function of extolliing Hecate's benefits to men in the *Theogony*? Only to record decorative attributes that grant her clout within the divine world? Readers are told nothing of this. A total dissociation of values and views, without any complementarity, emerges. The two poems at this point do not speak to each other.

The work leads the reader through a continuing discussion with the enormous bibliography and deals in scholarly and creative ways with almost all the crucial passages of Hesiod's text. Among many passages, let us note the famous ll. 26–28 of the *Theogony*, where C. correctly underlines the fact that the truth and the lies of all poetry, even of that of Hesiod, are said to be undistinguishable; or her discussion of the myth of the races, for which she offers a new organizing principle: 'the succession of the races . . . constitutes repeated experiments involving trial and error by the gods or Zeus'. The writing is clear and provocative: it exudes C.'s awareness of saying something new and interesting.

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THE WORLD OF PYTHAGORAS

C. RIEDWEG: *Pythagoras: Leben—Lehre—Nachwirkung. Eine Einführung.* Pp. 206, map, ills. Munich: C. H. Beck Verlag, 2002. ISBN: 3-406-48714-9.

$a^2 + b^2 = c^2$ is a mathematical theorem with which even students of ancient history are familiar. Although the use of this formula to calculate flood-areas was already known to the Babylonians and Egyptians at least 500 years earlier, it is linked indivisibly with the name of a Greek personality. In antiquity Pythagoras of Samos (*c.* 570–*c.* 475 B.C.) was associated not only with the creation of mathematics but also with a cosmos dominated by a harmony of spheres, metempsychosis, reincarnation, and vegetarianism. This combination of mathematics, philosophy and mysticism has created the image of a half-scientist/half-religious figure who gathered disciples united in a code of secrecy: the saying 'Speech is silver, silence is golden' seems to have been the motto of this unusual group, while ostracism and exclusion were the penalties for those who broke their oath. No words directly attributable to Pythagoras have been preserved, and most information comes to us through Diogenes Laertius, Porphyry, and Iamblichus, so that reconstruction of this mystic character presents a complex scholarly challenge, starting with the evidence from the third and fourth centuries A.D. and then reading back through a fluid tradition stretching back almost a further millennium. R.'s monograph is a new attempt to meet this challenge, in four main chapters: the first is an introduction to the ancient tradition on Pythagoras, the second is an attempt to delineate the historical character, and the third is an examination of the secret society; the short fourth chapter, dealing with the influence of Pythagoras on philosophers from the Presocratics to the present, appears to be something of an afterthought.

R. begins with a detailed and well-informed explanation of the ancient accounts which are to be placed between fact and fiction, and the book in general immerses the reader in the mystical–religious everyday life of Archaic Greece. This not only provides a reason for attempting to understand the 'historical Pythagoras' but also gives a well-founded suggestion about the nature of the Pythagorean cosmos, which heavily influenced the Platonic view.

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In the second chapter R. successfully pursues the 'historical Pythagoras' by locating him in his contemporary setting, discussing the apparently strange logic of the so-called Pythagorean *acousmata* (lit. 'things heard': in German 'Hörsprüche'), e.g. 'What are the Islands of the blessed?—Sun and moon', and checking the plausibility of the oldest references. This evaluation and the resulting picture of Pythagoras leads to the nucleus of his book, which deals with the standard debate as to whether Pythagoras was a scientist or a charlatan.

R. tackles this problem by considering whether Pythagoras should be seen as founder of scientific mathematics or even the inventor of the word *philosophía*. R. (like, for example, Zhmud and Fritz) favours the view that Pythagoras should be seen as a scientist: he approaches the thesis from a primarily philosophical background and thus to a great extent evaluates the Pythagorean *theoria* in the light of Platonic and Neoplatonic philosophy. By contrast, there is no substantial analysis of Pythagoras' possible mathematical contributions. R. uses Aristotle's definition of *mathemata* (*Metaph*. 985b23) to evaluate Pythagoras and, via Levi-Strauss's concept of '*pensée sauvage*', comes to the conclusion that he and his disciples 'somehow' founded scientific mathematics, or at least established the basics of the subject.

Surprisingly, R. does not in this context mention Euclid's proof (Book 1, Prop. 47) of Pythagoras' geometry theorem, nor the fact that scientific mathematics, even as conceived in antiquity, respected the fundamental rule of clarification. There is no hint that Pythagoras had developed any sense of the necessity to prove his theorems. Pythagoras and his disciples did not construct a consistent theory with a deductive structure, nor did they compile any kind of exercise manual. These essential features of science did not appear until the late fourth century B.C., as is recognized by historians of science (compare e.g. Lucio Russo's *The Forgotten Revolution* [Berlin, 2004]).

