donor and acceptor molecules are formed on a reactive surface site.

Like most books, this one has its share of errors, but they are neither excessive nor particularly serious. Fick's second law for diffusion is mistakenly written with a negative sign several times on page 794. Equation (6.11), the relation between the sulfur and oxygen pressures which prevails when ZnS and ZnO are in equilibrium with each other, should read,

$$p_{S_2}^{\frac{1}{2}} / p_{O_2}^{\frac{1}{2}}.$$

Equation (9.10) is also in error, and should read,

$$\ln K_0 = (\Sigma \nu_i s_i^{\circ}/k) = (\Delta S^{\circ}/R).$$

More annoying than such errors, which are readily seen and discounted, are the many undersized figures that appear in the text. When all of this is said, it is nevertheless an excellent book. What a pity that its excessive cost will limit it to the libraries of the more affluent institutions!

Progress in Brain Research. Vol. 2. Nerve, Brain, and Memory Models. N. Wiener and J. P. Schadé, eds. 280 pp. Elsevier, New York, 1963. $15.00.

Reviewed by Joseph G. Hoffman, State University of New York at Buffalo.

Twenty papers on the operations of the nervous system have been contributed to this volume by twenty-five authors. Fifteen papers are in English, three in French, and two in German. They present original work on neurocybernetics which deals "with the pathways of action via sense-organs, neurons and effectors". As editor, Norbert Wiener wrote in the Introduction, "the nervous system is unbelievably complex", and this complexity requires the collaboration of neurologists, psychiatrists, biologists, engineers, mathematicians, and physicists for its elucidation. The integrated nervous system is a formidable object which has not yet been adequately described; new words have to be coined. To quote Wiener again: ". . . You cannot hope to get people of these different disciplines to produce cybernetic work merely because they are brought together. They must understand language, methods, and thoughts of the others."

All of the papers achieve high standards of presentation and are

stimulating. For example, after reading Napalkov's paper, "Information Processes of the Brain", and Stanoulov's "Preliminary Notes on a Functional Scheme of Human Thought", I found myself wondering if the human mind can ever catch up with the evolution of the mind, which started about 3 billion years ago. There is an enigma in saying that the mind can describe the processes which create it. If and when it succeeds with the description, it may set about to improve the processes and eventually become a supermind. Perhaps this is how evolution is supposed to work; it may be a process of continuous feedback.

Many hard facts, such as descriptions of nerve cells and automata, and fascinating theories are presented here. For those who wish to know more about the physical basis of the mind, this book is recommended with the qualification that it is hard reading because it is written in the technical jargon of many different specialists. The format is superb: heavy glossy paper, good mathematical symbols, good illustrations, a table of contents, and author and subject indices.

Chemical Kinetics of Gas Reactions. By V. N. Kondrat'ev. Transl. from Russian by J. M. Crabtree and S. N. Carruthers. 812 pp. (Pergamon, Oxford) Addison-Wesley, Reading, Mass., 1964. $17.50.
Reviewed by Kurt E. Shuler, National Bureau of Standards, Washington, D. C.

Professor Kondrat'ev, a member of the Academy of Sciences of the USSR and a member of its Institute of Chemical Physics, has been an active worker in the field of chemical kinetics for more than 30 years. He has made important contributions, particularly in the fields of chain reactions and combustion processes.

Chemical Kinetics of Gas Reactions is a noteworthy and successful addition to the literature. I believe it to be the most thorough *general* treatise on chemical reactions in the gas phase. It is evident that Professor Kondrat'ev wants above all to convey information, to explain matters to the reader, to be understood, and to be clear. In this, he has been most successful.

The topics discussed in this book [General Kinetic Rules for Chemical Reactions, Chemical Mechanism of Reactions, Theory of Elementary Chemical Processes, Bimolecular Reactions, Unimolecular and Termolecular Reactions, Energy Conversion during Molecular Collisions, Photochemical Reactions, Chemical Reactions in Electrical Discharges, Chain Reactions, Combustion Processes] are more or less standard fare in general treatises on chemical kinetics. What distinguishes Kondrat'ev's book are the thoroughness of the treatment and the inclusion of a great wealth of experimental data. This display of and reference to experimental results is probably more extensive than in any other comparable volume. In addition, this book has an extensive list of references to the Russian literature (about 300 citations) which is most welcome. Reflecting Kondrat'ev's own interests, as well as the primary concentration of Russian kineticists in general, the chapters on chain reactions and combustion processes are particularly informative, thorough, and well written. The chapter heading "Chemical Reactions in Electrical Discharges" is somewhat of a misnomer since this chapter also includes activation by ion "bombardment" as well as activation by α and β particles, γ radiation, neutrons, and "hot" atoms. It too appears to be a very thorough job filled with a wealth of interesting experimental data. If the reviewer has any reservations, it is to Chapter 6 on energy conversion during molecular collisions where the theoretical treatment is quite primitive and "old fashioned" and where the experimental data are not always the best or most reliable. It must, however, be remembered that Kondrat'ev's book was published in the Russian original in 1958 (more anent this later) and much of the good quantitative work, both theoretical and experimental, has been done since that time. This recent exponential growth of research should, however, not affect the other chapters as seriously as it affects Chapter 6.

As stated in the Foreword, this is a monograph. It was not meant to be a textbook, graduate or undergraduate, and it probably should not be used as one. It could, however, serve most usefully for collateral reading in courses in chemical kinetics in conjunction with some of the standard US texts. As a monograph addressed to the active research worker in various branches of chemical kinetics, it should prove most valuable for its breadth of coverage, for its detailed discussion of experimental work, and for its wealth of data.

Last, but not least, the reviewer has to pick two bones with the publishers. In spite of the claims in the Foreword ("Professor Kondrat'ev also added a considerable amount of further new material . . . additional references to recent literature. . . .") I have been unable to find any references to the literature later than 1958. There is no coverage of work between 1958 (the publication date of the original Russian edition) and 1964 (the date of publication of this translation). As mentioned above this does not, however, detract from the value of the book.

Not too surprisingly, the publishers do not mention that an English translation of *Chemical Kinetics of Gas Reactions* already exists. This was published in February 1962 by the US Atomic Energy Commission, Division of Technical Information, as AEC-tr-4493 in two paperbound volumes and is available from the Office of Technical Services, National Bureau of Standards, Washington, D. C. 20234, for $9.25. The present translation is, by and large, identical with the AEC translation except for some transposition of words and the use of synonyms. I presume that the publishers have made their peace with the US government. In all fairness to the publishers of the present volume it must be stated, however, that their book has been completely reset in type—text, equations, figures, references, and all—and is well produced in legible type on good paper and bound in hard covers while the AEC translation was photoproduced from a typewritten copy prepared by the translating agency and is somewhat flimsily bound in thin paper covers. Whether this is worth an additional $8.25 to the purchaser will sooner or later be determined experimentally by the publishers.