History of Philosophy
63 Whitehead's "Science and Modern World"
By Dr. Arthur Holmes of Wheaton College

Abstract:

In this overview of Alfred North Whitehead's *Science and the Modern World*, Dr. Arthur Holmes explains how Whitehead critiques the **mechanistic materialism** of the 17th and 18th centuries. The text highlights Whitehead's belief that philosophy must fulfill both a **critical task** by exposing scientific abstractions and a **speculative task** by proposing a more **empirically adequate** worldview. Central to this critique are the "unpardonable sins" of the **fallacy of simple location** and the **fallacy of misplaced concreteness**, which mistakenly treat isolated abstractions as fundamental realities. Instead, Whitehead proposes an **organic model** where reality consists of **interrelated events** rather than static, senseless matter. Holmes emphasizes that this **process philosophy** views nature as a **value-achieving system** governed by **internal relations** and teleological purpose. Ultimately, the sources illustrate how Whitehead uses **concrete experience**, such as romantic poetry and modern physics, to argue for a **theological and aesthetic order** in nature.

Briefing Document:

Analysis of Whitehead's Science and the Modern World

Executive Summary

This briefing document synthesizes the core themes of Alfred North Whitehead's *Science and the Modern World*, as analyzed in the provided source context. Whitehead's work serves as a historical and philosophical critique of the mechanistic worldview that has dominated modern science since the 17th century.

The central thesis posits that the "scientific materialism" of the Newtonian and Cartesian eras—characterized by senseless, valueless matter and external

relationships—is a collection of high-level abstractions that fail the tests of **empirical adequacy** and **rational coherence**. Whitehead proposes a transition to an **organic (or organismic) model** of reality. In this model, the fundamental unit of existence is not a "pellet" of matter but an **event** defined by **internal relations** and **prehension**.

Ultimately, Whitehead argues for a value-laden, teleological "Order of Nature" where process is directional and aimed at aesthetic achievement. This framework is supported by both the concrete human experience found in poetry (the "Romantic Reaction") and the developments of 20th-century physics, such as relativity and quantum mechanics.

The Dual Task of Philosophy

Whitehead defines philosophy as having a two-fold function that balances critical analysis with constructive theory:

- **The Critical Task:** The examination of theoretical constructs and scientific abstractions to determine their validity. This involves identifying where abstractions have been mistaken for concrete realities.
- **The Speculative Task:** The positive function of proposing more consistent, comprehensive, and empirically adequate theories to explain reality.

Criteria for Philosophical Judgment

To fulfill these tasks, Whitehead utilizes two primary criteria:

1. **Empirical Adequacy:** Does the theory cover all relevant information and align with concrete experience?
2. **Rational Coherence:** Does the theory provide a unified, comprehensive, and logically consistent scheme?

The Critique of Scientific Materialism

Whitehead challenges the "fixed scientific cosmology" of the 16th and 17th centuries, which he labels **scientific materialism**. This worldview is built upon several problematic assumptions:

The Nature of Matter and Relations

- **Irreducible Root Matter:** The assumption of "senseless, unconscious, valueless, purposeless" material spread throughout space.
- **External Relations:** The belief that relationships between entities are artificial and imposed from the outside, leaving the entities essentially unchanged. Whitehead contrasts this with **Internal Relations**, where the nature of an entity is defined by its relationships to others.
- **The Problem of Induction:** In a mechanistic universe of unrelated moments (atomism), there is no inherent reference to the past or future. Consequently, inductive generalizations (like the laws of gravity) cannot be empirically justified because there is no observed causal connection between discrete "atoms" of experience.

Primary Philosophical Fallacies

Whitehead identifies two "unpardonable" philosophical sins inherent in mechanistic thinking:

1. **Fallacy of Simple Location:** The belief that things have fixed, instantaneous locations in space and time, independent of their relationships to other things.
2. **Fallacy of Misplaced Concreteness:** The error of mistaking an abstraction for a concrete fact. Examples include treating "substance," "fixed points," or "senseless matter" as if they have actual, concrete existence.

The Organic Model: Events and Prehension

In place of the mechanistic model, Whitehead proposes an **organismic model** where parts are interdependent and reality is a process.

The "Event" as the Unit of Reality

- **Vibratory Existence:** Real entities (events) are not permanent; they come and go.
- **Internal Interconnectedness:** Unlike the "indivisible pellets" of materialism, events are defined by their internal relationships. An event is a "gathering of things into the unity of apprehension."
- **Double Aspect Theory:** Every event has two aspects—the physical (causation/stimulus) and the conceptual (logical possibilities).

