Sears, D.W.G. (1995a) An Introduction to Cosmochemistry, by Charles R. Cowley. *Meteoritics* **30**, 798-799. (Book review).

An Introduction to Cosmochemistry by Charles R. Cowley. Cambridge Uni-versity Press, New York, 1995, 490 pp., $29.95 (ISBN 0-521-45920-6).

Fourteen years ago I came to the University of Arkansas and inherited a graduate level course on nuclear cosmochemistry from Paul Kuroda. Over the years, the course has evolved into a general cosmochemistry course and spawned an undergraduate version. I mention this because one of the frustrations of teaching an otherwise delightful topic is the lack of a really good textbook. Such was my concern that I am actually about half way through writing a first draft of such a book. When Cowley's book dropped on my desk, it was as if a former student of mine had smuggled my lecture notes to Michigan where an inspired Cowley had beaten me to the press!

The book is as delightful as its subject matter. It begins by defining cosmochemistry (essentially the study of the compositions of cosmic matter and an understanding of the cosmos through the principles of chemistry) and then presents brief but useful primers on mineralogy, petrology, thermodynamics, the cosmochemical classification of elements, Prior's rules and condensation theory. Cowley then describes the determination of the bulk compositions of the planets using astronomical and chemical methods and briefly reviews meteorite compositions, both elemental and isotopic. By now we are about one-third of the way through the book and Cowley jumps into nuclear physics, stellar evolution, atomic and molecular spectra and stellar spectra. These topics are the basis for the final third of the book on stellar evolution, nucleosynthesis, interstellar chemistry and the chemical evolution of the galaxies.

Cowley writes well, with a lively mixture of history and mathematics that he manages to keep nicely balanced. The sections are well thought-out and the general flow of the book is good. The most violent jump is from meteorites to nuclear physics, which is moderated well with a discussion of isotopic anomalies in meteorites. The number of references to other major textbooks is an excellent aspect of the book, as are the problems at the end of each chapter.

A couple of minor negative points do not significantly mar an otherwise excellent book. The first is that slightly greater caution could have been used in presenting the condensation calculations, keeping in mind that the condensation sequence is essentially the reverse of the evaporation sequence and we cannot be sure which is being displayed in meteorites. It might be one or the other or both! Second, the figures are all reproduced from journals and books without redrafting, so the format is varied and the quality usually rather poor. One of the half-tones looks like a silhouette.

But no matter. This is a wonderful book—all chemistry, geology and astronomy graduate students should see it at least once in their formative periods. I am very keen to try it out on my students next Spring. In the meantime, I wonder what I should do with my own efforts in this direction.

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