

J. Baird Callicott (with John van Buren and Keith Wayne Brown), *Greek Natural Philosophy: The Presocratics and Their Importance for Environmental Philosophy* (Cognella, 2018), 372 pages.

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This large and impressive book, *Greek Natural Philosophy: The Presocratics and Their Importance for Environmental Philosophy* (2018) was originally written for classroom use by J. Baird Callicott. Updated and revised with the assistance of John van Buren and Keith Wayne Brown, it extends far beyond the classroom to anyone interested in and excited by the Presocratics of the 6th – 4th centuries BCE. This is a thrilling book for those of us who grew up reading Milton Nahm’s *Selections from Early Greek Philosophy* (1st ed., 1934) and John Burnett’s *Early Greek Philosophy* (1930) and more recently Gerald Naddaf’s *The Greek Concept of Nature* (2006) and J. Donald Hughes’s *Pan’s Travail: Environmental Problems of the Ancient Greeks and Romans* (1994), along with other works about the period. Moreover, it synthesizes and applies the insights of the Presocratics and Greco-Roman philosophy to today’s environmental crisis. In this essay review, I discuss highlights of the major sections of the book and provide my own evaluation of the authors’ arguments.

In each chapter, the authors present bold-faced translations of key passages from the Presocratics, which they themselves translate from the original Greek or modify from existing translations, all with carefully sourced footnotes. They do not claim to include all known fragments of each philosopher, but rather only those that contribute to their overall argument. They interpret the philosophy of each of the ancients and their relevance to today’s environmental problems within a framework known as *historia periphyseos* (inquiry into nature), as elaborated by Naddaf. And they propose their own “diachronic dialectic of ideas”—ideas transmitted through time via prose discussion. They elaborate on the differences between oral cultures and the transmission of oral myths, in the tradition of Homer and Hesiod, with those of written letters and words expressing abstract concepts, as epitomized by Plato and Aristotle—a shift away from the ancient use of gods and poetry to the modern tradition of nature and prose. They argue that the Greek alphabet with its 24 letters including consonants and vowels leads to universal cultural literacy, as opposed to earlier forms of localized symbolic writing—such as Mesopotamian/Sumerian cuneiform, Chinese icons, and Indian Sanskrit. Moreover, instead of listening to the spoken word through the medium of sound, shared by individuals in a particular time and place, the written word could be read by anyone, anywhere, anytime in a material medium and could conjure up imagined images of places and times. All of these changes allowed for the possibility of written discussion, logical argument, and extended analysis, via their “diachronic dialectic of ideas,” shared through time and elaborated via prose.

A map of the region shows Miletus (home of the earliest Greek philosophers) at the east-west crossroads between Asia and Europe and the north-south crossroads between Egypt and Europe, along with the cities that spawned the other Presocratics. An analysis of the environmental and topographical conditions of the Greco-Roman world helps to set the stage for the authors’ unique environmental/philosophical analysis. The four elements—

earth, air, fire, and water—combined with the bringing of light from the solar fire—source of the “clear light of the sunny Greek landscape” (p. 37) create the unique Presocratic vision of the intellectual world passed down through the ages. The cover image of the owl, symbol of Athena, goddess of knowledge and wisdom (Minerva in Rome) represents knowledge, wisdom, and culture, as appropriate to the content of the book. (p. 39)

A major focus of the book is to show how Presocratic philosophy is transmitted to and reflected in today’s environmental philosophy and ethics. The subtitle of the book is: “The Presocratics and their Importance for Environmental Philosophy.” The Introduction contains a “Coda: Natural Philosophy and Environmental Philosophy and Ethics.” And the final chapter (Ch. 9) is “A Neosocratic Manifesto” with sections titled, “The Advent of Environmental Philosophy” (p. 332) and “The Mandate and an Agenda for Environmental Philosophy.” (p. 333). The authors point out that the Greek earth has been symbolized as a complex self-regulating system known as Gaia. Moreover, the words *oikos* meaning the house or home and *ousia* meaning substance or essence have provided the prefix *eco* in the words ecology and economy. Both *oikos* and *ousia* have overtones of the natural and built environments. (p. 38) Greek natural historians may in fact be called “proto-ecologists.” (p. 39) “Environmental philosophy,” the authors assert, “came on the scene in the 1970s and one of its founders . . . (Callicott) . . . taught the world’s first course in environmental ethics” (p. 332) The first Earth Day in 1970 drew attention to the environmental crisis in the form of foul air, polluted waters, endangered species, and outbreaks of diseases caused by accumulations of pesticides, chemicals, and metals in the food chain. Awareness of the crisis gave rise to new interpretations of nature, human nature, religion, land ethics, and environmental narratives manifested in foundational articles, books, courses, environmental studies programs, and new professional societies and journals. (pp. 332-333) The connections between the ideas of the Presocratics and current environmental philosophy and ethics are elaborated throughout the book.

