study of the sense-organs. Johansen's study is based on a PhD thesis both suggested and supervised by Myles Burnyeat, someone who has himself contributed not a little to the burgeoning debate.

J. approaches the task in a lucid and thorough manner. He examines the key texts critically and presents a unifying theory: Aristotle, in J.'s view, seeks to explain the characteristics of the different sense-organs by reference to the goal that they serve (that of enabling animals to perceive). The power to perceive consists for Aristotle in the ability to be changed by colours, sounds, smells, flavours, and tangible qualities (the sense-objects). Because this ability is only found in Aristotelian matter (*hulê*) animals must have sense-organs to provide them with the requisite matter, i.e. the matter which can be changed by the various sense-objects. For example colour, which is the sense-object of sight, changes what is transparent. Consequently transparent matter is required if the animal is to see and this explains why animals have eyes (eyes according to Aristotle being made up of water).

How does J.'s theory sit with the well known controversy over Aristotle's doctrine that in perception the sense-organ takes on the form without the matter? Literalists explain the doctrine as referring to a physiological process wherein the eye, say, literally goes red when it sees red. The spiritualists say that the eye's taking on the form red means nothing more than that the perceiver becomes aware of redness. Aristotle's account of the sense-organs is in J.'s view acceptable on both the literalist and spiritualist position. This is because even if a material basis is necessary for sense-perception it is still an open question whether the material in question undergoes a physiological change when perception takes place. But J. goes on to argue that this neutrality favours the spiritualists. Spiritualists face an embarrassing question: as J. puts it (14), 'Why do we have eyes in our heads rather than simply holes, for why should the senses have a material basis if there is no material change in perception ?' J.'s theory explains why we have eyes without having to assume material changes in perception and thus removes the embarrassment.

I would question J.'s contention that the theory he attributes to Aristotle is neutral between the literalist and the spiritualist position. Firstly he argues (91) that peripheral sense-organs like the eye are not where perception takes place: these organs are simply acting as conduits through which the action of the sense-object on the external medium (the gap between perceived and perceiver) is enabled to reach the true location of perception in the heart. They are in fact extensions to the medium and not sense-organs at all. Secondly he maintains (127) that the action of the sense-object on the medium is fundamentally different to action on a medium in other causal sequences. The medium in perception has a phenomenal role, that of allowing 'the sense-object to appear to a perceiver unhindered and undistorted through it' (120), and the 'change' undergone by the medium in perception consists merely in the fact that this phenomenal role is performed (146). Thus J. rules out the sort of change in the medium which the literalists require in the sense-organ. Since the sense-organ is itself really just a medium this disposes of the literalist interpretation (147).

It will, I hope, not detract from the value of J.'s account as a contribution to the literalist/spiritualist debate to note that his explanation of the peripheral sense-organs is problematic. It seems a gross distortion of Aristotle's position to deny that perception takes place in these peripheral organs. Admittedly Aristotle regards the heart as the seat of the central faculty of sense but not at the expense of his view that the individual sense faculties are located in the peripheral sense-organs of which they are truly the form and realisation. Indeed if J. is correct then the eyes do turn out in the end to be something dangerously close to holes in the head.

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GOLDIN (O.) **Explaining an eclipse. Aristotle's *Posterior Analytics* 2.1-10**. Ann Arbor: U Michigan P, 1996. Pp. ix + 170. 0472105965.

One problem that the reader of *Analytica Posteriora* (*APo*) B can have is that if all deductions are based on definitions, no definitions can be deduced; and yet Aristotle (A.) devotes B8 to showing how a class of definitions can be deduced. It is this problem that Goldin tackles, which he interprets as the question of how one can have a deduction based on definitions, although the proof provides information going beyond the content of the definitions (ch. 1). The class of entities which can in this manner be defined in a deduction he sees, quite traditionally, as *per se* incidentals (καθ' αὐτὰ συμβεβηκότα). His solution (ch. 5, 6) (supported by a reading of the earlier parts of *APo* B (ch. 2, 4), and a defence of the traditional interpretation of assumptions of existence (ch. 3)) is that in order to proceed beyond a definition assumed by the science in question, we take a definition from another science. As G. sees, this solution runs counter to the prohibition against kind crossing (no premises are to be used that do not belong to the appropriate science—*APo* A 7, 9); which problem he suggests should be solved by positing different stages in A.'s thought (ch. 6 sec. C).

The solution should make any reader of A. uneasy, not merely because there is no separate reason to suppose that A7, 9 belong to a different stage of A.'s thought than B 8 (unless one separates books A and B radically, which G. does not); but simply because the examples of 'sciences' that G gives—'physics', 'chemistry' and the like—are not A.'s sciences at all; rather, those enquiries dealing with changing things are all parts of φυσική (*Metaphysics* E 1, cf. *Meteorologica* I 1). A.'s favourite example of a *per se* incidental is that the sum of the angles of a triangle equal two right angles: to which science outside geometry should one appeal to prove that?

Unfortunately for G., Jonathan Barnes' second (and much revised) ed. of his translation and commentary of *APo* (1994) was only available to him in the last stages of writing (viii). G. uses only the first ed.; but the second has much to offer, most obviously on the closely connected debates in Aristotelian scholarship (e.g. kind crossing in the *de Motu Animalium* was mooted by Nussbaum (1978)).

