution involves a demonstration of how a plurality of individuals is consistent with the universe, and...exhibits the World as requiring its union with God, and God as requiring his union with the World...also...how the Ideals in God's nature, by reason of their status in his nature, are thereby persuasive elements in the creative advance.

The metaphysical scheme of Process and Reality, or one highly analogous to it, is thus presupposed in Adventures of Ideas. As a parenthetical remark, it is interesting to observe that in a seminar held at Harvard on 1929 April 26 Whitehead stated that a book should be written on the natural history of ideas; Adventures of Ideas may be his own response to this remark which is highly characteristic of the musings of professors.

Cosmology, on the other hand, is

13. 1926 Religion in the Making, 84. This volume will be designated henceforth as RM.
14. 1933 Adventures of Ideas, 215. The volume will be referred to as AI.
15. This remark is extracted from seminar notes taken by Professor Emmet during her study in Harvard. It should be observed that these notes indicate that no appreciable change has occurred in Whitehead's stated position in the year immediately following the delivery of the Gifford Lectures.
the effort to frame a scheme of the general character of the present stage of the universe. The cosmological scheme should present the genus, for which the special schemes of the sciences are the species. The cosmology and the schemes of the sciences are mutually critics of each other. 16

Expand this notion with an introductory statement in Process and Reality:

...it must be one of the motives of a complete cosmology, to construct a system of ideas which bring the aesthetic, moral, and religious interests into relation with those concepts of the world which have their origin in natural science. 17

Both statements have their authorship in the same year, 1929: the Preface to the Gifford Lectures is dated January 1929, and not during the period in which they were delivered. Cosmology thus partakes of a mixed nature, and includes elements not ordinarily considered to fall within its domain. It is almost exactly equal to Professor Dingle's idea of philosophy which is equivalent with the summation of the generalities of the more special inquiries. 18

The differentia of metaphysics and cosmology for Whitehead then may be summarized in tabular form:

16. FR, 61.
17. FR, vi.
Metaphysics

Describes the general nature of all that ever happens.

Describes the nature of cosmology: its components, its operations, its laws.

Final stage of generalization.

Professor Emmet has also indicated the greater association with empirical elements enjoyed by cosmology; such a conclusion would also follow from the table at the head of this page.

Metaphysics might then be conceived as the scheme which describes the world through the mediation of cosmology; metaphysics must be approached through cosmology.

Sir Edmund Whittaker has indicated that "A philosophy treating of the general nature of Being and covering the whole of experience should have, at its source, physicomathematical science criticising itself." The usual assessment of the realm of cosmology, with minor variations, is just that self-criticism of "physicomathematical science." Thus, although Process and Reality bears the

20. 1948 The Modern Approach to Descartes' Problem. The Relation of the Mathematical and Physical Sciences to Philosophy, 20.
subtitle, An Essay in Cosmology, it is cosmology in the expanded sense of Process and Reality. By all other standards it is really an essay in metaphysics with applications in cosmology. Here, then, Whitehead has introduced the idea of a range of generality intermediate between "physicomathematical science criticising itself" (Which has been the primary preoccupation of this thesis) and metaphysics. It is the level at which the interaction of God, values, man, and the objects of the natural sciences cannot any longer be considered in abstraction from each other. Perhaps "cosmology" is a happy choice of words to describe that level; certainly a useful addition to the philosophical vocabulary is that suggested by Sir Edmund Whittaker. Thus, another statement by the latter would be endorsed by Whitehead: "The principle that metaphysics is completely independent of physics is seen to be inconsistent with the facts,"21 and "metaphysics must originate with reference to physics, since it is the conceptual framework into which our experience of Nature is to be fitted."22

It is instructive to note a variation in Whitehead's thinking about "Nature." Whitehead's books of the relativity era have been called his "Nature" books. Science

22. Ibid., 107.
and the Modern World devoted an entire chapter to the "Nature" of the Romantics, Wordsworth and Shelley. But not a reference to "Nature" occurs in the index of Process and Reality of Adventures of Ideas. But with the appearance of Nature and Life in 1934, Whitehead warned, "You cannot talk vaguely about Nature in general. We must fix upon details in Nature and discuss their essences and their types of interconnection." With this distinction Professor Ritchie is in agreement. "You must talk about the natural sciences." Yet despite the cautious introductory remark, Whitehead proceeded to say, for instance,

Sense-perception omits discrimination of the fundamental activities within Nature.

Science can find no individual enjoyment in Nature; science can find no aim in Nature. Science can find no creativity in Nature.

We find ourselves living within Nature.

It is only by using the unemphasized substitution of the phrase, "the objects of the natural sciences," that the quasi-personification of Nature, valuable for poets, but dangerous for cosmology in either sense of the word, is

23. Page 9. Henceforth Nature and Life will be designated as NL.
24. 1950 November 21. Lecture to Senior Honours students in Logic and Metaphysics at the University of Edinburgh.
25. NL, 65.
26. NL, 66.
27. NL, 70.
There is a fundamental assumption in Whitehead's metaphysics and cosmology which has been regarded by some as an instance of personification. That assumption is the attribution of a process highly analogous to that ordinarily postulated of animate beings, to the inorganic entities which form the building-blocks of the physical world. This assumption led Whitehead to call the doctrine of *Science and the Modern World*, the "theory of organic mechanism" and that of *Process and Reality*, "the philosophy of organism." The attribution of an organic operation to the components of the universe Whitehead traced to Leibniz, but it seems likely that it has more remote ancestry in the preliteral origins of animism. That the technique has enjoyed a great amount of success will be shown in the remainder of the thesis; whether it is a true analysis is unanswered and perhaps cannot be answered. Some further remarks upon that question will be offered in Chapter XIII.

It is usual to designate *Science and the Modern World* as the introduction to the metaphysical writings of Whitehead. The doctrines of the volume were still somewhat unsettled; it was an example of what Whitehead could later

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28. SMW, 99.
29. PR, v.
30. SMW, 193.
describe as a consideration of the focus of the challenge of the World of Activity to the World of Value. 31 There was an attempt to preserve as nearly as possible his own conclusions of the relativity era, and yet to take process seriously. Evidences of a change had become apparent, though. Religion in the Making appeared in 1926, and confirmed his decision that process could become the key to metaphysics.

Perhaps the central critical doctrine of Science and the Modern World was concerned with exposing certain customary habits of philosophical and scientific thinking to be fallacies. In the words of the 1905 memoir, it was an attempt at "disentangling the essentials of the idea of a material world from the accidents of one particular concept," 32 and as such is a sort of prolegomena to any future cosmology. Whitehead was still developing the central problem of "On Mathematical Concepts of the Material World."

Among the fallacies necessitated by the Cartesian philosophy, and which was being continued uncritically, was the dualism of body and spirit. This "bifurcation" was not strictly true, insisted Whitehead. Any separation

which is effected is purely the result of an analytical device, and not a representation of what is actually the case.

The bifurcation of substance and quality is again another unwarranted importation from the old philosophical tradition. In actuality the two cannot be separated.

Again, the notion of simple location of bits of matter in a given volume of space through a given duration of time, is repudiated on the grounds that it is not strictly true, and cannot be so considered.

All three are examples of a more general fallacy, known as the Fallacy of Misplaced Concreteness. In essence, it consists in asserting the metaphysical reality of what has been nothing more than a convenient analytical device.

Professor Arthur O. Lovejoy responded to this attack, as well as others, in a famous volume, The Revolt Against Dualism. He attempted to show that Whitehead had, in fact mistaken the case, and was arguing in favor of the very dualism he was condemning. It is also a major point of Professor Northrop's contribution to the collective discussion of Whitehead's philosophy, that Whitehead had not avoided the bifurcation he condemned. Indeed,

33. SNW, 64.
34. Lovejoy. 1930 The Revolt Against Dualism, 188.
declared Northrop, "whether epistemologists and philosophers like it or not, science requires bifurcation." In spite of the considered judgment of these two writers, it is suggested that Whitehead did avoid the bifurcations he correctly condemned. Whether he concurrently introduced other bifurcations will be considered at the appropriate points.

Whitehead, in the period between the comments of Lovejoy and Northrop, summarized his case excellently in his Presidential address to the American Philosophical Association:

Whenever a vicious dualism appears, it is by reason of mistaking an abstraction for a final concrete fact.... The universe is dual because each actuality requires abstract character.... The universe is many because it is wholly and completely to be analysed into many final actualities.... The universe is one, because of the universal immanence.... Throughout the universe there reigns the union of opposites which is the ground of dualism.36

It has been suggested (see pages 291 and 294) that a major factor contributing to the misunderstanding of Process and Reality lies in the mistaken understanding of its method. It has also been observed that the scheme which

36. 1932 "Objects and Subjects" The Philosophical Review, 41, 146. Henceforth this paper will be known as GS.
Whitehead was proposing was not to be considered as ultimate; rather the accurate expression of the metaphysical generalities was the goal of philosophical thought.

The matrix of tentative generalizations suggested by Whitehead was known as his "Categoreal Scheme." In the opinion of this thesis, this categorial scheme represents a continuation and a generalization of the problem set in the 1905 memoir, as well as including a philosophically more mature and comprehensive consideration of the problem as generalized.

In *Process and Reality* he repeated the warning that he was presenting this tentative categorial scheme, and would argue directly from that matrix to the conclusions, which would then need to be tested.37

Several factors are contributory to justifying the presentation of a lengthy discussion of the categories. First and foremost, Whitehead himself conceived the study of the matrix of the categorial scheme the central preoccupation of his metaphysics and his cosmology. Second, the tendency of commentators in explaining Whitehead's philosophy is to avoid, as much as possible, making the discussion of the categorial scheme their central preoccupation. In the third place, the method used in *Process and Reality* is so similar to that of "On Mathematical

37. PR, v, vii, x, 7, 8, 12-13, 19, 30, in particular.
Concepts of the Material World" that a direct use of the axiomatic method of 1905 promises immense rewards by way of understanding. Finally, despite tremendous difficulties of the application of symbolic reasoning to the philosophy of organism, the contribution of that mode of presentation to clarity more than compensates for any shortcomings arising from the present author's incomplete mastery of symbolic logical systems and the innate difficulties of so presenting the subject. It is not claimed that the symbolic statements of the categoreal scheme of Process and Reality will be offered in their most primitive possible forms; they are intended as an initiatory effort at a symbolic statement of the scheme. Their complete replacement by another set by someone exclusively concerned with symbolic logic would not detract from the usefulness of this venture. Indeed, it has been suggested by Professor Urban that a project of the nature here attempted cannot meet with anything but failure.38 The feeling of the inadequacy of the symbolic process arises with the present author as well, partly from the suspicion that, within the scheme, subjective aims may not be amenable to symbolism, nor does there seem to be any means of distinguishing God

from any other actual entity. Externally, doubts as to the adequacy of the symbolic process in explaining the operations of what may be loosely denominated "consciousness," "God," "obligation," "ideals," etc., arise.

The symbolic expression here attempted seems less open to the internal criticisms than the external. Perhaps that is because Whitehead offered *Process and Reality* in the form which that great contributor to symbolic reasoning found clearest. The external criticisms of the symbolic process arise in Chapters X and XIII nearly as much against the philosophy of organism as against the symbolic process.

Nevertheless, despite all these deterrents, a symbolic statement of *Process and Reality*’s categorial scheme will be attempted. To the judgment of professional logicians who would be better qualified to present it the fate of its ultimate value must conform.

The categories are divided into four basic classes. The first, the "Category of the Ultimate," is the one category which is the base-principle of the philosophy of organism, and in which the other three genera are presupposed. It expresses the final functional character of the universe.

The second class is that encompassing the categories of existence, of which there are eight. It describes the entities which operate in accordance with the demands of
the category of the ultimate, and of the other categoryal genera.

The third class includes the categories of explanation, twenty-seven in number. These categories describe the process by which the categories of existence interact. As Professor Emmet has observed, they are not mutually independent, and may require subsequent alterations. The system is, then, admittedly a disjunctive one. As in the case of the 1905 memoir, Whitehead did not test his axioms, or categories, for independence. However, the list of twenty-seven categories of explanation is reasonably adequate. It will be indicated at the appropriate junctures where alterations might be profitably made.

The final class is that of the categories of obligation, of which there are nine members. These categories express the necessary conditions which must obtain in order that creativity may operate—justifying the name "obligation." In a sense, the categories of explanation describe the reactions of the categories of existence according to the demands of the categories of obligation, as well as of the interrelations of the categories of existence themselves.

39. WPO, 70.
40. See pages 7-8 of this thesis for the distinction between a disjunctive and an independent set of axioms.
At this point, the basic symbolic definitions will be given. The category of the ultimate will be designated by \( \mathbf{X} \). The symbol \( \& \) will be used to designate the members of the class of the categories of existence. The categories of explanation will be designated as \( \text{Hps R}_\& \). The symbol \( \text{Hp R}_0 \) will designate a category of obligation.

Because of the derivation from the first class of the other genera of categories, the following assertions are true.

1.00 \( \vdash \exists : \mathbf{X} \vdash \exists \mathbf{E} \vdash \sum \text{Hps R}_\& \vdash \sum \text{Hps R}_0 \)
1.01 \( \vdash \text{Hp R}_\& \in \text{Hp X} \)
1.02 \( \vdash \text{Hp R}_0 \in \text{Hp X} \)

Thus, according to 1.01 and 1.02, a category of explanation or of obligation is really an axiom regarding the operation of creativity.

Because \( \mathbf{X} \) represents the total functioning of the universe,\(^1\) it might be stated in its operational form as having a certain number of entities within its domain:

1.10 \( \mathbf{X}(\vdots \vdots \vdots \vdots \vdots) \)

where the semicolon indicates the entities operated upon. Accordingly the assertion will follow that

1.11 \( \vdash \& \subseteq \mathbf{X}(\vdots \vdots \vdots \vdots) \)

When the operative character of $X$ is restricted to a certain number of receptive entities, the functional character will be expressed as

\[
\begin{align*}
1.12 & \quad X(;;) \quad \text{two entities} \\
& \quad X(;;;) \quad \text{three entities}
\end{align*}
\]

etc. Actually expressions such as 1.12 will be abstractions from the totality of the operations of the universe, and never really tell the whole truth.

Essentially, then, the problem of *Process and Reality* is an expansion of that considered in the 1905 memoir. Here the problem may be alternatively stated: "Given a set of categories of existence ($\mathcal{E}$) which form the field of a certain complex function ($X$), what axioms ($\text{Hp R}_\mathcal{E}, \text{Hp R}_0$) satisfied by $X$ have as their consequence that the generalizations of philosophy and cosmology are the expression of certain properties of the field of $X$?"\(^{42}\) This statement of the problem re-emphasizes the enormity of the task Whitehead set for himself.

**The Category of the Ultimate**

The category of the ultimate, it has been observed, is the master principle of the Whiteheadian metaphysics. As the ultimate principle of a universe of a plurality of

\(^{42}\) Cf. page 60 of this thesis and MCMW, 465.
entities, its operations are extremely complex.

In the concept of an entity or a being, observed Whitehead, there are three necessary notions. First is the singularity of that entity which distinguishes it as an operative unit. Second, there is the notion of disjunction, which signals the presence of many operative units distinct from each other. But the third concept involved is that of creativity. None of the three are totally independent notions; the unit existence of an entity signals that there are other such entities, and that creativity is in operation. Similar reasoning can be applied to the other notions to show their mutual involvement.

In the notion of creativity itself, two special functions are involved. It is part of the nature of the universe that the entities in it are capable of entering into a complex unity. The first function of creativity is to provide the process whereby the many become the unit which is the universe conjunctively.

The second function of creativity is that of providing a principle of novelty. When the entities form a complex unity, a novel entity distinct from all others already existing is the result.

Now, for Whitehead the basic entities of the universe

43. PR, 31.
44. PR, 31.
45. PR, 31. RM, 90.
were called "actual entities" or "actual occasions," and were examples of the first species of the categories of existence. Creativity, then, expressed the unification process that can happen to an actual entity: that of contributing to the determination of novelty (either the novel entity which is the unit-universe or a new actual entity within that universe).

Several more basic symbolic definitions are required. An actual occasion will be signified by $a$, and $a^n$ will designate the class of actual entities at any selected stage of novelty, n. A specific actual entity of this class will be denoted by a Greek subscript: $a^n_\alpha, a^n_\beta$, etc. It might be noted that there is no final stage of novelty--no "far-off divine event."

It thus follows that
\[ 2.01 \vdash a^n_\alpha, a^n_\beta, a^n_\gamma, \ldots \subseteq a^n \subseteq \mathcal{E} \subseteq X(;;;;;\ldots) \]

Also
\[ 2.02 \vdash a^n_\alpha, a^n_\beta, a^n_\gamma, \ldots, a^{n+1}_\alpha, a^{n+1}_\beta, a^{n+1}_\gamma, \ldots \subseteq a^n \subseteq \mathcal{E} \subseteq X(;;;;;\ldots) \]

To designate the operation of the category of the ultimate restricted to one stage of novelty, the corresponding expression will be
\[ 1.121 \quad X^n(;;;;;\ldots) \]

It then follows that
\[ 2.03 \vdash a^n_\alpha, a^n_\beta, a^n_\gamma, \ldots \subseteq a^n \subseteq \mathcal{E}^n \subseteq X^n(;;;;;\ldots) \]
From the nature of the category of the ultimate, that an actual entity is a singularity can be expressed:

2.10 $\vdash \text{X. O. } \text{Nc}^c a^n_\alpha = 1$

It also follows that there are diverse actual entities.

2.11 $\vdash \text{X. O. } \exists ! (Za^n)$
where

2.12 $\sum a^n = a^n_\alpha v a^n_\beta v a^n_\gamma v \ldots$ Df

and

2.13 $\vdash \sum a^n \supset: a^n_\alpha \neq a^n_\beta, a^n_\alpha \neq a^n_\gamma, \ldots, a^n_\alpha \neq a^n_\gamma, a^n_\beta \neq a^n_\delta, \ldots$

Accordingly, $\sum a^n$ will be the symbolic notation for the universe disjunctively at stage of novelty $n$.

The novel togetherness of actual entities, by which a new entity emerges, is to be known as a "concrescence." 46

Now this new entity itself may also be known as a concrescence; all actual entities now existing are products of the operation of the category of the ultimate. They are produced, rather than original, elements.

The concrescence of elements will be denoted as

$c^c(a^n_\alpha, a^n_\beta, a^n_\gamma, \ldots)$.

All actual entities are to some extent, by their very nature, implicated in the concrescence of every novel actual entity. It follows that the novel entity is at a more advanced stage of novelty than the components which produce it.

46. FR, 32. NL, 87.
The first aspect of creativity, whereby the disjunctive universe becomes the conjunctive universe, can then be described in terms of a concrescence. Using $A \sum a^n$ to represent the actual occasion which is the universe conjunctively, the tentative formula arises:

$$2.14 \quad r. \quad C^{6}(\sum a^n) = A^{n+1} \sum a^n$$

The universe conjunctively is also known as the "solidarity" of the actual entities.\(^{47}\) It follows that, although the conjunctive universe is the concrescence of the disjunctive universe at stage of novelty $n$, and may be denoted as the "conjunctive universe at $n$," it operates as a direct determining factor only at stage of novelty $n+1$.

This point is not made clear by Whitehead. Accordingly the conjunctive universe of stage $n$ will contribute a determinateness to actual entities at some later stage, which will be designated as $n+1$.

However, it is questionable whether the components contributed by any one factor will occur at the immediately consequent stage of novelty. Accordingly, this consideration and the operation of the multiple time series makes the formula for the conjunctive universe highly ambiguous. But the operation of the conjunctive universe is a definite factor which must not be ignored. Whenever, then, $A^{n+1} \sum a^n$ appears, it will be necessary to remember that the

\(^{47}\) PR, 254.
proper stage of novelty is unclear. It should be translated to mean "the previous conjunctive universe which at this stage of novelty contributes determinateness to the concrescence in question." The same ambiguity regarding stage of novelty will be apparent in large-scale statements regarding the concrescence of actual entities, and a similar interpretation must be inserted. The question will become more pressing in connection with "causal efficacy" and "presentational immediacy."

In view of the discussion of the preceding paragraph, it is apparent that the conjunctive universe is really expressed by the formula

\[ 2.20 \quad C(\sum a^n, A^{n-p+1}) = A^{n+1} \]

It must also be remembered that the notion of \( \sum a^n \) is an abstraction; \( X \) implies the existence of \( A^{n+1} \( \sum a^n \) as well.

Formula 2.20 is merely a special case of the more general equation expressing the production of any new actual entity:

\[ 2.21 \quad C(\sum a^n, A^{n-p+1}) = a^{n+1} \]

Obviously, then, the mode of concrescence, including the amount of determinateness contributed by each entity in the field of the concrescence, will determine whether a new actual entity or the conjunctive universe arises, and more particularly, what sort of actual entity it will be. To describe the concrescence is the duty of the categories
of explanation and obligation.

Furthermore, the actual case is a statement that not one, but many, new actual entities become.

2.211 \( \sum_c (\sum a^n, A^{n-p+1}) \equiv \sum a^{n+1} \)

The "creative advance" of nature thus becomes \( \sum_c (\sum a) \), and is a manifestation of the category of the ultimate. It is the adventures of actual entities in their function of contributing to new concrescent actual occasions.

From 2.11, 2.12, 2.13, and 2.21, the statement that the concrescent entity is different from any of its contributing occasions follows.

2.22 \( \forall (a_{n+1}^n \subseteq \Sigma a^n) \)

But, the possibility that an entity may persist unchanged is expressed by

2.221 \( \exists (\exists a^n_{\alpha})(a^n_{\alpha} \subseteq \Sigma a^{n+1}) \)

But at the same time that \( a_{\alpha}^{n+1} \) is being produced, other actual entities will also be in process of emergence, so that it will not necessarily be true that at any stage of novelty the new universe will be the sum of the occasions at a previous stage and the new occasions. For in the production of new occasions, old ones are lost, although their influences are "objectively immortal." Hence,

2.23 \( \forall (\Sigma a^{n+1} \equiv \Sigma a^n \cup a_{\alpha}^{n+1}) \)

Rather, it is the case that the concrescent nature of 2.211 is true.
The case for the actuality of creativity then lies in the fact that all its progeny are actual.\textsuperscript{48} Creativity is not just the essential ordering process, as in the case of the essential relation in the 1905 memoir.

Order is not sufficient. What is required is something much more complex. It is order entering upon novelty; so that the massiveness of order does not degenerate into mere repetition; and so that the novelty is always reflected upon a background of system.\textsuperscript{49}

Creativity is not itself an actual entity; it lacks the determinateness of an actual entity.\textsuperscript{50} Yet it is that function of the universe which produces the determinate concretion which is the actual entity.

2.24 \( \exists (x \in a) \)

Creativity is the ultimate "givenness" for the philosophy of organism; its presence cannot be reasoned into justification. It is one of Whitehead's insights that every metaphysical system is essentially based on some "given" elements.\textsuperscript{51} Certainly that notion is not new to mathematics, physics, or "physicomathematical science criticising itself."

Professor A. E. Taylor has suggested that creativity may be the same as Bergson's \textit{élan vital}.\textsuperscript{52} The suggestion

\textsuperscript{48} PR, 10.
\textsuperscript{49} PR, 515.
\textsuperscript{50} RM, 92. Charles Hartshorne, \textit{op. cit.}, 526.
\textsuperscript{51} Emmet, WPO, 71.
\textsuperscript{52} 1927 "Dr. Whitehead's Philosophy of Religion" The Dublin Review, 181, 34-35.
appeared in response to the publication of Religion in the Making, and the fuller discussion in Process and Reality was not yet available. Such an identification was to be expected, using only Religion in the Making as evidence. However, creativity transcends even the élan vital, which would be more readily associated with the "subjective aim" of an actual entity in the philosophy of organism. However, Professor Taylor was wary of definitely assigning the creativity-élan vital identification, and continued, in the same paper, to observe that creativity might well be "the purest of all unrealized potentialities." 53 Again, the analogy is extremely tempting, but creativity does not represent any potentiality of an existing state or the summation of them in however complex a fashion may be desired. That function will be delegated to the "Primordial Nature of God" and the eternal objects, both of which obey the dictates of Whitehead's uncreated creativity.

53. Ibid., 36.
The Categories of Existence

I. Actual Entities

The notion of an actual entity was introduced in the symbolic statements, 2.01 through 2.24, and in the exposition accompanying those assertions.

The actual entity is the ultimate building brick of which the universe is made (cf. 2.11 and 2.12). That there should be but one type of actual entity is the ideal to which Whitehead attempted to conform.54 It is possible that diverse types do exist, but the attempt is to demonstrate that any possible species of determinate entity shall be wholly describable in terms of actual entities. It is instructive to remember that in the 1905 memoir Whitehead exhibited the desire to have a monistic concept. An actual entity is the result of a concrescence (cf. 2.21). As such, it is composite; it has appropriated components from the rest of the universe, and is inextricably related to them. It is this aspect of an actual occasion which is one sense of Whitehead's denial of "simple location." It is a "throb of experience including the actual world within its scope."55 This statement is a declaration

54. PR, 168.
55. PR, 290. See also PR, 28, 65. NL, 58.
of the ultimate metaphysical situation: that of entities subjectively experiencing their actual worlds.

Because of the internal relatedness implied in con-
crescence, actual entities do not change. They persist (cf. 2.221) throughout a certain spatio-temporal extensive quantum, and are superseded by other actual entities which appropriate their determinateness. Actual entities are known as actual occasions when they are considered in terms of their character of extensiveness. When a certain number of actual occasions are related in a determinate fashion, that "nexus" of occasions is to be known as an event, identifiable with the relativist's event and Whitehead's own event of the relativity era.

Using the symbol \( \mathbb{N} \) to denote the nexus (plural of nexus) at stage of novelty \( n \), the proposition follows that there exist actual entities forming a nexus:

\[
3.01 \quad \{ \mathcal{a}_n^\alpha, a_n^\beta, a_n^\gamma, \ldots \} (a_n^\alpha, a_n^\beta, a_n^\gamma, \ldots \subset \mathbb{N}_n^\alpha)
\]

The nexus will be considered at greater length in its function as a category of existence at a later stage in this chapter.

Thus the extension \( \mathbb{A} \) of an event can be defined by the familiar formula

56. FR, 52, 92. 1927 "Time" Proceedings of the Sixth International Congress of Philosophy, 59. The paper will hereafter be designated as TIME.

57. FR, 119.
3.10 \[ \overline{\Delta s} = (c^2 \Delta t^2 - \overline{\Delta x}^2 - \overline{\Delta y}^2 - \overline{\Delta z}^2)^{\frac{1}{2}} \] 

underscoring the appropriate elements to show that its ex-
tensiveness is the character considered. The extensive 
boundaries of \( H^2 \) will then be defined by \( \overline{\Delta s} \). The lower 
limiting type of event is an actual occasion; the upper 
limiting type is the conjunctive universe:

3.11 \[ H^2 = \overline{\Delta s} \cup A^n \leq \overline{\Delta s} \leq A^n \] 

"Events" thus have a less important function than in the 
earlier writings so far as the metaphysics is concerned. 
So far as physical cosmology is concerned, the "event" is 
the only element which seems capable of identification 
with any customary scientific element. Formula 3.11 de-
fines only the actual limits within which the nexus can be 
extensively divided. Theoretically, it is possible for \( \overline{\Delta s} \) 
either to decrease or to increase indefinitely, since ex-
tensiveness implies for Whitehead only potential or possible 
divisibility.58 When the temporal extent of the occasion 
is in question, the term "epochal occasion" may be applied.59 

The actual entity in its character of extensiveness 
does not tell the whole story, however. There is also the 
genetic or concrescent character of the actual entity,

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58. On this point see the discussion of presentational 
immediacy, introduced in connection with the eighth 
category of explanation in Chapter IX.
59. RM, 91.
which cannot be described in terms of $\Delta$s. Nor is the genetic character a simple one. Each actual entity is essentially dipolar, having what may be called a mental and a physical pole. \textsuperscript{60} Whitehead here made what was, in the opinion of this thesis, an unhappy choice of words, because it necessitated a constant emphasis that the separation did not represent the distinction between the physical aspect (in the usually accepted material aspect) and mental aspect or the spiritual aspect (in the usually accepted sense) of an organism. It is here suggested that they would be more appropriately called the "conformative" and "originative" poles respectively.