Following the presentation of the authors’ comprehensive and distinctive analytical framework and the background provided on philosophy and ethics, Chapters 2-8 move to an in-depth discussion of individual schools and writers. Richly illustrated with images of the philosophers themselves, the authors provide an accessible, innovative, thorough presentation of early Greek ideas.

In my view, one way to assess the contributions of the Presocratics and their influence on environmental philosophy and ethics is to ask how they answered three of the most fundamental questions of philosophy: (1) What is the world made of and how does change occur? (the ontological question) (2) How do we know? (the epistemological question) and (3) How ought we to act? (the ethical question). In this review I ask how the authors deal with these questions and with what success.

Chapter two on the Milesian School includes the philosophy of Thales, Anaximander, and Anaximenes. Thales asked the first of the fundamental questions in philosophy—what is the world made of? His answer, “all is water,” represents a single entity—the *arche* or origin, from which everything comes and to which all returns—“ensouled, living, divine matter.” (p. 77). The authors argue further that when Thales said that “all things are full of gods,” he meant that all things are composed of water and that “water is alive

and divine.” (p. 77) Anaximander’s answer, however, goes beyond that of Thales by rejecting each of the four elements (earth, air, fire, and water) in favor of the *apeiron*—the indefinite—something infinite and unlimited out of which all things arise and to which they all return. It is here, they maintain, that we find the first examples of critical thought, abstract ideas, and theoretical entities. Moreover, the second fundamental question which I posed above, “How does change occur,” is answered by Anaximander as the separation of the contraries (later called hot, cold, wet, and dry) in continual conflict with each other. Although the next philosopher, Anaximenes’ choice of air as the first principle would seem to be a regression, the authors insightfully point out that Anaximenes saw that if the four contraries separated out of the *apeiron* they must have been in it to start with, hence Anaximander’s *apeiron* is actually four and not one. Anaximenes’ elegant solution is that there is only one substance and it is air. “When it thins, it becomes fire, and when it compresses, it becomes wind and as it compresses further then cloud, then water, then earth, then stone.” (p. 97) And, whereas for Anaximander the contraries separate out of the *apeiron*, for Anaximenes the forms of matter emerge by a quantitative (not qualitative) transformation and form a substantive continuum, not a collection of discrete things or atoms—as for the later pluralists. This analysis, gained by the authors’ careful comparison of the comments of later Greco-Roman philosophers, provide the reader with previously unrecognized insights into the Milesians.

In chapter three, the authors juxtapose Xenophanes and Heraclitus. Xenophanes lived just north of Miletus on the Aegean Sea whence he migrated to Sicily after the Persian takeover of the area. He furthered the Milesian concept of a living, intelligent *arche*, a hylotheism of divine matter—a Greek form of rational theology to which the authors return in subsequent chapters. Unlike the chapter on the Milesians, however, the authors make no connection or comparison between Xenophanes and the second philosopher in chapter three, Heraclitus, who lived in Ephesus, just to the north of Miletus. In this reviewer’s opinion, they do not do justice to Heraclitus who gives the most sweeping and comprehensive answer to philosophy’s second ontological question: “how does change occur?” by making change not only universal but, in fact, reality itself. This principle was exemplified in his famous phrases: “You could not step twice into the same rivers, for fresh waters are ever flowing in upon you.” And “Into the same rivers we step and we do not step; we are and we are not.” For Heraclitus, reality itself is change; the world is constantly changing; nothing is permanent. While I believe that their discussion of Heraclitus is far from adequate, the authors do note that the river exemplifies the logos, for it remains the same, as it is contained by its banks while its substance, water, is ever changing and ever flowing onward.

