

exclusion of the equally important physical ones. The explanation of the Roche limit, in a footnote on page 195, is incomplete and misleading.

Whilst the chapters on the physical properties, and the origin, of the Moon are disappointing (especially now that the reader is able to view them in the light of the results from the more recent Apollo missions), these chapters are short and do at least present a record of the more important geochemical evidence as we knew it at the time of Apollos 11 and 12. With these limitations, which in my opinion are quite acceptable in view of its title, the book is definitely to be recommended to the lunar and planetary scientist—who may well look for a revised edition and for follow-up texts concerned with subsequent Apollo missions. G. FIELDER

## Corrosion

*Advances in Corrosion Science and Technology*. Vol. 1. Edited by M. G. Fontana and R. W. Staehle. Pp. x+347. (Plenum: New York and London, 1971.) £10.50.

THIS is the first of a series of review papers on selected topics in the field of corrosion, and it is anticipated that further volumes will appear at yearly intervals. The concept of "corrosion" as confined to metals and to reactions that are undesirable is refuted by the editors, who point out that the term will be interpreted to include all reactions of metals, glasses, ionic solids and polymeric solids with their environment; the series will include contributions from workers in fields peripheral to corrosion, since studies in the field of physics, physical chemistry, physical metallurgy, and so on are often of great value in the resolution of corrosion problems.

There is an excellent review article on "Techniques for the Measurement of Electrode Processes at Temperature above 100°C" (D. de G. Jones and H. G. Masterson), and in this connexion it should be noted that valuable and fundamental work in the field of high-temperature aqueous electrochemistry has been stimulated by the need to solve practical corrosion problems that arise in the electrical power industry; thus although workers in other disciplines contribute to the understanding of corrosion mechanisms, the converse is also true. The authors outline the various difficulties in obtaining useful measurements at elevated temperature and pressures, and discuss practical details such as design of pressure vessels and liners, methods of insulating and sealing electrode leads, types of reference electrodes, and so on that have been used by workers in this field. Examples are pro-

## Electrodeposition



Growth spirals of copper deposited from acid copper sulphate. From Fischer, H., *Electrochim. Acta*, 2, 50 (1960); reproduced in the second edition of *Electrodeposition and Corrosion Processes* by J. M. West (Van Nostrand Reinhold, London, 1972; £2.25).

vided of electrochemical studies of ferrous and non-ferrous metals at elevated temperatures, with particular reference to corrosion problems that are encountered in electrical power generation and in high pressure desalination plants.

"Surface- and Environment-Sensitive Mechanical Behaviour" (R. M. Latinision and D. R. C. Westwood) reviews the influence of surface structure and environment on the mechanical properties of inorganic crystals, with some emphasis on metal monocrystals, and its inclusion in the book exemplifies the very broad definition of corrosion adopted by the editors; stress-corrosion cracking has been omitted because the authors consider that the subject has been dealt with adequately in a recent publication. The authors consider first how the nature of crystal surfaces differs from the structure of the bulk material, and conclude that the near-surface region may be regarded as a separate phase that ranges from a few atom layers in terms of structural rearrangement to probably microns in terms of chemical and electronic properties. They then proceed to give examples of environmental effect which by influencing the surface also affect bulk properties.

The control of corrosion by organic inhibitors is considered in the review paper on "Mechanism and Phenomenology of Organic Inhibitors" (G. TrabANELLI and V. Carassati), which deals with both the theory and practical application of inhibitors. There have been a number of attempts to correlate the structure of organic compounds with their inhibitive action, and the authors have reviewed the significant work in this field in some detail. Inhibitors are usually specific in their action, and

more knowledge is required on how the various groupings of an organic molecule interact with the detailed structure of a metal surface. The authors review the relevant organic chemistry, surface chemistry and metal physics, but it is apparent that it is not yet possible to design organic inhibitors for specific metals in specific environments. The authors provide a most valuable summary of the applications of organic inhibitors in controlling the corrosion of metals in the atmosphere and in aqueous (acid, neutral and alkaline) and non-aqueous solutions.

The review paper on "Anodic Oxidation of Aluminium" (S. Tajima) is detailed and well referenced, but a rather uncritical approach has been adopted and some of the diagrams are far from clear. Nevertheless, the author has brought together the whole spectrum of the anodic behaviour of aluminium, which ranges from the formation of thin dielectric barrier-type films formed in buffer solutions to the thick porous films formed in acid electrolyte solution that dissolve the oxide during its formation.

The review papers that have been selected for volume 1 of this series provide a comprehensive and up to date survey of existing knowledge in four very diverse fields that fall within the confines of "corrosion science and technology", and in view of the increasing importance of environmental deterioration the appearance of this series is timely. The book as a whole strikes an appropriate balance between theory and practice, and can be recommended without reservation to students, research workers and technologists who are concerned with the environmental behaviour of metals and other materials.

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