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Some Problems in Chemical Kinetics and Reactivity, Vol. 1 (2nd Revised Edition). By N. N. Semenov. Translated from Russian by Michel Boudart. 239 pp. Princeton U. Press, Princeton, N. J., 1958. Paperbound \$4.50. Reviewed by Henry Wise, Stanford Research Institute.

To the student in reaction kinetics the significant scientific contributions by the Russian School under Professor Semenov are well known. The present book is of interest not because of its novel approach to problems in chemical kinetics but rather because of its review of current Russian thought on this subject. As pointed out in the introduction, this book is the outgrowth of a Symposium on Chemical Kinetics and Reactivity held in Moscow in 1955. The author did not intend to write a sequel to his treatise on *Chemical Kinetics and Chain Reactions* published some twenty years ago. Instead he attempted to present the "state of the art". As a result this volume represents a review of some of the work in the field of chemical kinetics, particularly by Russian scientists. The topics included cover a range of subjects such as the reactivity of mono- and diradicals, the dissociation of molecules, the recombination of radicals by homogeneous and heterogeneous reactions, and chain initiation by ions of variable valence. Whereas the reactivity of radicals is considered in some detail from a kinetic and thermodynamic viewpoint, the treatment of heterogeneous reactions appears oversimplified, especially in view of recent applications of solid-state research to problems in catalysis by metals and semiconductors.

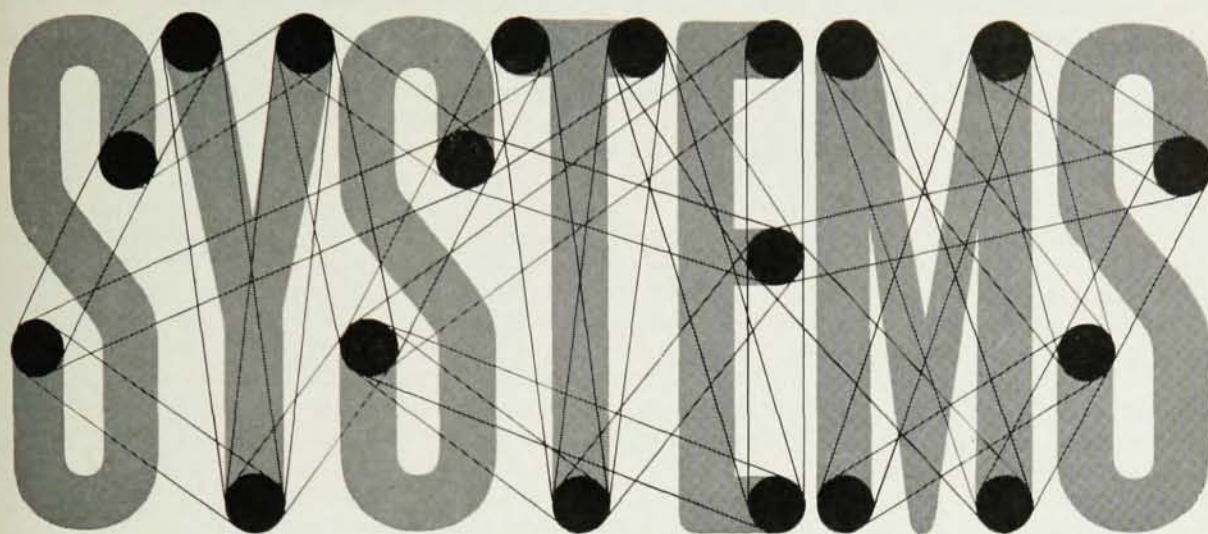
This book is valuable because of the extensive bibliographies with special reference to Russian research including some doctoral dissertations. As a matter of fact, if one were to judge by the references quoted in the chapter on "Wall Initiation and Termination of Chain Reactions", one gains the somewhat erroneous impression that this subject has been the purview of Soviet scientists. It indicates the high level and quality of research on the kinetics and mechanisms of chemical reactions.

The Earth and Its Gravity Field. By W. A. Heiskanen and F. A. Vening Meinesz. 470 pp. McGraw-Hill Book Co., Inc., New York, 1958. \$12.50. Reviewed by Serge A. Korff, New York University.

Two of the best-known experts on the subject of gravity have collaborated to produce this excellent and certainly authoritative text. The book goes thoroughly into many aspects of geophysics and is on a level suitable for advanced graduate students. Indeed an expert may find it a useful reference book on many occasions.

