Sears, D.W.G. (1987b) Chemistry and Physics of Terrestrial Planets, ed. by S.K. Saxena. *Geochim. Cosmochim. Acta*, **51**, 765. (Book review.)

Chemistry and Physics of Terrestrial Planets. Advances in Physical Geochemistry, Vol. 6. edited by S. K. Saxena. Springer-Verlag, 1986, 405 p., $59.00.

WHAT DOES ONE CALL a book dealing with theoretical models of various aspects of the Earth's interior (50%), the surfaces of Venus and Mars (20%), and processes occurring in the primordial solar nebula/primitive solar accretion disk (30%)? Saxena chose the title above for this mixture.

The book starts at its high point. Chapter 1, by Safronov and Vitjazv, is a masterful review of the processes which took the circumsolar disk from diffuse gas and dust to planetesimals. Some of the most exciting recent developments in cosmochemistry lie on the interface between astrophysics and meteorites. Repeated references are made to meteoritic data, so one gets the reassuring feeling that these ambitious theories are constantly being tested against hard data. The second chapter, by Saxena and Eriksson, deals with equilibrium thermodynamic models for condensation in a gas of solar composition. In 69 pages the authors briefly review the calculations of others (mainly Jack Larimer and John Lewis) and describe in exhaustive detail their own calculations for condensation-related reactions of every mineral conceivably relevant to the primordial solar nebula. They skip briefly over non-equilibrium processes, and offer a few self-contradictory words about the uncertainty in their calculations. Further equilibrium thermodynamic calculations are discussed in Chapter 3 by Petaev and Khodakovsky, but this time a non-solar C/O is assumed and the relevance of the calculations to enstatite chondrites is discussed. There is at least one instance of a paper being quoted which has clearly not been read, but perhaps this is atypical.

The next two chapters concern the reactions between the surface and atmosphere of Venus (Volkov, Zolotov, and Khodakovsky) and the relative importance of mechanical mixing and weathering on Mars (Sidorov and Zolotov). These are succinct review papers, especially the Venus chapter which I enjoyed reading and learned much from. The final five chapters concerned theoretical modelling of seismic profiles and phase relations with reference to the Earth's interior. I found these chapters to also be succinct and, on the whole, well-written, but very narrowly focussed.

It is not clear what readership he had in mind when Saxena commissioned these 10 chapters, mainly from Soviet workers. The book is a mixture, and its value to readers will be determined by their interest in a particular chapter. I would buy Saxena's book for Chapter 1 alone, but the remaining chapters, especially Chapters 2 and 3 which are complicated versions of what can be found in the primary literature, are probably too narrowly focussed to be of much use to non-specialists and students.

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