

neuroendocrinological studies should have been to the fore. Contributions by Dr J. S. Tindal on "Environmental Stimuli and the Mammary Gland", Professor L. Martini on "Hypothalamic Releasing Factors", Professor W. B. Quay on "The Significance of the Pineal", and Professor H. Heller on "The Neuroendocrine Control of Water Metabolism" are notable in this respect.

The diversity of subject matter and the comprehensive manner in which it is treated within the common framework of "Hormones and the Environment" should make excellent reading for all interested workers in the field of endocrinology. The many questions raised by the contributors will undoubtedly encourage further research.

A. THORPE

ELEMENTARY OPTICS

Optical Data Processing

By Arnold Roy Shulman. (Wiley Series in Pure and Applied Optics.) Pp. viii+710. (Wiley: New York and London, June 1970.) 260s.

OPTICAL data processing is one of the more exciting applications of the past decade of intensive research in lasers and opto-electronics. The publishers of this text state that it "presents a thorough introduction to this new field" with "a maximum amount of physical interpretation of the basic principles". The publication of such a book would be particularly opportune but, unfortunately, this volume is far from meeting these claims. Rather, it is a compendium of elementary optics and the associated mathematics, rarely rising above the level of a first-year university course, and spiced with some practical hints on photography and holography.

Typical examples of the general mathematical verbosity are the use of three lines on p. 121 to move from $\sqrt{2\pi}/2\pi$ to $\sqrt{1/2\pi}$ and the trivial algebraic steps on p. 284, one of the sixty-one pages devoted to the elementary mathematical treatment of Ronchi gratings. The book is cluttered with much algebraic and optical trivia, yet, curiously, while eighty pages are devoted to developing Fraunhofer diffraction, the Fresnel-Kirchoff integral is quoted (on p. 389) without any derivation at all. There is an equal profusion of trivial or repetitive photographs, such as that of a rectangular aperture on p. 624 and the thirty-three Moiré patterns in appendix 6. Circumlocution extends even to the final chapter on properties and techniques for photographic reproduction, which, like the rest of the volume, could have been drastically condensed to great advantage. This book cannot be recommended, especially at a price of 260s.

D. J. BRADLEY

SOUNDERS AND WHISTLERS

Plasma Waves in Space and Laboratory

Edited by J. O. Thomas and B. J. Landmark. Vol. 2. Pp. 562. (Edinburgh University: Edinburgh, April 1970.) 140s.

This volume completes the published proceedings of the Røros school of April 1968, and comprises some thirty-five papers—those classified as contributions to current research rather than as reviews. Papers concerned with space rather than laboratory plasmas predominate, on both observational and theoretical aspects.

The several contributions on top-side sounders, ionosphere resonances detected by Explorer XX and the Alouette satellites, seem somewhat contradictory and confusing, until put in perspective by Benson's review of the numerous observations. The demonstration that

the resonant frequencies are displaced from the integral harmonics is important for deciding between rival theories. Allowing theoretically for non-uniformities in the magnetic field is also shown to be important. A further sizable group of papers concern themselves with whistlers, both their detection and explanation. The importance of collisions in selecting the propagating (convective) modes is brought out from two angles. There are, in addition, several papers on antenna theory—these with laboratory emphasis—and two final, isolated contributions on weak turbulence and on magnetospheric drift instabilities (as the source of micropulsations).

Through using offset reproduction of an excellent typescript, this volume gives some 50 per cent more information per £ than volume one, but at the cost of closer type and occasional clumsy format. The publishers deserve congratulations for the overall good quality production at—for these days—a reasonable price. Nevertheless, I question the sense of producing current research papers this way, at perhaps double their cost in established journals. Some of the papers will no doubt retain relevance for a few years yet, but inevitably in the two years since the Røros school, many have been superseded by more recent work. As in the first volume, abstracts are annoyingly absent, so I must again deplore the lack of adequate summaries to certain of the papers. Still, for those working specifically on top-side sounders and whistlers, this volume will provide a useful collection for reference purposes, and for would-be students it supplies a convenient introduction to these topics.

M. K. WALLIS

BETWEEN THE STARS

The Interstellar Medium

By S. A. Kaplan and S. B. Pikelner. Pp. xi+465. (Harvard University: Cambridge, Massachusetts; Oxford University: London, July 1970.) 190s.

THOSE of us working in the field of interstellar matter have become increasingly aware of the need for a comprehensive and up to date text on this subject. During the past decade our traditional views of the interstellar medium have undergone a significant evolution. The simple, two-component picture of an interstellar medium consisting of gas and dust clouds has proved to be as inaccurate as it is naive. In addition to gas and dust, magnetic fields, cosmic rays, radiation fields and stars must be considered together as forming a system of mutually interacting components. The authors of this book have played a major part in shaping our modern view of the interstellar medium, and in their new book they expound this view in a clear and lucid manner.

The first chapter deals with interstellar hydrogen, the most abundant component of the interstellar medium. It discusses the state of ionization of hydrogen and its distribution in space, the propagation of Lyman continuum and Lyman-alpha radiation and the emission and propagation of radiowaves in the interstellar medium. Then follows a chapter on the physical state of the gas which includes a discussion of the formation of spectral lines in the interstellar gas, molecules in space and the energy balance of the interstellar gas. Next is a chapter on interstellar dust followed by one on interstellar magnetic fields and non-thermal radio emission in the galaxy. A final chapter, devoted to interstellar gas dynamics and the evolution of the interstellar medium, discusses, among other topics, the behaviour of shock fronts and ionization fronts in the interstellar gas as well as the problem of star formation from interstellar gas clouds.

The book encompasses a remarkably wide range of topics presented in a logical order with meticulous care given to detail. Theoretical discussions are often presented from first principles, and relevant observational