small child's questions: "What's that, Mummy?", "A Cow", "Why?" The truth is that it is hopeless to base religion on a "God of the gaps" Who only operates in the murky corners of His universe. The relation of the scientist and the religious man as they survey nature is closer to that of two men, one of whom says "I see chalk marks on a blackboard" and the other says "I see an algebraic equation."

Curiously enough Mr. Rowland is really a disguised worshiper of science. Explaining why he takes little account of Plato, Aristotle, and other ancient philosophers, he writes, "No man . . . unacquainted with the development of science . . . can really have much importance for contemporary thought." Plato's *Republic* is concerned with the idea of justice. Are we really to suppose that because he was unacquainted with Boyle's Law and the experimental method he can tell us nothing valuable on this subject?

Fortunately the case for religion is stronger than Mr. Rowland supposes.

The Defect Solid State. By T. J. Gray, D. P. Detwiler, D. E. Rase, W. G. Lawrence, R. R. West, T. J. Jennings. 511 pp. Interscience Publishers, Inc., New York, 1957. $11.00. *Reviewed by R. Smoluchowski, Carnegie Institute of Technology.*

There is little doubt that "defect solid state" is an extremely vital and interesting subject matter both from the theoretical and from the experimental point of view. It is also a vast subject since, so far as we know, all solid materials have atomic and electronic imperfections and nearly all physical and chemical properties are influenced by them to a certain degree. For this reason, there is a great diversity of approach by various authors depending upon their personal preferences and interests. The present book is written by faculty members of the well-known College of Ceramics at Alfred University, and the approach, in various chapters, ranges from that of a pure physicist to that of a ceramic engineer. Actually over half of the book is by Professor T. J. Gray and the rest by his colleagues. The book is not a systematic survey of the whole field, but rather a selection of several topics connected with defects. Some chapters, as for instance those on magnetism or on phase diagrams, have only a remote relation to defects. Nevertheless, the book is a vividly written account of several greatly interesting aspects of defects and it may well serve as a very readable introduction to the whole domain.

The first chapter gives a brief account of the various kinds of lattice and electronic defects. The next goes into some detail of the qualitative aspects of semiconductivity, while the third chapter deals with the elements of the modern theory of semiconductors. The mechanisms of diffusion, of sintering, and of other reactions in solids, in particular in nonmetallics, are discussed in the next chapter, which is followed by an analysis of the corrosion phenomena, summarizing primarily the various theories of oxidation and its kinetics. The following chapter, the longest of all, is an elegant and compact summary of the theory of magnetic properties of solids including such subjects as ferrites, nuclear resonance, and elements of some of the basic experiments. The next deals with the fascinating relation between defects and catalytic properties, especially of semiconductors, and this is followed by an account of the basic properties and theory of dielectric materials and their defects. A chapter on the elements of phase equilibria theory is followed by a compilation and discussion of the fundamental facts concerning high-temperature ceramics. A very short chapter is devoted to intermetallic compounds, and a final chapter deals with the techniques of differential thermal analysis and microbalance.

The book, while rather unorthodox in choice, arrangement, and point of view, is a valuable contribution to the growing literature on the "pathology of solids".

Books Received

Solar Radiation in Air Conditioning. By Ivor S. Groundwater. 125 pp. (Crosby Lockwood, England) John de Graff, Inc., New York, 1957. $5.00.

La Dynamique Relativiste et ses Applications. By Henri Arzeliès. 304 pp. Gauthier-Villars, Paris, France, 1957. Paperbound $11.71.

Productive Uses of Nuclear Energy: Report on Regional Economic Development and Nuclear Power in India. By Norman L. Gold. 132 pp. National Planning Association, Washington, D. C., 1957. Paperbound $2.75.

Games and Decisions: Introduction and Critical Survey. By R. Duncan Luce and Howard Raiffa. 509 pp. John Wiley & Sons, Inc., New York, 1957. $8.75.

Der Ultraschall und seine Anwendung in Wissenschaft und Technik. Nachtrag zum Literaturverzeichnis of 6th Edition. By Ludwig Bergmann. 66 pp. S. Hirzel Verlag, Stuttgart, Germany, 1957. Paperbound DM 9.00.

La Theorie de la Mesure en Mécanique Ondulatoire: (Interprétation usuelle et Interprétation causale). By M. Louis de Broglie. 130 pp. Gauthier-Villars, Paris, France, 1957. Paperbound $7.42.

Solid State Physical Electronics. By Aldert Van Der Ziel. 604 pp. Prentice-Hall, Inc., Englewood Cliffs, N. J., 1957. $9.75.

Ionization and Breakdown in Gases. By F. Llewellyn-Jones. 176 pp. John Wiley & Sons, Inc., New York, 1957. $3.50.

Nuclear Stripping Reactions. By S. T. Butler and O. H. Hittmair. 130 pp. (Horwitz Publications Inc., Australia) John Wiley & Sons, Inc., New York, 1957. $8.75.