G. gives a clear discussion of central problems and

recent literature (especially on Gomez-Lobo 1980, Hintikka 1986, Ferejohn 1991 and McKirahan 1992). One omission may be mentioned here: Ross in the OCT at 93a36 reads δι' ἀμέσων for the commoner reading of the Mss. διὰ μέσων. With Barnes (1994) one should accept Hadgopoulos' (1977) reinstatement of the Mss. reading, the point being that unmediated premises provide no guarantee that one has the explanation of the phenomenon in question: it has to be a genuine middle term to do that (*APo* A 13).

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SEXTUS EMPIRICUS: **Against the Ethicists**. Tr. and comm. R.A.H. Bett. Oxford UP, 1997. Pp. xxxiv + 302. 019823620.

This excellent and admirable volume contains an English translation, with copious notes and commentary, of Sextus Empiricus' most extensive discussion of ethical theory, otherwise known as *Adversus Mathematicos* XI (*AM* XI). It is in all respects an exemplary production. The translation, occupying the first thirty-nine pages, is excellent, offering no blemishes worth contesting in a notice of this length, and generally capturing Sextus' dry, and sometimes drily witty, philosophical prose. The commentary, six times as long at 234 pp., is also excellent, providing extensive discussions of the text, argumentative structure, and larger philosophical issues. In addition, B. provides excellent thumbnail summaries of the other philosophical views that Sextus combats. The volume finishes with a good bibliography and full range of indices (nominum, locorum, etc.).

Especially worthy of emulation is B.'s system for organizing his commentary, explained at xxxiii. *AM* XI, medium-sized at sixty pp. of Loeb Greek, was divided in antiquity into seven chapters; B. subdivides his commentary into roughly forty sections, each treating one argument, example, objection or the like. Each section of commentary then begins with considerations of the text or translation; those of strictly philological interest are enclosed by square brackets. Next come discussions of the dogmatic views quoted and criticized by Sextus, then analyses of Sextus' own arguments contra; these passages rightly occupy the bulk of the commentary. They also display B.'s excellence as an historian of the Hellenistic schools, his sound feel for Sextan argument, and his thorough knowledge of the most up-to-date literature. Finally, B. includes where relevant comparisons to Sextus' other treatise on ethics, the last twelve chapters of the third book of the *Outlines of Pyrrhonism* (*PH* III). This organization is uncommonly successful, orienting the reader both within Sextus' treatise and within B.'s discussion of it.

The last-mentioned comparisons serve one of the major ends of B.'s commentary, to which some pages of the introduction as well as two appendices are devoted, namely his campaign to revise the chronology of Sextus' writings. Traditionally, *PH* I-III have been taken to be earlier than *AM* I-XI; B. plumps for their posteriority. Evidence is derived both from comparisons of parallel passages as handled in each work and from B.'s views about the kind of scepticism Sextus practiced at the time of their writing. On the small points, B. often convinces, though frequently the evidence is deeply amphibolous; e.g. when he writes that 'the formulations that occur in *PH* III ... are clearer and less awkward' (270) than their *AM* counterparts, we are meant to see evidence of maturity and lateness. But clarity and grace are themselves not always uncontroversially measurable, and even when definitively detected the reasons for their presence in a text are endless; sometimes repetition and revision improve, sometimes they pejorate. Still, I find myself more often persuaded by these micro-comparisons than by B.'s more sweeping stories of the evolution of Sextus' outlook.

And in general, I found least satisfactory in this book B.'s broadest views about the nature of Sextan scepticism. B. is always eager to defend Sextus from charges of inconsistency or incompetence, and Sextus himself could hardly find fault with his diligence. But B.'s general strategy for defending Sextus from any charge of carelessness or contradiction is to load him down with dogmata, and then to heap on top of them additional meta-dogmata. Sextus turns out to have the most extraordinary positive views about the natures of things (*pace* B.'s exculpatory arguments in xviii and 141, which do not succeed), and about what it is to be part of the nature of a thing, and even about the psychological effects produced by thinking about the natures of things—B. at one point, apparently without irony, suggests that Sextus 'could cite Plato as an ally' (143) for one of the more substantive and implausible claims. Something has gone wrong when that arch-dogmatist is introduced in order to defend Sextus' consistency as a sceptic, and I think that what is wrong is B.'s whole approach. But my dissension may also reflect no more than the fact, on which Sextus built a thriving practice, that doctors differ.

More important than those complaints is the fact that B. has put an immense amount of thought into every line of Sextus, and the translation and commentary reflect that. This book now joins W. Heintz's, *Studien zu Sextus Empiricus* (Halle 1932) as an indispensable accompaniment for any reader intending the serious study of Sextus. If the reader arrives at different conclusions from B.'s, they will nevertheless be improved by the work he has done. All in all a first-rate production, which should be taken as a model for future members of its genre.

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SMITH (M.F.) **The Philosophical Inscription of Diogenes of Oinoanda**. (Österreichische Akademie der Wissenschaften, Ergänzungsbände zu Tituli Asiae Minoris 20.) Vienna: Verlag der Österreichischen Akademie der Wissenschaften, 1996. Pp. 234 + 64 pp. plates. DM 122. 3700125968.

This volume is intended as a 'supplement and complement' (9) to Smith's full edition of the fragments of Diogenes (*Diogenes of Oinoanda: the Epicurean Inscription*. Naples: Bibliopolis, 1993). The earlier volume provided a lengthy introduction, full apparatus,