The two poles work in cooperation with each other, thereby maintaining the unity of the actual entity. In certain entities the mental (originative) pole is more active; in others the physical (conformative) pole is dominant. Every entity, from the least complex to God, is dipolar; nor is the case true that the gradation of complexity depends upon increasing emphasis upon either pole. As a consequence of this nature of an actual entity, neither the physical (conformative) nor the mental (originative) world can be considered in abstraction from each other.

Pictorially, actual entities may be shown as $\mathfrak{P}$.

\textsuperscript{60} RM, 118. FR, 54, 165, 366, 470. TIME, 59. 03, 146.
with $M$ and $P$ to show the variations in dominance of either pole. That the world at any stage of novelty $n$ produces a concrescence which is a new actual entity may be pictorially reproduced (cf. 2.21).

This diagram, however, is an abstraction from the real case, which might be shown as (cf. 2.211 and 2.221):

The number of participating and resultant entities has been arbitrarily restricted to five for ease of representation. In general, the world at $n+1$ will not be tremendously different from the world at $n$; the objective immortality of most of the characters of each actual entity is dominant in the physical world.

This pictorial representation emphasizes another important aspect of the philosophy of organism not readily
apparent from the symbolic statements: it is "a cell-theory of actuality. Each ultimate unit of fact is a cell-complex, not analysable into components of equivalent completeness of actuality."\(^{61}\) It is important to note that the use of the terms, "cell" and "organism," as well as others which will appear later, are peculiarly suggestive of biological terminology.\(^{62}\)

The cell can be considered either morphologically or genetically. That is to say, it can be considered as a nexus of determinate facts, in which case the sciences have been particularly interested. But the world of actual entities is a going concern. The morphological analysis is by its very abstraction incomplete. Hence the necessity for the genetic analysis of the concrescence.

Forgetting this point is the primary reason for the inability of many commentators to locate Parts III and IV of *Process and Reality* with reference to the whole. Part III, "The Theory of Prehension," considers actual entities genetically. Part IV, "The Theory of Extension," considers them morphologically. Neither analysis is complete in itself; it must be augmented by the other. Relegation of

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61. TR, 334.
either method of analysis to a permanently subordinate status invariably results in showing either prehension or extension to be the core of the philosophy of organism. Most of Whitehead's earlier writings were occupied with morphological analysis; excessive emphasis on them will accordingly present extension in a highly colored context.

Consideration of the ultimate constituents of the universe as a sort of metaphysical cell attracted Professor Stace in an attempt to forward the cause of phenomenalism.63

It has been observed that there are two poles to an actual entity: the mental (originative) and the physical (conformative). In its character as a physical occasion the entity is "an act of blind perceptivity of the other physical occasions of the actual world."64 The notion of perceptivity introduces the second category of existence: that of prehensions.

2. Prehensions

Prehensions are the "concrete facts of relatedness"65 in the universe of actual entities. By means of this vector form of internal relatedness, entities are made to

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64. PR, 440. Cf. also SMW, 86.
65. PR, 32.
contribute to the determinateness of one actual entity; it is the relatedness of the appropriation of particular elements in one entity by an actual entity. Thus, in one sense, the world is the solidarity of actual entities; in another sense it is a manifold of prehensions. 66

Prehensions may be of two pure types: conceptual and physical. The former prehensions are made via the mental (originative) pole; the physical prehensions have ingress via the physical (conformative) pole.

Because of the vector nature of prehensions there is a repetition of the attack on bifurcation. By the prehensive character of actual entities, they act as "subjects" in appropriating elements from the other actual entities and eternal objects. In reference to the public nature of the elements appropriated, an actual entity reaches the stage of superject; in reference to the private appropriation by an actual entity, that entity is described as a subject. 67 Thus, an actual entity is subject-superject.

The symbolic expression of a prehension of one actual entity by another will readily follow.

4.01 \( a_{\alpha}^n \mathcal{P}^n a_{\beta}^n \)

The disjunctive universe at any stage of novelty, less any particular actual entity will be

66. SMW, 89.
67. PR, 443-444. SMW, 144.
\[ \Sigma a^n - a_n^a \]

In some form or another, each actual entity prehends every other actual entity in the universe:

4.02 \[ a_n^a \rightarrow \Sigma a^n - a_n^a \]

By way of description of the nature of prehension, the mutual prehensions of actual entities is not the same thing as either the logical sum or the logical products of the entities.

4.03 \[ a_n^a \rightarrow a_n^\beta \rightarrow a_n^a \rightarrow \Sigma a^n - a_n^a \]

Fictorially, prehensions are the vector relatedness bonds between actual entities. Thus, actual entity \( a_n^a \) will prehend actual entities \( a_n^\beta \) and \( a_n^a \). In addition to the direct prehension of \( a_n^\beta \) by \( a_n^a \), there is the prehension of \( a_n^\beta \) by \( a_n^a \) through the mediation of \( a_n^\gamma \). This mediate prehension will assume greater clarity in the discussion of contrasts (the eighth category of existence) and will assume importance in the later discussion of hybrid prehensions. In the case of the mediated prehensions, the vector path \( a_n^a - a_n^\beta - a_n^\gamma \) will not generally be equivalent to the direct path \( a_n^a - a_n^\gamma \). Symbolically, this assertion assumes the form:
Whitehead traced his theory of prehension to a more primitive form expressed by Francis Bacon as a "perception" in a context not involving the notion of sense-awareness, but rather in the mode of a primitive "taking account" of other objects. 68

3. Nexus

When the prehensions of actual entities are considered in complex unity as a pattern of relatedness, this determinate relatedness is known as a nexus. 69 A nexus of many actualities may be treated, for analytic purposes, as a single entity. Whitehead's use of the word "event" in the relativity era corresponds most closely to the nexus in the philosophy of organism. Thus in considering the endurance of a block of wood, the thing talked about is a nexus of many actual occasions.

Symbolically, (cf. 3.01),

5.01 \( (\int a^n, a^n, a^n, \ldots, P^n, P^n, P^n, \ldots)(a^n, a^n, a^n, \ldots, P^n, P^n, P^n, \ldots < P^n) \)

Also, the summation of the prehensions at any stage of

69. PR, 32.
novelty may be considered to be a nexus;

It follows from 2.11, 2.12, and 2.13, that the universe may be considered as a multiplicity of actual entities; from 2.20, that it can be considered as an actual entity; from 5.02 that it can be treated as a nexus of prehensions.

Diagrammatically, the pattern of relationships holding among the occasions \( a^n_\alpha, a^n_\beta, a^n_\gamma, \ldots \), and \( a^n_\varepsilon \) is the nexus of those occasions.

Whitehead described two types of order which may exist in a nexus: social and personal. Social order obtains when three conditions are satisfied. First, there must be some common element of form in each of the actual entities participating in the nexus. This form is the taking into account of some complex eternal object by each member of the nexus. If the common element of form is lacking, there is still a nexus, but no society. Thus, the complex eternal object may be that one which describes the various chemical and physical properties of a piece of oak. Second, this common element of form is taken into account, or prehended, because of conditions imposed through its prehensions of other members of that nexus. Thus, the conditions
of existence of the other actual entities, when prehended by the occasion in question, are such as to deny that occasion the power to be anything else than a case exhibiting the complex eternal object which it does. Thus, an actual occasion exhibiting the properties of oak does so because the other cells implicated work for the perpetuation of that eternal object objectified in the nexus. The oak-occasion $a^n_{\alpha \gamma}$ continues as oak-occasion $a^n_{\beta \gamma}$, and not as dead-oak-occasion $a^n_{\beta \delta}$, or carrot-occasion $a^n_{\gamma \epsilon}$, or coal-occasion $a^n_{\delta \eta}$, because itsprehensions of other occasions prohibit the change. The third condition necessary before a nexus is also a society is really an expansion of the second.\textsuperscript{70} It is that the other occasions impose the necessity for the specific occasion's prehension of the complex eternal object because they themselves prehend the eternal object positively, that is, accept, and do not reject, it.

When these three conditions are present in a nexus, it may be called a society. When, in addition to social order, a genetic serial relation holds—corresponding to the exact perpetuation of the social nexus—the society enjoys what is called "personal order," and is known as an "enduring object."

\textsuperscript{70} Criteria listed as three in number in PR, 56-57, are condensed as is suggested, in PR, 137.
An interesting case occurs when the complex eternal object is no longer a common element of the nexus, but is gradually replaced by another complex eternal object, as in the petrification of wood, or in a chemical reaction.

The whole discussion of social and personal order is thus a vindication of the enduring objects of the earlier period, expressed in terms of the philosophy of organism. A block of wood, Edinburgh Castle Rock, and a glass of milk are examples of societies with temporal endurance. They may change: the wood may petrify or be burned, the components of Edinburgh Castle Rock may become soluble and be carried away, and the milk may sour. However, for a certain length of time the serial repetition of components of a society may be "personal" (enduring objects). It is when the change occurs that the personal order is broken down. Therefore a society may, or may not, be composed of many subordinate strands of "enduring objects."

The symbolic form $e$ will be used to denote an eternal object, $e_\alpha$ to denote a specific eternal object, $e_\beta$ to indicate an eternal object which is complex. A plus will be added above the prehension symbol to denote positive taking into account. The alternative negative form, rejection, would be designated by the use of a minus sign instead of a plus.

71. FR, 52.
That several actual entities positively prehend the same complex eternal object is asserted by 5.11.

5.11 \[ \alpha^n \stackrel{\beta}{\psi} e_{\gamma} \alpha^n \stackrel{\beta}{\psi} e_{\gamma} \alpha^n \stackrel{\beta}{\psi} e_{\gamma} \ldots \]

5.12 \[ \alpha^n \stackrel{\beta}{\psi} a_{\alpha} \alpha^n \stackrel{\beta}{\psi} a_{\alpha} \alpha^n \stackrel{\beta}{\psi} a_{\alpha} \ldots \]

A nexus with personal order will be designated as \( P_n \); one with social order, \( S_n \).

5.13 \[ \alpha^n \stackrel{\beta}{\psi} a_{\alpha} \alpha^n \stackrel{\beta}{\psi} a_{\alpha} \alpha^n \ldots \]

5.14 \[ S_{n-p} S_{n-1} S_n S_{n+1} S_{n+q} S_{n+q} S_{n+q-1} \]

5.15 \[ P_n \]

5.16 \[ (S_n \Phi)(P_n \Phi), \ldots \]

Diagrammatically, a nexus is a society when
and when $a^n_\alpha$ prehends $e_{\alpha\beta\gamma\ldots}$ because the positive prehensions of $e_{\alpha\beta\gamma\ldots}$ by $a^n_\beta, a^n_\gamma, a^n_\delta$, and $a^n_\epsilon$ control $a^n_\alpha$'s prehensions of themselves so that $a^n_\alpha$ cannot do other than prehend $e_{\alpha\beta\gamma\ldots}$ positively.

The order is personal when

\[ n \quad n+1 \]

Whitehead the observes that an atom may be regarded as a society whose activities are at least partly explained as rhythms (vibrations, waves),\(^72\) thus accounting for the use of "rhythm" in the relativity era and in Science and the Modern World.

Furthermore, it is apparent that one society may include many subordinate societies; the dominant society will be known as a structured society. Because of the very nature of a society, the structured society will tend to stabilize the subordinate societies by tending to eliminate conditions which might upset the order.

Symbolically, a statement about structured societies

\(^72\) PR, 121.
is possible.

5.17 \( r \cdot ( S_{N_1} \alpha, S_{N_2} \beta, \ldots, S_{N_L} \gamma) \cdot ( S_{N_1} \alpha, S_{N_2} \beta, \ldots) \cdot ( S_{N_1} \alpha, S_{N_2} \beta, \ldots) \cdot C_{S_{N_K}} \cdot S_{N_L} \gamma, \ldots, C_{S_{N_1}} \cdot S_{N_2} \beta, \ldots, C_{S_{N_1}} \cdot S_{N_2} \beta, \ldots) \)

Diagrammatically, it is possible that nexus ABC is structured, containing the subordinate societies A, B, and C. It is also possible that structured society ABC is itself a member of a larger structured society. In fact, observed Whitehead, in all probability he would need to consider the elementary particles of physics as complexly structured societies.\(^{73}\)

It is apparent that a structured society will promote an intensification of its own experience by means of the contrasts inherent within itself and because of the narrowed range of originality in which it participates. It is also evident that, just as the primitive form of society may break down through environmental influences, so may a structured society, although in general it will be more stable.

When the mental (originative) poles of actual entities intensify their initiative and prehend other eternal objects, certain subsequent alterations will be produced

\(^{73}\) PR, 152.
in the structured society. It is by means of the exhibition of originating initiative that the evolutionary movement in biological organisms is possible.74

4. Subjective Forms

That there must be some means of distinguishing the "how" of prehensions, in order that all prehensions will not be exactly alike, is the justification for the fourth category of existence, the subjective forms. The subjective form is how the "subject" prehends another entity. Thus a prehension is not merely receptive of fact; the subjective forms "clothe the dry bones with the flesh of a real being, emotional, purposive, appreciative."75

The subjective form of a prehension is determined by the subjective aim inherent in each actual entity. The subjective aim is that restless product of creativity which drives the actual entity toward its concrescence, its satisfaction. It determines the subjective forms, which contribute to the determinate final state of an actual entity. Thus, the integrations in the final phases are a function of the subjective aim in the earlier entities, as well as of the actual world in which that entity

74. PR, 154-155. AI, 259.
75. PR, 131.
operates. The mental (originative) pole is the "seat" of the subjective aim; it determines the subjective forms of the prehensions, including those of the physical (configurative) poles. Accordingly, it is the mental (originative) pole which is the generator of novelty in the actual entities.

Consciousness must not be equated with subjective aim, subjective form, or the mental pole, nor with all activities involving those three associated components. Consciousness is, however, the result of certain complex prehensions when the subjective aim and the subjective forms are properly integrated with those complex prehensions of the "actual world." Thus consciousness is a consequence of experience, and not experience of consciousness. This is a direct reversal of the prevalent philosophical position. Consciousness will be more fully discussed at the appropriate juncture of the exposition.

There is no separate category of subjective aims. It is the opinion of this thesis that the omission was properly decided. It is really something directly implied in the notion of the operation of creativity on an actual entity. Subjective forms, on the other hand, are concrete facts of experience, although they are private matters of fact.

76. PR, 108.
77. PR, 83.
This is not meant to devalue the importance of subjective aims. As a meeting point of creativity and the actual entities, it is one of the most important and interesting concepts of *Process and Reality*.

Two contributory components are present in the subjective form of a prehension: its qualitative pattern and its pattern of intensive quantity,\(^{78}\) not wholly separable. The quantitative intensities of the qualitative constituents to some extent determine that qualitative pattern. And the quantitative pattern is similarly the variety of the qualitative elements with their accompanying intensities.

Symbolically, subjective forms will be denoted by a subscript to the prehension symbol. For that reason, Greek subscripts have been employed in preceding statements where the subjective form would have been important. Strictly speaking, no prehension is ever without its subjective form. Also, the subjective aim is largely responsible for determining whether a particular prehension will be positive or negative. It is a consequence that, in general,

\[
6.01 \quad \alpha^\alpha_{\alpha} \neq \alpha^\beta_{\beta}
\]

In the preceding statement the notation \(+\) above the

\(^{78}\) PR, 356.
symbol for prehension means "either positive or negative." When considering subjective forms as categories of existence, the symbol $\mathcal{S}$ will be used. Thus,

$$6.02 \quad \mathcal{S}^n \subset \mathcal{E}^n \subset \mathcal{E} \subset X(\ldots)$$

5. Eternal Objects

That a class of entities other than actual entities exists was implied in the discussion of societies, to which eternal objects contribute some common element of form. That eternal objects are forms of definiteness is their primary function; that they are pure potentials in this determination distinguishes them from some aspect of definiteness of an actual entity.

The actual world, as a process of actual entities, has the definiteness it has because it allows the "ingression" of these unchanging, non-temporal forms, the eternal objects. $^{79}$ These eternal objects are prehended by an actual entity directly through the mental (originative) pole, never through the physical (conformative) except as mediated by the mental (originative) pole of another actual entity. $^{80}$

79. SMW, 197-198. PR, 32, 70.
80. SMW, 129. PR, 280.
Together, the eternal objects constitute an unchanging array of potentials containing all the possibilities in which the universe could participate. No eternal objects are ever dropped; none ever added.

Because all the different incompatible possible forms of definiteness are eternal objects, there is not one entity which is the class of all eternal objects. Certain simpler, compatible eternal objects may act as a complex eternal object as a form of definiteness. It does not mean, however, that that complex eternal object will act as such for all other entities.

Symbolically, any eternal object will be designated as $e$, and a specific one as $e_\alpha$.

The statement

$$7.01 \vdash \ldots = e_{\alpha}^{n-1} = e_{\alpha}^n = e_{\alpha}^{n+1} = \ldots$$

is in glaring contrast to an analogous statement about actual entities:

$$7.02 \vdash \ldots \neq a_{\alpha}^{n-1} \neq a_{\alpha}^n \neq a_{\alpha}^{n+1} \neq \ldots$$

It follows from 7.01 that the superscript designating the stage of novelty considered will be superfluous for eternal objects. It has value only for existences which are temporal, and when they are considered in conjunction with eternal objects, the temporal entities will designate the stage

81. SMW, 208. TR, 50-52.
of novelty themselves.

Another statement is suggested by 7.01:

7.03 \[ t \cdot Nc \sum e^n = Nc \sum e^{n+m} \]

The statement

7.04 \[ a^n_{\alpha} + r_n \cdot e_\alpha \]

means that \( e_\alpha \) has contributed some form of definiteness to \( a^n_{\alpha} \). This may be accomplished in any one of three ways:

1. by contributing some form of definiteness to \( a^n_{\alpha} \) itself,
2. by contributing some element of definiteness to the subjective form of any of the prehensions of \( a^n_{\alpha} \), or
3. by contributing to the evaluation which is made by the mental (originative) pole of a presented situation.\(^{82}\) Essentially, (3) is a function of either (1) or (2), or a combination of both.

It is apparent from this analysis that two species of eternal objects are possible: those which function as (1), but not as (2); and those which function as both (1) and (2). An eternal object cannot function as (2) alone, because the subjective form is itself an element in the final concrescence. Those eternal objects which function as (1) are known as eternal objects of the objective species. Those operating as both (1) and (2)—and here the emphasis

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82. FR, 445.
is on (2) with (1) implicitly included—are known as eternal objects of the subjective species.

The objective species of eternal objects are those which have a public function; they accomplish the task which universals accomplish in older metaphysical schemes. At their feet lies the task of contributing the determinateness to the "order of nature." But the eternal objects which contribute to the subjective forms function privately. It follows that Whitehead's earlier "objects" are now eternal objects of the objective species.

Symbolically, an eternal object contributing to the definiteness of some actual entity or some nexus (the objective species) will be designated as $oe_a$; one contributing to the subjective form, $se_s$. There seems to be no reason why a complex eternal object may not be constituted of mixed species, so long as their functions are not thereby confused or inconsistent.

Diagrammatically, and without prejudice in the pictorial situation of eternal objects relative to actual entities, the pictured situation is an expression of the prehensions of an actual entity, where the Greek letters on the vectors indicate the subjective form of the

83. FR, 447-448.
corresponding prehension. Also, in some fashion, either positively or negatively, each actual entity prehends every eternal object with differing intensities.

7.05 \[ \sum e \]

The anatomy of the objectification of the eternal objects and of the determination of the subjective forms will be the task of the categories of explanation and obligation.

The eternal objects have been the source of a great amount of controversy, and the sources of difficulty have centered around two questions: (1) How can eternal objects participate in the actual world and still remain eternal objects? (2) Are Whitehead's eternal objects universals?

That the answer to question (1) was, "They cannot," is the assertion of Lovejoy.\(^84\) Whitehead's reply, however, is an equally strong affirmative. For him, eternal objects would be unaffected by the concrescences of the actual entities.

Professor Emmet has pointed out that "the relation of the whole realm to actuality is as a scheme of possibilities of varying degrees of relevance."\(^85\) *Science and the Modern World*, which contains the best description of eternal objects, contains this answer by Whitehead:

\(^84\) Lovejoy, op. cit., I11.
\(^85\) WPO, 130-131.
An eternal object, considered as an abstract entity, cannot be divorced from its reference to other eternal objects, and from its reference to actuality generally. This principle is expressed by the statement that each eternal object has a "relational essence." This relational essence determines how it is possible for the object to have ingress into actual occasions.

The fuller exposition of this "relational essence," not discussed in *Process and Reality* as such, becomes part of the consequences of the second, fourth, sixth, seventh, eleventh, eighteenth, and twenty-fourth categories of explanation. They constitute Whitehead's response to the "How?" It will be suggested later, however, that it may be preferable to allow the eternal objects to change with concrescences of actual entities.

An extremely valuable discussion of the question regarding the identification of eternal objects and universals is found in Professor Emmet's volume.\(^87\) It was suggested on page 340 that eternal objects of the objective species function in a way analogous to that of universals. However, to rely upon this analogy too strongly is to introduce a misleading contrast. As will be seen from the fourth, eighteenth, and twenty-fourth categories of explanation, no such thing as a sharply defined universal or particular exists. No group of entities in the philosophy

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86. SMW, 198.
87. WPO, 106-126.
of organism represents, in the older sense of the term, universals; no group of entities represents particulars.

6. Propositions

A totally novel theory of propositions is given in the philosophy of organism. A proposition is a hybrid between actual entities and the potentiality of eternal objects. In short, a proposition is the arrangement of actual entities acting as a potential determiner of fact in another entity. Thus, a group of actualities may act in the same way as the objective species of eternal objects; it is a "lure for feeling," an invitation to be prehended.

It is a consequence of the facts that every actual entityprehends in some way every other actual entity (cf. 4.02), and in some way takes into account every eternal object (cf. 7.05), that there is no proposition which is not determinant in some actual entity.

Symbolically, a proposition may be denoted as

\[
\frac{\alpha_n}{\gamma_n} \Rightarrow (\forall a_\alpha^n, a_\beta^n, a_\gamma^n, \ldots : a_\alpha^n \rightarrow a_\beta^n \leftrightarrow a_\gamma^n \wedge \ldots : a_\alpha^n \equiv \frac{\alpha_n}{\gamma_n} \Rightarrow a_\gamma^n \ldots : \equiv \frac{\alpha_n}{\gamma_n}) \text{ Def}
\]

Also,

\[ \in \cdot \left( \exists \alpha^n \right) \left( \alpha_{\beta}^{n+n} \in \left( \in \right) \right) \]

The import of a proposition is that every actual entity is potentially implicated in every other one, and carries with it the relations of the prehended actual entity to the universe. However, although a proposition implies that the universe has some relation to nexuses implicated in the proposition, it does not absolutely presuppose the universe in its fully actualized character. In their elaborated form, the interrelations of propositions justify the possibility of prediction in physical science.

In this diagram, all those things outside \( a_{\alpha}^n \) are included in the overall proposition presented to it.

The simplest case of a proposition can be pictured as below.

The actual entities involved in the proposition, excluding \( a_{\alpha}^n \), are known as the logical subjects of the proposition. The eternal objects involved are the logical predicates of the proposition. 89

89. FR, 283.
The actual entities for which the proposition exists as a proposition are those which are in the "actual world" of any of the logical subjects of the propositions. Thus, if $a^n_\alpha$ is part of the actual world of $a^n_\beta, a^n_\gamma$, or any $a^n$ which is also part of the proposition, then that whole proposition is pertinent to the actual entity $a^n_\alpha$. The sum of the actual entities for which the proposition is a lure is called the "locus" of that proposition.\(^{90}\)

When the proposition is actually felt by $a^n_\alpha$, and enters into the determinateness of $a^n_\alpha$, the dotted lines of the preceding two diagrams will be completed, and the prehension will be known as a propositional feeling.\(^{91}\) Hence, 8.02 also expresses the fact that propositional feelings do exist.

Again, the urge to insert consciousness at this point is premature. "The subjective forms of propositional feelings are dominated by valuation rather than by consciousness."\(^{92}\)

Propositions are apparently examples of a separate category of existence because they are very real for the entities which prehend them. They are not, in their totality, members of any other category. However, this category of existence is, as is the case with the second,

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90. FR, 283, 396-397.
91. FR, 391.
92. FR, 402.
third, and fourth categories of existence, one which is subordinate to those of actual entities and eternal objects, expressing, as Professor Emmet has observed, one of "the modes of existence produced by the coming together of actual entities and eternal objects." 93

7. Multiplicities

The most neglected of the categories of existence is that of the multiplicities. A multiplicity is that group of ingredients which have some common character, but no unity as a result of that character. 94 For example, if the subscript $\rho$ signifies the presence of the same character in each component demonstrating it, a multiplicity could contain, for example, $a_{n-1}^{\rho}, a_n^{\rho}, a_{n+1}^{\rho}, \ldots, a_{\infty}^{\rho}, a_n^{\rho}, \ldots$, the nexūs including $\rho$, subjective forms by which $\rho$ is prehended, $e\rho, e\rho, \ldots$, propositions involving $\rho$, as well as contrasts (see eighth category of existence) involving $\rho$. Aside from the fact that each component in some way is characterized by $\rho$, they may have nothing in common which would make them unified. When so considered in disjunction, the group will be called a multiplicity.

93. WTO, 161.
94. FR, 33, 73.
Symbolically, multiplicities may be denoted by \(-M\), and qualified as \(M^n\) when all elements are selected from one stage of novelty, \(-M_\beta\) when it considers elements all of which have a \(\rho\)-characteristic, etc. Hence, the case of the highest generality is

9.01 \(\Sigma \epsilon \subseteq -M\)

Other cases of interest might be given as

9.02 \(\Sigma \epsilon^n \subseteq M\)
9.03 \(\Sigma \epsilon_\alpha \subseteq -M_\alpha\)
9.04 \(\Sigma \epsilon^n_\alpha \equiv \Sigma \epsilon^n \cap \Sigma \epsilon_\alpha \cap \Sigma \epsilon_\beta \cdot \Sigma \epsilon^n_\alpha \subseteq M^n_\alpha_\beta\)

and so on.

9.05 \(\Sigma \epsilon_\alpha \cup \Sigma \epsilon_\beta \subseteq -M_\alpha_\beta\)

Diagrammatically, a multiplicity \(M^n_\alpha\) would include at least the components pictured below.
8. Contrasts

This category of existence should really be looked upon as a sort of infinite series, containing contrasts of contrasts, etc. A contrast is defined to be the "mode of synthesis of entities in one prehension."\(^95\) Thus, when actual entity \(a^n_\alpha\) prehends actual entities \(a^n_\beta\) and \(a^n_\gamma\), the mode of their synthesis in being presented to \(a^n_\alpha\) is called a "contrast." But \(a^n_\beta\) and \(a^n_\gamma\) contain diverse characters determined by their own conceptual prehensions. It is therefore true that \(a^n_\beta\) and \(a^n_\gamma\) contain elements which are interrelated in such a way that they are objectified for \(a^n_\alpha\) as a unit, and those contrasts will be the expression of those \(a^n_\beta\, a^n_\gamma\) relata and no other. These contrasts form a separate category of existence, although in one sense a nexus is a form of contrast.\(^96\) The ordinary term, "relation," is a selection from a contrast.