The first chapter of the book is a summary, and is in itself a review, good enough so that this reviewer has to resist the temptation to quote at length from it. The chapter could well be read by persons who wish to get a brief view of the subject. The second

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chapter reviews the present knowledge of the internal structure of the earth. In the following pages the authors plunge into the main subject. They describe in detail the gravitational field and the shape of the equilibrium ellipsoid, they discuss gravity measurements, and they treat in detail the reduction of the measurements, departures from equilibrium, isostasy, and physical geodesy. The final chapters are on the convection currents postulated in the interior, and on the migration of the poles.

Both authors are certainly among the outstanding authorities on the subject of the book. Their treatment of the parts pertaining to their specialties is complete and well done. One of the authors, Vening Meinesz, has designed a widely used gravity meter of excellent accuracy and stability which is described, among other instruments. However, the authors do not seem to have agreed on a notation. For example, the Newtonian constant of gravitation, known to physicists as G , is defined on page 34 as k^2 but on page 119 as k , and later k is used as an elastic constant. Furthermore, in spite of the long chapter in which the authors describe internal convection within the earth, and regardless of the fact that the authors are well aware that geomagnetism is currently attributed in large part to irregular convection currents within the earth, they seem to accept without challenge the proposition that the magnetic poles and the poles of rotation are closely connected, and that because the earth's magnetism, as indicated by rocks, has varied during geological history the poles of rotation have wandered accordingly. The point is not whether the poles have or have not wandered; but that the evidence on which the supposition of wandering is based seems to be far from conclusive.

Otherwise the book is certainly an excellent one, containing much authoritative information and describing in detail many of the phenomena concerned. It is an excellent text and reference book, and should be on the bookshelf of every geophysicist.

Thermodynamics of Gases. Vol 12 of *Handbuch der Physik*. Edited by S. Flügge. 686 pp. Springer-Verlag, Berlin, Germany, 1958. DM 154.00 (subscription price DM 123.20). *Reviewed by Stuart A. Rice, Institute for the Study of Metals, University of Chicago.*

In the last fifteen years there has been a renewal of interest in the molecular theory of dissipative processes, largely stimulated by the work of Kirkwood and Born and Green. In keeping with this interest, sixty-five percent of this volume of the *Encyclopedia of Physics* deals with the kinetic theory of gases and the statistical mechanics of fluids. The first article, by J. S. Rowlinson, treats the thermodynamics of real gases in a clear and precise manner with good illustrations and with actual data. The article is not as detailed or as complete as that by Beattie. The last two articles by Jaekel and Alpert, respectively, deal with the experimental details of vacuum technique.

The major portion of the volume is in three articles. Waldmann gives a clear and workmanlike presentation of the Chapman-Enskog theory of gases. The material is well presented but invites an unfortunate comparison with the book by Hirschfelder, Curtiss, and Bird which is, of course, much more complete. From the point of view of this reviewer the best articles in this volume are by Mayer and by Grad. Mayer's article contains a detailed discussion of the theory of fluids in the gaseous and liquid regions for both the classical and quantum mechanical cases. The text is illuminated with several carefully worded physical arguments which do much to improve the presentation (cf., p. 171). In addition much material on the theory of liquids previously available only in the journal literature is collated and systematically integrated into the general presentation. Grad's article is simultaneously the most interesting and the most frustrating of the contributions. The author immediately comes to grips with the question of the introduction of irreversibility and the meaning of the H -theorem. The discussion is perceptive and physically illuminating. However, many of the arguments are augmented by analysis to which the almost invariable reference is "not yet published". In an article of this length (88 pages) a few more pages giving the analysis would have been very welcome and very much in place.

The articles by Mayer and Grad have either new material or collations and interpretations that are new and provocative, whereas other articles seem to cover fairly well-worn ground. The major value of this volume would appear to be as a convenient collection of most of the aspects of gas theory, but more detailed accounts are available for several of the topics.

Light and Matter II. Vol. 26 of *Handbuch der Physik*. Edited by S. Flügge. 965 pp. Springer-Verlag, Berlin, Germany, 1958. DM 168.00 (subscription price DM 134.40). *Reviewed by L. Marton, National Bureau of Standards.*

Four contributions constitute this volume of the *Encyclopedia of Physics*, three short ones in English and one very long one in French. The three shorter ones in order of appearance are: Luminescence by F. G. J. Garlick, Temperature Radiation of Solids by F. A. W. Rutgers, and Raman Effect by San-Ichiro Mizushima. They are followed by a much longer contribution written by Jean Lecomte on Infrared Spectroscopy. This longer contribution is so voluminous it could have been worthwhile to issue it separately as an individual monograph on the subject. It alone comprises almost 700 pages out of 965 allotted to the volume. The volume actually is even more voluminous than it appears from the number of pages. 965 pages is already substantial, but in fact, an enormous amount of material has been compressed into it using two sizes of type. A sizeable part of the material, particularly in the Lecomte contribution, is printed in smaller type. I don't recall having seen this type before