

REVIEWS

Remote Sensing—Optics and Optical Systems. By Philip N. Slater. [Addison Wesley Publishing Co., Reading, Massachusetts 01867 (617) 944-3700], 1979, Pp. 575, Price : \$ 34.50.

At a time when remote sensing is being offered as the indispensable (but yet unproved) solution to the problem of monitoring and managing earth's resources (agriculture, forestry, minerals, etc.), the book under review is remarkable for (i) its lucid analysis of the motivation (advantages) and limitations of remote sensing; and (ii) a coherent development of the basic principles and techniques involved.

The author, well known for his work in optics, has presented the essentials of remote sensing in such a way as to serve the needs of (i) the practising resources manager (by calling attention to the potentialities and limitations of the techniques used); and (ii) the design scientist engaged in the choice of suitable sensor payloads (on board the aircraft/satellite).

Even though, as the author points out in the preface, the book does not deal with remote sensing outside the spectral range $0.4-16\mu\text{m}$, its contents serve as sufficient motivation for a similar logical development of remote sensing principles and techniques in the other useful bands of the electromagnetic spectrum.

The main aim of remote sensing is to identify (and estimate the extent of) the desired ground features over large areas by making use of measurements of radiant flux emanating from them. The sensors which record these measurements are located far from the scene of interest. It turns out that the measured radiant flux is subject to changes caused by many factors (like sensor degradation, atmospheric and sky variations). Further, in order to be able to separate ground features from one another, and to develop satisfactory techniques (manual/automatic) for effecting this separation, we should acquire (radiant flux) data having good spatial and spectral resolution.

The book leads the reader from clear-cut definitions of the various terms germane to remote sensing, to the basic equations of feature characteristics, first based on simplifying assumptions and then on the modifications needed in reality. The author has arranged the topics systematically, giving a detailed view of remote sensing techniques with reference to the optical (visible, infrared) systems in wide use. However, image processing and scene classification of the acquired data are not considered.

Now a listing of the essential contents of the book follows :

Chapter 1. Motivation for remote sensing.

Chapters 2 and 5. Introduction to and explanation of remote sensing terminology. Radiation calculations. Standard (reference) sources.

Chapter 3. Electromagnetic radiation. Radiational characteristics of sun. Atmospheric properties. (The material of this chapter is standard fare.)

Chapter 4. Electromagnetic theory (the details of which, as the author correctly points out, are not necessary for understanding the rest of the book). However, the contents of this chapter would be useful for developing the techniques of microwave remote sensing.

Chapters 6 and 7. Basics of the imaging of earth's resources. Image irradiance calculations. Spectroradiometric calibration of remote sensing systems. Band selection using filters. Spectral properties of objects. Analysis of colour.

Chapters 8, 9 and 10. Atmospheric (absorption and scattering) effects on remote sensing measurements. Atmospheric models. Spectral (reflection and emitted) characteristics of ground features and their correction. Reflectance models. New material on the Fraunhofer Line Discriminator (FLD) method and its feasibility.

Chapters 11 and 12. Characteristics of imaging systems : Cameras, aerial films (black-and-white, colour). Microdensitometer and drum scanner (needed in the digitization and reproduction of photographic data).

Chapter 13. Electro-optical (semiconductor) detectors : Photomultiplier tube, visible and infrared scanning systems. Design calculations. Return beam vidicon (used in satellite remote sensing).

Chapter 14. Concluding material on space remote sensing systems : Landsat (and its data format), Thematic Mapper (of current interest) and others. Future technology based on charge coupled devices.

Appendices 1-9. Useful material to supplement the text. Appendix 9 on satellite data is quite informative.

The references in each chapter are relevant and up-to-date.

On the whole, the book is an excellent introduction to the basic principles and techniques of remote sensing in the optical and near infrared regions of the electromagnetic spectrum.

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Annual Reviews Reprints—Immunology, 1977-1979. Compiled by Irving Weissman (Annual Reviews Inc., Palo Alto, California, 94306, USA), 1980, Pp. vii + 466. Price : not given.

Recent developments in immunological techniques provide tools of unprecedented specificity to researchers in cell biology, developmental biology, biochemistry, pharmacology and clinical medicine. Due to their wide applicability in many disciplines overlapping immunology, the most recent developments in the field have been critically reviewed in diverse Annual Review series : Biochemistry, Biophysics and Pharmacology and Toxicology. In Annual Review Reprints : Immunology, 1977-79 compiled by Irving Weissman of Stanford University, 18 of such selected review articles were brought under a single cover.

The articles included in the 'Reviews' by different author(s) are : **ANTIBODIES**—1. Three dimensional structure of immunoglobulins (L. M. Amzel and R. J. Poljak), 2. Early molecular events in antigen-antibody cell activation (H. Metzger); **MEMBRANE BIOLOGY**—3. Recent membrane research and its implications for clinical medicine (V. T. Marchesi), 4. Immunological properties of model membranes (S. C. Kinsky and R. A. Nicolotti), 5. Photoaffinity labelling of biological systems (V. Chouwdhry and F. H. Westheimer), 6. Chemical cross-linking in biology, (M. Das and C. Fred Fox), 7. Phagocytosis as a surface phenomenon (C. J. van Oss), 8. Immunogenetics of cell surface antigens of mouse leukemia (L. J. Old and E. Stockert); **CELLULAR IMMUNOLOGY** :—9. Control of

immune system by inhibitor and inducer T lymphocytes (H. Cantor), 10. Perspectives on the *in vivo* location of cellular interactions in the humoral immune response (J. R. Lumb), 11. Association between major histocompatibility antigens and susceptibility to disease (R. M. Zinkernagel), 12. Dynamics of the macrophage plasma membrane (S. H. Zuckerman and S. D. Douglas); **CLINICAL IMMUNOLOGY**—13. The association between genes in the major histocompatibility complex and disease susceptibility (T. Sasazuki, H. O. McDevitt and F. C. Grumet), 14. IgA-associated glomerulonephritis (J. J. McPhaul, Jr.), 15. Immunological aspects of renal tubular and interstitial diseases (R. T. McCluskey and R. B. Colvin), 16. Immunobiology of the maternal-fetal relationship (R. E. Rocklin, J. L. Kitzmiller and M. D. Kaye), 17. Immunotherapy for malignant disease (J. E. Goodright, Jr. and D. L. Morton) and 18. Hairy cell leukemia (R. C. Braylan and J. S. Burke).

This review volume provides specialists with ready access to current critical reviews in immunology and to beginners a comprehensive presentation of fundamental aspects of immunology. Acquiring this volume by the libraries of Research Institutes, Universities and Medical Colleges would greatly benefit post-graduate students, teachers and research scholars.

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SYMPOSIUM ON 'NEW REAGENTS, REACTIONS AND REARRANGEMENTS'

The symposium held on 20 January 1981 at the University of Madras, Department of Organic Chemistry, consisted of invited lectures from distinguished chemists of India. The lectures covered new findings either unpublished or pending publication. Professor Ernest L. Eliel of the University of North Carolina was also present as Sir C. V. Raman Visiting Professor of the Madras University. The participants included senior organic chemists and research scholars of various

institutions. The afternoon was devoted to Prof. T. R. Govindachari Endowment Lectures, by Prof. Sukh De/ and Prof. Pai. Professor S. Swaminathan of the University of Madras was given the first (1980) T. R. Govindachari 60th Birthday Commemoration Award for his distinguished work in organic chemistry. The award Rs. 5,000 is made once in two years by the University of Madras.