novel shakiness of the Hellenistic gender system (if the old one was so solid, one wonders why science had to play the ideological role it supposedly did in the classical period). One supposedly new superstition—that menstruating women break mirrors—stands for the rise of menstrual taboos—and one anthropologist's book—Mary Douglas's *Purity and Danger* (Penguin, 1970)—offers an explanation for this as easily as it does for the rise of PMS and the assurance from Dean-Jones's fellow graduate student in 1987 that, indeed, permanent waves will not "take" if a woman is menstruating. In short, theory even in the service of feminism is no substitute for historical thinking.

THOMAS W. LAQUEUR

Charles Lichtenthaeler. *Neuer Kommentar zu den ersten zwölf Krankengeschichten im III Epidemienbuch des Hippokrates.* (Hermes Einzelschriften, 65.) (Hippokratische Studie, 15.) 188 pp. Stuttgart: Franz Steiner Verlag, 1994. DM 76, SFr 76, ÖS 593.

Charles Lichtenthaeler, who died on 18 May 1993, was an eminent historian of ancient Greek medicine, with special interests in the Hippocratic corpus. He published the first volume of his Hippocratic studies as long ago as 1948 (*La médecine hippocratique: Méthode expérimentale et méthode hippocratique* [Gonin]). He had completed the fifteenth volume in that series shortly before his death, and the work has been seen through the press by Markwart Michler.

After a brief general introduction, Lichtenthaeler devotes a detailed discussion to each of the first twelve case histories in *Epidemics,* book 3. Each case history is first labeled by the name of the patient (when given) and the Hippocratic diagnosis. The Greek text and translation are then set out. There follow a general account of the case, a detailed running commentary, a discussion of the connections between the case and other material in the *Epidemics* and the treatise *Prognosis,* notes on stylistic points, and a final section dealing with why the Hippocratic author was interested in the case and what its significance is for our understanding of Hippocratic medicine.

Hippocratic exegesis has had a long and checkered history, from its origins in the school of Herophilus in the early third century B.C. The extensive volumes Galen devoted to Hippocratic commentaries served a twofold strategic purpose, validating Galen's own medical theories and practices and displaying his learning. The first "modern" editor of Hippocrates, E. Littré, working in 1839–1861, had a different double aim, to establish the text and to comb it for the useful medical knowledge it contained.

Hippocratic scholarship has moved on, and Lichtenthaeler is well aware of the fallacies of anachronistic, retrospective diagnoses of the cases described. The focus of his own interest is, first, on how the case histories relate to the more theoretical, generalizing, sections of the *Epidemics* and *Prognosis* and, through that, on the "system of thought" that governs or guides Hippocratic practice. Developing theses familiar from his other studies, he sees the case histories as antedating and in some sense providing the basis for *Prognosis.*

The care with which these correlations, within the Hippocratic corpus, are carried out is exemplary, and the book contains many other valuable insights, not least on points of style and vocabulary. Yet an even more cautious approach might have been adopted, seeing the case histories not so much as a resource for generalization about what particular signs (for example, "thin" urine or "sleeplessness") may mean but, rather, as underlining the need to take every sign *in its collocation,* namely, as part of a history to be viewed and interpreted *as a whole.* On this alternative reading (which I would myself support but which cannot, of course, be defended here), the message of these texts is sometimes an implicit criticism of the more simpleminded theories proposed by other Greek doctors, including some represented elsewhere in the Hippocratic corpus.

G. E. R. LLOYD

John Phillips Britton. *Models and Precision: The Quality of Ptolemy's Observations and Parameters.* (Sources and Studies in the History and Philosophy of Classical Science, 1.) xx + 202 pp., figs., tables, apps., bibl., indexes. New York/London: Garland Publishing, 1992. $41.