When, however, more than two elements are contrasted, such as B-C-D, there exists what is known as a multiple contrast. The multiple contrast includes the dual contrasts, B-C, B-D, and C-D, but it contains something over

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95. TR, 33.
96. TR, 349.
and above that—it is the contrasts \((B-C)-(B-D), (B-C)-(C-D),\) and \([(B-C)-(B-D)] - [(B-C)-(C-D)]\). Even when these contrasts are summed, Whitehead holds, there is something in the total contrast \(B-C-D\) expressing the wholeness of that contrast not implied in any of the component contrasts. This, he suggests, is the ground for the doctrine of emergent evolution.\(^{97}\)

It is possible to assign the symbol \(K^n\) to designate the class of contrasts at stage of novelty \(n\). When it is desired to indicate a particular contrast, the symbol \(K^n(\alpha_\alpha^n, \alpha_\beta^n, \ldots)\) may be employed. It seems that it should be possible to isolate certain elements in contrasts for purposes of analysis, so that the eternal objects ingredient in \(\alpha_\alpha^n\) and \(\alpha_\beta^n\) are the intended objects of the contrast. As a matter of fact, whenever actual entities are contrasted, it is impossible to avoid dragging in all the constituent categories of existence. In abstraction, it should be possible to speak of \(K^n(e_\alpha, e_\beta, \ldots)\) or of \(K^n((n_\alpha^n, n_\beta^n, \ldots), \ldots)\), for example. From the nature of eternal objects (cf. 7.01) it follows that

\[
10.01 \uparrow K^n(e_\alpha, e_\beta, \ldots) \equiv K^{n+k}(e_\alpha, e_\beta, \ldots)
\]

It must also be observed that

\[
10.02 \uparrow \uparrow K^\uparrow(e_\alpha, e_\beta, \ldots) \neq e_\alpha \beta \ldots \quad K^\uparrow(e_\alpha, e_\beta, \ldots) \supset e_\alpha \beta \ldots
\]

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97. PR, 349.
As to multiple contrasts,

\[ 10.03 \quad \vdash \kappa^n (a^\alpha_n, a^\beta_n, a^\gamma_n) \vdash \kappa^n (a^\alpha_n, a^\beta_n) \vdash \kappa^n (a^\alpha_n, a^\gamma_n) : \kappa^n (a^\alpha_n, a^\beta_n, a^\gamma_n) : \]

\[ \kappa^n (a^\alpha_n, a^\beta_n) : \kappa^n [\kappa^n (a^\alpha_n, a^\beta_n), \kappa^n (a^\alpha_n, a^\gamma_n)] : \]

\[ \kappa^n [\kappa^n (a^\alpha_n, a^\beta_n), \kappa^n (a^\alpha_n, a^\gamma_n)] : \]

\[ \kappa^n [\kappa^n (a^\alpha_n, a^\gamma_n), \kappa^n (a^\beta_n, a^\gamma_n)] : \]

\[ \kappa^n \{ \kappa^n [\kappa^n (a^\alpha_n, a^\beta_n), \kappa^n (a^\alpha_n, a^\gamma_n)], \kappa^n [\kappa^n (a^\alpha_n, a^\beta_n), \kappa^n (a^\alpha_n, a^\gamma_n)], \kappa^n (a^\beta_n, a^\gamma_n), \kappa^n (a^\alpha_n, a^\gamma_n)] \} : \]

\[ \kappa^n \{ \kappa^n [\kappa^n (a^\alpha_n, a^\beta_n), \kappa^n (a^\alpha_n, a^\gamma_n)], \kappa^n [\kappa^n (a^\alpha_n, a^\gamma_n), \kappa^n (a^\beta_n, a^\gamma_n)] \} : \]

But, summing the entire right-hand component of 10.03 with the symbol \( \Sigma \kappa^n a^\alpha_n, a^\beta_n, a^\gamma_n \):

\[ 10.04 \quad \vdash \kappa^n (a^\alpha_n, a^\beta_n, a^\gamma_n) \vdash \Sigma \kappa^n a^\alpha_n, a^\beta_n, a^\gamma_n \]

Whenever feelings of contrasted entities are integrated, what is known as comparative feelings arise. Two simple types of these feelings are of importance.\(^{98}\) The first is the comparative feeling integrated from a propositional feeling and the actual feelings from which the proposition is derived (the nexus); they are known as

---

\(^{98}\) PR, 406.
intellectual feelings. The second type of comparative feelings is known as the class of physical purposes. These physical purposes are the integrations of conceptual prehensions and the physical prehensions which give rise to the possibility of those conceptual prehensions. The first type involves consciousness; the second type does not.

An intellectual feeling in which the nexus is prehended and contrasted with a proposition determined by it, may possess two subclasses. (1) When the items which are relevant to the immediate fact are in contrast with those items which are not relevant, there occurs conscious perception as the feeling of that contrast. (2) When the nexus itself is felt physically, and this prehension is integrated directly with the propositional feeling without the relevant-irrelevant valuation. This type of comparative feeling is known as an "intuitive judgment," and is more complex than conscious perception in that it involves physical recollection and its train of consequences. Conscious perception is derivative from a perceptive feeling; intuitive judgments include an imaginative feeling.

The comparative feelings involved in physical purposes are less complicated than intellectual feelings, and are the basis from which the "order of nature" springs.99

99. FR, 420-421.
In this species the reactions are clearly defined: there is a physical prehension,

which generates the corresponding conceptual feeling. The physical and the conceptual feelings are integrated to form the physical purpose in question, which is nothing more than the reproduction of the first physical feeling in later stages of concrescence, forming one of the defining characteristics of an enduring object.

When, however, the conceptual feeling gives rise to "reversions," the physical feeling is not exactly reproduced.

This possible reaction accounts for the existence of vibration and rhythm in the external world by means of hidden parameters.
Summary

It is clear from the discussion of the categories of existence that actual entities and eternal objects stand out as the really significant "existents." The other "existents" are thus, in a sense, statements about the two primary types of entities standing in a certain relationship. As data for further operation in the world, however, they can lay some claim to consideration as a separate type of existence.

Symbolically,

11.01 \[ \mathcal{E}^n = a^n \cap e \cup r^n \cup s^n \cup t^n \cup k^n \]

11.02 \[ \Sigma \mathcal{E}^n = \Sigma a^n \cup e \cup r^n \cup s^n \cup t^n \cup k^n \]

It is thus possible to speak of the universe as \( \Sigma \mathcal{E}^n \) as well as \( \Sigma a^n \) (cf. 2.12) or as \( A_{\Sigma a^n} \) (cf. 2.20). It is well to repeat here that

1.11 \[ \mathcal{E} \subset \mathcal{X}(\quad) \]

For purposes of talking about the concrescence of \( a^n \), the form \( \Sigma a^n(a^n) \) will be adopted to denote the "actual world" of \( a^n \), and will thereby include every actual entity which may contribute determinateness to the future of \( a^n \). This actual world may also be designated as \( \Sigma \mathcal{E}^n(a^n) \). Also,

11.03 \[ \Sigma \mathcal{E}^n(a^n) \neq \Sigma \mathcal{E}^n(a^n) \neq \Sigma \mathcal{E}^{n+1}(a^{n+1}) \neq \ldots \]
The revised problem of "On Mathematical Concepts of the Material World" thus considers $\mathcal{E}$ as the entities forming the field of the operation known as creativity, instead of the linear objective reals and instants of time as members of the field of the "betweenness" relation. The axioms of Process and Reality will be stated in the immediately following chapter. It is instructive to note that "instants of time" are not included among the ultimate existents of the Process and Reality concept. It is surprising that a philosophy frankly professing to take process seriously should seem to relegate time to a derivative status, and to deny it a position among the ultimate existents. However, it will be seen in the discussion of the next chapter that the notion of time is inherent in the concrescence of an actual entity.

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CHAPTER NINE

THE AXIOMS OF PROCESS AND REALITY

It is a major suggestion of this thesis that the categorial scheme of Process and Reality can be considered as an elaborate development of the problem posed in "On Mathematical Concepts of the Material World." The categories of existence, analogous to the ultimate existents of the 1905 memoir, were discussed in the preceding chapter. The categories of explanation and obligation, performing the function of axioms,\(^1\) are the object of this chapter.

As has been observed, the axioms are only tentative statements, by no means independent. Of the two subclasses, the categories of obligation are far more homogeneous than the explanation categories, which are really a heterogeneous collection of assertions about the categories of existence, creativity, and the categories of obligation. Whitehead frankly admits that, for example, the first, fourth, eighteenth, and twenty-seventh categories of

\(1.\) Victor Lowe, in his 1938 mimeographed paper on "The Development of Whitehead's Philosophy," has also referred to these categories as the "axioms" of Process and Reality, 13.
explanation are merely different aspects of the same metaphysical truth. Some (but not all, as one critic has suggested) are nothing more than definitions and are overshadowed by others.

These statements are not intended as denunciations of the categorial scheme. Rather, they show the tentative character of the system. Whitehead himself emphasized this characteristic by showing that the perfection of the axioms was his goal, and not the origin of his metaphysics. The categories of obligation, however, by reason of their preoccupation with the concrescent process inside the actual entity, and involving the interplay between the mental (originative) and the physical (conformative) pole, have an air of necessity. As categories, they are more fully developed than the majority of the explanation categories.

The Categories of Explanation

1. Process

This category asserts that the world is a process which is constituted by the origination of new actual entities, each with its achieved satisfaction.² This

² PR, 33, 94. SMW, 87, 90. NL, 59-60.
category represents, it seems, the central and primary
document of the philosophy of organism: the moving
character of the universe. "There is a rhythm of process
whereby creation produces natural pulsation, each pulsa-
tion forming a natural unit of historical fact." 3 It
might, then, be said that the thesis of Process and Reality
is that "reality is process." Professor Hocking, re-
calling a private conversation with Whitehead, reports him
as having said, "Reality is always emergence into a finite
modal entity." 4

Within the overall process of the universe there are
two main subtypes of process: (1) the process whereby ac-
tuality in its determined form passes from one existent to
another, and (2) the concrescent process inside the actual
entity, whereby the conditions received as data are made
to contribute determination to the concrescent entity. 5
Subprocess (1) is macroscopic in its operation, and may be
categorized as efficient. Subprocess (2) is microscopic,
centering in only one actual entity, and is teleological.
The two subprocesses might be further distinguished as
public and private, respectively. This distinction will

3. Whitehead. 1938 Modes of Thought, 120. Henceforth
this volume will be designated in footnotes as MT.
4. 1941 "Whitehead on Mind and Nature" The Philosophy of
Alfred North Whitehead, The Library of Living Philo-
5. PR, 326.
bear further fruit in the discussion of the eighth category of explanation.

Process is always dipolar, in that it involves both actual entities and eternal objects. Both determine, either in microscopic or in macroscopic process, what the novel actual entity will be. This process, by introducing determination, involves a pattern. In "Mathematics and the Good" Whitehead observed, "...mathematics is the study of pattern. Here we find the essential clue which relates mathematics to the study of the good...."  

Whitehead reasserts his repudiation of the classical unique series of temporal succession, and repeats the necessity for a multiple time-series.  

A discussion of process suggests the problem of the reconciliation of opposites always present in Whitehead's thought (but not as a dialectical process): permanence and change. The problem, variously designated as "How can there be permanence amid change?" or "What are the forms in the facts?" reached a new flowering in 1941. In his Ingersoll Lecture on "Immortality" Whitehead pondered "How can creative action derive immortality from Value?"

6. PR, 72.
7. 1941 "Mathematics and the Good" The Philosophy of Alfred North Whitehead, The Library of Living Philosophers, 3, 674. Hereafter, in footnotes, the letters MG will denote this memoir.
8. PR, 52.
9. IMM, 686.
Here, two fundamental worlds were postulated in contrast, the world of Activity, which is the creative world of many entities, and the world of Value, which is the persistence of something amid change. It was no new problem, but a perennial problem of all philosophies.

The category of process is one which has a long history in Whitehead's writings; it is "the existence of change" in the 1905 memoir, "passage" in the relativity era, and "process" in the philosophy of organism. And process, having now reached the stage of being a central principle, draws the fire of critics who doubt that process is the central principle of the universe. Two years subsequent to the publication of Process and Reality, M. H. Moore challenged, "His 'concept of nature as the locus of organisms in the process of development' apparently means much more to him than what he actually discovers in nature."  

Professor Northrop, who studied under Whitehead, attributes the appearance of the emphasis on process to the philosophy of Bergson, brought to Whitehead's attention by his friend, Professor H. Wildon Carr. And the tendency was reinforced, insisted Northrop, by Alexander.

Professor Ritchie is inclined to suspect a substantial addition to this list in the person of Professor L. J. Henderson, the Harvard biologist, who became close friends with Whitehead after the latter's removal to America.\(^{12}\)

Decisive evidence is lacking in all cases, however.

Symbolically, this category is an existence axiom (cf. 1.10, 2.02, 2.211), and may be enunciated as

\[
12.01 \quad \text{I Hp } R_c \equiv J' \Sigma C' (\Sigma a) \quad \text{Df}
\]

2. Unification of Many Potentials

The category expresses the fact that, although there are many diverse entities in the universe, they yet can be potentially united; this unity is made determinate in the concrescence of an actual entity.\(^{13}\) How this unification is effected is described by the other axioms. This category is a large generalization of the statement that many causes can conspire to produce one complex, but determinate, effect.

Symbolically, potential concrescence may be denoted as \(\Pi C\), so that the potential concrescence of \(a^n\) would be

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\(^{12}\) 1950 This possibility has been suggested on several occasions during supervisory conferences by Professor Ritchie. No direct evidence of an influence has been found. On the other hand, it is difficult to believe that the influence was non-existent.

\(^{13}\) PR, 33, 233. AI, 258.
designated as $\pi^C(a_n^a)$. 

13.01 III Hp $R \equiv : C\left[\pi^C(\sum \xi^n)\right] \equiv a_n^{n+1}$. Ne $a_n^{n+1} = 1$ Df 

3. Novel Entities

This category declares that in the concrescent process, new exemplifications of each of the categories of existence are created, except that there are never any alterations to the realm of eternal objects. Thus, after the stage of satisfaction (completion) of an actual entity has been reached, that entity, by being a new entity, adds novel elements (except eternal objects) to the factors in the universe. Also, certain others cease to exist because of the supersession of the old actual entity by the new.

Symbolically,

14.01 III Hp $R \equiv : C(\sum \xi^n). \ni (\exists a_n^{n+1})[\sim(a_n^{n+1} \subset \xi^n) .
(\exists P_n^{n+1})[\sim(\sim P_n^{n+1} \subset \pi^n) .
(\exists N_n^{n+1})[\sim(\sim N_n^{n+1} \subset \xi^n) .
(\exists M_n^{n+1})[\sim(\sim M_n^{n+1} \subset \xi^n) .
(\exists K_n^{n+1})[\sim(\sim K_n^{n+1} \subset \xi^n) .

$\xi^n = \xi^{n+1}$ Df

14. PR, 33, 340-341.
4. The Principle of Relativity

The fourth category of explanation, the principle of relativity, is not the statement that scientific relativity has a metaphysical reality. It is the assertion that, in some way or another, every item in the universe is involved in each concrescence of an actual entity. Every entity is a potential contributor to every concrescence. In essence, this is a repudiation of Royce's challenge that realism requires hyper-independence; regardless of what Whitehead's philosophy is denominated, a realist could easily adopt the principle of relativity as a guiding principle. He declares that there is no such thing as an entity abstracted from the world: "every reality is there for feeling." What Whitehead seems to mean here introduces an exception not explicitly stated. This exception is that of propositions. Propositions are potentially implicated in only those actual entities which are within their locus. Whitehead says "Every item" and means "Every item except

16. 1900 The World and the Individual, 1, 115ff. See also pages 37-39 of this thesis.
17. FR, 472.
18. See page 345 of this thesis.
propositions."

Symbolically,

\[ 15.01 \quad \text{IV Hp } R \xi \equiv \neg \{ \exists \xi^n \left[ \neg \xi \in C_{-T} \right] \}
\]

A second part is implicit in the first:

\[ 15.02 \quad \forall \alpha_{n+1} \equiv C(\xi^n) \]

The comparison with 12.01 of 15.02 shows the involvement of the first category of explanation with this category: 12.01 is the existence axiom of IV Hp \( R \xi \) and its consequent axiom, 15.02. It is also difficult to disentangle IV Hp \( R \xi \) from II Hp \( R \xi \), which stresses the unity of the potential unification of the ingredients of the concrescence in question.

IV Hp \( R \xi \) should also be compared with 4.02, whereby every actual entityprehends every other actual entity. Essentially, then, this axiom is a statement regarding the relations of the categories of existence, while I Hp \( R \xi \), although inextricably allied to the principle of relativity, is concerned mainly with the category of the ultimate. It seems probable that Whitehead performed many of the apparently arbitrary separations in the categories because he wanted to highlight certain consequences of them.

It is a consequence of this category, together with XVIII Hp \( R \xi \), that the old philosophical argument over the status of universals and particulars is blurred. An
actual entity cannot be described purely in terms of universals, or even eternal objects of the objective species, because other actual entities enter into the real constitution of that actual entity. 19

A more exact meaning to the subject-object distinction is possible: an object is any element which is potentially a contributor of determinateness; a subject is the actual entity which does the prehending. 20 It therefore follows that for $a^n_\alpha$ the class $\Sigma \varepsilon^n_\alpha$ are the objects for $a^n_\alpha$: which is the subject. The class of objects is also known as the "actual world" for the subject in question. (cf. 11.03)

Lovejoy considered associated statements in Whitehead's books immediately preceding Process and Reality to be, not a potent refutation of dualism, but a denial of realism, and a plunge toward idealism. 21 Such an assertion, no matter how tempting, seems to rest on a misunderstanding of the statements made by Whitehead. Professor Ernst Mach, who could scarcely be described as an idealist, was himself responsible for endorsing such a statement. 22

19. PR, 76.
20. PR, 136. OS, 144.
22. 1889 Die Mechanik in Ihrer Entwickelung, 209. See also pages 18-19 of this thesis.
5. Actual Worlds Different

This category declares that no two actual entities arise from an identical universe. The axiom is precisely that which has been listed as 11.03. Thus, symbolically,

\[ 16.01 \quad \forall \, \text{Hp R}_e \cdot \Xi \varepsilon^n(a^\alpha_n) \neq \Xi \varepsilon^n(a^\beta_n) \neq \Xi \varepsilon^{n+1}(a^\alpha_{n+1}) \neq \ldots \]

Df

It is implied in this statement that

\[ 16.02 \quad \Xi a^n(a^\alpha_n) \neq \Xi a^n(a^\beta_n) \neq \Xi a^{n+1}(a^\alpha_{n+1}) \neq \ldots \]

and that

\[ 16.03 \quad \Xi a^n(a^\alpha_n) \neq \Xi a^n(a^\beta_n) \neq \Xi a^{n+1}(a^\alpha_{n+1}) \neq \ldots \]

It is in the sense of 16.03 that Whitehead pays particular attention in this category of explanation, introducing perhaps an arbitrary limitation in describing the actual world of \( a^\alpha_n \) as \( \Xi a^n(a^\alpha_n) \) instead of as \( \Xi \varepsilon^n(a^\alpha_n) \): (cf. 11.03, 15.01, and 15.02). The limitation seems to have been introduced only to underscore the assertion of II Hp R (cf. 13.01).\(^{23}\) As such it is an example of the many shifts of meaning which Whitehead apparently uses for purposes of emphasis, but which result in a great deal of confusion of the meaning as expected by the reader.

\[ ^{23} \text{PR, 33-34, 351.} \]
6. Mode of Implication

This category asserts that, so far as its own nature is concerned, each entity in the universe can be involved in a given concrescence in many modes, but that actually it is implicated in only one mode.\(^{24}\) This mode in which \(a^n_\alpha\) is implicated in \(a^{n+1}_\alpha\) is partially conditioned by the correlate universe, but is rendered determinate only in the concrescence in question, and remains the same because of the self-identity of \(a^{n+1}_\alpha\). The function of \(a^n_\alpha\) may be complex (as a result of the contrasts), but it is self-consistent.

A diagrammatic representation of VI Hp R\(\_\) will serve to accent its import. Actual entity \(a^n_\alpha\) may be implicated in any of these ways, among others:

More complex chains are, of course, possible. Because of the subjective aim of \(a^n_\alpha\), and because of the nature of the universe of \(a^{n+1}_\alpha\), one mode will be chosen and rendered determinate in the concrescence. By combining this

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24. FR, 34, 89.
explanation with the givenness of early $a^n$'s, Whitehead sought to avoid the difficulty that all actual entities might be expected to behave in exactly the same fashion. The principle which prevents a "mere undifferentiated repetition" of actual entities is known as the "principle of intensive relevance," and is part of VI Hp $R_e$. Through it, actual entities have a graded relevance to any con- crescent entity. This principle of intensive relevance may also be looked upon as a corollary of IV Hp $R_e$; indeed the whole of VI Hp $R_e$ is little more than IV Hp $R_e$ with a different emphasis.

Symbolically, and using $\Lnot \rightarrow$ for potential prehension, 17.01 VI Hp $R_e \equiv : (\exists d, \chi, \psi, \ldots) \left[ \text{Ne}^e (\alpha^{n+1}_\alpha \Lnot \rightarrow \alpha^n_\alpha) > 1 \right]$

$\alpha^{n+1}_\alpha \Lnot \rightarrow \alpha^n_\alpha \quad \text{Ne}^e \omega = 1 \quad \text{Df}$

But it is possible that

$\omega = \rho \sigma \tau \upsilon$

It will, nevertheless, be true that

$\text{Ne}^e \omega = 1$.

7. Eternal Objects Potentially Ingredient

This category is really a clarification of the function of eternal objects, and states that eternal objects

25. PR, 224.
are pure potentials which can be described only as having potential "ingression" into an actual entity. The ingression is accomplished in a particular mode, which is how that eternal object contributes definiteness to the actual entity in question.

The principle of intensive relevance is applicable to eternal objects as well as to actual occasions, and each eternal object is graded in relevance to a particular concrescence by the concrescent entity itself, whether the relevance be positive or negative.

\[ \text{VII Hp } R_e. \equiv: A^n_{\alpha} \rightarrow \Sigma e.(\mathcal{I}, \mathcal{Q}, \chi, \psi, \ldots) \]

\[ [\text{Nc}^c(A^n_{\alpha} \rightarrow e_{\alpha}) > 1]. A^n_{\alpha} \rightarrow \omega_{\alpha}. \text{Nc}^c \omega = 1 \text{ Df} \]

8. Actual Entities as Objects and as Concrescences

This category of explanation is extremely important. It asserts that a description of an actual entity is incomplete unless it accounts for that entity as (1) potentially an object in the concrescence of other actual entities, and as (2) a concrescent process itself. This distinction led John Dewey to observe, "There is a mathematical-formal and genetic-functional attitude. Which

26. TR, 34.
27. TR, 69, 250-251.
28. RM, 89. PR, 34, 433-434. MT, 151.
aspect is primary and leading, and which is auxiliary?" 29
The potential objectification is described by the mathematical-formal characters, and the concrescence by the genetic-functional ones. Whitehead's immediate response declared,

John Dewey asks me to decide between the 'genetic-functional' interpretation of first principles and the 'mathematical-formal' interpretation. But I must decline to make this decision. Our present problem is the fusion of the two interpretations. The historic process of the world, which requires the genetic-functional interpretation, also requires for its understanding some insight into those ultimate principles of existence which express the necessary connections within the flux. 30

In the opinion of this thesis, this interchange between Dewey and Whitehead represents one of the most meaningful dialogues for present-day philosophy of science and metaphysics.

John Dewey, with his never-failing clarity of analysis, has ferreted out a crucial "bifurcation." Whitehead, with prophetic insight, failed to see a bifurcation, but two mutually cooperating and necessary explanations. The history of the philosophy of science had been, in large part, the story of the vacillations between the two interpretations; it is to Whitehead's credit that he saw the truth in both interpretations, and the falsity of their

29. 1937 "Whitehead's Philosophy" The Philosophical Review, 46, 175.
real bifurcation—another example of the fallacy of mis-
placed concreteness.

Symbolically,

\[ \text{VIII } R_\xi \equiv \exists : a^\xi_n : \exists : a^\xi_n \subset \mathcal{C}^\xi (\Sigma \xi^n) : \]

\[ a^\xi_n \equiv \mathcal{C}^\xi (\Sigma \xi^n A^{n-p+1}_n, A^{n-p}_n) \]

What might then be an entirely separate category of
explanation is suggested as a metaphysical assumption:

The real potentialities relative to all
standpoints are coordinated as diverse determi-
nations of one extensive continuum. This exten-
sive continuum is one relational complex in
which all potential objectifications find their
niche. 31

Although this assumption merely provides the framework for
the operation of potential objectification, it is basic to
the philosophy of organism, presupposed in all Whitehead's
specialized scientific discussion in Process and Reality,
and underlies the whole part of the lectures on the exten-
sive continuum. The principle relates all the potentiali-
ties so that they can be expressed in terms of the same
extensive continuum. Symbolically, this principle will be
called VIII-A Hp R_\xi. It makes possible the existence of a
metric in terms of which physical field theories are pos-
sible, and replaces a multiplicity of actual occasions by
an extensive continuum of potential efficient objectifica-
tions. It is because of extension that prehensions seem

31. PR, 103. Cf. SMW, 200-201.
to have the nature of an external relation as well as that of an internal relation suggested by creativity.

A further empirical principle is introduced, whereby "so far as physical relations are concerned, contemporary events happen in causal independence of each other." By this principle, simultaneity or contemporaneity has all the latitude of a temporal epoch, which might appropriately be called the "specious contemporary." This principle states that the potential objectifications of the contemporary world are of the nature of a passive potentiality, capable of description with reference to an extensive continuum. "The perceptive mode in which there is clear, distinct consciousness of the 'extensive' relations of the world...is here termed 'presentational immediacy.'"

This mode arises in the later, originative and integrative phases of the concrescent occasion; it is very important only in a few high-grade organisms.

It is only with reference to potentiality that continuity is valid; application of continuity to actuality leads only to confusion. This is, in essence, an elucidation of the Whiteheadian half of the Dewey-Whitehead dialogue. It may well be true that field theories, based on

32. FR, 95. TIME, 63. AI, 251.
33. FR, 95, 188-189. SYM, 19.
a continuum, will fail completely in solving the puzzles of quantum mechanics on Whiteheadian principles because of VIII-A Hp Rg. So great seems the probability that this is true that Sir Edmund Whittaker has suggested that the results of quantum mechanics may represent a serious challenge to Whitehead's method of extensive abstraction.34

Victor Lowe believes, however, that

...the method of extensive abstraction does not have actual occasions as such (nor even nexus of occasions), as its subject-matter, but rather the extensive continuum, which is a systematic network of potentialities. The method develops the theory of Coordinate Division, which Whitehead describes as division, not into actual prehensions, but into "quasi-prehensions." Now I take it that sub-atomic physics has for its subject-matter the minima of actual existence, and consequently the empirical facts which it presents cannot directly upset the theory of the extensive continuum. Whether it might do so indirectly, would depend, I should think, on the nature of the relationship between potentiality and actuality. Whitehead seems to me to have thought of this relationship in a way that would preclude even indirect conflict.35

The problem belongs intimately to the chapter on physical cosmology, and will be considered again there. Suffice it to say that Whitehead apparently intended the extensive continuum to refer to potentiality only, and left room for an ambiguity in interpreting its reference to the newly-born quantum mechanics precipitated by

34. 1948 "Alfred North Whitehead" Obituary Notices of Fellows of the Royal Society, 6, 295.
In actuality, then, the extensive continuum was atomically divided; in potentiality it was infinitely divisible. Such a continuum, however, needs a content before it can act as an object for an actual entity. Without content, the situation would be that described by Professor Doctor A. G. M. van Melsen, of the Catholic University of Nijmegen, regarding an empty event: "Is an 'event' however, possible without something that 'events,' that takes place?...without being there is no event." The content of the continuum is supplied by eternal objects functioning as sense-data; they are the "objects" of *The Concept of Nature* and the "sense-objects" of *Science and the Modern World*.

The simplest form of actual occasion, then, will be one prehending a few sense-data emotionally, with little contrast.

