

surface where the distribution of energies is Gaussian. The sixth chapter deals with chemisorption, and I thought this the least critical part of the book. The seventh chapter deals with adsorption from solution, and the last chapter gives some experimental hints for determining isotherms.

The book is relatively free from errors, but I could not overlook some points. Pressures lower than 10^{-5} torr can be measured by a suitably constructed Pirani gauge (page 309), and vacuum conditions are as important in studies of fundamental aspects of physical adsorption as for chemisorption, both phenomena being sensitive to surface topography (compare page 308, where the authors state that a vacuum of 10^{-5} torr is sufficient). The well-defined point *B* reported in reference No. 89 (page 88) was actually at a very low relative pressure (0.01, not 0.1 as stated).

The book is well produced and its content is appropriate for a large number of potential users, which includes undergraduate and postgraduate students and people in industrial research laboratories. There are some 560 references and the figures have a uniform style (Fig. 6.6 excepted!).

M. W. ROBERTS

LOW TEMPERATURE PHYSICS

Specific Heats at Low Temperatures

By E. S. R. Gopal. (The International Cryogenics Monograph Series.) Pp. x + 240. (London: Heywood Books, for Iliffe Books, Ltd., 1966.) 70s.; \$11.50.

SOME twenty or so years ago several useful books appeared dealing with physical phenomena of importance at temperatures generally realizable using liquid nitrogen, hydrogen and helium. These books could all be given the same broad title "Low Temperature Physics" and, although the emphasis varied from one publication to another, there was in each an attempt to review a variety of topics from the theoretical and experimental aspects. The wider availability of low temperature facilities and resources since then has greatly speeded the collection of detailed knowledge about the behaviour of matter at low temperatures and this has, of course, stimulated theoretical speculation.

That a series of monographs written by specialists in limited fields is now called for to replace the general books of twenty years ago reflects the general trend of greater specialization which must accomplish greater detailed knowledge. In the circumstances, it is clear that the editors of such a series will exercise their important controlling functions in the choice of individual authors. Let it be said right away that the editors are to be congratulated on their choice of author for this volume. It is no easy task to collect within such a limited compass a sufficient theoretical background with which to compare experimental results and to make the comparisons in a way which retains the active interest of the reader. Dr Gopal has made an excellent selection of topics and dealt with these in an admirable way. The theory is sufficient to make the results intelligible in all cases and although certain readers with particular interests will want to supplement what is given in the book they will find much not requiring any additional reading; the references at the ends of chapters make good starting points for further work.

The arrangement of the book follows a conventional but logical pattern. Starting with some elementary concepts, the author goes on to a discussion of lattice heat capacity, including a very satisfactory introduction to lattice dynamics, and the occurrence of Debye θ in other problems of the solid state. The next chapter deals with the electronic heat in metals and alloys, including superconductors, and the relationships to other properties. As

the author states, he cannot do justice to the BCS theory in the space available, but what he does clearly shows the interesting character of the results which can be followed up in the papers referred to at the end of the chapter. The fourth chapter deals with the magnetic contribution to specific heats and I found this a particularly useful chapter. After a brief outline of the thermodynamics of the problem the author deals with specific heat contributions arising from spin waves, ordering processes with reference to the Ising and Heisenberg models and specific heats near the transition temperature, Schottky effects in paramagnetic salts and those arising from nuclear magnetic moments. A useful chapter follows on liquids, most of which is given over to liquid ^4He and ^3He , with a brief mention of mixtures of these two liquids.

Although the chapter on the specific heats of gases has to be included for completeness, the material dealt with is readily available in many standard works elsewhere. The final two chapters deal with specific heat anomalies and miscellaneous problems such as specific heats near phase transitions, relaxation of rotational and vibrational specific heats and surface effects.

To some specialists parts of this volume may appear inadequate, but if it had been intended principally for such people it would have taken a different form and certainly not have been condensed into 240 pages. The book can be thoroughly recommended to anyone interested in calorimetry, for Dr Gopal has managed to present a great deal of factual information in a most readable style.

F. E. HOARE

ENZYMES AND SACCHARIDES

Methods in Enzymology

Vol. 8. Complex Carbohydrates. Edited by Elizabeth F. Neufeld and Victor Ginsburg. Pp. xxv + 759. (New York: Academic Press, Inc.; London: Academic Press, Inc. (London), Ltd., 1966.) 208s.

THIS comprehensive volume must be regarded as a complementary volume to *Methods in Carbohydrate Chemistry* by Whistler and Wolfrom. It contains 119 articles written by more than 150 authors from many different laboratories in the world, and it is concerned with methods, including quantitative methods, for dealing with all the enzymes involved in the synthesis and degradation of complex saccharides.

The book starts with a section on analytical methods for estimating simple sugars, particularly those contained in mucopolysaccharides and mucoproteins. Some of the methods, particularly immunological methods and gas chromatography, will be particularly useful at this time.

One section deals with the methods of preparation of the substrates used in the subsequent enzyme reactions. Descriptive methods for dealing with enzymes themselves are divided into three sections: these consider sugar activation, complex saccharide synthesis and finally the utilization of complex saccharides. All the individual processes are described by acknowledged experts in the field, and so it will be found that the best available methods are provided. Readers will find the grouping of the sugars and the techniques concerning them together particularly valuable. Thus all the systems dealing with amino sugars are provided and also, for example, all those dealing with the involvement of sugar nucleotides in the important and novel transferase systems.

Each of the sections makes fascinating reading to all concerned with any aspect of carbohydrate chemistry and biochemistry. Articles on neuraminidase and the sulphatases are particularly topical.

Excellent author and subject indexes are provided, and the book is splendidly printed and can be warmly recom-