

Reason, causation
and compatibility
with the phenomena

Basil Evangelidis

Series in Philosophy



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In the Americas:
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1000 N West Street,
Suite 1200, Wilmington,
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United States

In the rest of the world:
Vernon Press
C/Sancti Espiritu 17,
Malaga, 29006
Spain

Series in Philosophy

Library of Congress Control Number: 2019942259

ISBN: 978-1-62273-755-0

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Abbreviations

<i>Adv. Math.</i>	<i>Against the Mathematicians</i>
<i>BB</i>	<i>The Blue and the Brown Books</i>
<i>CE</i>	<i>Cause and effect: Intuitive awareness</i>
<i>CV</i>	<i>Culture and value</i>
<i>De Gen. et Corr.</i>	<i>De Generatione et Corruptione</i>
<i>DRN</i>	<i>De rerum natura</i>
<i>Ecl.</i>	<i>Eclogarum physicarum et ethicarum</i>
<i>Enn.</i>	<i>Enneads</i>
<i>LH</i>	<i>Letter to Herodotus</i>
<i>Mant.</i>	<i>Mantissa</i>
<i>Meta.</i>	<i>Metaphysics</i>
<i>NA</i>	<i>Noctes Atticae</i>
<i>NB</i>	<i>Notebooks</i>
<i>PG</i>	<i>Philosophical grammar</i>
<i>PH</i>	<i>Outlines of Pyrrhonism</i>
<i>Phys.</i>	<i>Physics</i>
<i>PI</i>	<i>Philosophical investigations</i>
<i>Post. Anal.</i>	<i>Posterior analytics</i>
<i>SVF</i>	<i>Stoicorum veterum fragmenta</i>
<i>TLP</i>	<i>Tractatus Logico-Philosophicus</i>
<i>Virt. Prof.</i>	<i>De profectu in virtute</i>

Preface

The passage from mythology to philosophy brought in the center of reasoning the problems of causality and compatibility with the phenomena. Pherekydes of Syros (sixth century BC), student of Pittacus and teacher of Pythagoras, was a mythographer, theologian and the first philosopher that wrote in prose. He is ranked as the founder of the Italian School of Ancient Greek Philosophy, with its important Eleatic and Atomist heirs, who developed rational conceptions of causation. Pherekydes' works, however, are not extant, in order to understand his philosophical system. The axiomatic method that the French philosopher Vuillemin (1986) considers as a prerequisite for free philosophy is still missing from the remnants of Pherekydes. The first onsets of an axiomatic philosophy were developed by the Atomists, who introduced causal explanations and terms that are actually in use in modern quantum mechanics theory, for instance, the terms "atom," "void," "collision," "rebound," "entanglement," "vibration," and "interweaving" (Epicurus, *Letter to Herodotus*).

Philosophical thought was shaped by subtle idealizations, which invented new research methods and concepts in ethics and natural matters. With the passage of time, the advancement of science and especially physics motivated further philosophical inquiries, for instance, in the field of causality. As an outcome of a long-running research for causes in scientific philosophy, modern quantum-physical theories introduced indeterministic explanations of the world, in substantial disagreement with the deterministic worldview of positivism and mechanistic philosophy. Stimulating upshots to philosophical beliefs about causation evoked relativity theory, as well. Consequently, philosophers such as Gaston Bachelard (1983) reflected upon the use of the concepts of causation and contemporaneity in epistemology. The plurality of the active causes at a certain time substantiates against one-dimensional causal explanations. It is rather the whole network of causal interconnections that plays the significant role. Hence, the cause of a certain fact can hardly be unique. In agreement with Epicurus, we should be alert that we may discover a plurality of causes and possibilities. The effective interplay between phenomena and scientific theory would, therefore, encompass the detailed investigation and enumeration of all multiple possible conclusions or analogues of evident observations.

More good reasons to philosophize set forth arduous theoretical disagreements between realists, idealists and sceptics, regarding the nature of the universals and the validity of the inference from the observable to the unobservable. How can we assume to have trustworthy knowledge of universal concepts and judgements? Are

universals compatible with objects of the extramental world? To what extent do models of the phenomena correspond to the real world? The respective disputes created new conceptualizations in Philosophy of Science, such as the notions of atom and energy. In parallel, the development of geometry and mechanics provided new methods for the study of the novel concepts, such as analysis, synthesis, analogy, exhaustion. Medicine was able to demonstrate the function of the brain and the heart. Demonstrative science became thus a role model for philosophy.

A strong motivation for this book was Descartes' method of radical doubt. The fact that Descartes was not only a philosopher but also an outstanding mathematician made the research topic more tangible, as it offers evidence that his methodological statement must be right and sincere. The respective Cartesian requirement for clear and distinct demonstrations, besides, is one of the most powerful propositions in the history of philosophy. The demand to provide philosophical work of the same value and to research the relevant interplay between philosophy and science has been enormous after the invention of the Cartesian method of radical doubt.