It is this extensive continuum which provides a meaning for space and time. Because of the reality of the actual entities, the potentiality they possess, and the continuum which is the framework for the potentiality, are in a sense "real." But the potentiality and the extensive

36. TR, 96.
38. SMW, 88. TIME, 63. TR, 97, 107.
continuum both arise from actual occasions, so that an "empty" space-time metric is impossible for Whitehead. Continuous space-time is produced by the concrescence of the actual entities, themselves atomic. There is then, a becoming of continuity and not a continuity of becoming.\(^{40}\)

It follows that space and time are primarily concerned with the physical (conformative) poles of the organism.\(^{41}\)

With respect to space, the extensive continuum is atomized by the volumes occupied by an actual entity; with respect to time, the atomization is brought about by the fact that the concrescent process requires a certain epoch of time or duration to reach its satisfaction, hence the name "epochal occasion" for "actual occasion."\(^{42}\) This atomizing is known as the "modal" character of space-time, and gives rise to the fallacy of simple location when not properly employed.\(^{43}\) A fuller discussion of the epochal nature of supersession of time will be found in Chapter XI. It is instructive to note the varying pattern which time takes in Whitehead's cosmological development. It is highly possible that others, such as J. E. Turner, recognized the approach of the epochal theory of time, even

\(^{40}\) SMW, 82. TIME, 63-64. PR, 103, 434, 442. Professor W. T. Stace says the same of his "cells" in 1940 The Nature of the World: An Essay in Phenomenalist Metaphysics, 34, 49-50.

\(^{41}\) TIME, 59-60. PR, 380, 436.

\(^{42}\) SMW, 158-159. RM, 91. PR, 434, 487.

\(^{43}\) SMW, 80.
before Whitehead himself. In 1922 Turner wrote, "Dr. Whitehead, in short, adopts what may be called a quantum theory of temporal nature." 44

An interesting consequence of VIII-A Hp R_e is that the extensive continuum participates in a contrast. This contrast holds between the actual occasion and the potentiality arising from that actual occasion, expressed in terms of the extensive continuum. 45

It is at this point that the traditional problems of epistemology are seen to be described in ontological terms. Indeed, Whitehead declared that such must be the case, 46 and that the principle is operative throughout his philosophy may be seen by reference to any discussion of epistemological problems. The dependence of epistemology upon ontology will be even more apparent with the exposition of XVIII Hp R_e, the ontological principle.

One of the most important parts of Whitehead's philosophy, according to Professor Emmet, 47 is the method of extensive abstraction. It is primarily to VIII and VIII-A Hps R_e, although also to XVIII Hp R_e that the method is possible. Between the relativity era and the appearance of Process and Reality, however, an important fundamental

44. 1922 "Dr. A. N. Whitehead's Scientific Realism" The Journal of Philosophy, 19, 152.
45. PR, 437.
46. PR, 288.
47. WTO, 206.
change had transpired in the method. Professor Theodore de Laguna held that the definition of points by means of durations was a distortion of the true case, and suggested the substitution of "extensive connection" as the base-relation for the older relation of "extensive whole" to "extensive part." The suggestion appealed to Whitehead, who adopted it, and devoted an appreciable section of *Process and Reality* to expounding the revised method of extensive abstraction.

9. Principle of Process

The principle of process, the ninth category of explanation, is simply the assertion that what an entity is is constituted by its becoming or its concrescence. Symbolically, it has already been given in 2.21:

\[ 20.01 \ \text{IX Hp} \ R_{E} \equiv C(\sum a^{n}, A^{n-p+1} n-p) \equiv a^{n+1} \]

This category emphasizes the mutual implication of the two members of the expression.

49. FR, 439-440.
50. FR, 34. SYM, 31.
10. Division

The tenth category of explanation asserts that the analysis of an actual entity into its most concrete components yields a maze of prehensions which have originated during the concrescence.51 Such analysis into prehensions is called "division."

Because actual entities are analyzable into prehensions, finite truths are possible, and there can be descriptions of the "laws of nature" in terms of prehensions.

Symbolically, using $\sum^{+\infty}_{-\infty} (a_n^\alpha)$ to denote all the prehensions of $a_n^\alpha$,

$$21.01 \ X \ H_p \ R_e \ \equiv: a_n^\alpha \supset \sum^{+\infty}_{-\infty} (a_n^\alpha) \subset a_n^\alpha \ \text{Df}$$

This category has received strong criticism: M. H. Moore52 and W. T. Stace53 insisted that prehensions thereby gain an undue pre-eminence in the ontological realm. Moore even suggested that Whitehead had here fallen into his own fallacy of misplaced concreteness.54 Nevertheless it seems that these criticisms must arise from forgetting that without actual entities, there would be no prehensions: the universe is a community of experiencing entities. It

51. SMW, 89. PR, 35, 287, 322, 359.
will be remembered that a similar problem attached to the ontological status of linear objective reals in the 1905 memoir. 55

11. Components of Prehension

This category is an elaboration of the definition of a prehension, and denotes the three essential ingredients in a prehension. These components are (1) the actual entity which does the prehending (the subject), (2) the datum prehended (the object), and (3) the subjective form of the prehension. 56 It therefore follows that only actual entities are capable of prehending: nexus, for example, do not prehend qua nexus, but qua the actual entities in them. Eternal objects do not prehend, but they are patient of any prehension.

The further definition is made that when the datum prehended is an actual entity, that prehension is to be known as physical. When the datum prehended is an eternal object, the prehension is to be known as conceptual. 57 Again, the choice of the word "conceptual" is not as happy as it might be, because consciousness is not implied in either simple type of prehension. 58 It is the failure to

55. See page 90 of this thesis.
56. TR, 35, 322.
57. PR, 35, 72, 335, 346, 361, 366. WPO, 146.
58. TR, 35, 49, 251, 361-362. WPO, 146.
grasp this point which caused M. H. Moore to find the ingress of eternal objects confusing. The terms emphasize the fact that a simple conceptual prehension enters only through the mental (originative) pole; a physical prehension only through the physical (conformative) pole. Perhaps the terms "originative prehension" and "conformative prehension" would serve to dispense with the necessity of repeated injunctions not to read consciousness into the simple prehensions.

Symbolically,

$$22.01 \; \Xi \; R_\varepsilon \vDash \vDash \vDash : a^{n+}_{\alpha} \rightarrow a^{n}_{\beta} \supset \alpha^n \cdot a_{\alpha} \cdot a^\varnothing \cdot \Phi$$

Also,

$$22.02 \; t \wedge (\varepsilon - a)^{n+}_{\alpha} \rightarrow \varepsilon^n_{\alpha}$$

Diagrammatically, physical (conformative) and conceptual (originative) prehensions are easily pictured:

Physical (conformative) Conceptual (originative)

Conceptual prehensions may also be characterized as a "flash of novelty" as the effect of an "appetition" of the mental (originative) pole. A comparison of conceptual prehensions with cognizance by adjective, and of physical

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60. *PR*, 280. WFO, 147.
prehensions with cognizance by relatedness immediately follows. 61

It is possible to integrate the two simple prehensions. One of the more usual products arises from the prehension by an actual entity of a proposition. A large component of the proposition is the maze of conceptual (originative) prehensions in it. When, therefore, $a^*_n$ prehends $T^*_n$, and this prehension is thereby integrated with the direct prehensions of the components of $T^*_n$, the result is an "impure" prehension. 62 However, physical and conceptual prehensions are integrated in the case of the physical purpose, and the result is not an impure prehension. It is a hybrid physical feeling, in which the actual entity is objectified by one or more of its prehensions of eternal objects.

Simple conceptual (originative) feelings are present only in the early stages of a concrescence. As the concrescence moves toward satisfaction, conceptual feelings of other actual entities are taken into account. Diagrammatically, in the earlier stages, $a^*_n$ has a simple conceptual (originative) prehension of $e_\alpha$. In later stages, the prehensions of $e_\alpha$ by other actual entities become important.

61. REL, 62-64.
Thus the prehensions of \( e_\alpha \) by \( a_\beta^n \) and \( a_\gamma^n \) are fitted with that of \( a_\alpha^n \), subject to the demands of consistency by the subjective aim of \( a_\alpha^n \). The result is a complex conceptual prehension of \( e_\alpha \) by \( a_\alpha^n \). The demands of the subjective aim of \( a_\alpha^n \) may be such as to eliminate, as inconsistent, for example, the prehension of \( e_\alpha \) by \( a_\beta^n \), replacing an original accepting \( a_\alpha^n - a_\gamma^n \) prehension by a rejecting \( a_\alpha^n - a_\gamma^n \) prehension.\(^63\)

Prehension of a nexus by an actual entity falls into the category of physical (conformative) feeling, but is to be known specifically as a "transmuted" feeling.\(^64\)

At this point it is possible to give an introduction to the nature of causation in the philosophy of organism, although its full elaboration will await the exposition of the ontological principle--XVIII Hp R\( \xi \). A simple act of causation is nothing more than a simple physical (conformative) prehension.\(^65\) It expresses the "objective immortality" of the prehended datum. The datum of the prehension is the "cause," and the prehending actual entity, the "effect." Complicated causal action, which is the general

\(^63\) FR, 131, 346-347, 483.
\(^64\) FR, 355.
case, is the summation of simple causative acts.

Further support is also given the dictum that epistemology must be ultimately describable in terms of ontology by the fact that simple causative acts are at the same time simple acts of perception. Both these interpretations are made possible by the vector character of prehensions.

12. Positive and Negative Prehensions

This category is closely related to category eleven in subject-matter and purpose—the definition of prehensions. It states that prehensions, conceptual (originate) or physical (conformative), may be either positive or negative. If they are positive, they are to be designated as "feelings." If negative, they eliminate from further intervention of the object in the concrescent process of the actual entity in question. If it were not for negative prehensions, the world would be a chaos of mutually contradictory and internally inconsistent entities. A consequence of this category also is that each actual entity prehends, either positively or negatively,

66. PR, 361-362.
every item in his actual world. 68

Symbolically,

\[ 23.01 \ \text{XII Hp } \mathcal{R}_x \equiv a^n_x \left( \sum_n \varepsilon(a^n_x) \right) \ 	ext{Df} \]

\[ 23.02 \ r \cdot a^n_x \Rightarrow a^n_r \Rightarrow a^n_r \]

A negative prehension is not, however, negligible. It contributes to the subjective forms of the concrecent entity. 69

\[ 23.03 \ r \cdot a^n_x \left( \sum_n \varepsilon(a^n_x) - a^n_\beta \right) \cdot a^n_x \Rightarrow a^n_r \Rightarrow a^n_r \]

It is with respect to the emphasis on feeling that Whitehead finds support from F. H. Bradley:

There is an immediate feeling, a knowing and being in one, with which knowledge begins; and, though this in a manner is transcended, it nevertheless remains throughout as the present foundation of my known world. 70

13. Subjective Forms

Like XI and XII Hps \( \mathcal{R}_x \), this category is in essence a definition. The thirteenth category of explanation asserts

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68. Whitehead says "in the universe," PR, 66. Clearly this is not what is intended. An actual entity does not prehend propositions not having that actual entity in its locus. What Whitehead says and what he means are at odds here: it is \( \sum \varepsilon(a^n_x) \) and not \( \sum \varepsilon^n \) which is prehended. This inconsistency appears at all places except where he discusses propositions.

69. PR, 66, 362.

70. 1914 Essays on Truth and Reality, 159-160.
that there are many species of subjective forms, simple or complex; that among them are "emotions, valuations, purposes, adversions, aversions, consciousness, etc."\textsuperscript{71} It is the character of the simplest forms of experiencing (prehending) that the subjective forms are emotional vector prehensions.\textsuperscript{72}

The character of valuation is always a major component in the subjective form of a conceptual (originative) prehension. It is necessary that this be so in order to determine the degree of relevance of an eternal object to the actual entity in question.\textsuperscript{73}

\textbf{24.01 XIII Hp R}_\dot{\varepsilon} \equiv (\mathcal{I} \Phi, \chi, \psi, ...) (a_{\alpha}^n \xrightarrow{q} a_{\beta}^n: \quad a_{\alpha}^{n^+} \xrightarrow{\chi} a_{j}^n; \ldots \mathcal{Q} \neq \chi \neq \psi \neq \ldots)

But what is the evasive thing in the philosophy of organism which has been denominated consciousness? It is not a character associated with the mental (originative) pole, or in its simple prehensions, as might be expected.

Whenever there is a prehension of a proposition by an actual entity, the subjective aim incites the actual entity to attempt an integration of that propositional prehension with the other physical (conformative) and conceptual (originative) prehensions in the experience of that actual

\textsuperscript{71.} \textit{PR, 35, 358.}
\textsuperscript{72.} \textit{PR, 246-247.}
\textsuperscript{73.} \textit{PR, 367-369.}
entity. There is, accordingly, a contrast of propositional feeling with an indicative feeling. Consciousness, for the philosophy of organism, is the subjective form of the feeling of this contrast, which arises late in the concrescence. It involves not only the mental pole, but the physical pole of the actual entity as well.\textsuperscript{74}

This explanation, Whitehead held, had the virtue that it

...agrees with the plain facts of our conscious experience. Consciousness flickers.... The simplicity of clear consciousness is no measure of the complexity of complete experience. Also this character of our experience suggests that consciousness is the crown of experience, only occasionally attained, not its necessary base.\textsuperscript{75}

It seems, however, that a very strong case could be built against the adequacy of this explanation of consciousness. What Whitehead has apparently done is to give a penetrating account of the function of consciousness, and not an illumination of what consciousness is. He has found the tools, the workshop, and the plans, but the workman is gone. The question will be considered at greater length in Chapter XIII.

\textsuperscript{74} TR, 245, 286, 362, 369-372, 391, 396-399, 407.
\textsuperscript{75} FR, 408.
The fourteenth category of explanation is another definitional axiom. It asserts that a nexus is a "set of actual entities in the unity of the relatedness constituted by theirprehensions of each other." 76

A detailed discussion of this category seems superfluous in view of the discussion of the nexus in the preceding chapter. The symbolic form of this category will be identical with 5.01.

25.01 XIV Hp R e \equiv 5.01 Df

15. Propositions

XV Hp R e defines propositions and their properties. 77
To discuss this axiom separately would, as with the previous axiom, add unnecessary length in duplicating a prior discussion. The symbolic form is identical with 8.01.

26.01 XV Hp R e \equiv 8.01 Df

76. FR, 35.
77. FR, 35-36.
16. Multiplicities

The nature and function of multiplicities are redefined by XVI Hp R_e; the symbolic statement is identical with 9.01.

27.01 XVI Hp R_e. ≡ 9.01 Df

17. Felt Unity of Datum

One of Whitehead's favorite assertions becomes XVII Hp R_e, but its definitional character is only superficially concealed. It asserts that whatever is a datum for feeling has a unity as felt. This unity is nothing more than the contrast of the entities felt by the prehending occasion.79

28.01 XVII Hp R_e. ≡ \[ a^{n+\gamma}_\alpha a^{n}_\beta a^{n+\gamma}_\lambda a^{n}_\gamma \ldots : \]

\[ a^{n+\gamma}_\alpha a^{n}_\beta a^{n}_\gamma \ldots \right( a^{n}_\beta, a^{n}_\gamma \ldots \right) \text{ or } [-\kappa n( a^{n}_\beta, a^{n}_\gamma \ldots )] = 1 \text{ Df}

18. The Ontological Principle

This category, as with the first, fourth, and twenty-fifth categories of explanation, stands out with a certain finality in defining the scheme of the categories in the

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78. FR, 36.
79. FR, 36, 321. AI, 258.
philosophy of organism. It asserts that

Every condition to which the process of becoming conforms in any particular instance, has its reason either in the character of some actual entity in the actual world of that concrescence, or in the character of the subject which is in the process of concrescence.\footnote{PR, 36-37. Cf. PR, 48, 64, 65, 373. SYM, 31. It will be noted that SYM is almost exclusively concerned with the questions under discussion in this section.}

This statement means that nothing is actual, or real, in the universe which does not derive directly from actual entities, either in the actual world of that entity, or the concrescent entity itself. No determinate character just "floats" in from the outside. Because of this character, the category has been called the "ontological principle," but essentially it is the principle of relativity (fourth category of explanation) in a different aspect (cf. 15.01). In its function as XVII Hp $R_x$, the universe appears monistic; as IV Hp $R_x$ it appears pluralistic.\footnote{PR, 224. AI, 254.}

Symbolically, the principle may be stated in positive form as a functional expression:

$29.01 \; \text{XVII Hp } R_x \Xi. a_{x}^{n+1} = \int \left[ \Sigma a_{x}^{n}(a_{x}^{n}), C'(a_{x}^{n+1}) \right] \text{ Df}$

Negatively stated,

$29.02 \; \text{XVII Hp } R_x \Xi. \Xi : \sim \Sigma a_{x}^{n}(a_{x}^{n}), \sim C'(a_{x}^{n+1}): \sim \Sigma a_{x}^{n+1} \text{ Df}$

The negative statement calls into question the function
of eternal objects in a concrescence into actuality. No inconsistency arises, however, when eternal objects are considered to be prehended through the Primordial Nature of God, who is Himself an actual entity. The Primordial Nature of God corresponds to the mental (originative) pole of temporal actual entities. Consequently, the ingression of eternal objects represents conceptual (originative) prehension of the non-temporal actual entity which is God. The whole question of the nature of God in the philosophy of organism will be considered in the following chapter.

It then follows that the ontological principle is the direct assertion of efficient \[ \Sigma a^n(a^m) \] and final \[ C(a^{n+1}) \] causation in the philosophy of Whitehead. So far as \[ \Sigma a^n(a^m) \] is concerned, there is determinism in the universe; so far as \[ C(a^{n+1}) \] is concerned, Whitehead postulated freedom (cf. ninth category of obligation). There is, however, a doubt as to the reality of that freedom; it seems to be more of a function of hidden parameters.

The continuity in natural processes between the subjective forms of succeeding actual occasions is called the "Doctrine of the Conformation of Feeling." It follows that there are two primary modes of

82. PR, 73.
83. PR, 37, 64, 73, 228, 320. AI, 251, 259. NL, 87, 89. Cf. Emmet, WFO, 142.
84. OS, 138.
objectification of the actual world in any actual entity. The first is the mode of presentational immediacy, the second, that of causal efficacy. "In causal objectification, what is felt subjectively by the objectified actual entity is transmitted objectively to the concrescent actualities which supersede it."\(^85\) \(\sum \in \mathfrak{N}(\alpha_n)\) is then objectified for \(\alpha_n\) in the mode of presentational immediacy in its character of extensiveness, and is felt subjectively by \(\alpha_n\) in the mode of causal efficacy.

By way of contrast of the two modes, presentational immediacy gives the contemporary world; causal efficacy gives the ground for division into past and future.\(^86\) Causal efficacy is operative in even the lowest actual entities; presentational immediacy only in some of the higher organisms.\(^87\)

Causal efficacy produces percepta which are vague, heavy with emotion; it produces the sense of derivation from an immediate past and of passage to an immediate future, a sense of influx of influences... modifying, enhancing, inhibiting, diverting the stream of feeling which we are receiving, unifying, enjoying, and transmitting.... Whether mentally analysed or no, it remains the given uncontrolled basis upon which our character weaves itself.

Percepta in the mode of presentational immediacy... are distinct, definite, controllable, apt for immediate enjoyment, and with the minimum of reference to past or future. We are

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85. FR, 91. Cf. FR, 184ff.
86. FR, 258, 363. SYM, 48.
87. FR, 261.
subject to our percepta in the mode of efficacy, but we adjust our percepta in the mode of immediacy.

It is apparent that Whitehead has again avoided a new and ominous bifurcation by allowing the two modes a complex interaction. Scientific theory attempts to describe the world of causal efficacy, but must depend upon percepta in the mode of presentational immediacy for distinct data. A satisfactory cosmology will need to explain the interwaeving of the two modes in such a way that scientific inquiry can have some degree of validity. Error arises not in either of the two pure modes, but in the mixed mode, which has been named the mode of symbolic reference. It seems that in the choice of these three names, Whitehead has introduced some fortunately denoted neologisms into philosophy. By means of introducing this device, many difficulties inherent in previous philosophy assume the aspect of verbal arguments; much of the comparative discussions (with other philosophers) in Process and Reality is devoted to the demonstration of this result.

The ground common to the three modes, which justifies the scientific attempt, are varied. They share, for example, the locus presented to an actual entity. Without causal efficacy, there would be no data in presentational

88. FR, 271.
89. FR, 257. FR, 22, 43. IMM, 700. Cf. Emmet, WPC, 159.
90. FR, 255-256, 271. SYM, 21, 22.
immediacy. Both modes refer to the same datum; the importance of either mode arises from the relevance each has to the actual entity in question. Furthermore, eternal objects are ingredient in both modes, giving a further community of reference.

That the ontological principle can have any validity at all is denied by Professor Stace. For him, Whitehead has fallen prey to the old fallacy that metaphysics can give reasons. The challenge is one to be expected from the point of view of phenomenalism, and serves to localize the disagreement as to their basic assumptions.

Professor Northrop has attempted to show that Whitehead has still not avoided bifurcation in the statement of causation. The protest was voiced earlier by Lovejoy. The challenge does not seem, however, to be warranted in view of the complex interaction of the two modes. It seems also that XVIII Hp R, in conjunction with I and IV Hps R, would serve to discourage cries of "bifurcation!"

However, an interesting situation has arisen with respect to the eternal objects. If the ontological principle be accepted, the existence of eternal objects at any stage of novelty can be seriously called into question.

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91. FR, 256, 262. SYM, 35, 58-59, 63. Emmet, WTC, 150.
92. FR, 259, 262. SYM, 59, 63.
95. Lovejoy, op. cit., 182-183.
Perhaps it is for just this reason that the actual entity, God, intermediates between eternal objects and temporal actual entities. In offering his own solution to the problem, Mr. Hall suggested that an actual entity involving its own past history, and not being completely superseded by a later actual entity, should be used.97 This, he thought, would eliminate the need for eternal objects. However, it will have serious repercussions in respect to the epochal theory of time. God has a Consequent Nature only because He is non-temporal; temporal actual entities do not have consequent natures in the same sense.

Professor Emmet has also declared the opinion that Whitehead's doctrine of "objective immortality" has not dispensed with the problems associated with it.98 Although the implications of the ontological principle are attractive to a clearly defined metaphysics, the opinion of this thesis is in concurrence with the criticisms of Professor Emmet and Mr. Hall.

It cannot be denied that the exact nature of the complex interplay between the two modes has not been demonstrated, and may prove to be a factor in finding the philosophy of organism difficult to accept. Although this assertion will form a major topic in Chapters XI and XIII,

97. Ibid., 41-44.
it is pertinent to mention a recent observation by Professor George Temple of London University, who performed a valuable service for Whitehead's relativity theory. Despite the fact that the method of extensive abstraction was the specific topic under consideration, the content seems to be applicable to the present discussion. "As to his Whitehead's method of extensive abstraction it is much more difficult to give an opinion about this because the method comes right outside the demand of our immediate sense observations." 99 That is the position in which the modes of causal efficacy and symbolic reference are found.

19. Fundamental Entities

This category of explanation asserts an observation made in an earlier paragraph: the fundamental entities are actual entities and eternal objects; other categories of existence are really statements of the relationships enjoyed by the two basic types. 100 A preferable location for this category in the scheme would be with the group, X-XVI Hps Rg.

100. PR, 37.
20. Functioning

This category reasserts, with an explanatory statement, the nature of concrescence (cf. 2.21, 20.01). When an element functions, it contributes determinateness to an actual entity.\textsuperscript{101} It seems to be another aspect of IX Hp R₂.

21. Actual Entity Contributes to Its Own Concrescence

This category represents a very important addition to XX Hp R₂ in its assertion that an actual entity functions in its own determination.\textsuperscript{102} If it were not for this category of explanation, the whole series of categories of obligation would be relegated to a position of insignificance. This dependence has been, in the opinion of this

\textsuperscript{101} FR, 38.
\textsuperscript{102} FR, 38, 227.
thesis, insufficiently recognized. It is this category which makes the concrescent occasion an active, rather than a passive, one, and without which the categories of obligation would be invalidated.

As a consequence of the operation of XXI Hp \( R_e \), an actual entity is, to an extent, self-creative. This function of self-creation is governed by the subjective aim of the entity, the goal of which is a fully determinate satisfaction. Using \( \sigma( a^{n+1}_\alpha) \) to denote the subjective aim of \( a^{n+1}_\alpha \), the statement of this category extends the scope of the concrescent equation.

\[ 32.01 \quad XXI \ Hp \ R_e \cdot \Xi \cdot a^{n+1}_\alpha = \mathcal{C} \left[ \Sigma \xi^n, A^{n-p+1}_{\xi}, \sigma(a^{n+1}_\alpha) \right] \]

Because of the self-creative aspect of actual entities, they in a sense transcend each other. Also, because God is one of the actual entities taken into account,\(^{103}\) each actual entity transcends God in the sense that it selects components from God and weaves them with other ingredients to produce a new actual entity.\(^{104}\)

During the transition period immediately preceding *Process and Reality*, Whitehead suggested a category of "incompleteness" which seems to have been replaced in the philosophy of organism by the one here considered. To the

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104. *PR*, 130.
Sixth International Congress of Philosophy, Whitehead suggested that

The category of incompleteness means that every occasion holds in itself its own future; so that anticipation is primarily a blind physical fact, and is only a mental fact by reason of the partial analysis effected by conceptual mentality.

Physical anticipation illustrates the truth that the creativity, whereby there is supersession, cannot be disjoined from the creature which is superseded. 105

There seems to be a nice refinement here not suggested by *Process and Reality*, but not refuted by the Gifford Lectures or any later writing. This is that the subjective aim seems to be determined, in part at least, by the physical (conformative) pole of the actual entity the present one is superseding. This inheritance happens, of course, only after the complex interaction between the physical (conformative) and the mental (originative) pole.

However, the inheritance should not be completely via a conformative route; otherwise the subjective aim of an actual entity is totally controlled by the previous state of the universe, and total cosmic determinism results. The process seems to be largely true in the case of low-grade actual occasions, and tells how causation, persistence, and "objective immortality" can be operative. But it fails to describe completely the drama taking place in

a high-grade actual entity, where the principle of novelty is so important. It is possible, of course, that an actual entity may bequeath, via the conformative route, an actual entity with a strong affinity for introducing novelty, but even that seems to be bordering on the very determinism which both Whitehead and quantum mechanics want to avoid.

22. Diversity of Roles

This category declares that, although the actual entity emerges into a coherent unity, the entity can play diverse roles with respect to its self-formation. These diverse roles are generally competitive and need not be consistent.

The operation of this category is in part contributory to an explanation of how novelty can occur, when taken in the light of the fact that there are several phases in the concrescence of an actual entity. However, it does not seem to eliminate determinism from the system.

106. PR, 38.
It will also be noted that numbers have been added under the prehension symbol. These numbers are used to show that different stages of the concrescence of $A^n_\alpha$ are intended. Otherwise, a self-contradictory statement would have to be made.

23. Real Constitution

The fact that an actual entity has a self-functioning character is the subject of the two preceding categories. XXIII Hp Rg asserts that this character constitutes the "real internal constitution"$^{107}$ of an actual entity. This category, when taken in conjunction with IX and XX Hps Rg (cf. 2.21, 20.01, 31.01) seems to form another description of the simple symbolic statement identical for IX and XX Hps Rg.

34.01 XXIII Hp Rg $\equiv a^{n+1}_\alpha = c^{\sum e^n}$

24. Objectification

This category separates the means whereby actual entities and eternal objects can contribute determinateness to an actual entity. It declares that actual entities are objectified for other actual entities; eternal objects

107. PR, 38, 323.
have ingression into actual entities. The nature of this category is such as not to necessitate a distinct symbolic expression. It merely emphasizes the two basic types of pureprehensions which can be operative. In a sense, it is a repetition of IV Hp $R_e$, and if a symbolic statement be wanted, it is suggested that IV Hp $R_e$ be utilized.

35.01 XXIV Hp $R_e\equiv$ IV Hp $R_e$ Df

25. Unity of Final Concrescence

The unity of the final actual entity which is the product of the concrescence is emphasized by XXV Hp $R_e$. This final concrescence, in its unity, is a prehension of every entity in the universe (cf. 2.10, 23.01).

36.01 XXV Hp $R_e\equiv a_{n+1}^\alpha \equiv \mathcal{C}(\sum \xi^n): Nc \xi^n a_{\alpha}^{n+1} = 1$

$$a_{\alpha}^{n+1} \rightarrow \sum \xi^n(a_{\alpha}^n) \text{ Df}$$

An actual entity has, therefore, the character of the subject of the process of becoming and of the superject conveying the objective immortality of the subject.

