

CONTENTS

<i>Preface</i>	IX
<i>Abbreviations</i>	X

PART I: THE MAN AND HIS WORK

<i>Chapter 1.</i> LIFE	3
------------------------	---

Early years. School at Sherborne and then Scholar and Fellow of Trinity College, Cambridge. Mathematical Writings: *A Treatise on Universal Algebra* (1898). Relations with Bertrand Russell, first as his teacher, later as collaborator in the writing of *Principia Mathematica* (1910-13). *London Period*: Professor at Imperial College. Contributions to the Aristotelian Society. Philosophy of Nature writings – interest in relativity theory. *American Period*: Professor at Harvard. Philosophical writings: *Process and Reality* (1929). C.D. Broad and Bertrand Russell on Whitehead.

<i>Chapter 2.</i> GENERAL INTRODUCTION	9
--	---

On interpreting Whitehead. Two schools of Whitehead interpretation: (a) that there is a continuity between his earlier philosophy of science and later metaphysics, and (b) that the problems and issues he is concerned with in his later work are largely of humanistic origin. Reasons for believing that philosophical notions occur in Whitehead's early writings and scientific ones in his later metaphysics. *Whitehead and Language.* Difficulties in understanding Whitehead's language in his later work. Similarities between Whitehead's philosophy and Husserlian phenomenology.

PART II: PHILOSOPHY OF SCIENCE

<i>Introduction to Part II</i>	17
--------------------------------	----

<i>Chapter 3.</i> THE IDEA OF EQUIVALENCE	19
---	----

Introduction to philosophical notions of *A Treatise of Universal Algebra*. The ideas of equivalence and identity. The nature of a calculus. Distinction between equivalence and identity. Replacement of the general notion of equality by that of matching. Theory of spatial congruence and measurement as based on notion of matching. Logical and mathe-

mathematical reasoning as involving synthetic judgments. Substitutive schemes and symbolism. Quine's critique of Whitehead's idea of equality as involving confusion of sign and object. Similarity of Whitehead's views on mathematical reasoning with that of the intuitionists.

Chapter 4. MATHEMATICAL CONCEPTS OF THE MATERIAL WORLD 33

Construction of alternative models of the physical world in Whitehead's *Royal Society* memoir (1906). Whitehead's geometrical and physical ideas combined there with his studies in mathematical logic. Resemblance to Leibniz's doctrine of possible worlds. Five concepts or models of the physical world developed. Classical Newtonian concept, assumes points of space, matter and instants of time. Whitehead's objection that it bifurcates the world into separate classes of elements. Alternative (Leibnizian) concept involving linear entities and unifying space and matter. Definition of points in terms of class of linear entities. Relevance of memoir to Whitehead's later philosophy.

Chapter 5. THE PHILOSOPHY OF NATURE 47

Whitehead's philosophy of nature as developed in his *Enquiry* (1919) and *Concept of Nature* (1920): concerned there with question of relating abstract notions of science to the data of sense-perception. Materialism and the bifurcation of nature into two systems of reality: (1) apparent nature and (2) causal nature. *Whitehead's theory of perception*: basic elements discriminated in sense-perception (a) events (b) objects – relation between (a) and (b) as involving bodily event of the observer. *Types of object*. Events and the general part and whole relation of extension. *Method of Extensive Abstraction*: derivation of ideal points and instants. Criticism of method as circular. Russell's discussion and use of the method.

Chapter 6. SCIENCE AND THE MODERN WORLD 55

Discussion in *Science and the Modern World* (1926) of the historical development of materialism from Greek times to the present day. Fate in Greek tragedy and the order of nature. Influence of scholastic logic and medieval theology on the development of science. Historical revolt at the Renaissance in religion and science. Experimental method and induction. Inconsistency in 18th century European thought between acceptance of scientific materialism and a belief in man as a self-determining organism. Protest against this attitude shows itself in 19th century literature, particularly in poetry. Influence of doctrine of evolution on scientific thought. The realm of possibility.

