Review
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vulnerable to the counter-claim, already implicit in Goodman, that the orthodox taxonomy is cheaper just *because* it is entrenched. Since the treatment of each of the topics mentioned is quite brief (in some cases only a few paragraphs), and since Rescher himself acknowledges that the whole subject of the economy of research and its place in methodology is still in its infancy (pp. 90–91), one hopes he will have more to say about it in the future. In the meantime, this book serves as a lucid and engaging introduction to an aspect of Peirce's thought, and to a cluster of problems in the philosophy of science, that certainly deserve the attention that Rescher has called to them.

(Note: Among the typographical errors found by the reviewer, three seem serious enough to warrant specific mention: on p. 22, the phrase "big surprises remain" in the second paragraph clearly requires a "no" before it; a phrase has dropped out of the sentence on p. 15, paragraph 2, beginning, "Analogously, when it is said . . ."; in note 29 on pp. 94–95, "qualitative" should replace "quantitative" at both places in the quoted material where the latter word occurs.) *John V. Strong, Boston College*

PETER K. MACHAMER and ROBERT G. TURNBULL, (eds.) ***Studies in Perception.*** Columbus: Ohio State University Press, 1978. ix + 567 pp. $30.00.

I had naively thought that before roughly the seventeenth century, though one finds both attempts at the psychology and physics of perception and theories of knowledge that depend on assumptions about perception, these do not come together in anything like the philosophically fruitful combination that they do after the time of Descartes. This book forces me to rethink that view. It is the result of a seminar-symposium held at Ohio State in 1974, and contains essays on most of the major figures in the history of theories of perception, and a number of essays on various modern issues about perception. The book does not represent a compendium or consensus of 'what we now think about perception,' and working through it would probably not be a particularly good way to learn the history of theories on the topic. Editorial indulgence is partly to blame for this. There are a number of essays, fine interesting essays in their own right, that just don't fit into the book. Some—Hausman on Innate Ideas, Laymon on Newton, Sellars on Berkeley on Universals—have nothing particularly to do with perception. And, while I'm being thus petulant, why is there an essay on Broad but nothing on Austin, an essay on Priestley but not one of Kepler?

The value of the book lies in the way several of its essays, taken together, make one rethink just what the fuss has been all about. I begin with the historical essays. In ancient theories of perception we certainly find both hypotheses about processes that lead from object to sense organ to belief, and hypotheses about the use of perception in the acquisition of knowledge. There is not any contradiction between the aims implicit in these theories. But—and this is the point that seems novel—there is a sort of rivalry between the two; if an ancient theorist begins by trying to explain knowledge then the theories he is likely to make are very different from those that would be produced if the aim were to understand the interaction of light, medium, and eye. Rivalries between the two styles of inquiry may not be apparent until the number of incompatible claims they generate mounts. That point seems to have been clearly reached in Islamic visual theory, as fascinatingly described by David C. Lindberg [Ch. 5]. Alkindi made clear the association of the extramission theories stemming from Plato and Euclid with an interpretation of vision as an active searching out of knowable geometrical relations of things, rather as the idea is recently developed by Gibson. And Avicenna sees very clearly the incommensurability between the broadly Aristotelian intromission theories of the transmission of form and color, which he prefers, and the extramission theories, whose physical interpretability he undercut.

The origins of these two classes of theory in the works of Plato and Aristotle are not treated very explicitly in the book. Heinrich von Staden [Ch. 4] presents a very textual analysis of the debate between 'Aristotelian' stoics and 'Platonic' skeptics,

