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the current notion of what polymer science is about.

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Thomas A. Witten, Jr is an assistant professor in the University of Michigan, Ann Arbor physics department. His research concerns renormalization group properties of polymers.

Atomic and Molecular Collisions

Sir Harrie Massey

327 pp. Halsted (Wiley), New York, 1979.
\$34.95

This most recent book by Sir Harrie S. W. Massey differs somewhat from his well-known previous volumes (*The Theory of Atomic Collisions*, *Electronic and Ionic Impact Phenomena* and *Negative Ions*) that have served a valuable resource for those involved in the field of electronic, atomic or molecular collision physics. It is different because it is not written for the same audience; it is intended for the undergraduate physics major. In fact, the author indicates his desire for the text to be one "...which can be read with profit by a

first year undergraduate..." He is not, however, referring to the traditional freshman physics major in an American university. A more reasonable description of a possible audience would include an undergraduate physics major whose senior thesis is in the field of atomic and molecular collisions or, possibly, an advanced undergraduate group interested in what is often referred to as a "special topics" course.

Following a brief introduction, the first four chapters contain discussions of some of the tools of quantum mechanics that are essential to the field and a review of atomic and molecular structure. The author uses a minimum of formal mathematics, and the student must accept some things on faith. The treatment is brisk, somewhat descriptive, but surprisingly complete for only 67 pages. The remainder of the text is devoted to the various subfields that fall within the general area of atomic and molecular collisions and includes discussions of both experimental techniques and theoretical methods pertinent to each subfield. Although the names of various researchers or research groups are sometimes mentioned, there are no specific references to the literature anywhere in the text. This may frustrate students who wish to refer to original



M16 star cluster and nebula in Serpens: an example of the color plates of Messier objects found in *The Messier Album: An Observer's Handbook* by J. H. Mallas and E. Kreimer (Cambridge U. P., New York, and Sky Publishing, Cambridge, Mass., 1979, \$11.95).

papers or to probe a particular subject in more detail. The fields covered include electron scattering and capture, heavy-particle collisions for neutral-neutral and ion-neutral systems, and photon collisions. In the words of the author, "...the aim [is] to expose the scope of the subject rather than to discuss a few aspects in detail." Consequently, there is considerable breadth, including such topics as resonance effects in electron-atom (molecule) scattering, semi-classical scattering theory for heavy particle collisions, resonant charge transfer and photodetachment. However, Sir Harrie does not discuss some recent topics, such as the study of highly excited "Rydberg" atoms, laser fluorescence and the contributions of quantum chemists to the field. The book concludes with a chapter on problems related to atmospheric physics and interplanetary space and with appendices that focus upon various experimental techniques.

This text by Sir Harrie Massey is unique, but probably will not be selected for as many personal libraries as were his earlier books due to its rather limited scope, its intended audience and its rather high price.

ROY L. CHAMPION
College of William and Mary
Williamsburg, Virginia

Astronomy of the Ancients

K. Brecher, M. Feirtag
215 pp. MIT, Cambridge, Mass., 1979. \$12.50

Astronomy of the Ancients is an archaeoastronomical sampler of papers from a symposium presented 10-13 January 1977 at MIT, embroidered by astrophysicist Kenneth Brecher and science editor Michael Feirtag. All but one of the eight articles (and Philip Morrison's brief but evocative introduction) originally appeared together as a special issue of *Technology Review* (December, 1977). Anthony F. Aveni's piece, "Old and New World Naked Eye Astronomy," also made its first bow in the same journal, but in a later issue (November, 1978).

Solar physicist John A. Eddy updates his fieldwork on the medicine wheels of North America's Great Plains and writes with a sensitivity worthy of the sanctity imbued in these monuments by the people who built them. NASA scientist John C. Brandt presents another aspect of American Indian sky lore: possible representations of the AD 1054 Crab supernova by eyewitnesses in the American Southwest. Although this interpretation is falling, gradually, into disfavor, Brandt presents a clear, fair statement of his argument.

A comparison, or rather a contrast,

between astronomical measuring instruments of the Old World and the New by historian of science Sharon Gibbs, renews our admiration for the sun dials and other, more remarkable devices contrived by the ancient Greeks. The Greeks were so close to the origins of modern mathematical science, they are often forgotten by those interested in prescientific astronomy. Here, then, is a welcome reminder of another side of Greek astronomy.

Anthony Aveni is a leading investigator of sites in Mesoamerica and Peru. He contrasts the ecliptic-pole scheme of Mesopotamia with the cyclic numerology of Mexico and appeals effectively for respect and further attention for the New World astronomy, so different from our own. Aveni also suggests that astronomy at temperate latitudes, unlike that at the tropics, was not focused on horizon phenomena. Though the evidence contradicts this, it does not dilute his main theme.

Co-editor Kenneth Brecher contributes his encounter with two mysteries associated with Sirius, the night's brightest star. One is a string of ancient reports of the star's red color. Sirius is white. The other is the the allegedly ancient Dogon tradition of an unseen companion of Sirius. The star exists, but the Dogon shouldn't have known about it. Brecher's account of these two enigmas is intriguing but unresolved. The mysteries await solution, and I suspect in the case of the Dogon much more may be learned by going back to the ethnographic reports.

Stonehenge is described by Owen Gingerich, well-known for his research of more recent astronomical history. Gingerich rightly separates the first stage of Stonehenge from the last, constructed 800 to 1000 years later, and regards the last as a monument to the astronomy of the first. This may, in part, be so, but Stonehenge experienced many modifications, and the astronomical dimension there is much more complex.

Two astronomical interpretations of mythology, one more convincing than the other, wrap up the book. Jerome Y. Kettvin offers an unexpected but plausible network of associations between Mediterranean cephalopods, the Gorgons of ancient Greece, and Algol, the Demon Star. His article ends with the most charming line in the book: "Most of you, of course, may prefer a rational account of things; but I was never one to put Descartes before Horus." Harald A. T. Reiche seeks Atlantis in the precession of the equinoxes. His belief in the astronomical component of myth is reasonable and well-stated, but the details of his cryptoanalysis stir uneasy memories of Pan-Babylonianism and the consequent rejection of any astronomical

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