Also, while the authors develop a “diachronic dialectic of ideas,” as their fundamental framework, they strangely do not attribute the origins of the dialectic itself or its use either in material or idealistic terms to Heraclitus. The dialectic, although not a term used by Heraclitus, is exemplified in his well-known phrase: “cool things become warm, the warm grows cool; the wet dries, the parched becomes wet.” Plato’s use of the term dialectic (*dialegesthai*), as the process of gaining insights through the mind via dialogue is, however, incorporated into their “diachronic dialectic of ideas.”¹ But they fail to mention that in the eighteenth and nineteenth centuries, Heraclitean dialectics were

critical to Georg Hegel's dialectical idealism, as well as to Karl Marx and Friedrich Engels' dialectical materialism. Engels wrote: "This primitive, naive, yet intrinsically correct conception of the world was that of ancient Greek philosophy, and was first clearly formulated by Heraclitus: everything is and also is not, for everything is in flux, is constantly changing, constantly coming into being and passing away."²

Chapter four on the Eleatic school, located in Elea on the western coast of Italy, focuses on Parmenides and his younger associate Zeno. Parmenides' answer to the questions what is the world made of and how does change occur is almost as far away as possible from those of Heraclitus, both conceptually and geographically, as the Greek world would permit. Unlike Heraclitus, for whom all is Change and nothing is permanent, for Parmenides, all is Being (i.e., existence) and there is no change. There are two truths: (1) Being Is, and (2) Not-Being Is Not. Everything else is merely opinion. Or, as the authors quote from Simplicius in their section on "The Way of Truth," "[It] Is and . . . not-Is cannot be. . . ." (p. 137). Parmenides' logic, as the authors put it, is the following: "There is but one Being, not many beings. For what except not-Being would separate one being from other beings; and not-Being does not exist." (p. 144). Their discussion of Parmenides and of his follower Zeno and his logic are both clear and informative.

How was the dilemma posed by Heraclitus and Parmenides resolved? How could only Change exist on the one hand or only Being on the other? This task was taken up first by the qualitative pluralists, Anaxagoras and Empedocles, and then the quantitative pluralists (or atomists) Leucippus and Democritus who are discussed in Chapters five, six, and seven. For qualitative pluralists, such as Anaxagoras there are infinitely many qualitative kinds of being that are associated into composite entities and then dissociated. (p. 184) Mind (Nous) orders all things as a self-moving, intelligent and alive principle. (p. 187) For Empedocles, there are four elements, earth, air, fire, and water from which compound substances emerge by motion. (p. 205) The causes of motion are Love and Strife (principles of attraction and repulsion) which are internal to the four elements. (p. 208) "Love attracts the four elements (or roots) to one another. Strife repels the four elements from one another." (pp. 209, 212) Yet ultimately, as the authors state, "qualitative pluralism leads to a scientific dead end," because for modern physics "all qualitative differences are reducible to quantitative differences." (p. 217) The quantitative atomists, Leucippus and Democritus, asserted that the void exists and is called space. Space is either empty or full. (p. 228) When space is full it is called atoms, or particles, differing in size, shape, and solidity, separated by empty space, or void. (p. 229) By moving, colliding, joining, and separating, objects of the material world are formed and transformed and acquire and lose secondary qualities. The quantitative atomists' elegant solution to the ontological questions, what is the world made of and how does change occur, would continue into modern times and be both refined and redefined.

The authors leave their discussion of Pythagoras and the role of mathematics in natural philosophy to Chapter eight. Here they give an elaborate account of his life and influence and evaluate what Plato, Aristotle, and his contemporaries and followers have said. Most important, they argue, was that the "Pythagoreans were the first to make mathematics central to natural philosophy," while also advancing pure mathematics. (p. 257) They conclude: "most puzzlingly, the Pythagoreans thought that things . . . are composed of