The Concept of Prehension

Whitehead replaces the traditional notion of "perception" with **prehension**, which can be uncognitive:

- **Physical Prehension:** The way objective data from past events flows into and precipitates a new event (causation).
- **Conceptual Prehension:** The way "eternal objects" or possibilities are incorporated into an event.
- **"To be is to prehend":** Reality is not a collection of static things but a process of prehensions.

Mechanistic Model	**Organic (Whiteheadian) Model**
Basic Unit: Indivisible pellets of matter	**Basic Unit:** Events
Relations: External and incidental	**Relations:** Internal and constitutive
Universe: Senseless, valueless machine	**Universe:** Value-achieving organism
Nature of Time: Linear sequence of points	**Nature of Time:** Vibratory process/flux

---

The "Order of Nature" and Aesthetic Value

Whitehead argues that the order of nature is not merely mathematical or logical, but fundamentally **aesthetic**.

- **Value-Laden Process:** Value is not something humans "add" to a sterile nature; nature itself is a value-achieving process.

- **Teleology:** The process of the universe is directional, moving toward the achievement of "aesthetic harmony."
- **The Romantic Reaction:** Whitehead cites poets like Wordsworth and Shelley as being "right" where mechanistic scientists were "wrong." The poets captured concrete human experience, which perceives nature as full of color, sound, and value, rather than the "dull affair" of material endlessly hurrying in a vacuum.

The Role of God in Process Metaphysics

In Whitehead's system, God is not a traditional creator but a necessary metaphysical component defined as the **Principle of Limitation**.

- **The Necessity of Selection:** Amidst boundless "eternal possibilities," there must be a reason why specific entities are actualized. God is the ground for this particularization.
- **Threefold Nature of God:**
    1. **Primordial:** The unity of all conceptual possibilities.
    2. **Consequent:** Affected by and prehending all events in the world.
    3. **Superjective:** Holding out specific possibilities to new events, acting as the limit that allows for concrete actuality.

Conclusion: Points of Reference

Whitehead's philosophy is grounded in two distinct but complementary sources:

1. **Modern Science:** The shift toward field theory, quantum physics, and relativity, all of which move away from "simple location" and toward interrelated events.
2. **Concrete Experience:** The "naïve" and "immediate" present experience of human life and action, which reveals a world of internal connections, memory, and intentionality that scientific materialism cannot explain.

By synthesizing these, Whitehead aims to provide a more "empirically adequate" metaphysics for the modern world, characterizing Christianity (and religion in general) as being in search of such an adequate framework.

Study Guide:

Study Guide: Whitehead's Science and the Modern World

This study guide provides a comprehensive overview of the analysis provided by Dr. Arthur Holmes on Alfred North Whitehead's work, *Science and the Modern World*. It explores Whitehead's critique of mechanistic philosophy and his development of a teleological, organic alternative rooted in process philosophy.

Part 1: Short Answer Quiz

Instructions: Answer the following questions in 2-3 sentences based on the provided text.

1. What does Whitehead identify as the "two-fold task" of philosophy?
2. Define the two criteria Whitehead uses to judge theoretical constructs.
3. What is "scientific materialism," and why does Whitehead challenge it?
4. Explain the "fallacy of simple location."
5. How does Whitehead define the "fallacy of misplaced concreteness"?
6. Contrast "external relations" with "internal relations" in Whitehead's thought.
7. What is the "Romantic Reaction," and why is it significant to Whitehead?
8. How does Whitehead's concept of "prehension" differ from George Berkeley's view of perception?
9. What does Whitehead mean by "vibratory existence"?
10. In what sense is God described as the "principle of limitation"?

Part 2: Answer Key

1. **The two-fold task of philosophy:** Philosophy consists of a critical task and a speculative task. The critical task involves analyzing and critiquing scientific abstractions to ensure they are coherent, while the speculative task involves proposing more consistent and empirically adequate theories to explain reality.
2. **Criteria for theoretical constructs:** Whitehead utilizes "empirical adequacy" and "rational coherence." Empirical adequacy asks if a theory covers all relevant information, while rational coherence requires that the theory provide a unified and comprehensive scheme rather than just being logically consistent.
3. **Scientific materialism:** This is the assumption that the universe consists of senseless, valueless, and purposeless "irreducible root matter" following a fixed routine. Whitehead challenges this because he believes it is entirely unsuited to modern scientific developments and fails to account for the value-laden nature of concrete experience.
4. **The fallacy of simple location:** This is the erroneous assertion that things have fixed locations in space and time that can be abstracted from their relationships. Whitehead argues this is a fallacy because space is actually a pattern of relationships, and the time dimension makes fixed, isolated locations impossible.
5. **The fallacy of misplaced concreteness:** This occurs when one treats a theoretical abstraction as if it were a concrete reality. Examples include treating a fixed point in space or the idea of an isolated event without internal relationships as the fundamental truth of nature.
6. **External vs. internal relations:** External relations are artificial connections imposed on entities (like Descartes' mind and body) that do not spring from their essential nature. Internal relations are essential to the entities themselves, meaning an entity is defined and constituted by its relationships to other things.

