

Star quality

Gary Steigman

Highlights of Modern Astrophysics: Concepts and Controversies. Edited by Stuart L. Shapiro and Saul A. Teukolsky. Wiley: 1986. Pp.389. £34.40, \$37.50.

IN October 1984 some 400 scientists gathered on the campus of Cornell University to honour Edwin E. Salpeter on the occasion of his sixtieth birthday. Without doubt, Salpeter has been in the forefront of many of the most important developments in astrophysics for more than 30 years. That "he is responsible for much of the progress achieved in theoretical astrophysics in the past 30 years", may be hyperbole. Then again, perhaps not. As the 13 articles in this collection continually remind one, Salpeter's influence on and contributions to modern astrophysics have been pervasive.

The articles in this collection range in subject matter from nuclear to neutrino astrophysics, from black holes to the Universe, from observational astronomy to philosophy. The authors are all acknowledged leaders in their fields. Inevitably, some of the contributions have appeared elsewhere, and little new is to be gleaned from the version that appears in this volume.

This, however, is a quibble. In general, the quality of the writing and the depth of detail presented recommends this book very strongly. But I must part company with the editors who think that "non-professional readers with little technical background . . ." should read it; the non-expert will quickly be left in the dust. However, professional astronomers or astrophysicists will find this volume an excellent resource for acquainting themselves with research in allied fields: for the astronomy/physics student, many of the articles will provide comprehensive and comprehensible introductions to some of the most exciting topics in modern astrophysics. Indeed, because of the pedagogical emphasis of many of the articles, the book has not suffered from the two years delay in seeing the light of day. Nor, for this reason, will its usefulness decrease very quickly, even in our ever-changing rapidly developing fields of modern astrophysics. In the wake of Supernova 1987a there is an eerie timeliness in Bethe's monograph on supernova theory and Ruderman's on neutron stars. Are you interested in knowing what was predicted and what observers might expect to find in the coming months? Read those articles. Has something been shot from the supernova at relativistic speeds? Read Martin Rees's article on jets and Marshall Cohen's on relativistic motion. Can we do Cosmology with the supernova? Read

Wagoner's contribution. If irony appeals to you, turn to Riccardo Giacconi's overview of the yet to be launched Space Telescope and contrast it with Freeman Dyson's persuasive "Quick Is Beautiful".

Whenever the writings of 13 outstanding scientists are assembled, variety of style and content will be the rule. These pieces are no exception. Those who find historical perspective appealing should try Willy Fowler's detective story of carbon and oxygen synthesis (and note Hoyle and Salpeter's complementary contributions), or George Field's historical overview of interstellar physics. Do you seek a pocket course in cosmology or in black hole Physics? Proceed directly to the comprehensive and detailed articles by Wagoner or Kip Thorne. Where do we stand on the Solar Neutrino Problem or the Dark Matter Problem? Bahcall and Rubin will tell you.

Although there are the inevitable typographical errors, the quality of production is, with one exception, excellent. The

reproduction of photographs and multi-colour maps is useless; the original glossies should have been included, or the figures revised or eliminated.

This is a valuable book because it can be used in many ways. Some articles provide tutorials, some overviews. All have extensive bibliographies, and there is a good, overall index. But, it is not relaxing summertime reading; with the exception of the "Perspectives" articles by Philip Morrison and Freeman Dyson, to profit from this book requires work. But that work will be rewarded. This volume is a fitting tribute to the accomplishments of Ed Salpeter; to his contributions and influence on the directions modern astrophysics has taken and its successes. □

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A big fat book

A. G. Lee

The Physical Chemistry of Lipids: From Alkanes to Phospholipids. Handbook of Lipid Research, Vol. 4. By Donald M. Small *et al.* Plenum: 1986. Pp.472. \$89.50.

LIPIDS are an unusual class of biological molecule in that they are insoluble in water. They are also an unusually heterogeneous group of compounds, including hydrocarbons, steroids, long-chain alcohols and acids, glycerides, phospholipids and glycolipids. Their biological interest lies in the uses to which their insolubility can be put by the cell, principally, of course, in the formation of biological membranes but also in the formation of lipoproteins necessary for transport about the body. Because they exist in a solid, undissolved state in biological systems, the properties of the solid state are of considerable importance, and this is the principal concern of this book.

For a biologist, the most interesting lipids are probably the phospholipids, glycolipids and sterols which make up the biological membrane. The properties of the phospholipids and glycolipids are best understood in terms of the properties of simpler, long-chain alkyl derivatives such as the alkanes, alkyl alcohols and fatty acids. Information about these compounds is widely scattered throughout the scientific literature and a major virtue of Small's book is that he has sorted through much of this rather tedious stuff, rendering it into manageable form. Unusually, the book is largely by the one author (with contributions from Craven, Lange,

Shibley and Steiner), which makes for an integrated and uniform approach.

The various modes of packing of hydrocarbon chains are particularly well described, as are the wide variety of different solid phases which these compounds can adopt. A clear discussion of the conditions under which these various phases are formed is valuable because of the current interest in the non-bilayer phases formed by phospholipids and their possible importance in the functioning of biological membranes: there is no doubt that a wide variety of non-bilayer phases can be formed under the appropriate conditions, but it is not so obvious that these phases are exploited in any way in biological systems; on the contrary, it seems that they are avoided at all costs.

Small's enthusiasm seems to have dwindled somewhat on approaching the vast literature on phospholipids, and the level of coverage here is less comprehensive than that given to the simpler lipid molecules. Furthermore, in places the literature coverage extends only to the early 1980s, suggesting a long gestation period for the book. But here begins and ends my nitpicking.

This is undoubtedly a true handbook which will be the first source to turn to for data about the physical properties of lipids, particularly the simpler lipids. It is a mine of information. Where else could one find out the solubility of alkanes in water or water in alkanes, the melting point of tsuzuic acid or the structure of obtusilic acid? Small deserves all our thanks for making so much basic data available in so clear and manageable a form. □

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