numbers.” In their view, however, Pythagoras got it totally wrong. They write: “The statement, ‘All things are composed of water’ is intelligible but false. To us, the statement, “‘All things are composed of numbers,’ is not false; it is nonsense.” (p. 258) In my view, however, the deeper question is: Is mathematics merely an explanatory device or is the world itself fundamentally mathematical? Is mathematics real or merely a tool that exists in the human mind? What is reality? Is it order or disorder? Predictable or unpredictable? But in support of Pythagoras and against their own conclusion that “all things are composed of numbers . . . is nonsense,” the authors quote MIT physicist Max Tegmark who wrote: “[O]ur physical world is not only described by mathematics . . . it is mathematics” (p. 292).³ And “The idea that the universe is, in some sense, mathematical goes back to Pythagoras of Greece, and has spawned centuries of discussion among physicists and philosophers.” (p. 293) Whether or not one agrees with Tegmark, by quoting him so positively, Callicott, et al, undermine and make nonsense of their own claim that Pythagoras’s statement “is nonsense.” In my view, it is fitting that Chapter eight should once again raise the fundamental ontological questions I posed at the beginning of this review: What is the world made of and how does change occur?

Although their book is primarily devoted to natural philosophy, in several places the authors discuss the roles of the other two great questions in philosophy set out earlier in this review: How do we know? (the epistemological question) and How ought we to act? (the ethical question). The authors credit Xenophanes as the first philosopher to engage with epistemology by distinguishing between knowledge and opinion, a distinction that would be critical to Plato’s theory of knowledge. For Heraclitus, one became knowledgeable, or rational, by breathing in the Logos. (p. 123) For Descartes, however, dualism separated mind from body, knowing from being, epistemology from ontology. By the early twentieth century, fields of study became atomized and separated from one another with a worship of scientific epistemology by analytic philosophers. (p. 325) But, our authors recommend, “We suggest that we philosophers, and humanists, generally can do our part to reintegrate science and its epistemology into the wider culture by expressing the new nature of Nature as revealed by the sciences in the grammar of the humanities and social science.” (p. 313)

The third fundamental philosophical question I posed at the beginning of this review was that of ethics: “How ought one to act?” And how can one’s actions be justified? In the ancient world, natural and moral philosophy were seamlessly united in the works of Plato, and Aristotle, while being manifested as justice in the political world. (pp. 5, 342) The authors mention ethics briefly in their discussion of Heraclitus (p. 130), while arguing that much of the work of Democritus deals with ethics in the form of virtue and vice, temperance and justice. (pp. 250-251) Judeo-Christianity and in particular Aquinas in the 13th century emphasized the roles of God and morality in daily life and in philosophy. But despite the efforts of Descartes and Hobbes in the seventeenth century, Kant and Bentham in the eighteenth, and Hegel and Shelling in the nineteenth, by the time of the twentieth century, they assert, “physics, chemistry, and biology were completely divorced from moral philosophy.” (pp. 342-343, quotation p. 302) In one of the major points of the book, they show that the environmental turn, in the late twentieth and early twenty-first centuries, revitalized the role of environmental ethics by considering what human actions ought to be with respect to nature. At the end of the book, a bibliography of readings on

environmental philosophy and ethics caps the authors' analysis of morals and ethics. (pp. 349-350)

In their final chapter "A Neosocratic Manifesto" the authors discuss the sources and use of the Presocratics as they were revived and rediscovered during the Renaissance and their influence on seventeenth century natural philosophy. They were recovered to some extent in the works of Descartes, Hobbes, and Spinoza, but with the reduction of philosophy to concepts of matter in motion, God and causality, mathematics and science, arising from the seventeenth century mechanistic worldview and culminating in the philosophy of Sir Isaac Newton, the influence of the Presocratics declines. The authors argue that during the eighteenth and nineteenth centuries, philosophy itself becomes barren and empty of the many ideas provided by these early thinkers. "In the late 17th century, natural and moral philosophy once more went their separate ways. . . [and] natural philosophy began its transformation into 'science.'" (p. 301). The rich history of the relations of ideas to the natural world was lost in the philosophical reduction to mathematics (logic) and facts (experiments and observations) ultimately epitomized by the Vienna Circle of philosophy (or logical positivism) in the early twentieth century, and more broadly, they assert, in the twentieth century during the Age of Analytic and Continental Philosophy (pp. 326-327)