Now that which guides the concrescence to its final satisfaction is the famous "lure for feeling"—the

108. TR, 38, 309, 336.
109. TR, 38, 65, 129.
110. RM, 90. TR, 71, 134, 251-252.
111. TR, 281.
final cause of the actual entity. In the final phase of the concrescence there is a graded relevance of every item in the universe to the novel actual entity. "Order" results from the fact that there is at least partial attainment of the specific order in which that actual entity is interested in achieving. Thus, from the "given" elements at the beginning of the concrescence, some specific order is derived. "Order is a mere generic term; there can only be some specific order, not merely order in the vague." Any disorder which arises is due to the inclusion in the satisfaction of components which deflect the satisfaction from the ideal specific order at which it has aimed. Thus specific "values" are already inherent in the concrescent actual entity.

When the specific orders attained are prevalent over many societies, the overall orders are known as the physical and geometrical orders of nature. The counterpart of this doctrine in physical science is the assertion of the statistical nature of the laws of the natural sciences. Whenever there is disorder, the society has been only partially successful in impressing its character on the "given" elements. Thus, "evil" is the destructive element

113. RM, 100.
in preventing the attainment of an ideal of order. In itself, it attains a satisfaction, and in that sense is a "good," but it is evil in preventing the formation of a more important satisfaction.\(^{115}\) Accordingly, it seems that "There is no reason...to conceive the actual world as purely orderly, or as purely chaotic."\(^{116}\)

Adventures of Ideas is perhaps the best place to look for a fuller discussion of the "Laws of Nature." There Whitehead conceives the prevalent views to be mainly four in number. They are denominated by holding that natural laws are immanent, imposed, described occurrences, or mere convention.\(^{117}\) It is to the doctrine of law as immanent (with a touch of imposition) that Whitehead subscribes.

Natural law as immanent implies the interdependence of all the various components; as the ingredients change or succeed each other, different types of order will be obtained as a result of the internal relations involved in the world. The doctrine of internal relations implies that knowledge of the relations leads to knowledge of the entities related; this is precisely what Whitehead has insisted in his doctrine of prehension.\(^{118}\)

But, in addition to natural law as immanent, Whitehead

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115. RM, 95.
117. AI, 142.
118. SMW, 134. AI, 143. NL, 88-89. Emmet, WPO, 210-211.
holds that an element from natural law as imposed is necessary to prevent the order from relapsing into less coherent order; there is no reason in the purely immanent order of nature for preserving the orders already attained. This deficiency is corrected by Whitehead by introducing the notion of the persuasion of God—the "imposed" element in the "immanent" scheme.

Imposed natural law in its pure form tends to be a restatement of the deistic position, where the order has been determined and "imposed" upon the natural ingredients, which follow instructions implicitly. Instead of the internal relations, external relations hold between the components of the universe of imposed law. It also follows that any disorder or evil that is found in the world can be laid to God's account. Imposed law in its pure form would be unsavory to Whitehead.

That Plato's Timaeus has a close analogy to the philosophy of organism seems apparent; it, too, selected a fusion of immanence and imposition as dominant in natural law. How closely the two cosmologies correspond will be the subject of Chapter XII of this thesis.

119. PR, 146-147.
26. Single Function in Final Satisfaction

This category of explanation asserts that, when the final satisfaction of an actual entity is reached, each contributory component will perform one self-consistent function, despite the complexity of that function.\textsuperscript{121}

Symbolically,

\[ \text{XXVI Hp } R_e \Xi : \quad \alpha^{n+1}_\alpha \equiv C^x(\Sigma e^n). \]

\[ N \subset^x C^x(\xi^2) = 1 \quad \text{Df} \]

This category of explanation just reverses the object of interest in XXII Hp \( R_e \), where the actual entity could function in diverse ways, but had one complex self-consistent function in the final stage of the concrescence.

27. Phases of Concrescence

This category asserts that there are successive phases in the concrescence of an actual entity, in which new prehensions arise because of the integration of the prehensions of earlier phases.\textsuperscript{122}

The three primary phases in concrescence are the responsive, the supplemental, and the satisfaction.\textsuperscript{123}

\textsuperscript{121} PR, 38-39, 89, 344.
\textsuperscript{122} PR, 39, 335, 337.
\textsuperscript{123} SMW, 220. PR, 323. MT, 131.
Beyond this there is the objectification of the concrescent entity for the actual world into which it emerges. The first stage is that in which the actual entity accepts the givenness of its own history and the actual world in causal efficacy and presentational immediacy.124

In the second stage, the earlier feelings of the other entities are compared, shaped, classified, and integrated according to the demands of the subjective aim. In this stage there may be an origination of novelty through the appetition of the mental (originative) pole, or there may not, depending on the entity. If there is no origination, the process moves passively to its satisfaction, the third stage.125

38.01 XXVII Hp R c.3. a_{n+1}^\alpha \equiv c^\epsilon (\Sigma \epsilon^n). Df:

\[ c^\epsilon \Sigma (a_{n+1}^\alpha \epsilon^n): c^\epsilon \left[ \Sigma (a_{n+1}^\alpha \epsilon^n), \sigma (a_{n}^\alpha), \Sigma \epsilon^n \right]. \]

D. a_{n+1}^\alpha \Sigma \epsilon^n. Df.

"A feeling bears on itself the scars of its birth; it recollects as a subjective emotion its struggle for existence; it retains the impress of what it might have been, but is not."126

124. PR, 249, 323, 335.
125. PR, 323-325, 249.
126. PR, 346.
The Categories of Obligation

The categories of obligation describe the conditions to which creativity must conform in the concrescence of an actual entity. They are much more closely related than the categories of explanation, but are still axioms about the operation of creativity. The first three stand out with a certain degree of metaphysical finality. Symbolically, they will be denoted I-IX Hps $R_0$.

1. Subjective Unity

This categorial obligation asserts that "the many feelings which belong to an incomplete phase in the process of an actual entity...are compatible for integration by reason of the unity of their subject."\textsuperscript{127}

By this category, the condition is specified that the actual entity presides over and conditions its prehensions, and emphasis is laid on the harmony of the actual entity operating as subject.\textsuperscript{128}

\textsuperscript{127} FR, 39.
\textsuperscript{128} FR, 341-342. OS, 142-143.
2. Objective Identity

Through II Hp R_o the obligation is asserted that there cannot be a duplication of elements in the datum forprehension, so far as the final satisfaction is concerned.\textsuperscript{129}

Thus, severalprehensions of an element in the datum must be integrated in the final satisfaction so that the datum does not appear to contribute varying functions in the final concrescence. The datum-element performs only one role in the final satisfaction, as explained in XXVI Hp R.E.

It seems that II Hp R_o asserts the necessity that XXVI Hp R.E be metaphysically true. There seems to be no difference in content.

\textsuperscript{129.} TR, 39, 344, 347.

130. TR, 39, 344, 348.

3. Objective Diversity

The third of the obligations which stand out as metaphysically indispensable is that asserting that there is no coalescence of diverse elements of the objective datum of an actual entity.\textsuperscript{130} The obligation states the condition

\textsuperscript{130.}
that when two contrasting items are prehended by an actual entity, they are not merged into one item, eliminating the contrast. Whitehead observed that this categorial obligation is really only a particular instance of II Hp \( R_0 \). \(^{131}\)

\[
\text{III Hp } R_0 \equiv: \quad a^{\alpha n}_{\psi} - K^{\alpha n}(\epsilon^{\alpha n}_\alpha, \epsilon^{\alpha n}_\beta). a^{\alpha n}_{\psi} \epsilon^{\alpha n}_\alpha.
\]

\[
a^{\alpha n}_{\psi} \epsilon^{\alpha n}_\beta \implies a^{\alpha n}_{\psi} \epsilon^{\alpha n}_\alpha \neq a^{\alpha n}_{\psi} \epsilon^{\alpha n}_\beta.
\]

4. Conceptual Valuation

Categories IV-VIII Hps \( R_0 \) all express conditions which obtain in the concrescence of an actual entity, whereby the complex interplay between mental (originative) and physical (conformative) pole is operative. The stage of the concrescence involved most intimately is the second: the supplemental or originative.

IV Hp \( R_0 \) provides that with each physical feeling the actual entity originates a conceptual feeling of the eternal objects which have contributed to the determinateness of the actual entity or nexus physically felt. \(^{132}\) A diagram will help make the situation clear.

In the first phase \( a^{\alpha n}_\alpha \) physically (conformatively) prehends \( a^{\alpha n}_\beta \) as well as conceptually several

131. FR, 348.
132. FR, 39-40.
eternal objects of its own. The actual entity $a^n_\beta$ may be replaced by a nexus, if desired. Now $a^n_\beta$ (or the nexus) is what it is because of the ingression of certain eternal objects. This category states that when $a^n_\alpha$ prehends $a^n_\beta$, $a^n_\alpha$ originates conceptual (originative) prehensions of the same eternal objects that determine the definiteness of $a^n_\beta$.

Thus, this case arises:

\[ a^n_\alpha \rightarrow a^n_\beta \]

The prehensions of $e_\beta$, $e^\alpha_\beta$, and $e^\gamma_\beta$ by $a^n_\alpha$ then are known as "conceptual reproductions of physical feelings." \(^{(133)}\)

Symbolically,

\[ 44.01 \quad IV \; Hp \; R_0 : \equiv \quad a^n_\alpha \frac{+n}{4} a^n_\beta \cdot a^n_\beta \frac{-n}{4} e_\beta \cdot a^n_\beta \frac{-n}{4} e^\alpha_\beta. \]

\[ a^n_\beta \frac{-n}{4} e^\gamma_\beta \quad \ldots \cdot \Rightarrow \quad a^n_\alpha \frac{+n}{2} e_\beta \cdot a^n_\beta \frac{-n}{2} e^\gamma_\beta \cdot a^n_\alpha \frac{-n}{2} e^\gamma_\beta \ldots \]

When these conceptual reproductions are made, they will be automatically contrasted with the physical feelings they are reproducing. The difference will be sensed, and $a^n_\alpha$ will attempt to effect a more complete realization (or rejection) of that eternal object. This conceptual

\(^{(133)}\) PR, 40, 47.
valuation and the subsequent striving to realize that goal is known as "appetition";¹³⁴ the eternal objects act as a "lure for feeling" by persuading \( a_n \) to realize them. Again, the derivative nature of consciousness becomes apparent. The two extremes of emphasis which may occur will be on the mental (originative) or the physical (conformative) pole, but not so far as to exclude the other.

5. Conceptual Reversion

When, in accordance with IV Hp \( R_o \), conceptual reproductions are originated, there is a secondary origination of conceptual feelings determined in part by the subjective aim and in part by the conceptual valuations of IV Hp \( R_o \). The new eternal objectsprehended may be the same as, or different from, those conceptually reproduced eternal objects. That this happens is asserted by V Hp \( R_o \).¹³⁵ This process brings about the origination of conceptual novelty. This, Whitehead asserts, is the "primary meaning of life."¹³⁶ Accordingly, a society or an actual entity in which these novel conceptual (originative) prehensions arise will be called "living."

¹³⁵. FR, 40, 380-381.
¹³⁶. FR, 156.
Diagrammatically, when $V \text{Hp } R_0$ is operative, the additional condition shown by the prehension $a^n_{\alpha} e_\rho$ will be obtained.

6. Transmutation

When IV Hp $R_0$ (or IV and V Hps $R_0$) is operative, it is possible that two actual entities may cause the origination of the same conceptual feelings. Diagrammatically, this situation is possible.
In this case the physical (conformative) prehensions of $a^p_\beta$ and $a^p_\gamma$ by $a^q_\alpha$ will give rise to the same new conceptual valuations by $a^q_\alpha$.

VI Hp R$_O$ says that when this situation arises, $a^q_\alpha$ will "transmute the datum" ($e_\beta\gamma$ and $e_\rho\gamma\delta$) to be, not eternal objects, but characteristics of $a^p_\beta$ and $a^p_\gamma$, or of the nexus of which $a^n_\beta$ and $a^n_\gamma$ are a part.$^{137}$

In effect, VI Hp R$_O$ describes how the substance-quality metaphysics arose by a process which Whitehead calls "transmutation." In that case, $a^n_\beta$ and $a^n_\gamma$ would be regarded as the substance, and $e_\beta\gamma$ and $e_\rho\gamma\delta$, the qualia of the substance.

It is indeed the method by which "sense-objects" are perceived and reflected upon. Without transmutation (a form of abstraction) an understanding of the world would be impossible. Further, without the operation of this categorial obligation, the case for perception in the modes of causal efficacy and especially presentational immediacy would lose its power.$^{138}$

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137. TR, 40, 386-387.
138. PR, 383, 386-387, 478-479. AI, 274.
7. Subjective Harmony

This category asserts that all the various valuations of conceptual feelings are made in accordance with the demand that they not conflict with the subjective aim of the actual entity originating them. Thus the eternal objects involved have a definite relevance for the concrescence, which is a unity.

This category is really a special aspect of I Hp R₀, and may be stated as

47.01 Vf Hp R₀.₄: IV Hp R₀. σ(αⁿ). Ncₐⁿ=1: C:

\( nC \sum (a^{+n}_{\alpha} e) \)  Df
8. Subjective Intensity

This category defines the subjective aim as an intensity of feeling in the immediate subject, as well as in the relevant future. This seems to indicate that the subjective aim can be expressed as a deterministic function of certain other variables.

\[ \text{VIII Hp } R_0 \equiv \sigma(a^n_\alpha) = f \left[ s^n_\Xi, s^{n-1}_\Xi, \sigma(a^{n-1}_\alpha), a^{n+1}_\alpha \right] \]

It seems that the variable \( a^{n+1}_\alpha \) must express the dependence of the subjective aim upon creativity. The variable \( s^n_\Xi \) expresses the dependence of the subjective aim upon God. \( s^{n-1}_\Xi \) and \( \sigma(a^{n-1}_\alpha) \) are the inheritance from the past. Within a given concrescence the expression of VIII Hp \( R_0 \) is intended to be a full, deterministic statement.

9. Freedom and Determination

The last of the categories of obligation states that "The concrescence of each individual actual entity is internally determined and externally free."

In essence, it means that those factors which are deterministic will be operative in a deterministic manner,

140. FR, 41. AI, 249-250. NL, 61, 94.
but that this determinism does not tell the whole story. The freedom arises in the decision of the concrescent entity, which, although it is highly relevant to the determined phases of the concrescence, is yet, at the end of the concrescence, free to choose. This seems to be the stage of the drama at which Whitehead considered \( \text{Hp } R_0 \) to be not fully deterministic.

Instead, the statement,

\[
49.01 \text{ IX } \text{Hp } R_0 = \sigma(a^n) = f \left[ X, s^n, s^{n-1}, \sigma(a_{n-1}) \right]
\]

seems most true in describing the subjective aim of a newly-born actual entity about to embark on his career at stage of novelty \( n \).

Nevertheless, the suspicion remains that there is more of determinism in the philosophy of organism than Whitehead intended. The subjective aim can be completely described by the antecedent world and the persisting aim of God, which seems to delimit the unfettered action of creativity. It seems that, by fettering creativity, Whitehead has seriously weakened the case for real freedom in the philosophy of organism.
Philosophy of Organism—Realist or Idealist?

With respect to the generation of the philosophy of organism, Whitehead expressed his feeling of indebtedness to Plato, Descartes, Locke, Hume, Kant, Bergson, James, Dewey, and Bradley.\(^{142}\) As a general expression of attitude, the philosophy of organism was described as a "recurrence to pre-Kantian modes of thought."\(^{143}\) But, in the opinion of this thesis, the indebtedness owed to those various authors is appreciably less than has been stated by Whitehead. Nearly any philosophy can propose elements found in the writings of the authors mentioned, but the direct contribution of those elements by the previous writers is by no means implied. To demonstrate similarities is grossly to underestimate Whitehead's own originality. That the philosophy of organism is a recurrence to pre-Kantian modes of thought is a reasonable generalization when used to express a basic attitude.

With respect to indebtedness to individual authors, it may be wise to combat specific ones of these. As to the indebtedness of Whitehead to F. H. Bradley, Professor Emmet says,

\(^{142}\) PR, v-ix.
\(^{143}\) PR, vi.
I doubt if Whitehead has really absorbed Bradley's Appearance and Reality, or the Logic. The Essay on Immediate Experience gave him a line to develop, but he does it in his own way. I doubt if he is ever as indebted to anyone as he says he is.144

In this conclusion James Feibleman concurs.145

With respect to indebtedness to the other process philosophers, the observation of Victor Lowe seems particularly probable.

It is possible that the production of a grand metaphysical scheme by Samuel Alexander encouraged him to try his hand. But there is no need whatever to assume that. Although Whitehead thinks highly of Alexander's work, and has been sensitive to the lively originality of James and Bergson also, I can find in his metaphysical writings no clear demonstration of their influence either in his choice of problems or in the essentials of his solutions. The references to contemporary philosophers in his prefaces are partly mere appreciations, partly the overstatements of a modest man.146

Is the tenor of the philosophy of organism idealistic or realistic? The suggestion that Whitehead's cosmology was anything but realistic before 1925 would not have been seriously considered. But with his metaphysical writings, Whitehead became involved with a complex interaction

144. 1950 October 26 Letter to the author.
between mind and nature. His solutions led him to postulate the dual nature of an actual entity with its mental (originative) and physical (conformative) poles. Furthermore the supreme exemplification of the metaphysical system was a God who "persuaded" and who conserved values. It is little wonder then that Professor R. F. A. Hoernlé, followed by many others, were inclined to regard the new metaphysics as idealistic. Professor Hocking has rendered an extremely valuable service on this score in recording his recollection of a conversation with Whitehead, who said something to the effect that

I am very near to absolute idealism when you take the finite as an abstraction; the slightest push would push me over. But where I differ is, your Absolute is a super-reality. My point is, when you try to get a ground of reality more real than the given, you get an abstraction; your super-reality is an under-reality. Reality is always emergence into a finite modal entity.

As it stands then, the philosophy of organism is definitely not absolute idealism, although many elements within the philosophy of organism could be readily assimilated into such an idealism. It would, however, only confuse further the meaning of idealism to place such a label on the philosophy of organism. To call him quasi-idealistic,

147. In addition to PR, cf. especially ML, 70-71.
as does Reinhold Niebuhr,\textsuperscript{150} does not contribute any clarity to the situation.

That "the setting of the metaphysical problem is realistic"\textsuperscript{151} cannot be denied; that the solution is not thoroughly realistic is just as apparent, although James Feibleman thinks Process and Reality to be distinctly realistic.\textsuperscript{152}

The opinion of this thesis is that the philosophy of organism is the peculiarly Whiteheadian metaphysics which cannot be described by either school as a member of itself.\textsuperscript{153}

In summary, the last two chapters have been devoted to the development of these four primary theses:

(1) The philosophy of organism must be expounded in terms of the categorial scheme.

(2) A symbolic and diagrammatic statement of these categories needs to be made and investigated.

(3) The categorial scheme of Process and Reality can be profitably considered as a generalization on the metaphysical level of the central problem of "On Mathematical Concepts of the Material World."

\textsuperscript{150.} 1941 The Nature and Destiny of Man: A Christian Interpretation, I, 120-121.
\textsuperscript{151.} Victor Lowe, \textit{op. cit.}, 108.
\textsuperscript{152.} Feibleman, \textit{op. cit.}, 25, 46, 51, 81.
\textsuperscript{153.} Wilbur M. Urban. 1949 Beyond Realism and Idealism, 233.
This categorial scheme was designed to satisfy especially the demands of physical cosmology.
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Without any previous warning, a description of a
metaphysical God appeared from Whitehead's pen in Science
and the Modern World. From the God of that volume grew
the more complete God of Process and Reality. The total
nature and function of this later God was a theological
novelty, although most of the features when disconnected,
could appeal to some earlier expositor for their genesis.

That Whitehead did not expect the God thus conceived
to assume the aspect of having been finally described, or
perhaps even religiously satisfactory, he made clear. As
to how far metaphysics can be successful in selecting a
God, Whitehead opined, "It may be doubted whether any
properly general metaphysics can ever, without the illicit
introduction of other considerations, get much farther
than Aristotle."¹ This far Whitehead proceeded in de-
scribing God in 1925.² But the God of Science and the
Modern World was enlarged by 1927, and the basis for the
extension was decidedly metaphysics. Nevertheless,

Availability of Whitehead's God: A Critical Analysis,
12.
² Cf. Emmet, WPO, 257.
Whitehead modestly warned:

...the system is confessedly inadequate. The deductions from it in this particular sphere of thought [the nature of God] cannot be looked upon as more than suggestions as to how the problem is transformed in the light of that system. What follows is merely an attempt to add another speaker to that masterpiece, 'Hume's Dialogues Concerning Natural Religion.'

What, then, is the nature of the God required by the metaphysical basis expounded in the philosophy of organism?

He must be the chief example of the operation of the categories; He must be an actual entity. As an actual entity, God must be dipolar, and the actuality of God is incomplete when either pole is considered in abstraction. Although the poles of the actual entity which is God are mental and physical, the activity and nature of the mental pole constitute God's Primordial Nature. Similarly, the nature and activity of God's physical pole are known as His Consequent Nature. As with an ordinary actual entity, God is an instance of a concrescence, and so possesses a Superjective Nature, which does not receive much attention in the philosophy of organism, and which may prove to be a weakness.

It seems, and perhaps incongruously, that the physical pole of God does not participate in the extensive scheme:

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3. FR, 521.
4. FR, 524. MT, 151.
God is never referred to as an actual occasion. This does not detract from the actuality determined in his Consequent Nature, however. In the sense of not being extensive, it seems that Whitehead's God is an exception to his metaphysical scheme, although God as extensive is clearly not generally agreed to be a desirable feature of any metaphysics.

If, then, the concept of God as dipolar and an actual entity is to be consistent in meaning with the concept of temporal actual entities, it seems that He must possess an extensive character. In addition, this extensive character must be objectified for all other actual entities. Such characters are not claimed for God, either by Whitehead or by the vast majority of theologians.

The Primordial Nature of God seems completely consistent with the metaphysical scheme. The "unconditioned conceptual valuation of the entire multiplicity of eternal objects" is the Primordial Nature of God. It is unconditioned by reason of the fact that no prior actual entities are required to pass the eternal objects into God's notice. The fact that God conceptually evaluates the eternal objects does not necessarily imply that those

eternal objects are "in the mind of God" in the usual sense, although they might be. Certain it is that He does not create them. The fact that God conceptually evaluates the eternal objects does carry, however, the implication that this evaluation, the primordial one, graduates the relevance of each eternal object for each other actual entity, although this may be altered by the temporal entities when they are using the eternal objects. "This divine ordering is itself matter of fact, thereby conditioning creativity." This conditioning of creativity, however, seems to be dangerously severe.

It thus becomes apparent that the "given" elements in the universe are the actual entities (including God), creativity (and the categorial scheme), and God’s conceptual evaluation of the eternal objects. It has been insisted that creativity is the ultimate principle; accordingly actual entities (including God) are the accidental actualizations of creativity. Consequently, so is God’s conceptual evaluation of eternal objects a derived condition, but "given" for everything after that original act.


Whitehead has, then, preserved the ultimateness of creativity, but with the restriction that it was allowed to operate on unbounded possibility only once: this limitation was the conceptual evaluation by God of eternal objects. This is God as the Principle of Concretion, the novelty introduced by Science and the Modern World.

Thus, God as an actual entity conceptually recognizes and evaluates the eternal objects; the adventures of temporal actual entities throughout their various time-series are dependent upon God's Trimordial Nature. The eternal objects, as ingredient in this Nature, is readily comparable to the multiplicity of Platonic Ideas, except, as Sir Edmund Whittaker has observed, these Ideas are (for Whitehead) completely realized in a temporal actual entity, and not imperfectly copied.

It is also this Trimordial Nature of God which originates, in large part, the initial phase of the subjective aims of the temporal actual entities, and is the main source of the "lure" experienced by temporal entities. An actual entity prehending the actuality, God, as objectified

by God's conceptual feelings, has a "hybrid physical feeling" of God. This provides the initial phase of subjective aim for a temporal actual entity. In this sense, God "creates" the world. Whitehead is clearly not a creationist in the "Divine Fiat" sense of the word.

Apart, however, from the "immanence of God in the world," the Primordial Nature is responsible for the usual conceptual (originative) processes for God in Himself.15 Thus, in the Primordial Nature there is a subjective aim, which is directed toward the origination and intensification of feelings. The eternal objects are prehended with subjective forms (devoid of consciousness in Whitehead's sense of the word16) regulated by the subjective aim so as to make the eternal objects more persuasive "lures for feeling." God's purpose, then, is "the evocation of intensities."17 It is usually actualized through the agency of societies, and the notion of emergent evolution easily follows. "The definite determination which imposes ordered balance on the world requires an actual entity imposing its own unchanged consistency of character on every phase."18

Although Whitehead did not attempt a "proof" of God's

15. PR, 134, 160-161, 524.
existence from the order of nature in Process and Reality, the lectures provide raw material for such an attempt. Compared with the following statement from Religion in the Making, these ideas seem to form a high-water mark in Whitehead's attempt to provide a spiritual God for his metaphysics.

The religious insight is the grasp of this truth: That the order of the world, the depth of reality of the world, the value of the world in its whole and in its part, the beauty of the world, the zest of life, the peace of life, and the mastery of evil, are all bound together—not accidentally, but by reason of this truth: that the universe exhibits a creativity with infinite freedom, and a realm of forms with infinite possibilities; but that this creativity and these forms are together impotent to achieve actuality apart from the completed ideal harmony, which is God.19

This "unchanged consistency" in God's conceptual valuation of the eternal objects might possibly lead to the conclusion that evil, as well as good, exists because God so determines. Such an implication is very far from Whitehead's intentions.20 God's purpose is the preservation and intensification of specific values inherent in the world. Evil arises in a determinate form, but is transformed when it is presented to God's Consequent Nature by His conceptual valuation of the evil in the crescence of His Consequent Nature.21

19. RM, 119-120.
21. RM, 98.
Evil is therefore those specific determinate concretions which obstruct the overall attempt at the intensification of value in God's purpose. God is therefore not completely unlimited in His control of the Universe.22 Ely has concisely summarized the situation: "God proposes, but the event disposes."23 This situation is present in the fact that every actual entity has a hybrid physical prehension of God, and makes its own use of the elements in God's nature. To the extent that the concrescence of a temporal actual entity is not determined in accordance with the intention of the appropriated components from God, He does not control, but merely persuades, the universe.24

In this connection, a second ground for the limitation of God arises. Although the categoreal conditions were established with the conceptual valuation of the realm of the eternal objects by the Primordial Nature, the agency rested more with creativity than with God, who derived His existence from creativity as well. Furthermore, God is powerless to disobey the metaphysical laws, but must work in accordance with the requirements of that rational part of the given.

23. Ely, op. cit., 29. It would be preferable to substitute "occasion" for "event."
A criterion suggested by Professor Edgar S. Brightman, one of the present outstanding theistic finitists, will show that Whitehead decidedly falls within the realm of the "finitists." For purposes of this decision, it is possible to glide over the "theistic" and "personality" components of the criterion, since they will be discussed later in the chapter.

A theistic finitist is one who holds that the eternal will of God faces given conditions which that will did not create, whether those conditions are ultimately within the personality of God or external to it.25

The Consequent Nature of God, analogous to the physical (conformative) pole of a temporal actual entity, is responsible for the "saving" or "value-preserving" function usually associated with Deity. In conformity with IV Hp Re, all the actual worlds of temporal actual entities are objectified for, and have a reaction upon, God.26 God is thus in a perpetual concrescence. When Godprehends \( \Sigma a_n \), He re-prehends their prehensions of His Primordial Nature. An internal reaction, similar to the interplay between the physical and mental poles of actual occasions, occurs, and the results of the creative advance are contrasted and integrated with the aims visualized in His Primordial Nature.27 This Consequent Nature is fully

25. 1940 A Philosophy of Religion, 313.
26. TR, 19, 134, 523.
27. TR, 523-524, 527, 530, 531.
conscious (in Whitehead's sense of the word). 28

The consequent nature of God is his judgment on the world. He saves the world as it passes into the imminence of his own life. It is the judgment of a tenderness which loses nothing that can be saved. It is also the judgment of a wisdom which uses what in the temporal world is mere wreckage. 29

The facts of evil are apprehended as such; they are remembered. But they are transformed when placed in contrast with the aims in the Primordial Nature, and preserved as a revised component contributing to the total aim. They are also preserved as a contrast contributory to the actualization of the total aim. 30

The immortality of individual components is discussed in one of Whitehead's last contributions, the lecture on "Immortality." Conceiving God as an example of the World of Value, and the adventures of temporal actual entities as exemplifying the World of Activity, Whitehead described the mechanism of God's preservation of the world.