according to which the stoics are trying to put together a serious psychophysics of perception and the skeptics are nattering away at them like a flock of analytic philosophers, emphasizing, truly but not helpfully, that knowledge is hard to get and that the basics of the perceptual situation won't tell one what is known and what is not. Any such simple antithesis between 'psychological' and 'philosophical' approaches certainly cannot be read into Plato and Aristotle themselves. Turnbull [Ch. 1] interprets both of them as supposing an inferential component in perception which derives infallible knowledge of the common sensibles (properties associated with no sense in particular) from fallible knowledge of the special sensibles (associated with particular senses). This seems to me to ascribe to them uncharacteristically modern errors, in confusing the idea of a quality of sensation and a property of an object. I don't see enough evidence that Plato or Aristotle had anything enough like the former concept to get into trouble about it. My meagre authority on these matters is somewhat buttressed by David E. Hahm's discussion of Hellenistic theories of vision [Ch. 3] and Lee's discussion of Epicurus [Ch. 2]. Their somewhat overlapping accounts of how the intromission and extramission theories developed do not appeal to any such modern dilemmas. Reading between the lines, the impression I get from Lee, Hahn, and von Staden is that the aim of classical theories of perception is first to explain how it is that things are colored, illuminated, visible, and also actually seen (heard, perceived). Then in getting an explanation of these things epistemological considerations intrude and have to be charmed out of the way. To do this one either takes as basic the transmission of form through media, so that perception is a special case whose special features can be ignored if it is optics one is interested in, or one takes as basic the form that the visual world assumes when one investigates it, looks this way and that. On the first Aristotelian strategy one gets a promising account of light and color and later has to cope with mysteries of migrating forms and the workings of the eye. On the other, Platonic, strategy, one gets the promise of a mathematics of visual appearance, and pays for it with a thoroughly mysterious picture of the objects of perception.

One would expect then, that the middle chapters of the book would discuss how in the period from Kepler to Berkeley these ancient problems got transformed into the modern ones. But one doesn't find anything like this. The final developments of ancient theories are described in Gareth B. Matthews account of Bacon [Ch. 7] and Sabra's account of Alhazen's theory [Ch. 6], which seems to be much more powerful and sophisticated than the most careful and intelligent mediaeval accounts. But they are totally different from the modern theories which some three hundred years later succeed them. What happened to change the ways the problems were seen is not completely clear, if only because the content of the scientific revolutions in that period and of the culture's reaction to them is not clear. No chapter of the book takes up the issue. Hausman's discussion of Innate Ideas [Ch. 8] is no substitute for a chapter on Descartes on perception. Neither is Wilfrid Sellars' discussion of Berkeley and Descartes on general ideas. The difficulty with the book here is that such a lot has been said about these thinkers that no expert would feel very expertly saying just what, for example, Descartes' theory of perception amounts to. But, put in the general context of the book, there are difficult intellectual problems about these thinkers, which should have been addressed.

A final group of papers deal with recent problems. They do not give any sort of a survey of what is now being done in the study of perception. Three, Hirst on the connections of the philosophy and psychology of perception [Ch. 14], Pappas on Broad [Ch. 15], and Own on the psychophysics of prior experience [Ch. 18], are on rather specialized topics not treated in a way to give the reader a sense of the state of the subject. The remaining three are concerned with the work of Gibson. Machamer [Ch. 17] brings out very clearly the appeal of Gibson's combination of positive reasons for the separation of sensation from perception with attacks on the appeal to reasoning lying behind perceptual judgments. Machamer shows how Gibson's picture allows us to return to a world in which objects are initially characterized in terms, mainly an objective notion of 'information,' which do not require any mental

digestion to lead to our beliefs. We just grasp them, rather as free-floating forms are absorbed on Aristotle's theory. Gibson, in 'The Perceiving of Hidden Surfaces' [Ch. 16], separates the heart of this idea from the other strands of his earlier work, and argues for a 'geometry' of the ways objects reveal or eclipse one another. It is not clear how this is to be extended to the perception of objects like tables and racehorses which are not by their nature congruent with the structures of perceptual activity as surfaces and media are: Machamer worries about this. Clark's 'Towards a Logic of Naive Realism' [Ch. 19] reinforces my apprehension that what is being directly perceived on such a view is not really the physical world, but something like one of the worlds of an intensional semantics. Clark's attempt to make a realism out of a Hinktikka-style logic depends at one point on the surely mistaken assumption that to say 'there is something of which *a* believes both *P* and not *P*' is to describe *a*'s beliefs as contradictory. It would be strange and disappointing if Gibson's ideas required such a retreat to a pre-physical construal of the world, but both Clark's and Machamer's papers make one fear that this may be the case. It may be direct, but it doesn't look like realism. *Adam Morton, University of Ottawa*