I disagree, however, with the authors' lack of enthusiasm for eighteenth and nineteenth century philosophy with respect to Presocratic concepts and influences. They write about the "Philosophical Alienation from Newtonian and Darwinian Science," stating: 'We suspect, however, that that many if not most humanists believe that they will find little in science to fire the imagination, to stir the emotions, to stimulate our aesthetic sensibilities, and to touch our deepest moral sentiments. The world revealed by science is as dull as the language scientists use to characterize it.'" (p. 313) Although the authors include a section on why humanists should love the new physics (pp. 315-317) and the new environmental sciences (pp. 317-319), I do not believe they do justice to humanists regarding the beauty and simplicity of mathematics and scientific assumptions in the centuries following Newton. The development of chemical ideas (e.g. by Joseph Priestley and Antoine Lavoisier); the two laws of thermodynamics and concept of entropy formulated by Sadi Carnot, Rudolf Clausius and James Prescott Joule (reinvigorated in today's concept of the Anthropocene); and James Clerk Maxwell's description of electricity and magnetism as four basic laws in the late nineteenth century are as beautiful and striking as the concepts of earlier periods. Presocratic ideas about matter, motion, energy, and mathematics are essential to the development of these sciences. Moreover, the Heraclitean concept of change was as fundamental to the ideas of Georg Hegel as were dialectics and Democritean materialism to those of Karl Marx. While it is beyond the scope of the Callicott book to trace these ideas throughout the Enlightenment and Industrial Revolutions of the eighteenth and nineteenth centuries, I believe they should be acknowledged and not denigrated.

The influence and concepts of the Presocratics were revived, the writers argue, during the Second Scientific Revolution beginning at the end of the nineteenth century with relativity theory and quantum mechanics at the subatomic level; in the mid-twentieth century with the development of ecology at the environmental level; and in the late

twentieth century, with the discovery of chaos theory and complexity theory. While such transitions are widely recognized in intellectual history, they have not heretofore been closely tied to the ideas of the Presocratics. The approach of Callicott, et al, enriches, augments, and greatly improves the history of science and the environment and makes the this volume a major contribution to intellectual history. As a whole the book is a bold, innovative, and exciting approach to philosophy itself and to environmental history.

If one wishes to teach a course on philosophy or do research that is highly relevant to today's world, one can do no better than to read and adopt this book. Starting with an understanding of basic concepts and primary sources in philosophy and the ways in which they illuminate further thought is not only an ideal way to teach, but also fundamental to doing basic research.

Notes

¹ On Plato's use of the term dialectic, see <https://www.britannica.com/biography/Plato/Dialectic>: "Plato uses the term *dialectic* throughout his works to refer to whatever method he happens to be recommending as the vehicle of philosophy. The term, from *dialegesthai*, meaning to converse or talk through, gives insight into his core conception of the project. Yet it is also evident that he stresses different aspects of the conversational method in different dialogues."

² Friedrich Engels, *Socialism: Utopian and Scientific, Part II Dialectics*, trans. Edward Aveling (New York: Scribner, 1892), p. 29: "This primitive, naive but intrinsically correct conception of the world is that of ancient Greek philosophy, and was first clearly formulated by Heraclitus: everything is and is not, for everything is fluid, is constantly changing, constantly coming into being and passing away." On the dialectic see also: <https://www.newworldencyclopedia.org/entry/Dialectic>: "With thinkers such as Heraclitus, Hegel, and Marx, the dialectic refers essentially to a conflictual movement inherent to reality. With Socrates, Plato, and the scholastic tradition initiated by Aristotle, the dialectic refers to a movement of the mind in search for truth." See also, <https://www.newworldencyclopedia.org/entry/Heraclitus>: Heraclitus is primarily recognized as the earliest dialectical philosopher with his acknowledgment of the universality of change and development through internal contradictions....Those in the history of thought who have identified conflict as the source of progress have tended to see Heraclitus as a sort of "patron saint" of the dialectic."

³ On Max Tegmark see *Our Mathematical Universe: My Quest for the Ultimate Nature of Reality* (New York: Vintage Books, 2014) and also Tanya Lewis, "What's the Universe Made Of? Math, Says Scientist," (January 30, 2014) <https://www.livescience.com/42839-the-universe-is-math.html>. Here he [Max Tegmark] writes: "But if the brain is just math, does that mean free will doesn't exist, because the movements of particles could be calculated using equations? Not necessarily ... Humans have the power not only to understand our world, but to shape and improve it."