Structure of Atomic Nuclei. Vol. 39 of Handbuch der Physik. Edited by S. Flügge. 566 pp. Springer-Verlag, Berlin, Germany, 1957. DM 125.00 (subscription price DM 100.00).

Ausgewählte Moderne Trennverfahren zur Reinigung Organischer Stoffe. Vol. 2 of Fortschritte der Physikalischen Chemie. By Rer. Nat H. Röck. 169 pp. Verlag von Dr. Dietrich Steinkopff, Darmstadt, Germany, 1957. Paperbound DM 24.00.

Table of Coefficients for Obtaining the Second Derivative without Differences. By Herbert E. Salzer and Peggy T. Roberson. 25 pp. Convair Astronautics, San Diego, Calif., 1957. Paperbound.

QUANTUM MECHANICS (2nd Edition). By F. Mandl. 267 pp. Academic Press Inc., New York, 1957. $6.50.

HIGH ENERGY NUCLEAR PHYSICS: Proceedings of the 7th Annual Rochester Conf. (Apr. 1957). Edited by G. Ascoli, G. Feldman, L. J. Koester, Jr., R. Newton, W. Riesenfeld, M. Ross, R. G. Sachs. 11 sections. Interscience Publishers, Inc., New York, 1957. Paperbound $4.50.

LA CRÉATION SCIENTIFIQUE. By Abraham A. Moles. 237 pp. Éditions René Kister, Geneva, Switzerland, 1957. Paperbound.

STEREOPHONIC SOUND. By Norman H. Crowhurst. 118 pp. John F. Rider Publisher, Inc., New York, 1957. $2.25.

ATOM HARVEST: A British View of Atomic Energy. By Leonard Bertin. 253 pp. W. H. Freeman & Co., San Francisco, Calif., 1957. $3.25.

PRACTICAL ASTRONOMY. By W. Schroeder. 206 pp. Philosophical Library, Inc., New York, 1957. $6.00.

RADIATION EFFECTS IN SOLIDS. By G. J. Dienes and G. H. Vineyard. 226 pp. Interscience Publishers, Inc., New York, 1957. $6.50.

THE SPECTROSCOPY OF FLAMES. By A. G. Gaydon. 279 pp. John Wiley & Sons, Inc., New York, 1957. $9.00.

ATOMIC ENERGY FACTS. Compiled by US Atomic Energy Comm. 216 pp. US Govt. Printing Office, Washington, D. C. Paperbound $2.00.

NEUTRON CROSS SECTIONS. Vol. 1, Div. 2 of Internat'l Series of Monographs on Nuclear Energy. By Donald J. Hughes. 182 pp. Pergamon Press, London & New York, 1957. $5.00.

ON NUCLEAR ENERGY: ITS POTENTIAL FOR PEACETIME USES. By Donald J. Hughes. 263 pp. Harvard U. Press, Cambridge, Mass., 1957. $4.75.

PROGRESS IN SEMICONDUCTORS, Vol. 2. Edited by Alan F. Gibson, R. E. Burgess, P. Aigrain. 280 pp. John Wiley & Sons, Inc., New York, 1957. $10.50.

REASON AND CHANCE IN SCIENTIFIC DISCOVERY. By R. Taton. Translated by A. J. Pomerans. 171 pp. Philosophical Library, Inc., New York, 1957. $10.00.

6TH SYMPOSIUM (INTERNATIONAL) ON COMBUSTION. (Yale U., Aug. 1956). 943 pp. Reinhold Publishing Corp., New York, 1957. $28.00.

GRADUATE STUDENT ENROLLMENT AND SUPPORT IN AMERICAN UNIVERSITIES AND COLLEGES, 1954. 302 pp. (NSF 57-17) US Govt. Printing Office, Washington, D. C., 1957. Paperbound $1.50.

INTRODUCTION TO THE MECHANICS OF STELLAR SYSTEMS. By Rudolph Kurth. Translated by F. D. Kahn. 174 pp. Pergamon Press, London & New York, 1957. $9.00.

DIGITAL DIFFERENTIAL ANALYZERS: an applications manual for digital and Bush type differential analyzers (4th Edition). By George F. Forbes. 154 pp. G. F. Forbes, 10117 Bartee Ave., Pacoima, Calif. Paperbound $5.00.

TAFELN R (p) UND Q (p) ZUR BERECHNUNG DER GLEITZAHLEN S_{44}, S_{55}, S_{66} UND DER MAXIMALEN TANGENTIALSPANNUNGEN. By H. Hörig. 85 pp. Technischer Verlag Herbert Cram, Berlin, Germany, 1957. Paperbound DM 24.00.

TRANSISTOR ELECTRONICS. By David Dewitt and Arthur L. Rossoff. 381 pp. McGraw-Hill Book Co., Inc., New York, 1957. $8.00.

THE ELEMENTS OF PHYSICS (6th Revised Edition). By Alpheus W. Smith and John N. Cooper. 671 pp. McGraw-Hill Book Co., Inc., New York, 1957. $7.50.