

reviews of the progress made from year to year. Secondly, they offer a useful bibliography of the work done in the whole country (and by Indian workers abroad) so that even out-station workers with no library facilities can keep in touch with the latest developments.

The publication is not without its defects. In the first place, it may be pointed out that there is considerable overlapping of matter between different sections. This is partly due to the creation of a number of independent sections relating to closely allied branches and partly owing to the fact that the contributors who are derived from different parts of the country have no means of consulting each other. This defect can be overcome by appointing small editorial committees to scrutinise all the publications both independently and collectively. A second observation that one may make is that many of the sections are more of the nature of abstracts than of reviews. Abstracts are undoubtedly very useful but the publications cannot, in that case, be called reviews. Certain amount of selection in regard to the matter is needed. Some criticism—in a kind and

helpful spirit—will also add to the value of the contributions. Many of the reviewers have cited reference to unpublished work—done by themselves and their friends—which, though useful, is not quite desirable in practice. Such a procedure will not be fair to the other authors who do not possess a similar advantage. Some of the contributors refer freely to their departmental reports, *Proceedings of the Indian Science Congress and Proceedings of the Society of Biological Chemists, India*—which cannot be classed as original publications of completed work. Many of these reports are essentially of a preliminary character and should have been left out until they are published in specialist journals in more complete form. The indices are not complete. A wider choice of 'subjects' will be helpful to most of the readers. The author index does not refer to all publications cited in the text. These are all small and inevitable defects in new ventures of this type and it is hoped that they will be steadily eliminated from later publications.

V. SUBRAHMANYAN.

Recent Developments in Indian Geology.*

PROFESSOR WADIA, in the course of his address, dealt with certain branches of Indian geology in which marked progress was achieved during the last two decades. Among the main lines of advance is the progress towards the unravelling of the most ancient rock-complexes of India carrying the principal ore-deposits of the country, in which Sir L. Fermor, Dr. Heron and the Mysore State Geologists have taken a leading part. Their classification, origins and structural characters are now better understood. It is in the steadfast pursuit of pure research in the problems of rock and ore origins that there lies the best chance of achieving results of economic value and industrial utility. The detailed study of the Gondwana system of rocks, the carrier of the coal-deposits of the country is proceeding, the principal contributions being those by Dr. Fox on the stratigraphy and correlation of the scattered Gondwana basins, and on the total coal reserves in them, and by Prof. Sahni on the study of fossil vegetation. Geologists have succeeded in proving during the late years that the thick pile of lavas building the Deccan plateau was erupted

in early Tertiary age rather than in late Mesozoic. A substantial body of the evidence for this belief has been collected by the research workers of the Lucknow, Benares and Mysore Universities,—a welcome sign of the time of increasing co-operation between the official department and universities. The most significant advance during the last 15 years is in our knowledge of the Himalayas, recent work on the structure, origin and age of these mountains by Pilgrim, Wadia, West and Auden has materially changed old ideas. In Kashmir, Simla and Garhwal Himalayas enormous tangential thrusts have been proved whereby large slices of the mountains have moved forward for miles, piled up on each other and folded back. These great earth-movements, in the Punjab Himalayas at least, are now proved to be of so geologically recent a date that Early Man must have been a witness to the finishing uplifts of the mountains.

The value of the total mineral production of India has been doubled in the last 25 years and the Geological Survey of India is devoting more and more attention to economic, engineering, soil, water-supply and industrial problems than in the past.

The President briefly reviewed the progress of Palæontology in India and welcomed the growth of the study of fossil plants and animals in the universities.

* Presidential Address at the Annual General Meeting to the *Geological, Mining & Metallurgical Society of India*, by Dr. D. N. Wadia, President of the Society. 30th September 1937.

SCIENCE NOTES.

Chemical Industries in India.—One of the main foundations of successful chemical industries is a cheap supply of sulphuric acid. India lacks any indigenous source of sulphur of commercial size and up to the present no use has been made of the sulphide ores occurring at Bawdwin in the N. Shan States or at the copper mines in Bihar. Schemes have, from time to time, been formulated for the purpose, but have never been brought to fruition. India is therefore dependent upon imported sulphur for its supplies of this most important acid. Imports of sulphur in 1935-36, amounted to 26,000 tons and of sulphuric acid to 284 tons. The output of the acid plants in the country is a little over 31,000 tons of 100 per cent. acid. The manufacture is widely distributed, and is a healthy sign of growing activity in the chemical industries. The objects of manufacture are varied. In Bihar, the acid is largely used for the preparation of ammonium sulphate from the coke by-product recovery plants and in the tin plate works; in Burma, for refining oil products and in the Nilgiris for cordite. The output of ammonium sulphate amounted to 15,400 tons in 1935. Fairly large quantities of aluminous sulphates and alum are produced by treating the indigenous bauxite with sulphuric acid.