Chapter 7. THE PHILOSOPHY OF TIME 66

Difficulty in reconciling description of experienced time with that given by science. Husserl and Merleau-Ponty on the phenomenology of time-consciousness. Comparison with Whitehead's position. Northrop and Einstein on scientific concepts as free creations of the mind. Whitehead's views on congruence as connected with our recognition of sameness or uniformity in nature. Poincaré's concept of the congruence relation as conventional. Northrop's and Grünbaum's criticisms of Whitehead's account of simultaneity and congruence. Grünbaum's belief that the metric of psychological time is based on that of physical time.

PART III: METAPHYSICS

Chapter 8. PROCESS AND REALITY 81

Philosophical systems. limitations of categorial frameworks implicit in past cosmologies. Whitehead's attempt to construct an alternative scheme to harmonise with present day scientific knowledge and take account of the rich variety of human experience. Descriptive character of the categoreal notions constituting the philosophy of organism. *Speculative philosophy and its method.* Whitehead's doubts as to the possibility of our ever finally formulating definite metaphysical principles. Errors in past philosophical thinking. General verification of a philosophical system to be sought in its practical success.

Chapter 9. PREHENSIONS AND SOCIETIES 97

The Theory of Prehensions: concept of prehension covers not only physical transmission, but also perception, cognition and judgment in man. *Positive prehensions* deal with endurance of physical objects, *negative prehensions* with alternative states of affairs. *Physical and conceptual prehensions* – spatio-temporal aspects of events and the sensory perspectives marking them out. Reality as made up of ordered events exhibiting regularities of pattern (societies). *Corpuscular societies* comprise physical objects analysable into simpler objects, molecules, electrons, etc. Higher grades of such societies include animals and other living organisms.

Chapter 10. PERCEPTION AND BODILY DEPENDENCY 105

Atomicity and continuity in perception. Physical world as consisting of atomic entities but perceived as made up of common sense objects. *Theory of symbolic reference:* physical events and sensory experience assumed to manifest a common relational structure. Sensory perspectives taken as standing as symbols for the causal activities in the physical world. Bodily experience and perception. Difficulties in relating the two perceptual modes, *presentational immediacy* and *causal efficacy*. Critique of Whitehead's and Russell's view that physical structures are isomorphic with sensory structures.

Chapter 11. PROPOSITIONS AND JUDGMENTS 112

Normal and illusory perceptions: (a) perceptual propositional prehensions refer to authentic (veridical) perceptions and unauthentic (illusory) perceptions; (b) imaginative propositional prehensions refer to mental states as occurring, for example, in memory and imagination. *Intellectual prehensions:* (1) conscious perceptions – i.e., immediate perceptual judgments, and (2) intuitive judgments as occurring in thought and imagination. Three types of empirical judgment. Distinction between propositions and judgments. Derivative judgments and deductive reasoning.

Chapter 12. CAUSATION AND PERCEPTION 121

Whitehead's critique of Hume's analysis of the causal relationship as one of expectancy. Hume's and Kant's denial of direct causal determination stems from their deletion of the

perceptual process of passage from experience. *Perceptual Causality*: Causal determination as a characteristic of a whole occurrence, from which the more refined causal notions of science are derived, Michotte's experimental work on perceptual causality – habit and expectancy not crucial factors in giving rise to causal impressions. Critical examination of Michotte's work from an analytical standpoint.

Chapter 13. RELIGION, DEITY AND THE ORDER OF NATURE 128

Whitehead's Natural Theology. Belief that he is putting forward a new kind of ontological argument for the existence of God. Whitehead's approach primarily descriptive, concerned with those general features of order in the universe which he believes give rise to our particular religious ideas, emotions and forms of behaviour. *Dipolar nature of God*: (a) Primordial Nature – the conceptual aspect of our experience of an order of nature; (b) Consequent Nature – the multiplicity of events or the qualitative content ordered by (a). *The Order of Nature*: Whitehead expresses this order more formally in terms of his concept of an Extensive Continuum. Whitehead's linking of mathematical concepts to value concepts.

Bibliography 135

Name Index 137

Subject Index 139