his own concepts in electrochemistry, to the triumphant application of the concept of the field and the line of force in his magnetic researches in the 1840's and 1850's. To read these papers is to experience, with Faraday, the thrill of discovery.

Dover has produced this reprint handsomely and at a moderate price. My only complaint is that the letters to Tyndall on diamagnetism and the lines of force, letters that were published in *The Philosophical Magazine* after the third volume of the *Experimental Researches* had been published, were not included, for they end the story. Despite this, these volumes can still be heartily recommended to anyone interested in the life of science.

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A Survey of Recent Research in Poland and the U.S.S.R.

Catalysis and Chemical Kinetics. A. A. Balandin and others. Wydawnictwa Naukowo-Techniczne, Warsaw, Poland; Academic Press, New York, 1964. xii + 255 pp. Illus. $10.

This slender volume is of exceptional interest to English-speaking readers who are concerned with kinetics and catalysis. The interest lies in the technical content and in the unusual nature of the book.

In a sense this is a one-volume version of *Advances in Catalysis* (also published by Academic Press) that surveys the research carried out in Poland and the U.S.S.R. during the postwar period. There are 14 chapters, each in the nature of a review article; six are by Soviet authors, eight by Polish. Coverage is highly selective, which is perhaps justifiable as a practical necessity in so vast a field.

The *raison d'être* of the book is somewhat enigmatic. The volume was printed in English, in Warsaw. In the preface, W. Trzebiatowski of the Wroclaw Technical University indicates that the book is intended to review the extensive work on catalysis and kinetics carried out in Poland. He does not refer to the Russian authors, although their contributions constitute almost 40 percent of the volume.

The introductory chapter, by Balandin, is a brief but well-balanced survey of Soviet advances in catalysis and kinetics; Balandin, in turn, makes no reference to the Polish investigators represented in the volume. Balandin, in fact, dominates the Soviet contributions. Aside from the introductory chapter, he provides in chapter 3 an updating of his multiplet theory of catalysis, emphasizing particularly the relation between bond strengths and activation energies predicted for the postulated model of substrate-catalyst complex.

Two other chapters are by co-workers of Balandin. In chapter 5 Vasyunina discusses the hydrolytic hydrogenation of polysaccharides, in the presence of phosphoric acid and ruthenium, in terms of Balandin's multiplet theory. Again the treatment goes beyond the geometrical framework, in which the original theory was couched, to the consideration of activation energies and the prediction of regular trends in energy as the result of systematic substitution in the reactants. Klabunovskii, also from Balandin's school, provides a brief and unsatisfactory discussion of asymmetric reactions carried out over optically active catalysts (chap. 6). The attempt to relate this work to enzymatic reactions is again framed in the language of the multiplet theory.

In chapter 2 Dubinin, whose studies of adsorption, particularly on active carbons, have been well known to a Western audience for some 40 years, summarizes the theoretical and experimental work of his school on the physical adsorption of gases and vapors on energetically heterogeneous carbon surfaces. Dubinin uses the (Polanyi) potential theory of adsorption and illustrates the extraordinary power of this approach to account for the experimental data on physical adsorption.

Two articles by Boreskov and Bielański are of exceptional interest. Both are concerned with understanding catalytic activity in terms of the electronic structure of the catalysts. Boreskov summarizes work carried on at the Karpov Institute of Physical Chemistry on the general problem of rational catalyst selection, both for metallic and transition metal oxide catalysts (chap. 5). The treatment is broad, rather than deep, but very stimulating nevertheless. In the United States Bielański's work at Cracow is less well known than that of Boreskov. His article is specifically concerned with changes in electrical conductivity during catalytic reaction over semiconducting oxides (chap. 7). A portion of the article, treating alcohol dehydrogenation over oxides, is taken almost verbatim from an earlier paper presented by Bielański and his co-workers at the Second International Congress of Catalysis (1960). It is interesting that both Boreskov and Bielański independently, and properly, warn that subtle but substantial changes may occur in the catalyst as a result of interaction with the reactants, which in turn may greatly affect the catalyst activity.

A third article concerned with the fundamental characterization of catalysts is by Trzebiatowski (chap. 10). Trzebiatowski, who has published with Selwood, applies Selwood's magnetic methods to establish the degree of dispersion of paramagnetic and ferromagnetic catalysts.

In a rather long article Sokalski discusses the problem of energetic heterogeneity in Fischer-Tropsch catalysts (chap. 8). He is concerned both with the development of heterogeneous surfaces during the impregnation from solution of a polydisperse support and with the adsorption of gases on such heterogeneous surfaces. Unfortunately the presentation is difficult to follow because of complicated nomenclature, much of which is inadequately defined.

Treszczanowicz summarizes studies on the kinetics and catalyst selectivity of alcohol dehydrogenation-dehydration, particularly over zinc-iron alloy catalysts (chap. 9). In chapter 11 Yatsimirskii reviews the astonishing versatility of the catalyzed iodide–hydrogen peroxide reaction, which in the hands of Yatsimirskii and his students has been utilized as the basis of extremely sensitive methods for the quantitative determination of molybdenum, tungsten, iron, tantalum, and zirconium.

Bretsznajder discusses the mechanism of nucleation in the thermal dissociation of solid phases, a field in which his own contributions have been great (chap. 12).

Jezowska-Trzebiatowska concerns herself with the mechanism of redox reactions in solution, and especially with establishing, by isolation of intermediate species and measurement of kinetics, whether reduction occurs by direct transfer of electrons or by transfer of atoms or groups (chap. 13). The discussion centers about the reduction of the oxyanions of manganese, iron, and rhenium.

In the final chapter Jósephowicz reviews work done at the Lódz Technical University on the kinetics of reactions usually studied in homogeneous solution but here constrained to occur at the interface between immiscible liquids. He shows that the rate equation in such circumstances can differ substantially from that in the homogeneous case.

The book is well printed on good paper. There is no author index, unfortunately, but the subject index is adequate. The price appears high; however, specialists in the field will probably feel adequately repaid in having available capsule summaries of work that is often difficultly accessible.

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