

Towards Angkor:

In the Footsteps of the Indian Invaders. By H. G. Quaritch Wales. Pp. 249 + 32 plates. (London, Bombay and Sydney: George G. Harrap and Co., Ltd., 1937.) 12s. 6d. net.

THE great expansion of Indian cultural influence, manifested most conspicuously in art forms and concepts, which accompanied the spread of Buddhism, did not fail to affect south-eastern Asia. From the early centuries of the Christian era, traders and colonists were carrying with them to lands known to the modern world as Siam, Cambodia, Annam, Sumatra and Java, and even far distant Celebes, a culture of which the material forms as known to us culminate in the Javanese temple of Burobudur and the Cambodian Angkor Wat. This culture still survives, mingled with other elements, in the, until recently, isolated island of Bali. Not the least remarkable feature is that although this movement originally was Buddhist, it presents even in its early stages the spectacle of a close and amiable association with the cults of Hinduism.

Owing to the absence of historical record of the early stages of this expansion—even mythological reference is scanty—this field of civilization, if not entirely uncharted, has remained unexplored. In "Towards Angkor", Dr. Quaritch Wales places before his readers a connected outline of the course of events and the cultural developments in south-eastern Asia, which led up to the great efflorescence of monumental art under the great Kmer empire of the twelfth century. This he is able to do in great measure through the remarkable discoveries of two archaeological expeditions sent out by the newly formed Greater India Research Committee in 1934-35 and 1935-36, of which he was the field director. These two expeditions placed in his hands the key positions for unravelling the evidence of this cultural development. Of these the first is the identification of the trans-peninsular route from Takuapa River (Tako'a Mart) to the Bay of Bandon, and the second the identification of Chaiya to the north of the Bay of Bandon as the centre of a vast maritime empire, which dominated south-eastern Asia for five centuries.

The Journal of the Institute of Metals

Vol. 61. Edited by G. Shaw Scott. Pp. 332 + 29 plates. (London: Institute of Metals, 1937.)

THIS volume contains sixteen papers which have been presented before the Institute. Dr. D. R. Pye in the Autumn Lecture discusses some outstanding metallurgical problems arising in aero-engine design. Consideration is also given to the physical nature of metal surfaces from the point of view of friction and lubrication. Literature and published experimental data bearing upon inverse segregation are summarized in a contribution by N. B. Vaughan, and accounts are given of the various theories relating to the phenomenon. A second review is by L. Kenworthy of the methods available for assessing the protective values of zinc coatings on iron and steel. Average weight, uniformity, structure and porosity are attributes of the coating affecting corrosion

resistance, and for its evaluation the usefulness of the Britton electrolytic test is strongly emphasized.

A study by H. Unckel of the macro-structural deformation of multi-phase alloys during cold rolling is of interest, dealing as it does with a hitherto neglected field. Constituents of varying hardness in these alloys interfere with the plastic flow of the metal, and extra stresses arising from secondary flow around the harder constituents may cause increased brittleness. The determination of alumina in the presence of metallic aluminium by a volatilization process using hydrogen chloride is described by Messrs. Brook and Waddington.

The acknowledged high standard of contributions to the *Journal* is well maintained.

A Text-Book of Qualitative Chemical Analysis

By Dr. Arthur I. Vogel. Pp. xi + 383. (London, New York and Toronto: Longmans, Green and Co., Ltd., 1937.) 7s. 6d.

DR. VOGEL'S book, which he says is based on several years of experience in teaching the subject, is one which has many very good features. The introductory chapter on theory is much more informative and modern than those usually found in elementary books on qualitative analysis, and provides a sound basis for the practical work. The descriptions of reactions and group separations are very clear and detailed, so that the work of the teacher should be made easy. A good feature in this part is the care taken by the author to provide accurate equations for the reactions, since without an appreciation of these, qualitative analysis loses much of its value. Reactions of some rarer elements which nevertheless may be encountered in common materials are given. The model analyses at the end will be useful to students in showing how results should be set out in practical examinations.

The book may be recommended as a sound and accurate treatise of moderate price, which deserves to become popular. If carefully studied, it will provide an excellent guide to the student from the early stages in his career up to the honours courses.

Molecular Beams

By Dr. R. G. J. Fraser. (Methuen's Monographs on Physical Subjects.) Pp. ix + 70. (London: Methuen and Co., Ltd., 1937.) 2s. 6d. net.

DUNOYER'S method for projecting beams of atoms or molecules through a vacuum has been applied in many branches of physics. Dr. Fraser describes particularly in this monograph its use in investigating atomic collisions, and magnetic and electric moments. It is evident that the potentialities of the method are extensive, whilst one gains the impression that its technique is not unduly difficult. The book is scarcely one for ordinary undergraduate reading, assuming as it does a considerable background of advanced physics, but as a survey of the subject for research workers it can be recommended wholeheartedly. The diagrams are clear, and there is an adequate index.