

that large numbers of Ottoman subjects would pass under European rule, least of all in the Asiatic provinces. This is an unfortunate error. Niebuhr's freedom from such presuppositions was one of his great advantages over many subsequent explorers. "In a Dane of the middle of the eighteenth century," wrote D. G. Hogarth sixty years ago in his *Penetration of Arabia*, "the sense of western and racial superiority was not developed enough to debar him from full sympathy with an eastern people. Niebuhr did not see in the Yemen Arabs an interesting lower order of beings, nor in their creed and religious practices curious parodies of those of a Christian".

The author is also wrong in supposing that to travel in Arab dress was then "most unusual for Europeans in the Orient". There were many parts of Asia where very few Europeans penetrated at all, but those who did could often not have travelled in any other way. There are a few mistakes. W. B. Harris should not be called a great English explorer, and his book was not entitled merely *Yemen*, but *A Journey through the Yemen*. Mr. Hansen's "Captain Pasha, the pirate" was the Kapudan Pasha, the imperial Ottoman admiral, as Niebuhr himself says. The "village of Abb" is Niebuhr's town ('Stadt', not 'Dorf') of Äbb; it is the modern Ibb. There is regrettable, though understandable, confusion in the spelling of oriental place names. In his own books Niebuhr used 'sch' and 'dsj' for the sounds usually represented in English by 'sh' and 'j' respectively. His 'Scherdsje' and 'Mauschid' would be confusing enough for British readers, but here they become 'Sjerdjsje' and 'Mausjid'. 'Sherje' and 'Maushid' would have been preferable. There are too many misprints in proper names, Palsgrave for Palgrave, Charden for Chardin, and Hodeia consistently for Hodeida.

These, however, are comparatively unimportant blemishes in a readable and pleasantly produced volume which will interest anyone who wishes to know more about the personalities of Niebuhr, Forsskål, and their companions and the background of this astonishing expedition. Naturally, there is much more about Niebuhr than the others, but there is nothing here to make one doubt the justice of Hogarth's memorable judgement, that "if he was not the most brilliant of the party, if any of his fellows surpassed him in energy, courage, and endurance, in intelligence, or in his measure of that scientific temper which is equally free from prejudice and from laxity, then a more remarkable mission was never despatched to any land". C. F. BECKINGHAM

ADVANCES IN ANALYTICAL CHEMISTRY

Advances in Analytical Chemistry and Instrumentation Vol. 2. Edited by Charles N. Reilley. Pp. vii + 408. (New York and London: Interscience Publishers, a Division of John Wiley and Sons, Inc., 1963.) 115s.

THIS volume continues a series in which new ideas and instrumental techniques in analytical chemistry, together with developments in more classical methods, are reviewed by practical experts of international repute. The editor has again secured the services of a distinguished group of contributors and the generally high standard of the individual articles is therefore to be expected, but the volume as a whole might have benefited from a little more uniformity in the treatment of the various subjects.

For example, F. Feigl, R. Belcher and W. I. Stephen, reviewing "Progress in Qualitative Organic Analysis", have compressed this vast subject into 29 pages of text, the result being virtually a catalogue of the significant papers published during the past ten years, in the style of the Chemical Society's *Annual Reports*. On the

other hand, G. Mattock has filled 81 pages with a detailed discussion of laboratory pH measurement, including such useful data as a table for the location of faults in glass electrode cells.

The wisdom of devoting two out of six articles to polarography might be questioned, but the articles themselves, on the hanging mercury drop electrode, by W. Kemula and Z. Kublik, and on organic polarography, by Petr Zuman, are excellent reviews by leading authorities on these subjects, both of which are finding increasing application. A more massive review, occupying a third of the volume, is that by Harry B. Mark, jun., Louis J. Papa and Charles N. Reilley on "Reaction Rate Methods". These have applications in the determination of mixtures of closely related compounds such as homologues, isomers and copolymers, which, so far, appear to have been rather neglected in Britain.

One chapter which seems out of place in this volume is that entitled "Mass Spectra of Organic Molecules" by Seymour Meyerson and John D. McCollum. In fact, this deals only with carbonyl compounds and allylic and related ethers, and the section on ethers, far from being a review, consists entirely of the authors' hitherto unpublished work. Moreover, the application of these results to analysis is referred to only in passing, while instrumentation is not even mentioned. The analytical chemist wishing to keep abreast of new developments, for whom this book is supposedly intended, would be sadly disappointed if he expected to find here a comprehensive review of the analytical applications of mass spectrometry. It is to be hoped that this subject will receive in a future volume a treatment more comparable with the high standard maintained by the other articles in this volume and its predecessor. R. J. MESLEY

CHEMICAL ICONOCLASM

Noble Gas Compounds

Edited by Herbert H. Hyman. Pp. xiii + 404. (Chicago and London: The University of Chicago Press, 1963.) 90s.

EVERY now and then we are forced into awareness of the areas of unnoticed ignorance in even the best cultivated fields of chemistry and physics. The noble gases of the atmosphere have figured twice in such dramatic happenings: in their original discovery and again, very recently, in the proof that they are not, after all, chemically inert. With the wisdom of hindsight, it now seems surprising that the chemical compounds of the 'inert' gases eluded detection for so long. Pauling and others predicted the existence of xenon fluoride thirty years ago, and all the thermochemical data are on record to extrapolate from the energies of the Te-F and I-F bonds to the conclusion that XeF₄ ought to have a favourable heat of formation. If Yost had worked in nickel or copper apparatus, instead of in quartz, he would certainly have isolated XeF₄ before the Second World War. In retrospect, the reactor chemistry group at Oak Ridge must actually have had xenon fluorides in their hands, but failed to draw the right (but seemingly far-fetched) conclusions from their poor mass balance for fission-product xenon in systems from which free fluorine was being liberated. It still remained for Dr. N. Bartlett, at the University of British Columbia, to do the crucial experiment: having proved that PtF₆ would oxidize molecular oxygen to [O₂⁺] [PtF₆⁻], to infer that xenon, with its similar ionization potential, should behave similarly. The experiment was done and the right inference drawn, even though it now seems he was wrong in identifying the product as Xe⁺ [PtF₆⁻].

What happened then exemplifies the difference between the scientific worlds of 1890 and 1960. From