The Institute for Research in Classical Philosophy and Science at Princeton has started, under the editorship of Alan C. Bowen and a distinguished advisory board, a new series of publications: Sources and Studies in the History and Philosophy of Classical Science. The book under review begins this series. It is a study of Ptolemy's astronomical work that John Phillips Britton completed as a dissertation in 1966. The author candidly informs us in the introduction that since 1966 our resources for understanding Ptolemy and the *Almagest* have been importantly af-

fected by a few major works. These include two extensive commentaries on the *Almagest:* one by Olaf Pedersen, *A Survey of the Almagest* (Odense, 1974); the other by Otto Neugebauer as part of his *History of Ancient Mathematical Astronomy* (Springer-Verlag, 1975). A third major resource is Gerald Toomer's superb English translation, *Ptolemy's Almagest* (Duckworth, 1984). It is Britton's view that most of the substance of his study is not duplicated in these works. I agree with this claim; indeed, I would opine further that Britton's work constitutes another major contribution that will importantly affect our view of Ptolemy. A promising start, then, for this new series, which has been amply confirmed by its second publication (see *Isis,* 1994, *85*:305).

Britton seeks, through an analysis of the solar and lunar observations reported in the *Almagest* and of the associated models, to gain a better understanding of both Ptolemy's abilities as a practical astronomer and the role of observations in the development of his theory. To put it succinctly, the author addresses an inverse problem: given Ptolemy's statements about his own observations and procedures, are they credible? Britton employs very sophisticated and powerful techniques that consist principally of comparisons between Ptolemy's reports and modern computations. These computations make extensive use of modern error analysis, applied to observational instruments and the procedures of their employment. Britton also tackles errors that Ptolemy could not have been aware of, as well as errors in current ephemerides. He uncovers difficulties in comparing Ptolemy's models and parameters directly with modern data and seeks to account for the resulting discrepancies. Some important conclusions that may alter our view of Ptolemy emerge from this study—conclusions that no serious student of ancient Greek astronomy in general and Ptolemy in particular should ignore.

It emerges that Ptolemy was not entirely candid in describing the procedures by which he determined the parameters. The relatively high accuracy of each of the parameters cannot be explained satisfactorily by assuming that Ptolemy was merely lucky or that he relied on Hipparchus's results. Britton argues that the accuracy of the parameters is probably the result of some average of many determinations from a much larger number of observations than Ptolemy describes. This claim departs sharply from the traditional view that Ptolemy's procedures for analyzing observations and deriving the parameters of his models were quite unsophisticated (pp. xiii–xiv). Thus the Ptolemy Britton portrays followed much more modern procedures than has been thought.

Why did Ptolemy conceal the actual procedures for arriving at the values of his parameters? Britton observes that Ptolemy nowhere attempts either to give a chronological report of his own work or to explain how he arrived at the particular models with which he accounts for the motions of the moon and the planets. He therefore suggests that the *Almagest* was intended to be not a historical account but, rather, a pedagogical treatise; the general objective was didactic rather than historical. Since Ptolemy could not have justified rigorously any method of treating errors, he chose—so the author argues—to adhere closely to the standards of geometrical rigor and finessed the question of how he had actually arrived at his parameters (p. 151).

In his fruitful attempt to solve this inverse problem, Britton may have projected modern standards onto the *Almagest:* to account for the relatively high accuracy of each of the parameters, he conjectures that Ptolemy had more observations than he described at his disposal and used some sort of "averaging" technique. This claim remains a conjecture. To Britton's credit, however, it should be stressed that this conjecture comes at the end of the study—it does not drive the argument of the book. If Britton's conclusions are correct, then Ptolemy is an exception in the annals of Greek astronomy. (I thank Bernard Goldstein for helpful discussions.)

GIORA HON

Miranda Green. *Animals in Celtic Life and Myth.* xx + 283 pp., frontis., illus., figs., bibl., index. London/New York: Routledge, 1992. $45, Can $56.50.

The many-faceted role of animals in past civilizations and cultures is not a new topic of investigation. But in the last few decades it has generated fresh interest and results, inspired by a new approach, multidisciplinary methods, and broadened prospects. Such studies range from the empirical first steps of zoological knowledge to the history of zoology as a science in the modern sense of the word, and from the practical or material use of animals by humans to the ethics, philosophy, and symbolism that have governed their relationship. Miranda Green aims at exploring "the role of animals in all aspects of Celtic life" (p. xviii). She starts with food and farming and successively considers hunting, war, sacrifices, art, earliest stories, religion, and symbols over time (from 800 B.C. until 400 A.D.)