The World of Value, the world of eternal objects, needs to be actualized in order that it not be abstracted into nothingness. This is accomplished in multiformity by the World of Activity. The multiple actualizations of the World of Activity are presented to God, who, by virtue of the unity of the World of Value, embarks upon a unification

of the multiple actualizations. The unification of the actualized results then becomes the Consequent Nature of God, subject to further integrations as new stages of novelty are reached and operated upon by the World of Value. This everlasting preservation is the meaning of immortality. The preserving function of the Consequent Nature of God is a direct consequence of the fact that God is an actual entity, and not, as Ely has suggested, metaphysically not deducible.

It has been suggested that this view of evil offered by Whitehead is a variation of the doctrine that evil appears so only because of our short-sightedness. However, the opinion of this thesis is that the variation is so great as to dismiss the assertion. It is certain that, in the philosophy of organism, some apparent evils fall into that category, but decidedly not all. Evil, for Whitehead, does exist, even from the wider view which is God's.

Certain consequences giving a further ground for God's limitation arise from God's Consequent Nature. God is never complete; He is constantly being enriched by the actualizations He successively integrates into His own Consequent Nature. Creativity continues to provide further facts which God is metaphysically obliged to take

33. Ibid., 51.
into account, and which He cannot specifically predict, in spite of His conceptual valuation of all abstract possibilities.34

The fact that there is a process in the universe at all thus depends on the Primordial Nature of God, His Consequent Nature, and His Superjective Nature. The process is an expression of God's goodness, which seems unlimited.35 This goodness, however, does not seem metaphysically deducible from the philosophy of organism, despite the groundwork within which it could be operative. It is more an article of faith, as Ely has suggested.36

Very little is said of God's Superjective Nature. But it is the Nature by which God's judgment on the world must be objectified for the other actual entities in the world, so that they can take account of this judgment.37 This Superjective Nature, by being an element in later concrescences, qualifies to some extent the creative advance of the universe. The Superjective Nature of God is the powerful element in changing the face of Whitehead's world, and is the main nature of God for Stace's "cells."38

The Superjective Nature of God follows from the

34. FR, 19, 527, 529, 530, 531. AI, 357, MT, 128.
35. Emmet, WFO, 222.
36. Ely, op. cit., 47.
37. FR, 135.
metaphysical status of actual entities, and avoids a difficulty which might threaten the endurance of God. Actual entities are superseded, and there seems to be no reason why, in God's concrescence, there should not be supersession. But the concrescence of God, through His Superjective Nature, preserves His Primordial Nature unchanged, and the integrated Consequent Nature, for a later concrescence of the persisting entity which is God. God, thus, is also objectively immortal, both for Himself, and for the other actual entities:

...there is the phase of perfected actuality, in which the many are one everlastingly, without the qualification of any loss either of individual identity or of completeness of unity. In everlastiness, immediacy is reconciled with objective immortality.... [In the final phase] the creative action completes itself. For the perfected actuality passes back into the temporal world, and qualifies this world so that each temporal actuality includes it as an immediate fact of relevant experience.... The action of the fourth phase is the love of God for the world. 39

This description of God's Superjective Nature throws light upon the objective immortality of actual entities, but does not seem to obviate the difficulties associated with supersession. Actual entities are completely superseded, and generally emerge with an altered subjective aim.

Is Whitehead's God a personal God? Apparently Whitehead was attempting to provide an enduring personality

39. FR, 532.
for Him. Because of the fundamental metaphysical presuppositions, personality must be a derivative of social order for Whitehead, not a primordial element.

An enduring personality in the temporal world is a route of occasions in which their successors with some peculiar completeness sum up their predecessors. The correlate fact in God's nature is an even more complete unity of life in a chain of elements for which succession does not mean loss of immediate unison.40

Earlier, Whitehead had acknowledged the personal element in God's nature as important, but denied the power of metaphysics to account fully for it. The indications that there is a personal God, Whitehead then maintained, must come from religious intuition or inference, and not reason.41

But with Process and Reality Whitehead seemed to be searching for some metaphysical element to justify the "personality" of God. In "Immortality," personality is used as a key example for demonstrating the integration of the World of Activity by the World of Value.42 Indeed, "personality" is found to be a cardinal factor in the unifying action of the World of Value. In addition, it is observed that God unifies all the personalities from the temporal world.

Again to refer to some criteria suggested by Professor

40. PR, 531.
41. RM, 62-63, 86-87.
42. IMM, 689, 694.
Brightman,

To believe in a personal God, accordingly, is to believe that the unbegun and unending energy of the universe is conscious rational will, a conscious purpose that is coherent, selective, and creative. Such a will or purpose cannot exist in abstracto; it is the functioning of a total, unified, conscious personality, or it is nothing.\textsuperscript{43}

Whitehead's God satisfies the necessary unified will by His subjective aim. If God be a personality, then, the unification of these factors would constitute Whitehead a theistic finitist.\textsuperscript{44} But the question of the status of personality in the philosophy of organism seems to the present author extremely troublesome. It seems that "persons" are so much derived, and even discontinuous, entities that the whole meaning of a person might well be lost in the philosophy of organism. This point will be considered as a general characteristic of Whitehead's philosophy in Chapter XIII.

In a sense, Whitehead's system is pantheistic; God is objectified for every actual entity and participates directly in their concrescences. He is supreme, but not nearly so much as Professor Hartshorne imagined: "Whitehead's God is as much, nay more, the supreme being as is the God

\textsuperscript{43} Brightman, \textit{op. cit.}, 226.
\textsuperscript{44} Various authorities may be cited in defense of this assertion: Sir Edmund Whittaker, \textit{op. cit.}, 293; Taylor, \textit{op. cit.}, 27; Brightman, \textit{op. cit.}, 160; to name a few.
of the Thomists. 

45 Sir Edmund Whittaker has decisively negated this view. 

Is this God of the philosophy of organism available for religious purposes as an object of worship and in the functions usually found in the God of religion? Whitehead evidently did not conceive that his God was fully available to the religious attitude; he repeatedly insisted that more evidence from outside the realm of metaphysics was necessary for this function. 

47 It is the opinion of this thesis that, although Whitehead has been successful in presenting a brilliantly conceived metaphysical God, that God does not fully satisfy the demands of religion. He does satisfy many of those requirements, but certain central necessities are either absent or present as subordinate elements. Among these elements might be included personality of an enduring nature, "soul" or "spirit" in man, the necessity that God be God and not just another actual occasion, and His supremacy over creativity, for example. This conclusion of inadequacy is supported by Professor A. D. Ritchie, 

48 Sir Edmund Whittaker, 

49 Stephen L. Ely, 

50 and Professor Doctor A. G. M. van Melsen. 

51 It 

46. Sir Edmund Whittaker, op. cit., 293.
48. 1950 November 22 Supervisory conference.
49. 1949-1951 Supervisory conferences. Also op. cit., 293.
50. Ely, op. cit., 12, 56.
51. 1950 December 4 Letter to the author.
is opposed by Professor Félix Cesselin, Julius Seelye Bixler, Victor Lowe, and Charles Hartshorne. Professor Emmet experimented with associating Whitehead's God with the God of the Christian tradition, but warned that she did not want the analogy to be taken too seriously.

The conclusion here reached, then, is that Whitehead's is not completely the God of religion, but at most the metaphysical portion of such a God. As such, this God possesses many advantages which are not claimed for the God of orthodox religion, or of closely allied religious faiths. Some of these advantages, if claimed, rest on an appeal to something other than reason—ordinarily revelation. It may well be that God cannot be approximated, much less completely described, by speculative reason. Extremely powerful support can be invoked in defence of this view, and the successive failures of systems of speculative philosophy to provide a religious God through metaphysics give mute support as well.

52. 1950 La Philosophie Organique de Whitehead, 85.
56. Emmet, WPO, 252-255.
A concise, but comprehensive, statement of this problem was made by Alexander:

Primarily God must be defined as the object of the religious emotion or of worship. He is correlative to that emotion or sentiment, as food is correlative to appetite. What we worship, that is God. But it is insufficient for our theoretical needs. It labours under the defect that so far as religion itself is able to assure us, the object of religion, however vitally rooted in human nature, however responsive to its needs, may be disconnected with the rest of the world.

On the other hand from the metaphysical approach, God must be defined as the being, if any, which possesses deity or the divine quality; or, if there are more Gods than one, the beings which possess deity. The defect of this definition... is that the being which possesses deity need not necessarily, so far as the bare metaphysical description goes, be the object of religious sentiment. It has to be shown that the being which possesses deity coincides with the object of religious passion... Neither definition is therefore for theory complete in itself. Were the passion towards God not already lit, no speculative contemplation or proof of the existence or attributes of a metaphysical God would make him worshipful. 57

With the remainder of Alexander's treatment this thesis is not concerned; his solution seems less satisfactory than Whitehead's.

Whitehead did not attempt to discuss the traditional arguments for the existence of God. On this score, he was convinced that arguments arising from the data of the actual world would completely fail to indicate more than metaphysical first principles. 58 God, however, for

57. 1920 Space, Time, and Deity, 2, 341-342.
58. RM, 71.
Whitehead, must be an exemplification of metaphysical principles; this has been construed by Professor Hartshorne to furnish "proof." It is not, however, a proof in the usual sense of the word as used in the Thomist tradition.

With respect to the philosophy of organism, the discussion of the nature of God has suggested several features which may represent difficulties with the system proposed in the categorial scheme.

(1) Although there is highly qualified opposition to the assertion, it seems that the God of the philosophy of organism is religiously inadequate. It must be remembered that Whitehead himself seemed to sense a possible weakness here. Furthermore, it may well be that the difficulty lies not peculiarly with the philosophy of organism, but with the very nature of a rationalist metaphysics itself.

(2) The notion of soul or spirit seems particularly neglected in the philosophy of organism. Admittedly, a large and respected portion of


60. Except for RM, 103, where Whitehead makes the cryptic statement that "a mental occasion is an ultimate fact in the spiritual world."
philosophy would not find in that statement a valid objection. Nevertheless, it is here suggested that it must be taken into account. An experiment in annexing a spiritual pole to actual entities, making them tripolar, has resulted in failure to provide a solution satisfactory to the present author.

(3) The concept of an enduring person seems to be a much more contingent occurrence in the philosophy of organism than is warranted. Again, highly qualified opposition asserts to the contrary. 61

(4) There seems to be no necessary reason why eternal objects should be unchanging. Is it necessary that the realm of possibility be absolutely conceived, once for all time? Why should not God, in influencing creativity, and by evoking new actualizations, thereby introduce new possibilities? Emergent evolution is possible in the philosophy of organism, but it is little more than the selection of new items from an already well-established and well-stocked storehouse. If creative advance is to be so central to the philosophy of organism, it seems that it should

61. E. g., Hartshorne, op. cit., 547.
be possible to have novel eternal objects, as well as novel actual entities. In this criticism, there is concurrence from Professors Emmet\(^{62}\) and Hartshorne\(^{63}\). Other writers have asked this question; Newton P. Stallknecht favored the change,\(^{64}\) and James Feibleman opposed it.\(^{65}\)

(5) It is not altogether clear that God should be an accident of creativity. As an actual entity, He must. If, on the other hand, creativity were conceived to be an element in God's subjective aim, it would seem that a metaphysically more satisfactory case could be constructed. A more detailed account of a possible development, incorporating postulated solutions to these problems, will be offered at the end of Chapter XIII.

This chapter has omitted one of the fundamental intentions of the philosophy of organism—that of providing

\(^{62}\) WFO, 116. Also 1950 October 26 Letter to the author.
\(^{64}\) 1934 Studies in the Philosophy of Creation with Especial Reference to Bergson and Whitehead, 136-138.
\(^{65}\) 1946 The Revival of Realism: Critical Studies in Contemporary Philosophy, 57, 74.
a satisfactory cosmology. To what extent the philosophy of organism provides an adequate physical cosmology will be considered by Chapter XI. Several more generalized questions with regard to physical cosmology will occupy central attention in the first half of Chapter XIII.
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CHAPTER ELEVEN

PHYSICAL COSMOLOGY IN THE PHILOSOPHY OF ORGANISM

Whitehead's writings after he accepted his Harvard appointment were metaphysical; there is no more of pure "physicomathematical science criticising itself." That Whitehead had not forsaken cosmology is apparent from the subtitle to *Process and Reality*. The philosophy of organism was mainly cosmology on a higher level of generalization, bordering on (if not directly inside) the metaphysical level. It seems that Whitehead was thus offering an amazingly complete code of metaphysical suggestions which might be required by the state of physicomathematical science in 1927. It is signally unfortunate that the Gifford Lectures of this man should have appeared at a time when it could not have considered the implications of the new quantum mechanics. Nor did Whitehead seem ever to indicate in writing his appraisal of the implications for the philosophy of organism.

It has been suggested that the problem of *Process and Reality* may be considered as a generalization of the problem of "On Mathematical Concepts of the Material World." Whitehead had also protested against certain prevalent scientific assumptions, and repeated his insistence on the
necessity for metaphysical inquiries to be rooted in the sciences. But the new stage of generalization has been a tremendous step. Sir Edmund Whittaker has suggested that the generalization is so great that Whitehead's "philosophy, in its developed form, has little or nothing in common with physicomathematical science; and it is not easy to see how a bridge between the two can be constructed."¹

It is not easy to see how the two can be perfectly geared, but this chapter will offer some suggestions which, it is hoped, will help show points of at least potential contact, especially with field theories. It will also be shown that physicomathematical science of the relativity era can operate successfully within the framework of the philosophy of organism.

In the first place, the philosophy of organism is describing a cosmos, not a chaos. Like Plato, Whitehead conceived his problem to be the finding of the forms in the facts. He also allowed certain parameters held constant in his earlier writings to assume their variable forms. The result is the complexly integrated system suggested by the categorial scheme of Process and Reality. It is not a cosmos where mind and matter, God and the world, are separated; the cosmologies of Descartes and his

¹. 1948 The Modern Approach to Descartes' Problem. The Relation of the Mathematical and Physical Sciences to Philosophy, 22.
followers are impossible for Whitehead. Any of the substance-quality cosmologies are found to be instances of the fallacy of misplaced concreteness; this encompasses scientific materialism. The justification of a separate Whiteheadian cosmology at all is crystallized in *Science and the Modern World*:

If we confine ourselves to certain types of facts, abstracted from the complete circumstances in which they occur, the materialistic assumption expresses these facts to perfection. But when we pass beyond the abstraction, either by more subtle employment of our senses, or by the request for meanings and for coherence of thought, the scheme breaks down at once. The narrow efficiency of the scheme was the very cause of its supreme methodological success.

Physical cosmology must, then, expand its boundaries to include the more generalized realm called cosmology by Whitehead—a realm bordering on metaphysics, if it is to present a reasonable claim for acceptance as a system of reality.

Will the forms in the facts always remain the same? On this score Whitehead wanted to allow for the possibility that they might not always be the same. Accordingly, he postulated cosmic epochs, which would be constituted by the fact that the dominant actual occasions would be of some common specific nature. Thus, in the present cosmic epoch, the forms in the facts resulted from the fact that

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2. SMW, 22.
the present actual occasions were electromagnetic occasions. Because of the dominance of these electromagnetic occasions, the universe obeys laws primarily electromagnetic in nature. This is merely another indication that Whitehead was defending the existence of a ground for justifying a statistical interpretation of the laws of nature. As one type of occasion ceases to be dominant, and another type assumes prominence, the universe will be characterized by a new set of forms, and there will be a new cosmic epoch. Thus, what was once order will in a later cosmic epoch, be disorder. But, no matter how many cosmic epochs the universe passes through, the metaphysical generalities will always be obeyed. It is perhaps because of the remoteness of metaphysical finality that Whitehead characterized Process and Reality as a cosmological essay.

There seems to be no necessary reason why actual occasions should be electromagnetic, why the spatiotemporal continuum should have a dimensional character, or why occasions should have the character of extensiveness. These factors, and others, such as the geometrical axioms, are thus special arbitrary factors, perhaps peculiar to the present cosmic epoch.

Whitehead never mentioned what a different cosmic

3. FR, 139-141, 313.
4. FR, 300.
5. FR, 140, 148-149, 442.
epoch may be like. Professor Emmet thinks that "probably he would say we haven't the means to imagine it. But he wants to leave room for the possibility." A new cosmic epoch would arise by the fact that the actual occasions would cease to find certain eternal objects of the objective species important, and would begin to give importance to others. Such a change might be accomplished as a result of the fact that a certain overall stage of actualization had been reached. Or it may be that the influence of God causes the change in accordance with His own subjective aim. If, however, eternal objects were allowed to change, there would be an additional variable which would certainly operate to change the cosmic epoch. This discussion of cosmic epochs is another indication of the importance of process and creativity to the philosophy of organism. The question of the validity of process in describing the entire universe will be raised in Chapter XIII.

Whitehead has shown how to account for permanence in a physical world dominated by process, but by a somewhat questionable doctrine of reproduction and repetition. Adherents of a permanence-metaphysics have shown process possible, but cannot show that process need exist at all.

6. 1950 October 26 Letter to the author.
7. PR, 140-141, 447-448.
As to which is primary there may be no final decision. They may possibly be complementary aspects of some more central principle. The more complexly and completely process is elaborated, the less apparent is the accounting for permanence. Also, a description of permanence reduces the justification of process. This question is intimately related to the genetic-functional and mathematical-formal aspects of the philosophy of organism as singled out by John Dewey. Whitehead might have been heralded as the first philosophical commentator on complementarity had he extended the discussion. Both aspects seem to be true, but they limit each other. It is entirely possible that Professor Niels Bohr, who introduced the scientific notion of complementarity, may derive a considerable philosophical stature from his attempts to find out how limited the notion of complementarity really is.

Whitehead might have performed such a function, but repeatedly emphasized the importance of process: "Nature is a structure of evolving processes. The reality is the process." 8

As to the status of his relativity writings in the philosophy of organism, Whitehead restated his interpretation that a whole sheaf of alternative time-series are needed to describe the creative advance of nature. 9 With

9. SMW, 156. PR, 52.
the advent of the philosophy of organism, a second major change in Whitehead's attitude to time is apparent. It is not composed of instants, as with the 1905 memoir, nor is it the uniformly flowing time of the relativity era. Time, for the philosophy of organism, is epochal.\(^10\) The very existence of time derives from the concrescence of an actual entity, which requires a certain durational quantum to achieve its satisfaction. The amount of time required to complete a concrescence is known as an epoch, and it is not necessarily true that all epochs are of equal duration.

The continuous time of the relativity writings is derivative from the potential scheme of objectification which is the superjective stage of the actual occasion. It is here that the spatio-temporal manifold becomes the manifold of the physical sciences. It is real only in the sense that it owes its being to real actual occasions. Its function bears only in potential objectification, which is the basic notion of the field theories. Time as created here is involved directly only with the physical (conformative) poles of actual occasions.\(^11\) Time in its function of locating past and future is rendered possible by the mode of causal efficacy. That objective immortality exists via the ontological principle accounts for the irreversibility

10. SMW, 158-159. TIME, 64. PR, 105, 434.
11. TIME, 59-60. PR, 435.
of time. An interesting and valuable discussion of two senses of simultaneity is then possible.

In the mode of causal efficacy, those occasions which are not in the causal past or causal future of \( a^\alpha_n \) may be called "simultaneous" with \( a^\alpha_n \). In the mode of presentational immediacy, all occasions felt by \( a^\alpha_n \) can be called "simultaneous." If the two classes of actual occasions coincide, the speed of light (or any kind of transmission) is infinite, and the classical theory of time follows. But it is conceivable that an occasion causally simultaneous may not be presentationally immediate to \( a^\alpha_n \). The result is a finite velocity of transmission of influence, and a relativistic time concept.

It is because of the dependence of time upon epochal concrescences that Whitehead affirmed that "there is no continuity of becoming, but there is a becoming of continuity." In the relativity writings it was observed that Whitehead had not satisfactorily accounted for the possibility of a public time. But with the philosophy of organism a more satisfactory explanation was possible. The pure mode of presentational immediacy is impotent, by itself, but is a necessary auxiliary, in describing an event to someone

12. TIME, 62.
13. TIME, 63.
14. TIME, 64. PR, 53.
else. Accordingly, the mixed mode of symbolic reference becomes operative, with its possibility of error. But two observers A and B will describe a given event E which has been presentationally immediate to A and to B, as well as causally objectified for A and B. Because of the common ground between presentational immediacy and causal efficacy, symbolic reference by both A and B to E is possible. Thus the notion of a public time is referrable to the event E (a sort of Body Alpha) itself. From the point of view of relativistic motion, the divergence between the two time systems can still be possible, but the explanation is still capable of providing for a public time within the limits needed by ordinary experiences involving a public time.

The assertion of the existence of dipolar actual entities seems to be a metaphysical improvement, but it does not materially help in scientific predictability. How is one, for example, to discover the relative dominance of one pole in a given actual occasion? Although evidence, such as that from psychosomatic medicine, indicates a close cooperation of what for Whitehead would be a complex interpolar action, the notion of a dipolar actual entity and the categorial obligations do not help clarify the situation. Whitehead has, so far as concerns science, introduced an unpredictable variable.
Eternal objects are also likely to attract no more scientific credibility than Plato's Ideas.

But with respect to explaining how field theories might arise, and how very elementary quantum wave phenomena might occur, the philosophy of organism is well qualified. For the physics of the first quarter of the twentieth century Whitehead's cosmology is certainly both adequate and superior. It is still extremely valuable, and can lay some large amount of claim to adequacy (limited primarily by quantum mechanics), in the opinion of this thesis. In this respect, Professor Doctor van Melsen declared, "I regard Whitehead's cosmological writings as adequate, that means as really on a philosophical basis."\(^{15}\)

Field theories in the philosophy of organism are an expression of the potential objectification of one actual entity in others. This follows directly from VIII and VIII-A Hps R.\(^{2}\) When the potential objectifications are made actual by the prehensions of other actual entities, the field has accomplished its momentary task with respect to those entities. It is thus possible to see that each actual entity in some sense can pervade the entire continuum, which is itself derived from actual entities. The actual objectification is accomplished through the "feelings" of an actual entity; these are publicly described in part

\(^{15}\) 1950 December 4 Letter to the author.
by the geometrical relevance of the potential objectification in question to the actual entity which is to take account of that objectification. The geometrical relevance is expressed in terms of "strains."\footnote{16}

This notion of potential objectification as providing a ground for field theories also explains why Whitehead should have chosen the physical impetus (rather than an infinitesimal element of the metric) \(dJ^2\) for the gravitational potential in his alternative theory of relativity. Einstein's relativity is roundly criticized again on points similar to those discussed before.\footnote{17}

The actual objectification of one actual entity in another is an example of the process of causation. It is also apparent that the general case is that one group of occasions are objectified complexly in another group of occasions. It is only the extremely simple case in which a single cause contributes to a single effect.

But this objectification had been called into question. The quantum physicists had shown that an elementary particle could be represented as a wave-function. The elementary particle itself was in constant agitation; this led Whitehead to postulate the rhythmical nature of actualities. Thus an atom was a society with very definite

\footnote{16} PR, 472-490.\footnote{17} SMW, 154-155. FR, 194, 506-507.
rhythms associated with its activities. The notion of rhythms had been introduced as early as The Principles of Natural Knowledge, and it reached almost immediate fruition. It was an addition of the philosophy of organism to observe that vibrations are made possible by the use of contrasts. With respect to causation, then, the existence of a rhythm might well produce an alteration in the effects. Thus, for Whitehead, what appeared to be disjointed and discrete momentary appearances in the mode of presentational immediacy is really a complex causative process, with which the techniques of Fourier analysis should be competent to deal. This is the conclusion Whitehead seems to have favored, and is also apparently the one believed accurate by Einstein. That is, the sum of the determinate states at stage n will determine the states at stage n+1, etc.

This is all very well for quantum physics before the period of quantum mechanics. But this is the very sort of thing quantum mechanics says cannot be true. In the first place, the actual entities at stage n cannot be fully determined (theoretically as well as practically). When the entity is fully determinate as to its character as a particle, its character as a wave-function is completely

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18. PR, 121.
indeterminate, and vice-versa. And no amount of complex interaction will be able to determine fully all the different aspects of the elementary components. Some doubt therefore arises with regard to the deterministic action of the ontological principle (XVIII Hp R_u). In the macroscopic realm, it seems to have unlimited physical validity; it doesn't seem to be adequate for elementary particles. And that is just the area in Whitehead's system where it is especially important.

Furthermore, it seems that it should be theoretically possible to compute simultaneously both the position and the velocity of an actual entity in terms of the extensive continuum. This is just what is declared to be impossible by Heisenberg's indeterminacy principle. Some doubt is therefore thrown on the subatomic validity of the method of extensive abstraction. Probably Sir Edmund Whittaker is the only person who has fully sensed this inadequacy in Whitehead's philosophy of organism.21

Taking into account the previous discussion of this problem (pages 374-376 of this thesis), it seems certain that the method of extensive abstraction must be confined to the realm of potential objectification. But if this be

21. 1948 "Alfred North Whitehead" Obituary Notices of Fellows of the Royal Society, 6, 295. The point has been constantly emphasized by him during supervisory conferences in the period 1949-1951. It is to him that the credit is entirely due for having called this item to the author's attention.
the case, the philosophy of organism is afflicted with even more troublesome difficulties of measurement than is quantum mechanics. If the method of extensive abstraction cannot refer directly to actualities qua actualities, then science in the philosophy of organism is a fairy tale.

When the problem is viewed from a totally different point of view, a possibility of rescuing the method of extensive abstraction seems to exist. The observations of science are all made in the mode of presentational immediacy. But the entities to which these observations refer operate only in the pure mode of causal efficacy.\(^{22}\) In that mode, percepta are indistinct, as contrasted with the distinctness in the mode of immediacy.\(^{23}\) When, therefore, the pure mode of causal efficacy is described in terms of the pure mode of presentational immediacy, some correspondence is likely to occur. But the chances are that "causal efficacy" will be endowed with a greater degree of exact demarcation than is actually the case. This means that the quantum mechanists are attempting to impose a description in terms of immediacy on action in terms of efficacy, and then complaining that immediacy is untrue.

Whitehead suggested,

There is no reason, derivable from these definitions, why there should be any close association

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23. TR, 257-258.
between the strain locus of an experient occasion and any duration including that occasion among its members.... It is permissible, in framing a cosmology to accord with scientific theory, to assume that the associated pair, strain-locus and presented duration, do not involve one and the same extensive region.24

It is completely understandable, then, that in describing the causal world in the terms of presentational immediacy, inherited from centuries of scientific investigation in that mode, inaccuracies may occur. Thus far did Whitehead declare his opinion on the situation. But can the philosophy of organism be expanded so as to provide a suitable metaphysical background which could include quantum mechanics?

Changes in quantum mechanics have necessitated changes in its connection with the philosophy of organism. Victor Lowe opines, "I think that quantum physics was to him a supporting illustration rather than a formative influence in the creation of his atomic pluralism."25 But Professor Emmet26 and Dr. W. Mays27 believe that probably the exact opposite may be the case. At any rate, Whitehead never ceased to emphasize the assertion that actuality was in fact atomically divided; only the realm of potentiality

24. PR, 492.
26. 1950 October 9 Letter to the author. Also 1950 May Personal conference in Manchester with Professor Emmet and Dr. Mays.
27. 1950 May Personal conference with Professor Emmet and Dr. Mays.
was continuous and infinitely divisible. This expression of his conviction regarding the ultimate importance of atomism was fully apparent as early as 1915.