Pythagoras and his followers, by contrast, seem to have been interested in establishing philosophical connections between metaphysical ideas about number theory, music and the cosmos. This could not be described as a scientific structure, in particular in the light of the advances of the 'Euclidean revolution'. For example, in Pythagorean belief everything could be classified by numbers. They counted the number of stones that could be laid around the outlines of different animals to determine their status in the cosmos; this already made Aristotle (*Metaph*. 987a24) characterize the Pythagorean methods as 'superficial'. R. also refers to the beans taboo: in Pythagorean logic this was explained with the 'observation' that a chewed bean after 90 days in the soil would develop the shape of a child's head. This tends to support the opinion of R.'s teacher Walter Burkert that Pythagoras was some kind of pseudo-scientific shaman (*Lore and Science in Ancient Pythagoreanism* [Cambridge, MA, 1979]). As well as lacking a solid scientific examination, the book fails to treat the medical aspects of the Pythagorean doctrine. It is certain that Pythagoras had contacts with a medical school in Croton, and these would certainly underline the impression of him as a shaman.

Thus R., by overstating Pythagoras' scientific credentials, fails to locate him properly in the development of scientific thinking. However, as a study of Pythagoras and his followers within a philosophical or natural-philosophical framework, this monograph does present an accessible introduction with a clear view of the sources and the influence of the Pythagorean tradition on Platonic views. R. does also create an attractive picture of the thought-world and intellectual development of the late Archaic period of Greek history. Overall, a useful

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introduction, provided that the limitations are appreciated—and the grand claims of the jacket blurb ignored.

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A PRESOCRATIC FESTSCHRIFT

V. CASTON, D. W. GRAHAM (edd.): *Presocratic Philosophy. Essays in Honour of Alexander Mourelatos*. Pp. xvi + 346. Aldershot and Burlington, VT: Ashgate, 2002. Cased, £47.50. ISBN: 0-7546-0502-7.

This volume emanates from a tribute to Alexander Mourelatos by his colleagues and former students, held at the University of Texas at Austin in March 1998. The primary theme was the Presocratics and Sophists: the consistent 'favourite subject', we are told, of Professor Mourelatos over the years (p. ix). There are twenty-two essays divided into five unequal parts covering (1) the Milesians, (2) Heraclitus and Parmenides, (3) the Pluralists, (4) the Sophists, and (5) Transmission, Traditions, and Reactions.

It is difficult to do justice in a short review to so many high quality, insightful (and at times provocative) essays. In what follows, I will attempt to provide the original flavour of each essay and at times some terse critical comments of my own.

In Chapter 1, Stephen White argues (contra Dicks) that Thales deserves to be considered as the founder of Greek astronomy. W. argues that Thales could have determined the equinoxes and the solstices using basic arithmetic and did not need (contra Dicks) an adequate geometrical model to do so. He thus stresses Thales's observational side rather than his speculative side. There is, however, good evidence that the Babylonians had already accomplished the same astronomical achievements that White attributes to Thales.

In Chapter 2, Michael Gagarin challenges the popular view (first initiated by Vernant, Vlastos, and Lloyd) that law was the essential model (or impetus) for Greek rational thought. G. argues against the idea that legal thinking and institutions influenced Presocratic cosmological ideas. While G. makes an excellent case, the fact remains that there is a correlation between political and cosmological models.

In Chapter 3, Daniel Graham re-examines the old controversy of who came first, Heraclitus or Parmenides, and who is attacking whom? He examines all the relevant corresponding passages in Parmenides and Heraclitus. In my view, G. convincingly shows that it is likely that Parmenides had Heraclitus' text in front of him. He concludes that it was Heraclitus' radical critique of his tradition that caused Parmenides to react in the innovative manner now associated with his name.

In Chapter 4, Alexander Nehamas argues (contra Graham) that Parmenides is not denouncing Heraclitus' perspective, but in fact shares to some degree the same ontological and epistemological enterprise. Moreover, N. wants to argue that Parmenides is writing independently of Heraclitus (again contra Graham). N. also confronts the age-old question of the status of the second part of Parmenides' poem (the *Doxa*) in light of the relationship between Parmenides and Heraclitus. N plausibly argues that although mortal opinions are deceptive for Parmenides, his own cosmology is correct. The *Doxa* is thus 'the very first effort to go beyond Milesian monism'. I tend to agree with N., although I would still argue that it is better characterized in analogy with Plato's *Timaeus* as a 'likely story'.

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