Salt-petre is produced in Bihar, the United Provinces and the Punjab by the laxiviation of nitrate bearing efflorescence formed near village sites after treatment with wood ashes. The crude product requires refining before use. The production amounted to over 12,600 tons in 1935. Although some is utilised as a manure and for gunpowder, the greater part is exported, the exports in 1935 being a little over 8,600 tons.

Magnesium chloride is produced from the natural bitterns of the Rann of Cutch and the Gulf of Cambay. The material is of high grade and has almost completely ousted the imported German product. There is also a small export trade.

Throughout India, use is made of the saline efflorescence occurring for the production of impure varieties of soda and similarly from the alkaline lakes in Sind. Some ten years ago a large soda factory was built in the Indian State of Dhorangadhra on the little Rann of Cutch. The Shri Shakti Alkali Works were intended to produce annually the equivalent of 22,000 tons of sodium carbonate by the ammonia soda process. Attempts to commence production in 1928 and subsequently, proved abortive. The Magadi Soda Works which had a plant near Calcutta for producing caustic soda from carbonate imported from the Magadi Lake in Kenya went into liquidation about 12 years ago. There is hope that various soda products will shortly be made in India by the Imperial Chemical Industries, Ltd. Imports of soda salts amount to 69,000 tons per annum. (*The Chemical Age*, 36, No. 932, 410.)

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I. C. I. Chemicals in India.—Imperial Chemical Industries (India), Ltd., which has for many years played a large part in the import of industrial chemicals for the Indian market,

announces its intention to float an Indian company for the local manufacture of products essential to Indian industrial development.

Factories will be erected in the Punjab for the manufacture of soda ash and in Bengal for the manufacture of chlorine and caustic soda, and further plans will be developed later. The company will have the full technical support of Imperial Chemical Industries, Ltd., London, in these developments.

It is intended that a large proportion of the capital shall be offered for subscription by the Indian public. Indian labour will be employed, and Indian Staff will be trained to share in technical management.

At the General Meeting of Imperial Chemical Industries, Ltd., held in London, in April last, Lord McGowan stated that Mr. H. O. Smith, one of the Directors, had been to India, where the company had considerable interests, in alkali, dyes, explosives, general chemicals, and metals, and that the continued progress of that country and the development which was to be expected under the new scheme of self-government, fully justified a fresh general survey of the possibilities.—(*Chemical Age*, 1937, 37, No. 947.)

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Herman von Helmholtz.—*The Bausch & Lomb Magazine* for August 1937, contains a brief sketch of the life of Helmholtz, pioneer in Physiological Optics, by Everett White Melson. In the history of Physiological Optics, Helmholtz, discoverer of the Ophthalmoscope, stands out as the most outstanding figure. "He investigated the optical contents of the eye, measured the radii of curvature of the crystalline lens for near and far vision; explained the mechanism of accommodation and discussed the mechanism of colour vision applying his theory to the explanation of colour blindness." He was born at Potsdam, Germany, on August 31, 1821, and graduated in medicine in 1842 from Friedrich Wilhelm Institute. He became famous as a teacher and lectured on Physiology, Pathology and Anatomy at Königsburg, Bonn and Heidelberg. In 1871, he became Director of the Physical Institute at Berlin, and in 1877, the Director of the Physico-Technical Institute. His researches were not confined to Physiological Optics alone; in the field of Physiological Acoustics, he published "His Sensations of Acoustics", explaining the mechanism of the bones of the ear and the action of the cochlea on the principles of sympathetic vibrations. He propounded the doctrine of the conservation of energy, and his theory of the atomic nature of electricity had far-reaching consequences. He inspired the experimental work of Hertz which proved the existence of Maxwell's electromagnetic waves, thus opening the way to wireless telegraphy.

In 1831, Helmholtz attended the World's Fair at Chicago. During his return trip to Bremen he fell down the companionway of his ship, sustaining injuries which led to his death in 1894.

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