An equally significant motivation for setting the thematic of this book was the research questions that emerge upon the problem of exactness in philosophy of science. The analytic tradition began with the *Analytics Prior* and *Posterior* of Aristotle, which offer a disciplined framework for scientific philosophy. Simultaneously, Aristotle regarded ontology as the most exact of the sciences, because of the limited number of its principles. In the two long millennia that followed ancient scientific philosophy, through collective efforts of scholastic examination and painful investigation of humans, society and nature, the exact sciences turned to experimental and mathematical methodologies, which demanded a radical reconsideration of philosophical thought. From this renovation-standpoint, I discuss problems of modern philosophy in their interplay with modern science (for instance, quantum mechanics) wanting to specify the exchanges and the boundaries between reason and experimental science.

Introduction

The Greek Mathematician and Philosopher Pythagoras had introduced the name “Philosophy” and called himself a “Philosopher,” upholding that no more than Gods can be really wise. Only seven wise men were publicly recognized as such in ancient Greece: Thales, Solon, Periander, Cleobulus, Chilon, Bias and Pittacus, according to Diogenes Laertius (1921a). Beginning with Thales and his student Anaximander, founder of the Ionian School, and Pherecydes and his student Pythagoras, founder of the Italian School, scientific speculation was focusing on higher sophisticated problems. Philosophy was motivated by riddling questions upon the deep meaning of natural and moral notions, such as causality and free-will. Striking contradictions in physical experience, everyday practice and human relations, required reflection upon their ultimate causes or hidden structures. Therefore, philosophy tries to clarify the significance of concepts like fate, chance, spontaneity, necessity and cause, either in the universe or in the human soul or in the use of language.

Nonetheless, what does the word “cause” mean? How a housebuilder is the cause of a house, while a computer-programmer may only incidentally be? Reflection upon intellectual deliberation and incidental spontaneity led the philosopher Aristotle to the distinction of different kinds of causes. Right after the introduction of the four causes (material, formal, efficient, final) by Aristotle, in the third part of the second book of his *Physics*, he refers to previous ideas about causality, namely “chance” and “spontaneity.” That prehistory of meditating on causation was written by philosophers like Empedocles, whose cosmology and zoology regarded chance as a cause, as well.

Some people insist that nothing happens by chance, but that everything has some definite cause; for instance, “coming ‘by chance’ into the market and finding there a man whom one wanted but did not expect to meet is due to one’s wish to go and buy in the market.” By contrast, some people ascribe “heavenly sphere and all the worlds to spontaneity,” as Aristotle¹ delivered. The early physicists did not recognize chance among the causes rather than love, strife, mind, earth, air, fire, water, etc. Others suggested that chance is not responsible for the generation of animals and plants, nature or mind, and yet they conferred that the heavens arose spontaneously. Others believed that “chance is a cause, but that it is inscrutable to human intelligence, as being a divine thing and full of mystery.”² The concepts of truth and realism could

¹ *Phys.* II, 4

² Aristotle, *Phys.* II, 4

hardly be formulated without any preceding considerations of causation. If realism supports the existence of a mind-independent reality, then our attitude towards causality, chance and free-will becomes crucial for becoming either materialists or idealists or dualists.

The first chapter of this book refers to the birth of philosophical thinking on causality, determinism, fate, chance, spontaneity and free action. This thematic consists of a synergy of two of three main philosophical directions, namely ethics and philosophy of physics, while keeping in the background the third direction that refers to philosophy of language,³ which was called dialectic from ancient times. Dialectic was introduced by Socrates and developed by his student Plato, who wrote dialogues that hung around the middle-ground between poetry and prose. Diogenes Laertius (1921a) stressed that Plato's dialectic is the art of discussion, through two main modes of presentation, the instruction and the investigation. The instruction is subdivided to theoretical (either Physics or Logic) and practical (either Ethics or Politics). The investigation is also subdivided to rehearsing (either thought aiming or checking out) and quarrelling (either demonstrating or contradicting). In the Platonic dialogue *Timaios* the universe is conceived as created by the Demiurge, according to two overarching principles: reason and necessity. The philosophers, thereafter, arguing on cause, chance, and necessity, admitting or rejecting divine providence and fate, will produce many different models of causality, wavering from free action to determinism under different combinations of modal premises.

