contributions that could be printed quickly, and Volume 2 contains the invited papers and the tardy ones. The majority of the papers are in English, with German a poor second. A few of the articles are in French.

The chief purpose of this brief review is to record the appearance of these volumes so that the less fortunate—those who were unable to attend the conference and enjoy the Gemütlichkeit of Munich—can read the papers which interest them while ensconced in their favorite easy chairs. The publishers and the editor are to be complimented on the lightning speed at which these proceedings appeared and on the general excellence of the photographs and the printing.

Elements of Maser Theory. By Arthur A. Vuylsteke. 362 pp. D. Van Nostrand Co., Inc., Princeton, N. J., 1960. $9.50. *Reviewed by Hans J. Hagger, Albiswerk, Zurich, Switzerland.*

MOST of the microwave devices we are familiar with can be easily understood by classical physics, and most of the people interested in the subject can follow the theories of such devices in books and periodicals. During the past few years, however, it has become necessary to incorporate quantum theory into the general knowledge of a microwave scientist, to enable him to understand new devices such as masers and lasers. Vuylsteke's book provides this basic knowledge. It is divided into three parts, of which the first two (about half of the pages) form an introduction to Bohr's quantum theory, to statistical mechanics, and to the interaction of matter and radiation. In the first chapter, an axiomatic approach to modern quantum theory, statistical mechanics, and particle-wave interaction supplies the background necessary for understanding maser theory in the next three. The third part of the book is a theoretical treatment of the two-level maser, electron parametric resonance, and the three-level solid-state and gas maser, and closes with theoretical considerations on maser noise. The book, being a theoretical introduction into maser theory, gives a reasonably complete understanding of the subject. A list of over 150 titles on quantum mechanics and related fields and an index are included.

The Theory of the Transition-Metal Ions. By J. S. Griffith. 455 pp. Cambridge U. Press, New York, 1961. $17.50. *Reviewed by Louis D. Roberts, Oak Ridge National Laboratory.*

DURING approximately the past two decades, optical methods, neutron diffraction, magnetic thermodynamic techniques, and electron-paramagnetic-resonance methods have been extensively applied to the study of paramagnetic salts. The measurements have often been made on samples of ionic salts of sufficient magnetic dilution that the observations would reflect the properties of an individual magnetic ion as perturbed by the electric field from, or a slight covalent bonding to, the immediate environment.

Crystal-field (or ligand-field) theory has proved especially useful in giving an interpretation of many of these measurements in terms of the symmetry of this environment. Although there is by now a wealth of experimental and theoretical information in this field, and although applications of the theory are spreading rapidly, few texts bearing on crystal-field theory have been prepared. Thus the present volume on the theory of the *3d* metal ions in salts is especially welcome. Although a considerable amount of experimental material is discussed, the book is primarily a theoretical text. In about the first half of the book, an introductory discussion of the necessary tools for an understanding of the ions of the *3d* metals is given. This introductory material includes a discussion of angular-momentum theory, electromagnetic radiation, configuration mixing in the free atom, spin-orbit coupling and magnetic effects in the free atom, and finally a discussion of the relevant group theory. In some cases this introductory discussion may be quite detailed. A knowledge of quantum mechanics at about the level of Schiff is perhaps a minimum preparation to begin the study of the book, however.

Following this preparatory material, the methods for the calculation of the energy levels and useful matrix elements associated with the *3d* shell are given. The treatment is directed toward the description of the ions in the dilute salts. Aspects of paramagnetism, optical properties, and electron resonances relevant to these salts are discussed. The theoretical methods described may often be useful in the treatment of metals and of magnetically concentrated salts, but there is little direct discussion of these subjects. In summary, the book is an important contribution to the literature of this subject and will remain useful for a long time.

Propagation of Electromagnetic Waves in Plasma. By V. L. Ginzburg. Transl. from Russian by Royer and Roger, transl. edited by Walter L. Sadowski and D. M. Gallik. 822 pp. Gordon and Breach, New York, 1962. $38.00. *Reviewed by Sanborn C. Brown, Massachusetts Institute of Technology.*

IT is an unfortunate commentary on the pressures put on modern scholarship that a book which could have been a classic fails to live up to the author's capabilities because of lack of attention to detail. Such is my general comment after studying at great length Dr. V. L. Ginzburg's new book. It was written as a series of essays on the theory of radio-wave propagation in the ionosphere in radio astronomy and astrophysics. The essays have been brought together without any great effort at homogeneity, and a few sections have been added to make them applicable to laboratory plasmas, although these are by no means emphasized in the book.

The amount of material and the coverage are excellent, and the physics is well done and carefully explained. The book, however, will be useful primarily