

book does is cover, with examples and illustrative theory, the behaviour of all types of supergiant stars. Slightly surprisingly, it also sets out to deal with novae and supernovae.

The subject matter includes data from all wavelengths between X-ray and radio, on stars of all possible temperatures. Considerable space is given to describing observations and derived quantities typical of subgroups such as Of, Be, W-R, P Cygni stars and ζ Aur stars. Evolution, atmospheric structure and mass-loss are described in separate chapters, and the largest section deals with chromospheric, coronal and circumstellar dust phenomena.

It is perhaps too easy for one familiar with the subject to look for deficiencies or omissions. My main personal regrets were the lack of summarizing tables in many sections, the lack of coherence between some of the chapters and the omission of many of the observational details and uncertainties. A good bibliography of more specialized books, conference proceedings and reviews would also have been welcome.

Nonetheless, the book is fairly thorough in its coverage and it is hard to find much of importance that is left out. Theoretical sections accompany all descriptions of data, but are mostly given at the physical concept level; the book is not a reference source for applying or deriving rigorous models. The chapter on atmospheres is perhaps the exception here and is an excellent introduction to recent work. However some other topics are belaboured to the point of my wondering how important they really are.

The author has clearly made extensive use of other published material and diagrams. While this tends to override any particular bias, it leads to a somewhat variable depth in the treatment of different topics. Diagrams are generally reproduced from other work and often contain symbols or features not explained in the captions. There is a sprinkling of typos and grammatical curiosities, which do not detract seriously from the book's impact — one which occurs regularly is "criterium". I also spent some time looking for the fifth type of nova.

The most luminous stars are important as they are responsible for most of the X-rays, supernovae, enrichment of the ISM, star formation and optical radiation in a galaxy, but they are rare and constitute a small fraction of its mass. They are often the only individual objects we can study in other galaxies, and it is clear that we need to understand them more fully. This book provides a good background and overall description of their properties at a time when many new facts are being learned about them. □

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Coming out on top

D.H. Everett

Chemistry in Two Dimensions: Surfaces. By Gabor A. Somorjai. Pp.575. ISBN 0-8014-1179-3. (Cornell University Press: 1981.) \$48.50, £29.

THE George Fisher Baker Lectures at Cornell University have long had a reputation for excellence, and those which have subsequently appeared in print have been important milestones in the development of chemistry: they include the books of Alfred Stock, Monteath Robertson, Linus Pauling, C.K. Ingold, G. Herzberg, Paul Flory, Jack Dunitz, Herbert Brown and R.P. Bell. This volume by Gabor Somorjai will prove to be no exception.

The past 20 years have seen an explosive development of surface physics and surface chemistry, brought about as so often happens by major developments in experimental techniques. Today the tools of the surface scientist are represented by a bewildering and annually increasing number of acronyms. In this book, after an introductory chapter, some 20 such techniques are explained, and their application to the characterization of solid surfaces is outlined. The results of experimental work on the surface composition of alloys are then described and their theoretical interpretation discussed. Enrichment of the surface of alloys by one preferentially adsorbed component follows a pattern familiar in work on liquid-vapour and solid-liquid interfaces, and it is perhaps a pity that the opportunity was missed here to draw attention to the underlying unity of various branches of surface science. Thus the theories of the surface enrichment of alloys, published in the mid-1970s and presented in the book, are essentially identical with those of adsorption at the liquid-vapour interface originally developed for ideal systems by Butler in 1932 and for regular solutions by Schuchowitsky and Guggenheim in the 1940s, and applied in the 1960s to adsorption at the solid-liquid interface. The unfortunate impression left by the present account is that the theories described are recent developments aimed specifically at the solid-vacuum interface.

Two chapters on the structure of clean surfaces and of adsorbed monolayers on solids provide full and authoritative accounts of the voluminous literature on the subject. A discussion of the surface chemical bond and of energy transfer in gas-surface interactions provides a valuable introduction to the last third of the book, which is concerned with catalysed chemical reactions at surfaces. A general account of heterogeneous catalysis includes extensive and valuable tables of kinetic parameters characterizing the catalysis by metal surfaces of the hydrogenolysis of ethane, propane, *n*-butane, isobutane, the isomeric pentanes, several hexane isomers, *n*-heptane,

benzene and a number of other hydrocarbons. Also tabulated are kinetic data on the ring opening of cycloalkanes, toluene hydrodealkylation and hydrogenolysis, the hydrogenation of olefins and aromatics, and the isomerization and dehydrocyclization of alkanes. These tables in themselves make the book an essential part of the literature on heterogeneous catalysis. Particular attention is then given to hydrocarbon conversion on platinum and to the catalytic hydrogenation of carbon monoxide; and a brief final chapter deals with photochemical surface reactions.

Gabor Somorjai has contributed much distinguished research to surface science. His enthusiasm and the authoritative position he commands in this field are apparent throughout this book. It cannot fail to become a classical text, the value of which will not be diminished by the rapid developments which will surely ensue in the future. Both as a wide survey of surface science, and as a source of critically assessed kinetic data on heterogeneous catalysis on metals, the book is most strongly recommended. □

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Seminal secrets

R.J. Aitken

Male Reproductive Function and Semen: Themes and Trends in Physiology, Biochemistry and Investigative Andrology. By Thaddeus Mann and Celia Lutwak-Mann. Pp.495. ISBN 0-387-10383-X. (Springer-Verlag: 1981.) DM150, £32.

IN *Male Reproductive Function and Semen*, Mann and Lutwak-Mann have produced a highly authoritative treatment of a vast volume of literature relating to the production, composition and function of semen. The book is a sequel to the successful *Biochemistry of Semen and of the Male Reproductive Tract*, published by Methuen in 1964, and summarizes the important advances that have taken place in the field since that time.

There should be something in the text for any student, clinician or scientist interested in this subject. For the student, there is an extensive bibliography and a comparative approach which provides a fascinating insight into the diversity of reproductive strategies employed by different groups of animals.

For the clinician and scientist no page of this book should really remain unturned. Of particular interest to the former are sections on such topics as the assessment of semen quality, the cryostorage of spermatozoa and the biochemistry of seminal plasma in relation to andrological practice. For the research worker there are excellent,