From Stardust to Planetesimals (ASP Conference Series, Vol. 122), edited by Y. J. Pendleton & A. G. G. M. Tielens (Astronomical Society of the Pacific, San Francisco), 1997. Pp. 470, 23·5 × 16 cm. Price $44 (about £26) + $15 airmail shipping (hardbound; ISBN 1 886 73342 2).

This volume contains a collection of review articles describing contemporary work on cosmic dust, its origins, and its astrophysical rôle. About half the book is devoted to compositional issues, with the rest dealing with the relationship of interstellar dust to objects in the Solar System. The transition implied in the book's title, although still conjectural, is one that is rapidly gaining support. The similarities of spectral features of cometary dust and dust in the diffuse interstellar medium show a well-nigh-compelling causal link, a connection that is strengthened with recent discoveries of presolar dust in the form of micro-diamond within meteorites.

Despite the many advances of observational techniques in recent years, the precise composition and origin of the main component of interstellar dust still remains uncertain. What is no longer in dispute, however, is that this dust is comprised of a mixture of organic polymers that includes aromatic and aliphatic functional groups. This is clearly borne out in the articles of Sections III and IV of this volume. The original suggestions of complex organic dust in the diffuse interstellar medium go back more than two decades (*e.g.*, N.C. Wickramasinghe, *Nature*, **252**, 462, 1974; F. Hoyle and N.C. Wickramasinghe, *Nature*, **264**, 45, 1976, and **270**, 323, 1977), and it is a sad commentary of our times that these are not given even a passing reference throughout the book.

The articles in this book on the whole stick closely to a 'law of conservation of paradigms'. New data are often found to point to radical departures from conventional theories. The chapter by J. S. Mathis presents a useful summary of the new observational constraints on grain models. Mathis makes much of apparent differences of heavy-element compositions between B stars and the Sun, with the implication that there might be less C and O than was hitherto thought available for condensation in grains. However, effects of radiation pressure on grains that depend strongly on stellar spectral type could lead to significant fractionation of heavy elements in star-forming regions, and thus affect stellar abundances in a manner consistent with observations. The overwhelming importance of recent *HST-GHRS* observations of interstellar abundances is the invariance of O/H and C/H ratios with respect to the fraction of molecular hydrogen in the line of sight (see article by U. J. Sofia). These data are in conflict with the paradigm of condensation and evaporation of grain mantles in normal interstellar clouds. Although grain mantle condensation must clearly take place, this process seems to be confined to the dense cores of molecular clouds. Likewise the interstellar silicate paradigm which has enjoyed a 20-year run is seriously challenged by the new observational data. Despite significant improvements in spectral resolution over the 8–12 μm waveband, the instances where astronomical data accord adequately with the detailed spectrum of any *real* silicate, hydrated, crystalline or amorphous, remain few and far between. The dust in our Galaxy as well as in external galaxies, typified by data for the Trapezium nebula, shows a significant excess of opacity over silicate models in the 8–9 μm waveband (see, for instance, F. Hoyle and N.C. Wickramasinghe, *Nature*, **223**, 459, 1969; *From Grains to Bacteria* (University College Cardiff Press), 1984). A substantial contribution from non-silicate absorbers seems to be required, a conclusion supported by recent studies of the relative depletions of Si (30%) and Mg and Fe (85%) towards high galactic latitudes (K. R. Sembach & B. D. Savage, *ApJ*, **457**, 211, 1996).