

### Discovery of Marine Beds at the Base of the Gondwana System in Central India.

**M**OST of the papers recently published in the Records of the Geological Survey of India naturally take the form of shading with details the general outline previously known. Some of the results published in the last general report of the director (Records, Geological Survey of India, vol. 54, Part 1) are, however, of special interest as showing that some of the previously accepted outlines need reconsideration. We have space to notice only one of them at this stage, and that because the director's announcement may not be superseded for some time by a more detailed description.

Among the results hitherto regarded as final has been the conclusion that the Peninsula of India has never been submerged beneath the sea since early Palæozoic times, except for narrow strips extending not far from the present coast lines. Towards the end of 1921, however, the discovery by Mr. K. P. Sinor of a very thin marine bed at the base of the Lower Gondwana system, on the small coalfield at Umaria in the Rewah State of Central India, suggested a review of the previously accepted view regarding the stability of the peninsular *Horst*. Early last year, after this discovery had been reported to the director of the Geological Survey of India, a field collector was deputed to obtain further specimens, and these included, besides *Productus*, a species of *Spiriferina* related to and probably identical with *Spiriferina cristata* var. *octoplicata*.

This discovery thus unexpectedly provides evidence of the fact that the sea in Carboniferous times trespassed on to the continent of Gondwanaland farther than was previously suspected; for the Umaria coalfield is some 500 miles from the present west coast, 400 miles from the east coast, and 400 miles from the marine formations which lie away to the north of the crystalline axis of the Himalayan range. In view of the fact that portions of the western States of Central India and the northern parts of the Bombay Presidency were invaded by the sea just before the outflow of the great Deccan trap early in Cretaceous times, one is tempted naturally to regard marine trespass from the west as the most natural line of

advance and subsequent retreat; but there is a possibility also that this *Productus* bed in Rewah records the spread southward of the Permo-Carboniferous sea which left thick masses of *Productus* limestone in the Punjab, Kashmir, and Tibetan plateau.

The discovery is thus one of very great interest to students of geomorphology; but though doubtless the basal (Talchir) rocks of the Gondwana system will now be searched afresh with renewed hope, the chances of finding further evidence are remote. The coal seams of peninsular India all lie above the Talchirs, and mining operations naturally are not carried below the coal beds for purely scientific objects, while it is only around the edges of the coal basins that narrow strips of the underlying Talchirs occasionally peep out. The surface is fairly flat—a soil-covered peneplain which is lapped over on its northern margin by the mantle of Gangetic alluvium of unknown thickness.

Some years ago this discovery would have had a double interest; for the problem of correlating the great freshwater Gondwana system with the standard stratigraphical scale was the occasion of some controversy due to differences of opinion which naturally follow indirect inferences from homotaxis. But twenty years ago characteristic members of the Lower Gondwana *Glossopteris* flora were found associated with *Productus* beds in Kashmir, whither presumably they were carried by one of the rivers then running from Gondwanaland into the great Eurasian ocean known to geomorphologists as Tethys. The base-line thus became definitely established and at a level in the vertical scale near that which W. T. Blanford and others had advocated from indirect evidence many years before. Blanford lived long enough to hear of the Kashmir discovery, which proved that in the Indian region the *Productus* marine fauna and *Glossopteris* land flora were contemporaneous. What polemics would have been saved, probably, if he had surveyed the Central Indian instead of the economically more important eastern coalfields, and had thus been able to start from a recognisable stratigraphical base line on the Peninsula itself.

### The Calcutta School of Tropical Medicine and Hygiene.

**T**HIS teaching and research institution was opened two years ago, and an account of its work is given in a paper by one of the staff, Major Knowles. The laboratory has four floors with 220 feet of north light and a shorter wing at right angles to the main front, while the special hospital for tropical diseases has more than 100 beds, both having been constructed and partially endowed at a cost of about 120,000*l.*, nearly two-thirds of which were raised by the founder, Sir Leonard Rogers, and by Major Knowles. The staff of whole-time professors and research workers now numbers thirty-three, special laboratories and investigators being provided for kala-azar, dysenteries, ankylostomiasis, leprosy (for which a separate institute is to be built opposite the school at a cost of another 20,000*l.*), diabetes and filariasis, all in addition to the teaching staff of the school. The departments now number seventeen, three or four sections commonly combining on one research under the director, Col. J. W. D. Megaw, thus furnishing the team work so essential to success.

The teaching is purely post-graduate, the number admitted being limited to 50 by strict selection. The course for the diploma in hygiene lasts nine months and that in tropical medicine six months,

against four in the Liverpool and three in the London School of Tropical Medicine. After an hour's clinical work in the hospital, a lecture is given illustrated by numerous lantern slides, epidiascope pictures, and cinematograph films. This is followed by practical work in the class-rooms for the rest of the day illustrating the same subject, after which that lecturer is free for the rest of the week for research and preparation for his next class.

In the short time the Institution has been open, important work has been published, or is in the press, on the pathology and treatment of leprosy by Muir; on the diagnosis by a new test and the treatment of kala-azar by Napier; on the differentiation of chronic dysenteries by the reactions of the stools by Knowles and Napier; on the poisonous amines of dysentery and cholera bacilli, and also in lathyrism and epidemic dropsy by Acton, Chopra (professor of pharmacology), and S. Ghosh (chemist). Tropical skin diseases are being closely studied with the help of the full-time artist and the photographer of the school. Every case admitted is worked out clinically and microscopically by all the sections concerned, and careful records are kept. This cannot fail in due time to result in important additions to our knowledge of tropical diseases in view of the unrivalled clinical