Apparently the changes to the philosophy of organism could not be made to the satisfaction of the advocates of quantum mechanics without destroying the foundations of that organic philosophy of Whitehead. It seems that the presence of the formal, coherent pattern at the base of the philosophy of organism is such that Whitehead's cosmology could expect no greater success in describing quantum mechanics than any field theory. There are, however, a few points which might be made the object of an investigation with a view to settling the difficulty.

(1) The complementarity of the mathematical-formal and the genetic-functional descriptions must be more strongly emphasized. This may entail a de-emphasis on the formal, organic pattern in the philosophy of organism. It would probably re-open the problem of the relation between objectification and prehension.

(2) That the uncertainty principle exists must be demonstrated to follow from the observations in the mode of presentational immediacy.

29. STR, 122.
(3) It seems that the divergence between the modes of presentational immediacy and causal efficacy might attain the status of a category of explanation. Similarly, certain categories now existing may be found to belong to only one mode, rather than the two.

(4) The Ontological Principle, XVIII Hp Rg, can stand as it is, but must be severely limited in scope. Thus, although the ontological reason for an actual entity exists either in some causal entity or itself, the possibility of pure indeterminism must be asserted. Strictly speaking, then, determinism only tends to be operative. Efficient causation occurs when it can, and VII Hp Ro must be treated with the alteration that an entity is at least partly externally determined, and at least partly internally free.

(5) It seems that a principle allowing the emergence of new eternal objects will assist in the metaphysical (but not the physical) project.

(6) The Category of Conceptual Reversion may be invoked to explain how sudden changes may occur. A typical diagrammatic representation follows. The original conceptual prehensions of \( a^\alpha \) are of
e_{\alpha} and e_{\alpha\beta}. The actual entity thenprehends a_{\beta}^{n} and a_{\gamma}^{n}, in which e_{\beta} and e_{\gamma} are respectively ingredient. The conceptual valuation of theseprehensions by a_{\alpha}^{n} proceeds. The subjective aim of a_{\alpha}^{n} introduces secondary conceptualprehensions of, say e_{\alpha\beta\gamma}. In the concrescence in process, e_{\alpha\beta\gamma} acquires the status of contributing substantially to the determinateness of a_{\alpha}^{n+1}. Thus, a_{\alpha}^{n+1}, instead of being a simple, physical reproduction of a_{\alpha}^{n}, is something totally different. This explanation may not replace the need for pure indeterminism, but may serve to explain many cases of quasi-indeterminism.

(7) The subjective aim of an actual entity must, as superject, be primarily free. If too many restrictions are placed on the freedom of the
necessitated an important choice. How much greater importance another choice necessitated by quantum mechanics had, Whitehead did not say. Nor did he commit himself on the wisdom of the choice he had made. The awareness of the earlier choice's importance is shown by Science and the Modern World:

This discontinuous existence in space, thus assigned to electrons, is very unlike the continuous existence of material entities which we habitually assume as obvious. Accordingly, if this explanation is allowed, we have to revise all our notions of the ultimate character of material existence.

In the fourth place, Whitehead was willing to let the future discoveries of physics guide his choices. For example,

It is thus an empirical question to decide in relation to special topics, whether the distinction between a coordinate division and a true actual entity is, or is not relevant. In so far as it is not relevant we are dealing with an infinitely subdivisible extensive universe.

Generally, then, Whitehead's physical cosmology can be summarized as a description of the forms in the facts. The doctrine of Science and the Modern World was appropriately denominated "organic mechanism," and the increasing emphasis on organism resulted in the philosophy of organism.

30. SMW, 45.
31. PR, 437.
32. SMW, 99.
Scientific cosmology is derivable from the final doctrine of the philosophy of organism, with the possible reservation of quantum mechanics. But the exact route of transmission from the metaphysical scheme to an empirical science presupposes the assumption of many intermediate axioms. The general route is indicated in the case of field theories, and the difficulties in the case of the dichotomy (not bifurcation) of causal efficacy and presentational immediacy have been noted.

If the metaphysics of Process and Reality be accepted as presented, many interesting chains of implications follow.

(1) Scientific inquiry must be concerned not only with its present data, but also with factors it wants to hold invariant. Physical science becomes a function of physical entities, emotional patterns and intensities, the persuasion of God, aesthetic balance, moral values, the operation of mind, and that elusive subjective aim. The possibility that such may be the case is not attractive to scientific precision.

(2) Scientific laws will be changing with the unending evolution of the universe. They will derive their dominance from statistical distribution, and will be immanent because of the real immanence of actual entities.
(3) Metaphysics and science will deal with the same subject-matter, but on different levels of generalization.

(4) Chance will be, to a large extent, eliminated. What is apparently a chance mutation is really the direct result of a complex interaction of causative factors.

(5) Philosophy from the age of Kant to the philosophy of organism would constitute an interesting gloss on the Category of Transmutation (VI Hp R₀) and the results of overemphasizing the mode of presentational immediacy.

(6) The advance of the world is, to a large extent, determined by God's conceptual valuation of the eternal objects. Eventually the time should come when scientists should be able to predict more accurately the future adventures of their universe, although never completely.

(7) Mysticism might gain support as an attempt to alter individual subjective aims to coincide with the subjective aim of God.

(8) God is a metaphysical God, still hard at work in the process of actualizing the best possible values in the universe, and limited by factors beyond His complete control.
(9) Process is the central principle in the universe. On this score, as well as that in (5), a static substance-quality metaphysics is repudiated.

(10) Scientific laws would be expressions of the predictable interaction of given types of prehensions.

(11) The elevation to the position of central metaphysical importance the principles of aesthetics and ethics.

It has been suggested that the philosophy of organism is, roughly, analogous to the position adopted in the *Timaeus* of Plato. How analogous the two attitudes are will provide the subject-matter for the following chapter.
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CHAPTER TWELVE

THE PHILOSOPHY OF ORGANISM AND THE TIMAEUS

A statement by Sir Edmund Whittaker in the Royal Society obituary notice of Whitehead seems to be the most accurate statement of a much-discussed analogy between the philosophy of organism and the Timaeus, occasioned originally by Professor A. E. Taylor.¹

...the philosophy of organism is in the first place a philosophy of Nature, or a cosmology. Now one famous philosophical cosmology has come down to us from the ancient world, namely that set forth in the Timaeus of Plato: and the resemblances between it and Whitehead are so many and so striking that Process and Reality may be described, in a first rough approximation, as the Timaeus brought up to date.²

Certain general cosmological principles of the philosophy of organism and the Timaeus are so similar as to merit another short comparative study. The conclusions reached are totally independent of whether the Timaeus is Platonic or Pythagorean in origin; the ideas within the dialogue

². 1948 "Alfred North Whitehead" Obituary Notices of Fellows of the Royal Society, 6, 290. Also 1950 September 26 Supervisory conference, in which Sir Edmund Whittaker affirmed substantially the same description.
are of present concern.

The two main commentaries on the *Timaeus* used here differ radically in each of the two controversial topics so far mentioned. On the analogy with Whitehead, Taylor is enthusiastic, and makes perhaps too many detailed comparisons with Whitehead of the relativity era; Cornford believes the technique mistaken. Taylor defends a Pythagorean authorship of the dialogue; Cornford insists upon its Platonic origin. On the question of the authorship of the dialogue, the present author is incompetent to make a decision; as to the Whitehead-*Timaeus* analogy, the opinion coincides with that of Sir Edmund Whittaker.

*Timaeus*, from whom the dialogue takes its name, is a Locrian from southern Italy. He is represented as offering a cosmological system to Socrates, who does not reject the story as unreasonable. The discourse is considered to follow upon an earlier discussion, presumably the first books of the *Republic*. The speaker, experienced in politics and science, recapitulates the previous day's discussions. Following the narration of an Egyptian tale about a war between the ancient Athenians and the men of the fabled Atlantis, Timaeus offers as a "likely story" his cosmological opinions.3

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In seeking for the "most likely" story, Timaeus fore-shadowed a fundamental cosmological argument as to the degree of validity to be expected in natural science. Scientific research, pursuing the ideal of the perfectibility of knowledge of nature and the predictability of future events, may nevertheless suffer under the impossibility of attaining its ideal. An empirical indication that the ideal may never be reached may be found in the increased concern with matters not ordinarily considered to fall within the domain of the natural sciences as possibly having a definite bearing on the natural sciences. If process should be a central metaphysical first principle, natural science is probably not capable of being perfect in description and prediction. It is therefore apparent from the discussion of the philosophy of organism that Whitehead would subscribe to this statement by Timaeus.

The aim of Timaeus' likely story is to present a geometrical science of nature in a single universe, as Professor Taylor has suggested. This geometrization of physics has a highly respectable modern prototype in the orthodox relativistic cosmology, and can even claim tentative support from early Whitehead in "On Mathematical Concepts of the Material World." However, the Whitehead of

the relativity era found the geometrical base of physics an unreliable foundation. On this point, it is valuable to observe that Sir Edmund Whittaker has warned, "a correct mathematical solution of a phenomenon does not necessarily furnish the correct physical description of the phenomenon."^5

The second important assertion, that the universe was a unity,^6 was part of Whitehead's category of the ultimate. It must be remembered, however, that in Process and Reality the universe was just as much a disjunctive universe as a conjunctive one. A secondary interpretation of this unity, made by Taylor, is one which Whitehead would have heartily endorsed. It is that "Plato's view of the physical world is thus one which regards the nature studied by the physicist and the chemist and the sensible world taken in through our eyes, ears, and the other organs of sense as identical."^7

Another general topic of outstanding similarity between the Timaeus and the philosophy of organism is the function of God with respect to the universe. Timaeus suggests that a limited but

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supernatural craftsman, who in some sense acts as God, and who is called the ἄριστος ἄνθρωπος, is represented as operating on a confused aggregate of pre-existent matter, and informing it with a quality of structure and harmony, in spite of obstacles arising from its refractory nature.8

The existence of a ἄριστος ἄνθρωπος is indicated by the argument from causation: an agent is needed to account for the existence of whatever becomes.9 Not all causation is derivative from the ἄριστος ἄνθρωπος, however; a certain necessity attaches to the things which exist in the physical world.10 The two conspire, however, to provide an account of causation. Boodin's equation of these two types of causes as mechanical and teleological, respectively,11 does not seem to be as valid as he thinks; agents are still originally needed in mechanical causation.

For Whitehead, God persuades the universe to attempt a greater achievement of value by allowing actual entities to apprehend his conceptual valuation of the eternal objects. Because of this apprehension by actual occasions, specific types of order and structure are possible: God's contribution to the subjective aims of the actual occasions

causes a multiplicity of specific orders to tend toward integrative achievement. But a perfect universal order does not exist; actual occasions achieve satisfactions which are sometimes in conflict with either God's aim or the aims of other occasions. The achieved value of actual entities, and their superjective natures, represent natural law as immanent; the functioning of God's aim at producing greater order (from the point of view of His subjective aim) is natural law as imposed. "Apart from some notion of imposed Law, the doctrine of immanence provides absolutely no reason why the universe should not be steadily relapsing into lawless chaos.... The Platonic 'persuasion' is required."12

But these becomings in the universe require for a stage what Timaeus called "Receptacle" (έμνόδοξα η'), the "nurse of all Becoming."13 The exact function of the Receptacle is another of the battle areas in the interpretation of this dialogue. Certain it is that it is the matrix within which all events take place. A ready modern analogy would be the space-time metric of the relativists, although Plato cannot be imagined to have been aware of relativity theory.14

12. AI, 146-147.
13. Timaeus, 49a, 50b.
Whitehead conceives the function of the Receptacle in those terms, and in his own specialized sense in which actual occasions can be objectified as components in other actual occasions. Because Plato's Receptacle is made to change with the events which take place in it, and because these events happen in the Receptacle, that Receptacle appears to be a substance qualified by the adjectives passing through it. This description appears to be close to that of the action of an object in its character of extension (through events) in Whitehead's relativity expositions, and Taylor was quick to notice the similarity. That the Receptacle is not a creation of the demiourgos is another point of similarity; the character of the mutual immanence of actual occasions, or of extension, in the philosophy of organism, is derivative from the actual occasions themselves.

The things which become in the Receptacle are configurations of the four "elements," which Timaeus treated as not themselves original. Timaeus imagined that the demiourgos created the four elements to form the proportion fire : air : water = 19

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\text{air : water : earth}
\]

\[
\frac{\text{fire}}{\text{air}} = \frac{\text{air}}{\text{water}} = \frac{\text{water}}{\text{earth}}
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15. AI, 172, 192-193, 258.
19. Timaeus, 32b.
demiourgos wanted to form this proportion, the postulate of the non-primitive status of the four "roots" is justified. From combinations of two types of triangles, the right-angled isosceles, and the "3-4-5" triangle, the four elements were constructed from the more primitive triangular components. Fire, having the lightest and most penetrating powers, was a pyramid whose four faces were composed of 3-4-5 triangles. Air and water were composed of complexes of 3-4-5 triangles, and took the shapes of octahedrons and icosahedrons, respectively. Earth alone was different, being cubical in shape.20 The different subspecies of the four elements were the results of using varying sizes of the component triangles.21

The interaction between the elements is made possible by the combination of the mutual attraction of the like elements, the attraction of lesser to greater elements, the power of the sharp edges to disintegrate the less stable elements, the regrouping of the severed triangles, and the motion imparted by the elements to the Receptacle.22 The physical and the chemical laws of the universe then constitute the description of these interactions. One

22. Timaeus, 54c-54d, 56d-57d.
interesting consequence of this interaction is that the universe would tend to form concentric shells of elements, with earth at the center and fire at the periphery. This cosmological model was not without its adherents in the ancient world.

It is the attempt to reduce the physical elements of the universe to more primitive roots of a geometrical nature which constitutes Timaeus' geometrization of physics. To such an attempt Whitehead would never have given his consent; for him geometry would (in the philosophy of organism) have been made possible by the physical elements. However, Timaeus emphasized the fact that this derivation was merely a likely account; in reality the roots may be more primitive still.23 Taylor imagines this statement to constitute a hint that, the number sets which denote the ratios of the lengths of the sides of the triangles may be a possibility.24 Whether this hint is really implicit in the Timaeus or not does not materially affect the present discussion; the central question is still one of the mathematization of physics, to which Whitehead would react unfavorably.

It has been observed that the physical laws of such a universe as Timaeus has suggested would tend to make it

24. Taylor, op. cit., 365. Cornford, op. cit., 162, admits the possibility, but is more cautious.
spherical in shape. Timaeus, however, insured this perfection of sphericity, as well as the primacy of soul over body, in another way. The universe had a world-soul, made before its body, and of spherical shape. The soul was composed of mixtures of indivisible and divisible existence, and of sameness and difference. Having completed this "fabric," the ἀνθρωπόμορφος split it into two ribbons, crossing them in the center, and then joining the ends to form two circles.

The outer strip revolved to the right and was called the movement of the same; the inner revolved to the left, and was called the movement of the different. The inner circle was then split into seven planetary circles in accordance with a strict proportional division, and gave the world-soul its body.25

The creation of man was delegated to a lesser divinity, who accomplished the task according to the instructions of the ἀνθρωπόμορφος, who himself supplied the immortal component in man from a second brew. The doctrine of

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knowledge as remembrance is here justified by the fact that, after their creation, all mortals were shown the nature of the universe. 26

Another important component in the making of the universe, and which appears to have served as the original "brew" mixed by the démiourgos, is the chōra (χώρα), which was remixed in forming man. The chōra was completely exhausted in the full creative process, 27 so that the continuous creation of some modern cosmologies could not exist. It has been likened to Whitehead's creativity in the sense that it is an ultimate behind all nature, by Sir Edmund Whittaker, 28 but such an analogy must not be pressed too far. There seems to be too much of the urge toward novelty in creativity, and too little of "stuffiness" to satisfy the demand completely. It may be possible to offer the occasions in their "occasionness" as another rough analogy to the chōra. There is really no one element in the philosophy of organism which corresponds exactly to the chōra of the Timaeus.

The universe of Timaeus has been characterized as the result of God's action on a retractable, but impressionable, chaos. The world is thus the product of intelligence (νοῦς)

27. Timaeus, 32d.
and necessity (δυναμη). Cornford seems to have described Necessity in terms most suitable to the cosmology proposed in the philosophy of organism, but his interpretation is in conflict with that of Taylor. As to which interpretation Timaeus intended, this thesis is in no position to give an opinion. For Cornford, "Necessity is irregular and disorderly, and not inexorably determined, but open to the persuasion of Reason." There is thus an uncontrolled and unpredictable surd left over after Reason has been accounted for. With this assertion Whitehead would have been in agreement. Professor Taylor felt, however, that Necessity is the willing slave of Reason; if complete knowledge were possible, Necessity would not have a part in cosmology. This dispute is a repetition of a fundamental disagreement in cosmological theory— is the universe fully governed by orderly laws, or are there fully indeterminate elements at work?

Both Taylor and Cornford are agreed that Necessity (involving the Errant Cause) is not to be interpreted as

natural law, or as having a determinate purpose of its own, nor is it intrinsically evil. It does not seem that Necessity will be comparable with creativity, as has been suggested by one commentator. Necessity has its own direct counterpart in the philosophy of organism.

It may well be, as has been urged by most commentators, that the purpose of this argument in the Timaeus was to demonstrate the powerful function of Reason in the universe, and as a justification for the existence of the démiourgos.

The démiourgos is definitely a limited God; agreement with Professor Taylor in the question just considered will result in a decreased limitation of God’s power, but will not, as Professor Taylor seemed to think, make him omnipotent. As Sir Edmund Whittaker has suggested, the démiourgos has not been able to impose perfect structure in the physical universe.

Again, to the question, is this God worthy of being the object of religious worship, the answer seems to be in the negative, and for reasons similar to those for so concluding about Whitehead’s God. In this decision, the

support of Sir Edmund Whittaker\textsuperscript{34} and Cornford\textsuperscript{35} can be enlisted. Professor Taylor's opinion is to the contrary.\textsuperscript{36}

As is the case with the philosophy of organism, any reason for the existence of the universe at all is to be found in the goodness of God.\textsuperscript{37} The axiom, reduced to its most primitive level, is again found to depend upon an act of faith (as contrasted with rational demonstration) for its full acceptance. Thus, the reason that God should receive a chaotic given and persuade it to accept a high degree of order or structure is not metaphysically demonstrated. It was this goodness of God which led Professor Taylor to consider Plato's God as "personal"\textsuperscript{38}; the criteria of Professor Brightman\textsuperscript{39} seem to be met by the démiourgos. If, however, Jowett is correct in reading "goodness" as equivalent to "law, order, and harmony,"\textsuperscript{40} there seems to be more of an indication that the démiourgos is really just a metaphysical first principle, although still a personal God.

A further important agreement between Whitehead and Timaeus is that they both insisted upon the reality of

\begin{itemize}
\item[34.] Sir Edmund Whittaker, \textit{op. cit.}, 290.
\item[35.] Cornford, \textit{op. cit.}, 35.
\item[36.] Taylor. \textit{A Commentary on Plato's Timaeus}, 82.
\item[38.] Taylor. \textit{Plato: The Man and His Work}, 441.
\item[39.] See pages 440-441 of this thesis.
\item[40.] Jowett, \textit{op. cit.}, 572, 596.
\end{itemize}
process, of flux, of the becomingness of the universe. \(^{41}\) Again, Professor Taylor was quick to pick up the analogy with Whitehead's writings of the relativity era, and even goes to the extent of declaring Timaeus to be innocent of Whitehead's "fallacy of bifurcation." \(^{42}\) Cornford rebelled violently \(^{43}\) to the exactness of the analogy claimed by Taylor.

In certain respects, Timaeus and Whitehead are in agreement as to the nature of time. For Timaeus, time came into being with the world \(^{44}\); Whitehead's epochal theory of time depended upon the concrescence of actual occasions to be realized. However, Timaeus' time is equally a series of instants, a homogeneous continuum, or a succession of epochs. Whitehead had rejected instants of time after the 1905 memoir, and in his later writings had held homogeneous continua to be derivative from the epochal theory of time. A further refinement which Plato could hardly have been expected to foresee is the multiple time-series of Whitehead. Also, as has been observed by Sir Edmund Whittaker, \(^{45}\) both writers took care to prevent

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43. Cornford, op. cit., xii.
the complete interchangeability of time and space. Neither writer, if Xenocrates is correct in interpreting Plato, intended to suggest the existence of a moment of creation, to.

It has been suggested that Whitehead's fundamental problem coincided with that of Plato, in a search for the "forms in the facts." The exact status of "Forms" and eternal objects to the transient world of becoming is in some senses very close. But in one very important respect, "Forms" and eternal objects differ completely. Professor Taylor's equation, then, of Forms and eternal objects is expecting too much. Both are members of an unchanging, eternal world; both have the power of contributing pattern or participation in certain characters to the world of becoming. They are not themselves thereby altered or depleted.

Neither are the Forms nor the eternal objects in the mind of God. For Plato, the dēmiourgos fashions the

universe after the Forms as completely as Necessity can be persuaded to submit. For Whitehead, God makes a conceptual valuation of the eternal objects and thereby intermediates between actual entities and eternal objects. Although eternal objects are ingredient via God's nature (the Primordial Nature), it does not necessarily follow that the eternal objects are in the mind of God. As a matter of fact, it does seem that, in the philosophy of organism, eternal objects are themselves strictly necessary after God has made his "primordial conceptual valuation" of them.

The important divergence comes in the completeness of realization of Forms and eternal objects. For Plato, the copy in the world of becoming (Whitehead's World of Activity) is incomplete and not fully realized. Whitehead's eternal objects, however, are fully determinate in the actual entities in which they are ingredient.\(^50\) It therefore seems that Whitehead has avoided a bifurcation which Plato exalted.

It is, from the total discussion of the Timaeus, apparent in what sense Whitehead can further compare Plato's attitude with his own in regarding natural law as a

mixture of immanence and imposition.  

The Timaeus, then, has so many similarities with the philosophy of organism, that the assertion that the latter can be roughly described as the Timaeus brought up to date, seems warranted. It is just as certain that there are violent incompatibilities in some specific accounts given by Timaeus and Whitehead--on sense perception, on physiology, and on the geometrization of physics, to mention a few examples. Further, Plato (or the Pythagoreans) cannot have been expected to know of the recent physical theories, and to that extent, there must be conflict. But the similarity of first principles are striking; Timaeus himself may have approved the philosophy of organism as an improvement on his own "likely story."

51. AI, 154-156.
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CHAPTER THIRTEEN

PRESUPPOSITIONS IN THE PHILOSOPHY OF ORGANISM

EVALUATION AND A SUGGESTED EXTENSION

Whitehead's philosophy has, for the present generation, been synonymous with a forbidding, difficult, and extremely complex metaphysics. To attempt an appraisal of the status of the final cosmology and metaphysics, then, is an extremely humbling task. This chapter will, therefore, merely propose certain questions, the answers to which appear to indicate the degree of validity to which the philosophy of organism will be able to lay claim. These questions draw into focus the presuppositions of the philosophy of organism, and in most cases the answer does not seem capable of a final, and in some cases, not even a definite answer.

I. Does physical cosmology have an implication for metaphysics?

That the response of Whitehead, as well as of this thesis, would be the assertion of a strong positive implication from physical cosmology to metaphysics is apparent.
Historically, it must be remembered that Whitehead approached philosophy from mathematics and inquiries regarding the presuppositions of physical science. With the admission of the primacy of process as a metaphysical assumption, there seems to be the beginning of the defence of the assertion that physical cosmology does have an effect upon metaphysics, although Whitehead himself most likely believed it to be true much earlier.

A decidedly negative answer to this question has recently been the opinion of Professor Weyl:

> With the years I have grown more hesitant about the metaphysical implications of science.... And yet science would perish without a supporting transcendental faith in truth and reality, and without the continuous interplay between its facts and constructions on the one hand and the imagery of ideas on the other.

An extremely strong case can be built for this side of the argument. In the first place, it is doubtful that the sciences have need of the broad generalizations of any metaphysics. Presumably, those concepts would get them into greater difficulties than an admittedly arbitrarily restricted set of intermediate principles. Furthermore, the sciences are attempting to hold invariant (because unpredictable, if no better reason exists) those very things which metaphysics is attempting to promulgate as central.

It is extremely difficult to show exactly how the

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1. 1949 Philosophy of Mathematics and Natural Science, vi.
objects of the sciences are related to the objects of metaphysics.  

There is, in addition, a disagreeable history of the misapplications of the natural sciences to metaphysics. Thus, the defense of both interactionist and parallelist epistemology has been held to be justified by the doctrine of the physical conservation of energy. Relativity theory has been held to support an idealist metaphysics, when no such interpretation is implied whatever.

The extreme negative case, of course, is the position which holds that metaphysics is meaningless, and has no real subject-matter. Despite the auxiliary usefulness of the logical positivists, for example, it is difficult to see that that standpoint can offer even a satisfactory tentative solution to the central problems of philosophy.

As an objection to Professor Weyl's standpoint, it may be argued that if there is no metaphysical reality which the sciences attempt to describe to a certain extent, there would be no sciences. For they attempt to describe the adventures of those realities, or of abstracted constructions which have been introduced to replace and simplify those metaphysical realities. But those realities, or their substitutions, are not completely described by

2. See Chapter XI of this thesis.
3. See Pages 41-43 of this thesis.
4. See pages 181-182 of this thesis.
the sciences. But if there is to be a complete description of the adventures of those realities, the subject-matter for a further inquiry remains. If the realities have been replaced by appropriate constructs, the critique of those constructs provides the subject-matter for a further inquiry, which will await the answers to the very real questions:

(1) What is the nature of ultimate reality?
(2) What is the relation of the constructive representations to those constituents of reality?
(3) What is the resultant opinion of the inquiries of the more special sciences, when integrated?
(4) What reasons, if any, can be given for the existence of the realities or their activities?

A proof from metaphysics that cosmology has implications for it is easier; both to some extent describe the same entities, but on different levels of generalization. Professor Gilbert Ryle, at the 1950 meeting of the American Philosophical Association in Toronto, Canada, affirmed this in a symposium called "The Modern Distemper of Philosophy." Furthermore, metaphysics undertakes to organize the results of the more special disciplines, which would include cosmology as a more important member of the

metaphysical conclave.

Professor Herbert Dingle, in his 1948 James Scott Prize Lecture to the Royal Society of Edinburgh, has, however, offered a rival solution which can lay a strong claim to sufficiency. Briefly, he suggested that scientific philosophy, cosmology, or physicomathematical science criticizing itself, should be equated with what would ordinarily coincide with the domain of metaphysics itself.

"...if one's purpose is to achieve the full rationalisation of the whole of experience, the scientific philosophy, though still incomplete, is the only one that offers any reasonable prospect of success."6 Professor Dingle's case is much stronger than this single sentence would indicate. This is so because he asserts that all experience should be subjected to the scientific method.

If not the world of material objects but experiences themselves are the fundamental data of science, then there is no reason whatever to grant any experience initial priority over any other; all are alike submitted for consideration, and our rationalisation is incomplete so long as they are excluded. Sensations are not in the least degree more "scientific" than emotions.7

It might be noted that the scope of Professor Dingle's "scientific philosophy" is approximately that of Whitehead's "cosmology" in the expanded sense. Where they differ is

7. Ibid., 406.
in the fact that whereas Professor Dingle is describing experience, Whitehead was also concerned with the items which are responsible for experience. Dingle's "scientific philosophy" is epistemologically centered, whereas Whitehead's "cosmology" is ontologically centered.

It is not suggested in this thesis that science should not concern itself with experiences. Indeed, if *Process and Reality* has asserted the need for the expansion of the scientific cosmology, it is just that experiences not ordinarily investigated by the sciences can be profitably included in their scope. It may well be expected that the scientific method will profoundly alter the aspect of reputedly unscientific disciplines. It is entirely probable that psychology will clarify the hazy or disorderly processes of experiencing, believing, willing, or acting impulsively, in its cooperative enterprise with physiology. The varieties of religious experience or of emotional experience undoubtedly would furnish suitable fields for scientific investigation.