7. **The Romantic Reaction:** This refers to the reaction of 19th-century poets, like Wordsworth and Shelley, against the "aesthetically sterile" universe of mechanistic science. Whitehead values this because poetry captures "concrete human experience" which ignores the secondary quality abstractions of the Newtonian worldview.
8. **Prehension vs. Perception:** While Berkeley argued "to be is to be perceived," Whitehead proposes that "to be is to prehend or to be prehended." Prehension is the gathering of things into the unity of an event, which can be "physical" (causation/stimulus) or "conceptual" (logical possibilities), and does not necessarily require a conscious mind.
9. **Vibratory existence:** This refers to the nature of entities—such as energy quanta, organisms, or events—that "come and go" rather than having permanent, static existence. It suggests that the units of reality are temporal events with life cycles rather than indivisible, unchanging pellets of matter.
10. **God as the principle of limitation:** Whitehead views God as the ground that narrows down boundless conceptual possibilities into the specific actualities that emerge. God is the "ultimate irrationality" in the sense that no reason can be given for His nature, as His nature is the ground of all other rationality and actualized value.

Part 3: Essay Questions

Instructions: The following questions are designed for in-depth reflection and analysis. No answers are provided.

1. **The Transition from Mechanism to Organism:** Compare and contrast the "mechanistic model" of the 17th century with Whitehead's "organic model." In your response, address the roles of causal mechanism versus teleology and external versus internal relations.
2. **The Role of Aesthetic Value in Process Philosophy:** Whitehead argues that the order of nature is not just mathematical or logical, but also aesthetic. Discuss how this view challenges the Newtonian distinction between primary

and secondary qualities and explain Whitehead's assertion that nature is "value-laden."

3. **Critique of Scientific Abstractions:** Using the fallacies of "simple location" and "misplaced concreteness," explain Whitehead's methodology for critiquing modern philosophy and science. How do these fallacies lead to the "problem of induction" identified by David Hume?
4. **The Nature of the Event:** Analyze Whitehead's concept of the "event" as the primary unit of reality. Discuss how an event incorporates both physical and conceptual prehension and how it relates to Whitehead's "double aspect theory."
5. **Philosophy and the History of Science:** Dr. Holmes suggests that it is "impossible to talk about the history of philosophy without talking about the history of science." Using Whitehead's analysis of the 16th through 20th centuries, argue for or against this statement, citing specific scientific shifts such as quantum physics and relativity.

Part 4: Glossary of Key Terms

Term	Definition
Aesthetic Order	The view that nature is a value-achieving process where truth and goodness contribute to a harmonious whole.
Conceptual Prehension	The process by which "eternal objects" or logical possibilities are incorporated into an event.
Concrete Experience	Naive, immediate human experience (often captured in poetry) that serves as a primary point of reference for testing philosophical abstractions.
Empirical Adequacy	The criterion that a philosophical scheme must cover and account for all relevant empirical information.
Eternal Objects	The range of eternal mathematical or logical possibilities that can be actualized within the process of nature.

External Relations	Relationships between entities that are incidental and do not change or define the essential nature of the entities involved.
Fallacy of Misplaced Concreteness	The error of mistaking a theoretical abstraction (such as "matter" or a "fixed point") for a concrete reality.
Fallacy of Simple Location	The belief that bits of matter or events occupy a specific point in space and time independently of their relationships to other points or times.
Internal Relations	Relationships that are essential to the definition and existence of an entity; the entity is constituted by its relations.
Mechanistic Philosophy	A worldview seeing nature as a blind causal mechanism of valueless matter governed by external relations.
Organismic Model	A model of reality where parts are interdependent and internally related, functioning like a living organism rather than a machine.
Physical Prehension	The way in which objective data and past events causally impact and enter into a new emerging event.
Prehension	A term for "uncognitive apprehension"; the process by which an event gathers other entities or possibilities into itself.
Principle of Limitation	The role of God in process philosophy, acting as the ground that determines which possibilities are actualized among boundless options.
Rational Coherence	The criterion that a philosophical system must be a unified, comprehensive, and logically consistent scheme.
Vibratory Existence	The temporal nature of reality where entities (events, quanta, organisms) have a life cycle of coming into being and passing away.