layers and aqueous dispersions of lipids.

Three chapters are concerned with surface chemistry: adsorption of molecules which can be taken as analogues of biological molecules, onto non-biological surfaces (Fontana), adsorption of surfactants at solid-water interfaces (Fuersteran) and adsorption of proteins and lipids to non-biological surfaces (Brash and Lyman). Although all are well written, the choice of material seems arbitrary. It would have been possible, for example, to choose examples of surfactant action of considerable biological relevance; and the importance of hydrogen bonding in explaining the action of surfactants on living systems, as worked out by Nash and others, is not mentioned.

The final chapter on cellular narcosis and hydrophobic bonding by C. S. Hersh is more rigorous physico-chemically than Ferguson's well known thermodynamic approach to the problem. The presentation, however, still offers little information about which biological materials are likely to be important in anaesthesia (for example, lipid or protein of the membrane or some other site).

In general, the book is clearly written, well produced and illustrated, and accurate. Occasional misprints—for example, on page 285, solvents in black membranes are described as "space filters"—are of minor importance.

A. C. ALLISON

Electronic Theory

Thermodynamics of Electrical Processes. By Malcolm McChesney. Pp. ix+278. (Wiley: London and New York, 1971.) £4.25.

THE preface is quite clear about intentions: the book is written by a professional thermodynamicist for second-year, third-year and perhaps early postgraduate students of electrical engineering and physics. The systems of primary interest are metals and semiconductors, many of whose properties are explicable in terms of interacting gases of electrons and phonons in imperfect lattices. The author's view is that these matters are best understood against a background of statistical thermodynamics applied to perfect quantum gases. I find the approach most helpful and only wonder why the title is not more accurately descriptive. Personally I would have removed chapter 1 (thermodynamics revision) and the final chapter (on information theory, irrelevant to the main themes).

The formal statistical mechanics is conventional and restricted to the microcanonical distribution. The approach is well explained, with the aid of examples and tables but missing out unduly sophisticated mathematical argument where a simple assertion will do. There is then a very detailed account of Maxwell–Boltzmann gases (including plasmas), Fermi–Dirac gases (including conduction electrons) and Bose–Einstein gases (including the phonon gas in solids). There follow 53 pages of excellent material on thermal and electrical transport in solids, and another well-presented 65 page chapter concentrating on band theory and electrons in semiconductors. The omission of a detailed model (such as Kronig–Penney) perhaps illustrates the slightly arbitrary criteria for selection of material in the book. Anyway I think it is fair to say that arguments are predominantly physical, based on the mathematics of the earlier "service" chapters or merely asserted.

The layout is pleasant and there are a few problems after each chapter.

DAVID BETTS

The Metallic State

Magnetic Resonance in Metals. By J. Winter. Pp. xiii+206. (Clarendon: Oxford; Oxford University: London, November 1971.) £5.50.

THIS monograph presents a uniform and coherent view of the relationship between the nuclear and electronic spin systems and the measurable quantities accessible to the experimentalist. The initial chapters provide a very brief introduction to nuclear magnetic resonance, the hyperfine interaction, and electrons in metals. These are the *sine qua non* of the subject at hand, and the coverage is adequate to introduce the bulk of the notation required subsequently. Chapter 4, entitled "Theoretical Study of the Nuclear Resonance Properties of Metals", promises to "include all the information about the metallic state that can be learned from a nuclear resonance experiment"—a statement designed to make a reviewer wince. Not surprisingly it is the longest of the ten chapters, and the treatment does introduce and develop essentially all of the basic concepts and many of the expressions found to be needed in the balance of the book. The theoretical treatment is concise, often invoking second quantization formalism. Were it not for the author's generally helpful physical arguments the coverage might be a bit too succinct in some places. The degree of theoretical sophistication of the reader, and also his motives in reading the book, will determine the adequacy of treatment. The unity and freshness of approach in the derivations is the strong virtue of the book and will be of undoubted help to the newcomer. The chapter (and book) are admirable in presenting a clear and inclusive statement of the significant nuclear-electron interactions in metals.

Successive chapters deal with the application of the theory to pure metals, alloys, liquid metals, and liquid alloys. The presentation is smooth and appealing. At times liberties are taken with the number and placement of data points in the (apparently all redrawn) figures; however, these renditions are generally satisfactory for their primary purpose of illustrating the author's arguments. The referencing is confused in Fig. 7.3 and Table 7.1; the ordinates in Figs. 7.1 and 7.7 are wrong, and the abscissae are atomic %. Somehow these facts do not detract greatly, and are presented here in an attempt to convey a sense of the relative emphasis and attention given to presenting the experimental and theoretical aspects of the subject.

Transition metals (even as dilute additions to the noble metals) are treated separately with arguments stressing the role of their unfilled inner shells. The use of resonance to investigate suspected Kondo behaviour is described, including reference to the local spin fluctuation view. Space does not permit a properly appreciative review of the chapters on superconductors and spin resonance of conduction electrons. The latter especially is very nicely done. Its material is used by reference throughout the book and enhances the entire effort.

Experimental technique is not discussed; some areas (for example motional effects), perhaps of less interest to some physicists, are essentially omitted and reference to them is annoyingly weak. Also, more frequent use of the 204 references given (ending in mid-1969) would have been beneficial. No tabulated reference data are included. The value of a Knight shift for a metal must be found elsewhere. Author and subject indexes are present and adequate; misprints and errors are few and not serious. The reader would be wise to refer to the original paper of Kohn and Vosko (Winter's ref. 95) for a more lucid derivation and numerically correct expression of Equation (7.25).

T. J. ROWLAND

Journal on Environment

Environmental Physiology: Nutrition, Pollution and Toxicology. Edited by J. Clausen. Associate editors, A. C. Allison, J. Ganguly, W. Staib, E. M. Boyd, B. Holma and P. S. Timiras. Vol. 1. No. 1. Pp. 54. Vol. 1. No. 2. Pp. 55–103. (Munksgaard: Copenhagen, 1971.)

THE stated scope of this new journal "encompasses experimental work on all environmental factors of a physical, chemical and/or physico-chemical