and contributor to a number of topics in the field of chemical kinetics. In particular, he has carried out some interesting theoretical work on the clarification of "macroscopic" chemical kinetics from the underlying microscopic molecular basis. This book is a review in which he discusses and summarizes the current status (up to 1964, the date of appearance of the original Russian version) of theoretical work in unimolecular reactions and the thermal decomposition of diatomic molecules. In line with Nikitin's interest it is written from the point of view that the macroscopic results on rate coefficients in a thermal ensemble should be related to and explained on the basis of the molecular interactions, both dynamical and statistical, underlying the overall rate process. This is a point of view with which the majority of chemical physicists, including this reviewer, are in hearty accord.

Within the limits of the 150 pages of this monograph, Nikitin has done a competent and welcome job. He has presented objectively and clearly the various approaches, models and theories that have been developed. Moreover, and much to his credit, he has managed to present the gist of the theories and arguments without getting the reader bogged down in unnecessary details. The latter can be obtained by the interested reader from the original papers that are well referenced in the book. If the reader is left somewhat unhappy and confused after reading this book, it is not the fault of the author, but of all the workers in the field (including the reviewer) who have not yet managed to develop a really predictive theory free of floating fudge factors of one sort or another. One of the salutary effects of this book is the demonstration that there are still many unsolved problems and that at present a theoretical chemical kineticist can always explain the magnitude and temperature dependence of a rate coefficient *after* the data are at hand but in most cases cannot yet calculate too well these quantities a priori.

This book can be recommended as a valuable introduction and summary to graduate students and to research workers planning to enter this field. The translation is well done, the printing large and clear and the book as a whole is well produced.

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The reviewer is a visiting professor of chemistry at the University of California, San Diego in La Jolla on leave as a senior research fellow from the National Bureau of Standards. He says he "has contributed to the confusion in this field through his own publications."

Emission, propagation, etc.

SOLAR RADIO ASTRONOMY. By Mukul R. Kundu. 660 pp. Wiley, New York, 1965. $19.75

by H. J. Hagger

During the last 20 years an enormous amount of research has been done in radio astronomy, and particularly in solar radio astronomy. The author has attempted to review and coördinate the observations, interpretations and associations of the sun's radio emissions in this book, as he states in his preface. With the exception of chapter 16 this book is a revised edition of a report of the University of Michigan's Radio Astronomy Laboratory where the author was affiliated before becoming an associate professor at Cornell University.

The book starts with a classification of solar radio emissions and an outline of the subject of research, the active sun. In chapter 3 the propagation and generation of radio waves in the solar atmosphere is discussed and bremsstrahlung, gyro-synchrotron radiation and Cerenkov radiation are considered as principal mechanisms of emission. In chapter 4 the author describes the basic techniques applied to solar radio astronomy. He then discusses the quiet-sun radiation at different wavelengths and also the radiation intensity distribution of the solar disk, that is, the background component of radiation. The second component considered is the slowly varying one that is correlated to sunspot regions. Systematic studies of the radio bursts at centimeter wavelengths that are superimposed on the two quiet-sun radiation components, have been made during the IGY. These bursts are classified and characterized in chapter 7. Comparison is made with flare areas and

with bursts at longer wavelengths. The author discusses several interpretations of the mechanisms related to these radio bursts. In chapter 8 Kundu discusses radio emissions in the frequency range between meter and centimeter wavelengths which show some similarities with the adjacent regions, but which on the other hand have properties characteristic for this decimeter wavelength region only. In chapter 9 there follows a description and interpretation of meter-wavelength radio emission of sporadic nature. This radiation is a powerful means for studying plasma and solar physics.

Chapter 10 is entirely devoted to intense and sudden meter-wavelength radiation that shows a slow drift in frequency. Chapter 11 then discusses the period of enhanced radiation following great outbursts of solar radio emission and chapter 12 deals with noise-storm radiation at meter wavelengths. In chapter 13 the author investigates the correlation between centimeter-wavelength emission and x-ray radiation. In the next chapter the relationship between solar radio bursts, geomagnetic storms and solar cosmic rays is dealt with. In chapter 15 Kundu discusses the dependence of solar emission from active solar regions and deals with an explanation of the production of different radiation types on the basis of the behavior of an active region relative to time. In chapter 16 the author investigates and interprets the observed increase of angular size and decrease of intensity of a radio source as its radiation passes through the outer corona. In the next chapter radar observations are described and in the last section Kundu investigates briefly the role of a satellite in observation of solar bursts. About 400 references help the reader through the literature.

Kundu's book is a comprehensive and excellent work on solar radio astronomy. He not only succeeded in summarizing the different observations on the subject, but also discusses the results, tries to explain the mechanisms involved and makes conclusions from the data published.

The book will be of high value to any radio astronomer and particularly to a solar investigator both from the astronomical and radio-technical field.

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A specialist in electronics, H. J. Hagger is associated with Albiswerk/Zürich in Switzerland.

For better understanding

TRANSISTORS: PRINCIPLES AND APPLICATIONS. By R. G. Hibberd. 304 pp. Hart, New York, 1965. $5.95

by H. J. Hagger

"Intended mainly for students and technicians," as the author states in the preface to this book, the subject is explained in words, detailed descriptions and drawings. The author starts with a historical introduction and with simple basic principles of solid-state physics, discussing junction and recombination phenomena by very simple and well composed model pictures. The reader is then gradually guided through basic circuits and fundamental equations. In chapter 3 transistor characteristics of input and output variables are discussed. The effects of temperature on leakage current are briefly considered stating rule of thumb for its increase. Voltage and current limitations, junction temperature and power dissipation as well as frequency and noise characteristics are treated briefly and generally. In a very good 4th chapter on transistor technology, standards and even more recently introduced manufacturing methods are explained. In chapter 5 the author switches to associated semiconductor devices, such as point-contact, gold-bonded and junction diodes, as well as tunnel and backward diodes. Rectifi-