The second chapter of the book turns to the philosophical problems of evidence, truth, method and realism, scoping the passage from antiquity to medieval and modern philosophy of intentionality and phenomenology. Observational evidence was subservient to intellectual illumination in Platonic philosophy, since pure knowledge was considered as superior to the disrupted and inattentive perceptions of the senses. The contradiction between evidence and reason was steadily effective from Democritus to Plotinus and from Porphyry to the Nominalists. On the contrary, the Christian tradition from Augustine to Aquinas defended the correspondence between evidence and reason. In the Middle Ages, Philosophy investigates the relations between faith, knowledge and truth, in various inquiries such as theory of consequences, singular future contingents, and intentions. The return to the medieval concept of intentionality by Franz Brentano and the related introduction of phenomenology by Edmund Husserl share remarkable similarities and common problems with the intellectual framework of the Scholastics.

³Philosophy of language will be revived by the British empiricist John Locke.

The third chapter examines the empirical and mathematical turn in the philosophy of science, which started in the age of the scientific revolution with Descartes and Leibniz. The revival of skepticism in these frameworks was mainly a consequence of Hume's criticism of the concept of causality and the problem of induction, which were the challenging themes of his *Enquiry* of the differences between relations of ideas and matters of fact. Confronting skepticism, the problems of truth and realism arise as central in philosophical thinking and maintain an enduring significance. The realist or correspondence theory of truth suggests that: "A belief is true if it corresponds to reality." Truth is a relational concept; facts make the propositions true, according to the realists. On the other hand, the idealist or coherence theory of truth alleges that: "A belief is true if it coheres with other ideas." The pragmatist or utility theory of truth argues that: "A belief is true if it is useful in practice." The truth-makers, therefore, are facts for realists, ideas for idealists, and practice for pragmatists. In the twentieth century, the logical empiricist Hempel (1958) formulated the Theoretician's Dilemma, the pragmatist Sellars defined truth as assertability, the logician Tarski provided the semantic definition of truth (as a version of the correspondence theory of truth), while Putnam put forward internal realism. The attempts for clarification have led Popper, Niiniluoto and others to turn to the concepts of "truthlikeness," "approximate truth," "verisimilitude," which are functional in the theory of fallibilism, that "claims that scientific theories are either uncertain-but-probably-true or false-but-truthlike hypotheses."⁴

The fourth chapter of the book refers to the influence of natural science and mathematics on Ludwig Wittgenstein, mostly during the formation of his philosophy in his young works. This influence was combined with a critical attitude, which "must teach liberation from language as the highest goal of self-liberation," as Mauthner⁵ argued. "If I want to rise up in the critique of language, which is the most important business of thinking mankind, I must destroy language step by step behind me, before me, and within me, I must break the rungs of the ladder as I step on them."⁶ This metaphor was first used by Sextus Empiricus, then by Ernst Mach and Mauthner, who influenced Wittgenstein. The picture theory of meaning, the truth tables and the philosophy of logical atomism were the main outcomes of that mixture of impels. Theoretical problems such as the status of logic, language, unobservable entities urged scientists as Kirchhoff, Boltzmann, Mach and Hertz, to tackle the related

⁴ Niiniluoto (2002), *Critical Scientific Realism*, p. 13

⁵ Mauthner (1901-1921), *Beiträge zu einer Kritik der Sprache*, 1.713

⁶ op. cit. 1.1

phenomenological questions and criticize traditional philosophy. Their epistemological theories influenced Wittgenstein.⁷

The fifth chapter of the book investigates the philosophical repercussions of Dirac's theory of the vacuum. Not only the fundamental concepts of quantum theory found their origin in the Ancient Atomist theories, especially in Epicurus and Lucretius, but also Dirac's model of the vacuum as an infinite sea of particles, has a striking resemblance with the theory of the disseminate void of Theophrastus and Straton of Lampsakos: "pockets of void are scattered throughout all things, and are the explanation of transparency, compression, and mixing."⁸ Dirac was also influenced by Lucretius' work and his contention that infinite atoms move faster than light in the infinite universe (*DRN* 2.142-66). Paul Dirac did not refer directly to ancient Atomists but only to contemporary quantum theories about light and matter particles. However, his insistence on the role of vacuum was extremely effectual to modern science and technology.

The sixth chapter is an attempt to discuss the relationships between Quantum Theory and consciousness, regarding scientific advances in physics, neurology, neurobiology, social neuroscience, etc. In this direction of comparative research, the alleged contradiction between human and natural sciences seems to discover a promising area of fruitful liaisons. The moral consequences of the accumulation of technological resources is an important part of this thematic. In the same manner, in the denouement of the book, a view on the thought of Michel Foucault, as a dialectic of power relations and exhaustive inquiry of the historical role of power in the formation of social and cognitive structures, provides valuable sustenance for the confrontation with the ethical dilemmas that arise from the role of discipline in the modern world.

⁷ In 1938, Wittgenstein taught about action at a distance and indeterminism as revolutionary developments in science, anticipating thus Kuhn. Wittgenstein was also open to the idea of the potential infinite, instead of the actual infinite.

⁸ Irby-Massie & Keyser (2002), *Greek Science of the Hellenistic Era: A sourcebook*, p. 12

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