But it seems that no matter how well the experience is encompassed by rational explanations, there is still the object of experience to be described. Unfortunately, the connection between the experiencing and the experienced is not, in the opinion of this thesis, so clear that when the experiencing is described, the experienced follows. The analogy used earlier to describe Whitehead's treatment
of consciousness seems equally suitable here. The workshop and the plans have been investigated (and in this case perhaps only the plans or the reactions of the investigator), but the workman has gone. Scientific consideration of experience qua an experience is necessary and extremely valuable, but it seems that it is fatal to lose sight of the fact that this sort of investigation can be nothing more than an instrument.

Both Whitehead and this thesis, then, would accept completely the answer which says that metaphysics and physical cosmology are distinct and that "A philosophy treating of the general nature of Being and covering the whole of experience should have, at its source, physico-mathematical science criticising itself." 8

Cosmology, at the level at which physicomathematical science criticizes itself, can confirm or reject as inadequate certain metaphysical presuppositions, and perhaps indicate certain limits within which metaphysics can dare to operate. Extreme caution, however, must be observed in making the cosmological solution furnish, unaltered, the metaphysical solution. It may not follow.

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II. Is Ontology the Central Problem for Solution?

This perhaps ambiguous question emphasizes a conviction Whitehead repeatedly emphasized to the effect that all the more special problems of philosophy must have recourse to the becoming, the being, and the perishing of actual entities. Epistemology is not the key problem for Whitehead, nor is theology. He specifically designates ontology as the only worthy applicant for the position of central importance.

In the opinion of this thesis, and contrary to highly qualified opposition from scientists and philosophers of certain schools, Whitehead has correctly localized the problem with which metaphysics is most centrally concerned. It seems that it must likewise be the locus of the most direct impact of physical cosmology upon metaphysics. It may also be suggested that philosophers have been occupied with the specialized problems of epistemology in their present setting long enough. It is now time to enlarge the vision, and to abandon the attempt to describe ontology in terms of epistemology. At best, such a description will be abstracted from its proper context, and may be responsible for the prominence of the operational and phenomenalist approach to metaphysics and the natural sciences. It seems to be more appropriate to describe epistemology in terms of ontology, although it is not denied that the
inverted inquiry will be fruitless.\textsuperscript{9}

It may be wondered whether, in his attempt to find the forms in the facts, Whitehead does not make aesthetics or perhaps axiology bear a stronger burden in the physical world than they are really capable of supporting. Every actual entity attempts to achieve, in effect, a harmonious satisfaction. It might justifiably be asked whether this statement represents the actual case, or is an idealization of cosmological, metaphysical, or aesthetic theory. With regard to axiology, every actual entity makes countless judgments, although mainly unconscious. The valuation process may conceivably be attacked on the same grounds for the physical world as the aesthetic process.

The prominence of aesthetics and axiology is highly consistent with Whitehead's attempt to find the universe a coherent, and not a chaotic, one. While admitting the possible objections as not fully answered, this thesis supports the assumption that ontology is the central clue to the problems of metaphysics, and aesthetics and axiology are important subsidiaries, especially in the realm of consciousness. The operation of the field theories in physical cosmology can conceivably be interpreted in terms

\textsuperscript{9} For support in this assertion, see Roy Wood Sellars, 1941 "Philosophy of Organism and Physical Realism" The Philosophy of Alfred North Whitehead, The Library of Living Philosophers, 3, 419.
of a complex unconscious selectivity or valuation-process, although such an interpretation may be of no value for the physical sciences, and may prove to be a result of the desire to make the physical universe an anthropomorphic one.

III. Is Cosmology the search for the forms in the facts?

The answer to this question seems to depend upon the answers to two main component questions:

(1) Are there forms in the facts?
(2) What degree of validity is to be expected in finding either the forms or the facts?

To the first component question, Whitehead and Plato would both respond with an affirmative answer. However, it is possible to entertain a metaphysical solution in which the so-called forms are nothing other than observed statistical regularities in a generally disorderly, or only partially orderly, universe.

Highly involved with this question is the one previously considered—is the universe a cosmos or a chaos? If it were pure chaos, there would seem to be no basis for even a statistical documentation of events. Knowledge would seem to be impossible. A certain amount of order must therefore obtain in the physical universe. This order would attest to "forms in the facts"—at least so far as the facts will admit the forms, or so far as it is
in the power of some one or more agencies to introduce	hose forms into the facts. It would seem that the con-
clusion that the universe is a completely coherent struc-
ture, free of contradictions or chance, is not warranted.
There are, it seems, forms in the facts to the extent that
it is possible to find a high degree of validity to follow
from the use of that assumption. It is not suggested that
those forms should have a separate existence. The whole
document of eternal objects seems just a little strange
and arbitrary. It is not wholly clear why the forms
should not arise from the actual entities themselves.
Again, a perpetual philosophical battleground has been
reached, with powerful adversaries on either side. The
opinion here offered is that there is a large element of
coherence in the universe, and hence forms in the facts.
But these forms arise from the actual entities themselves.
Possibly as the result of the desire of a guiding Deity,
possibly simply because those facts are as they are.

As to the second component question, it seems that the
forms will be constantly changing, and no complete evalua-
tion is possible. To the extent to which the various
forms are persistent, it should be ideally possible to de-
termine them accurately. It should therefore also be
ideally possible to achieve a high degree of accuracy in
discovering scientific laws or regularities. It is con-
ceivable that some forms may be present only as defining
tendencies.

It does not seem possible that a complete, all-embracing system is likely to have more than a heuristic value, or more claim to validity than a highly accurate analogy. This is not intended to deprecate the attempts at speculative philosophy; indeed, it seems that complex system-building is one of the most lucrative projects known to metaphysics or to physical cosmology. But it seems that they cannot lay claim to any ultimate validity. In this respect, it is instructive to consider an observation by Professor Rosenfeld of Manchester University: "...if we choose to indulge in dreams of formal beauty, we must realise that we cut ourselves off from the 'solid ground of nature.'"10

Tentative conclusion: To a limited extent, there is a formal pattern of some sort to be discovered. The pattern itself is probably changing with the universe. It is not completely realized, perhaps because of the recalcitrant nature of the ultimate ontological existents. But the degree of validity to be expected in system-building, either in physical cosmology as world-models, or in metaphysics as systems, is enough to reward the efforts expended in that costly enterprise. But the system-builder should not

be disappointed to find himself with the footprint of an escaped reality.

It is Whitehead's merit that he seems to have realized this ultimate fate of systems, as well as the immense value of a synoptic view through a comprehensive axiomatic-deductive system.

IV. What is the status of "process" as a key to metaphysics?

Is the universe a process? Or, at least, does it behave in a manner analogous to a process? If the answer to both questions is decidedly negative, the whole philosophy of organism is fallacious.

In this respect, it is perhaps wise to recall Whitehead's invective against the substance-quality metaphysics, and his dissatisfaction with the mechanical analogy. This brings in another question which is closely involved, but which will be treated as a separate question. But the substance-quality metaphysics, and the static world-model at an instant of time Whitehead found to be inadequate. It seems certain that they cannot command the obedience they once did until the defects indicated by Whitehead have been resolved, or shown to be not defects.

If process be adopted as central, it seems that there is a tremendous residue of permanence which is arbitrarily explained in a process metaphysics. If, on the other hand,
permanence metaphysics be adopted, there is the problem of accounting for changing individuals, and many other trailing problems. If forced to a choice between the two, the opinion is suggested that the adoption of process may be the more fruitful course, with the suspicion that a stronger case could be built of a system incorporating in some way the two. Somehow, the problem of persistence seems to involve more than the repetition of forms of definiteness in epochal occasions. It is also difficult to believe that elementary components of the universe are processes in the same sense that a complex biological organism incorporates processes.

In this connection, it might be wise to recall Whitehead's unwillingness to effect a decision as to the primacy of either of the mathematical-formal or genetic-functional aspects of his philosophy of organism. This may prove, in time, to be a prophetic statement. With Bohr's expanded principle of complementarity, it may form part of a more inclusive master-principle.

Both aspects seem to be absolutely necessary: both the theory of prehension and the theory of extension are required by the philosophy of organism. Just so, perhaps a complement to process, but not eliminating process, will become the ideal of metaphysics.

As to the validity of process as a key to physical cosmology, the conclusion seems to be that it is possible,
but not necessary. If adopted, objective immortality is a
major topic for cosmology to investigate, and the super-
jective stage of an actual occasion is perhaps the most
important stage. Unfortunately, from the point of view of
quantum mechanics, Whitehead's process seems to be a fully
determinate (in principle) process, and the ontological
principle has unquestioned obedience.

V. How accurate is the "organism" analogy?
The answer to this question is intimately concerned
with the answer to the previous question, and can perhaps
be briefly indicated as being a cautious, heuristic affir-
mative.

For Whitehead's cosmology, the answer seems to be the
same for both senses in which Professor C. M. Yet has distin-
guished metaphysical theories as analogies.11

The biological sciences have been joined by psychology
in suggesting that in the more complex entities in "nature"
the only satisfactory analogy is that of organism. How
accurate the organism analogy is in the "material world"
seems to invite the repeated answer, "It is possible, but
not necessary." The attempt to make everything behave as
organisms may be the result of an anthropomorphic desire,

or an unwarranted attempt at insuring a monism of ultimate existents.

Again, if forced to a decision, it is suggested that the organism is perhaps the best present description of ultimate metaphysical existents, comprehending, as it does, existents of all sorts found in the universe. For the simplest components, the organism may introduce unnecessary complexity.

However, Professor Vlastos made the important observation that "We should look for Whitehead's permanent contribution to philosophy in his description of the genuinely organic parts of our experience." 12

VI. Can the philosophy of organism encompass the results of quantum mechanics, particularly with respect to the indeterminism implied by it?

This question has been discussed at some length in chapter XI. A summary of those findings is all that is presently necessary. That is, that the systematic superstructure of the philosophy of organism as it stands, does not seem capable of including quantum mechanics. The philosophy of organism finds itself in exactly the same position with respect to quantum mechanics as the field

12. Gregory Vlastos. 1937 "Organic Categories in Whitehead" The Journal of Philosophy, 34, 253-263. This particular statement, which summarizes the memoir, is found on page 262.
theories. Certain points in the philosophy of organism, indicated in chapter XI, may be expanded to meet the needs of quantum mechanics, but on the whole, the philosophy of organism seems to have too much of determinism to satisfy the needs of this latest branch of the physical sciences.

VII. What is the relation between actual occasions and the elementary particles of physics?

It does not seem possible to answer this question explicitly, partly in view of Question VI. Whitehead made it clear that societies of occasions may correspond to electrons or other elementary particles. But the identification does not seem a necessary one; why should not the elementary particles of physics be the actual occasions themselves? A specific equation of entities on the metaphysical level to entities on the physical level is missing in the philosophy of organism, and for that reason, a bar to acceptance has been made.

The answers to the foregoing questions seem to determine the degree of validity which can be attached to the purely physical aspects of Whitehead's cosmology. Briefly, he has given an adequate description of the state of the physical sciences up to, but not including, quantum mechanics.
VIII. How fundamental is consciousness?

Answers to this question would be numerous, and would depend upon the initial assumptions of the answerer. Whitehead believed consciousness important, but not a primitive element in the metaphysical scheme. He seems to describe, not consciousness, but only how it works. Even then it is not clear that it is consciousness in any of the usually accepted connotations either of common sense or of the philosophical tradition. Professor Brightman observes, "I am not especially troubled, however, by what he says about consciousness, since he uses the word in so esoteric a sense." 13 Professor Emmet thinks that he "makes consciousness incidental in a way which I cannot believe is satisfactory." 14 Stallknecht agrees. 15

But on the other hand, Victor Lowe decided, "Whitehead's theory of consciousness seems to me a very good line of thought." 16

Consciousness, in the opinion of the present writer, does seem to be more fundamental in metaphysics than the philosophy of organism allows. With this statement naturalists, among others, would disagree, and their case is

15. 1934 Studies in the Philosophy of Creation with Special Reference to Bergson and Whitehead, 149-150.
strong. But beyond the "physiological consciousness" of the naturalists, it is suggested that there is still something which has to be described, and for which an account should be given.

IX. How fundamental is enduring personality?

Again, accounting for the endurance of any component in the philosophy of organism via objective immortality has been ingeniously accomplished, but in what seems to be an artificial manner. How repetitive occasions can account for the endurance of a material particle, much less a "person," will always remain one of the troublesome questions in an atomistic cosmology.

A second component of this question is concerned with the nature of an epoch. The epoch of time involved in a particular satisfaction does not seem to be the clearly delineated epoch Whitehead defined it to be. Nor does the superjective stage of an actual occasion seem to account for this indefinite extensiveness in time. The epochal theory of time seems a peculiarly penetrating account, with the exception of its demand for distinctness of epochs. Some epochs, such as those utilized by quantum mechanics, may well be precisely defined; others need not meet that requirement.

With regard, then, to an enduring person, this thesis agrees with Roy Wood Sellars: he "hardly does justice to
an enduring self." Professor Hartshorne takes the opposite view, and thinks the difficulty largely verbal.

X. What is the status of God in the philosophy of organism?

That Whitehead has not given a religious, but only a metaphysical, God, has been urged by this thesis. Indeed, although the religious God must be a component in any metaphysics, it may well be that such a religious God cannot be demonstrated to be a metaphysical necessity, unless initially postulated. It may well be that it will follow only with the postulation of the importance of spiritual or religiously susceptible persons in the universe that a religiously satisfactory God can be demonstrated to be of central importance. This Whitehead does not seem to have done in the philosophy of organism. But it has also been observed that he may not have been averse to this need, and sensed that a fully satisfactory religious God was outside the scope of his metaphysics. But he did not seem to think it necessary to his metaphysics: "The concept of God is certainly one essential element in religious feeling. But the converse is not true; the concept of religious

feeling is not an essential element in the concept of God's function in the universe."19

It seems that religious functions can be annexed to Whitehead's God, however unnecessary they may be to the philosophy of organism. Perhaps the ideal would be to show them mutually involved and mutually necessary.

Because of the nature of the God of the philosophy of organism, it is not clear that He could not be replaced by another actual occasion. His function in primordially valuating the eternal objects makes Him unique among actual entities. But if that function is removed to allow the forms of definiteness to be derived from actuality, God seems to become simply another occasion. A philosophy eliminating the need for eternal objects may then be confronted with the task of holding up God's pedestal; His saving function then becomes part of the internal constitution of every actual entity. Natural law is fully immanent; the universe is a going concern with no outside attraction or intervention. The situation would then be that of Laplace, who had no need of "cette hypothèse-là."

This situation, in the opinion of the present author, is not desirable, although the change in the eternal objects is.

19. TR, 315-316.
XI. Why should there not be new eternal objects?

Whitehead's demand that all possibilities must be primordially conceived in the Primordial Nature of God has been given as the reason why there should be no new eternal objects. But he has not indicated exactly why he thinks this would lead to chaos.

In this respect it has been indicated that Professors Emmet and Hartshorne have both endorsed as reasonable and desirable the attempt to make new forms of definiteness possible. It is here suggested that the eternal objects can be conceived to be derivative from actuality, and thus new eternal objects are indeed possible in the philosophy of organism.

A Suggested Extension

If these indicated weaknesses really exist in the philosophy of organism, a suggested remedy is in order. This suggested revision must not be considered to follow necessarily from the results of the thesis. Instead, it is of the nature only of a possible extension which, while appearing plausible to the present author, will necessarily be subject to strong objections from many quarters. Alternatives to this one are indeed possible; this one is offered as the one which seems most adequate to the present writer. In this revised system, which bears many
resemblances to the species of personalism advocated by Professor Brightman of Boston University, indebtedness for the basic concepts are due to him, as well as to Whitehead. The burden of proof of the irregularities rests solely with the present writer, and it is to him that the inadequacies are solely due.

Four aboriginal metaphysical constituents are postulated: God (spiritual in nature would be the closest analogy), the rational Given, persons, and actual entities. The universe is postulated to be operative analogous to that of the process of an organism in its various components. God, persons, and the actual entities attempt to achieve the actualization in a more perfect fashion the satisfactions of their own subjective aims, which do not coincide. This desire for actualization is born of creativity, which is the major component of God's subjective aim. Creativity is also present to a lesser degree in the subjective aims of persons, and primitively in actual occasions. The means whereby these satisfactions are achieved is dictated by the categorical scheme, which constitutes the rational Given. Indeterminism as well as determinism exists; there is real freedom. Determinism tends to be operative, subject to the qualification that it is not completely powerful.

Actual entities, having conflicting subjective aims,
produce conflicting as well as cooperative satisfactions. God functions, however, to persuade actual entities and persons to achieve satisfactions compatible with His own subjective aim. Cooperative persons having a spiritual component either derivative from God or coexistent with God likewise attempt to achieve their satisfactions. Because of their more complete realization of the demands of creativity, they are able to persuade the satisfactions to be more consonant with their own aims. But because of their personal or spiritual nature they are able to cooperate more actively in achieving the satisfaction of values compatible with God's subjective aim.

Because of the state of accomplished satisfactions, the subjective aims of God, persons, and actual entities may change. In this way, higher values may be conceived, and higher values may be achieved by God, by persons, and by actual entities. The higher values achieved by actual entities and by persons would be responsible for the description of emergent evolution through the route of proteins, organisms, and the usual evolutionary scheme. Because of the higher values which may be achieved, the rational Given may also change.

God, as the most powerful creative existent, is most persuasive in the operation of creativity. To the extent which this has been accomplished in accordance with the subjective aim of God operating by the rules of the
rational Given, the evolving universe is God's creation. God is thus finite in power, although infinitely perfectible. Because higher values may emerge, He, too, attempts to perfect their actualization.

Metaphysics in such a scheme is ontologically centered and unified all the results of the various disciplines, attempting to give a better description of the operation of the aboriginal existents. Physicomathematical science describes the activities of the actual entities, as well as their nature. Biological science describes the societies of actual occasions which have achieved the organic stage of emergence. Psychology describes the functioning of actual entities in which the nervous systems are important, as well as the relations between persons and the biological organisms with which they are associated. Logic and mathematics will describe the rational Given, and as that rational Given is actualized in the universe. Epistemology becomes a branch of ontology, determined largely by the results of psychology. Axiology becomes the study of the operation of the subjective aims in relation to the values conceived in terms of the rational Given and creativity. It is thus a three-cornered reference frame (subjective aim-actualization-rational Given) with other dimensions relating this frame to those of God and the actual entities. Aesthetics is inextricably implicated in axiology.
In conclusion, it must be repeated that the difficulties believed to inhere in the philosophy of organism by this author, are not so found by all commentators. The tremendous scope and value of Whitehead's writings lies as the urge behind the entire thesis. For the present writer to indulge in extensive praises of Whitehead's achievements and insights would be an exhibition of the present writer's inadequacies. Whitehead's writings themselves will make a greater impact upon philosophy and upon physical cosmology than any description of them.

This chapter has been offered only as summarizing the main implications and presuppositions of the philosophy of organism as believed to exist by this investigator. The alternative system offered only leads to the statement of humility offered by Whitehead:

There remains the final reflection, how shallow, puny, and imperfect are efforts to sound the depths in the nature of things. In philosophical discussion, the merest hint of dogmatic certainty as to finality of statement is an exhibition of folly.20

20. FR, x.
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APPENDICES
APPENDIX A

SYMBOLIC STATEMENT OF THE AXIOMS OF THE CONCEPTS OF THE MATERIAL WORLD IN THE 1905 MEMOIR

Concept I

I \ Hp \ R. = . \exists ! R' ( ; ; ; ) \ Df

II \ Hp \ R. = : (a, b, c) : R' (abc). D. R' (c ba) \ Df

III \ Hp \ R. = : (a, b, c) : R' (abc). D. \sim R' (bca) \ Df

IV \ Hp \ R. = : (a, b, c) : R' (abc). D. a \neq c \ Df

V \ Hp \ R. = : (a, b) : a, b \in R' ( ; ; ; ) . a \neq b . \exists ! \{ R' (ab ; ) \} \ Df

VI \ Hp \ R. = : (a, b, c, d) : c, d \in R' ab . c \neq d . D . a \in R' cd \ Df

VII \ Hp \ R. = . (I a, b, c). \Delta_R' (abc) \ Df

VIII \ Hp \ R. = : (a, b, c, d, e) : \Delta_R' (abc). R' (bcd). R' (cea). D.

\exists ! \{ R' de \cap R' (a ; b) \} \ Df

IX \ Hp \ R. = : (I p, d) . p \in R. d \in R' ( ; ; ; ) . p \ Df

X \ Hp \ R. = . (I a, b, c, d) . R' ( ; ; ; ) \subset \Pi_R (abcd) \ Df

XI \ Hp \ R \ is \ some \ statement \ which \ secures \ the \ continuity \ (in \ CANTOR's \ sense) \ of \ the \ points \ on \ a \ line. \ The \ axiom
need not be given here, since there will be no reasoning in this memoir connected with it.

XII \( \text{Hp } R. = \ldots \alpha \in \text{lin}_R \cap \text{cls}_C \alpha \cdot \mathcal{D}_{a, \alpha} : (\mathcal{G}_C) : c \in \alpha : \]

\( l, l' \in \text{lin}_R \cap \text{cls}_C \alpha \cdot c \in l \cap l' \cdot l \cap a = \Lambda \cdot l' \cap a = \Lambda \).

\( \mathcal{D}_{l, l'} : l = l' \) \( \text{Df} \)

(Pages 478-479, MCMW)

**Concept II**

This concept is a monistic variant of Concept I, and uses the same axioms as concept I.

(Page 480, MCMW)

**Concepts III-A and III-B**

\( R \) is everywhere replaced by \( R_t \). The axioms are those of Concept I except that I \( \text{Hp } R \), VII \( \text{Hp } R \), and IX \( \text{Hp } R \) are further modified by the introduction of the hypothesis \( t \in T \). Added is one axiom:

\( \text{XIII } \text{Hp } R. = : t \in T \cdot \mathcal{D}_t \cdot R^t(\ldots , \cdot) \subseteq R^t(\ldots ; t) \) \( \text{Df} \)

(Pages 480-481, MCMW)
Concepts IV-A and IV-B

I \( Hp \ R. = t \in T. \triangledown_t^* O \subset R^t(\ldots;\ldots; t) \) \( Df \)

II \( Hp \ R. = \mathcal{E} \subset R^t(\ldots;\ldots; \) \( Df \)

III \( Hp \ R. = (a, t). a \in \rho R^t(a; ; ; t) \) \( Df \)

IV \( Hp \ R. = (a, b, c, d, t). R^t(abcdt). \triangledown R^t(adcbt) \) \( Df \)

V \( Hp \ R. = (a, b, c, d, t). R^t(abcdt). \triangledown R^t(acdbt) \) \( Df \)

VI \( Hp \ R. = (a, b, c, d, t). R^t(abcdt). \triangledown b \neq d \) \( Df \)

VII \( Hp \ R. = A \in intpnt_{R^t}. a \in A. \triangledown_{a, A, t}. a \in R^t(a??t) \) \( Df \)

VIII \( Hp \ R. = (A, B, C). A, B, C \in R^t(\ldots;\ldots;). A \neq B. A \neq C. B \neq C. \)

\( \mathcal{E}(A \cap B \cap C). \triangledown R^t(ABC). \triangledown R^t(BCA). \triangledown R^t(CAB) \) \( Df \)

IX \( Hp \ R. = (A, B). A, B \in R^t(\ldots;\ldots;). A \neq B. \triangledown \mathcal{E} \subset R^t(AB; \ldots) \) \( Df \)

X \( Hp \ R. = (A, B, C, D, E). \Delta R^t(ABC). R^t(BCD). R^t(CEA). \triangledown \)

\( \mathcal{E}\{R^t(DE \cap \overline{R^t(A; B)}\} \) \( Df \)

XI \( Hp \ R. = t \in T. \triangledown_t. (\mathcal{E}_{p, D}. p \in p \epsilon R^t. D \in R^t(\ldots;\ldots;)-p \) \( Df \)

XII \( Hp \ R. = (\mathcal{E}_{A, B, C, D}. R^t(\ldots;\ldots;) \subset \Pi R^t(ABCD) \) \( Df \)

XIII \( Hp \ R. = \mathcal{E} the axiom of continuity (cf. XI Hp R of Con-cept I) \) \( Df \)
XIV Hp R. = \( \exists \alpha \in \text{plane}_{Rt}. a \in \text{line}_{Rt} \cap \text{cls'}(\alpha) \subseteq (f c): c \in \alpha \):

\[ l, l' \in \text{line}_{Rt} \cap \text{cls'}(\alpha). c \in l \cap l'. l \cap a = \Lambda. \]

\[ l' \cap a = \Lambda \Rightarrow l, l'. l = l' \quad \text{Df} \]

(Page 489, MCMX)

**Concept V**

I Hp R. = \( t \in T. \supset t. 0 \in 0_{Rt} \quad \text{Df} \)

II Hp R. = \( \text{III Hp R of Concept IV} \)

III Hp R. = \( \text{IV Hp R of Concept IV} \)

IV Hp R. = \( \text{V Hp R of Concept IV} \)

V Hp R. = \( \text{VI Hp R of Concept IV} \)

VI Hp R. = \( \text{VII Hp R of Concept IV} \)

VII Hp R. = \( (t, u): u \in \text{intpnt}_{Rt}. \supset (f p): p \in \text{pnt}_{Rt}. u \subseteq p \quad \text{Df} \)

VIII Hp R. = \( (p, u, v, t): p \in \text{pnt}_{Rt}. u, v \in \text{intpnt}_{Rt} \cap \text{cls'}(p), u \neq v. \)

\[ \supset u \cap v = \Lambda \quad \text{Df} \]

IX Hp R. = \( t \in T. \supset t. \dim_q 0 = 3 \quad \text{Df} \)

X Hp R. = \( \exists t \in T. \supset \text{cls'}(0). v \in \text{ax}_q \cap \text{cls'}(c_m_q). u. \)

\[ \supset u, v \quad (f w). v \neq w \subseteq \text{equiv}_q. u \quad \text{Df} \]

XI Hp R. = \( \exists t \in T. \supset t. u, v \in \text{ax}_q. \text{Nc'}(u \cap v) \geq 2. \supset u, v. \)

\[ u \cup v \in \text{mx}_q \quad \text{Df} \]
XII Hp R. = : p, q ∈ ppleRt • p ≠ q. J!{assRt' p ∩ assRt' q} Λ Rt

\[ \Rightarrow p, q, t : J!(p \cap q) \]  \(\text{Df}\)

XIII Hp R. = : ∞Rt • pntRt  \(\text{Df}\)

XIV Hp R. = : (A, B, t) : A, B ∈ pntRt • ∞Rt • J!R pn ; (AB; t)  \(\text{Df}\)

XV Hp R. = : (A, B, C, t) : A, B, C ∈ pntRt • ∞Rt • J!(A \cap B \cap C).  

A ≠ B, C ≠ B, C ≠ A. \[ \Rightarrow R pn ; (ABCT). \lor; R pn ; (BCAT). \lor; R pn ; (CABt) \]  \(\text{Df}\)

XVI Hp R. = : (A, B, C, D, E, F, t) : R pn ; (BCDt). R pn ; (CEAt).  

A ∩ C ∩ B = Δ. \[ \Rightarrow f s R pn ; (A \cap B) \cap assRt' (D \cap E). \]  \(\text{Df}\)

XVII Hp R is an axiom of continuity.

(Pages 511-513, MCMW)
During the preparation of this thesis, a large amount of bibliographical material concerning Whitehead's writings was accumulated which was of no immediate use to the thesis. To the best of my knowledge, there exists nowhere a compilation of commentaries on Whitehead's works. Although, therefore, this bibliography by no means pretends to encompass every source available at the present time, it does represent a stage of progress toward that ideal which cannot be ignored. It is the intention of the present author to continue work in the collection of these commentaries to a more complete stage.

The documentation of this bibliography is simple: Whitehead's contributions have been listed chronologically, following the plan of the excellent bibliography in the Schilpp edition on Whitehead of 1941. Under the appropriate contribution, reprints, partial reprints, new editions, translations, and reviews of that contribution will be listed. Following this, commentaries discussing or mentioning the contribution of Whitehead will be separately listed. Generally, to discuss a memoir will be construed to mean a full paragraph or more, and will not include statements merely quoting Whitehead at length.
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