

Sir Lewis L. Fermor, Kt., O.B.E., D.Sc., A.R.S.M., F.R.S., F.G.S.,
F.A.S.B., M.Inst.M.M.

AFTER thirty-three years' distinguished service to India, Sir Lewis Fermor will be retiring this month from the Directorship of the Geological Survey of India, and India will be losing one of her most distinguished scientists. We take this opportunity of paying our tribute to one who has laboured so well for the cause of Science in India.

Trained as a geologist at the Royal School of Mines under Prof. J. W. Judd, with a strong interest in metallurgy, Sir Lewis Fermor was appointed to the Geological Survey of India in 1902, at the time that Sir Thomas Holland assumed the Directorship of the Survey. His promise of exceptional

ability was recognised when he was promoted to the grade of Superintendent in 1910, at the early age of 30.

Sir Lewis Fermor's first introduction to Indian Geology was given to him by the late Mr. E. W. Vredenburg, whom he accompanied into the field in Central India. It was on this occasion that Sir Lewis first came into contact with manganese ore deposits in the field, and it was probably due to this that in the following year Sir Thomas Holland, thinking it advisable to examine scientifically what was then already a flourishing industry, deputed Sir Lewis Fermor to investigate the manganese ore



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deposits of India. It is probable, however, that Sir Thomas Holland never visualised that this work would take six years to complete, and lead to the publication of a monumental memoir running to 1294 pages. In this great work, by which Sir Lewis is still best known outside India, manganese was treated from almost every point of view; and hidden away in this memoir there is a wealth of original observation, concerning not only manganese itself but also many related geological problems, which has frequently been overlooked. Of the many

valuable results accruing from this work, one may specially be mentioned, since it proved to be of direct help to the mining companies which were engaged in winning the ore. This was the recognition that the folded sheets of manganese ore had generally a marked pitch, and that the direction of this pitch could be determined in a single exposure by observing the groovings developed on the bedding planes of the associated rocks. The recognition of this principle must have saved the companies many thousands of rupees, previously lost through

their inability to understand the probable underground course of the ore bodies.

The number of papers already published by Sir Lewis Fermor is well over 80. Of these one may be picked out as of particular scientific interest. As a result of studying the rocks of the Eastern Ghats, which are rich in garnet and of high density, it occurred to Sir Lewis to enquire into the reasons for rocks in certain areas being composed of minerals of high density, such as garnet, whereas elsewhere rocks of similar chemical composition are composed of minerals of lower density. This led him to suggest that below the plutonic zone of granites and gabbros there occurs an infra-plutonic shell of similar bulk composition but composed of denser minerals, of which the chief is garnet. This shell was regarded as being a cushion upon which the isostatic operations of the earth have their foundations; for it would only require a release of pressure over any given portion of the infra-plutonic shell to allow the liquefaction of that portion of the shell under the high temperatures present. In this way he was able to offer an explanation of many geological problems, such as isostasy, magmatic differentiation, the origin of earthquakes, and even the constitution of meteorites. It is unfortunate that this work, published so long ago as 1914, has not been followed up in greater detail. At the moment it is being revived in connection with the origin of earthquakes, and one Japanese seismologist has recently supported the hypothesis, following up R. D. Oldham's suggestion that earthquakes are due to the sudden transformation of rocks of the infra-plutonic zone into less dense forms in the manner indicated above, a change, which, being endothermic, may take place with explosive rapidity.

In 1911 a detailed survey of the Archæan rocks of the Central Provinces was begun, and Sir Lewis Fermor was placed in charge of the party. He at once initiated the mapping of these very old rocks in a more detailed manner than had ever before been attempted. This work has continued intermittently since that date, but it is unfortunate that owing to official administrative duties Sir Lewis has not yet had an opportunity of publishing his own results. We may perhaps express the hope that in the quieter times ahead opportunity may be found for bringing this valuable work to fruition.

During the War Sir Lewis Fermor rendered valuable service on deputation to the Railway

Board, during which time he investigated the Bokaro coalfield, and the Karanpura and Talchir coalfields, while he also went on deputation to the Indian Munitions Board. The value of this work received recognition at the hands of the Government of India when, in 1919, he was made an O.B.E. For his contributions to theoretical geology he was awarded in 1921 the Bigsby Medal of the Geological Society of London, while in 1934 he was elected a Fellow of the Royal Society.

During his long service in India, Sir Lewis Fermor has been President of the Mining and Geological Institute of India, President of the Geology Section of the Indian Science Congress, General President of the Indian Science Congress, and now, at the time of his retirement, he is President of the Asiatic Society of Bengal, and President of the National Institute of Sciences of India, the oldest and the youngest academies of scientific learning in India. To each of these Institutions he has delivered inspiring and original addresses, which have indicated the wide scope of his outlook.

Sir Lewis Fermor was made Director of the Geological Survey in 1932. During his tenure of the Directorship it has been a great disappointment to him that his Department, for adventitious reasons, suffered so severely during the retrenchment carried out by the Government of India in 1931-32. His untiring advocacy of the value of the Geological Survey to the prosperity of India has, however, resulted in the partial restoration of the cadre of his Department. In the Birthday Honours of this year the honour of Knighthood was conferred upon him for his long and distinguished services to India, a reward, however, which he himself likes to regard as a recognition by the Government of India of the value of his Department to this country.

Great as have been Sir Lewis Fermor's achievements in the development of India's mineral resources and in the domain of pure science, it is probable that many will regard his unremitting endeavours last year to unite scientists in India, when there appeared the possibility of an undignified rupture, as his most happy achievement. The tact and patience which he displayed as Chairman of the Indian Science Congress Academy Committee revealed to many a new aspect of his character, which finally resulted in the formation of the National Institute of Sciences of India, inaugurated on January

7th, 1935, by H. E. Sir John Anderson, the Governor of Bengal, with Sir Lewis Fermor as the first President.

In bidding farewell to Sir Lewis Fermor, it would be ungracious to omit a reference to Lady Fermor. During the three years that she has been by his side in India, she has, by her charm and understanding, endeared

herself to all who have had the good fortune to come in contact with her, and especially to every member of Sir Lewis Fermor's own Department. We hope that the years that are ahead of them may be rich in achievement and filled with prosperity and happiness.

Industrial Intelligence and Research in India.

By N. Brodie,

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THIS article deals with the formation and activities of the organisation recently set up by the Government of India to deal with industrial intelligence and research. The importance of industrial research under present-day conditions is universally recognised and Government bodies of one sort or another exist in all the major industrial countries but industrial intelligence is not so much in the foreground and, by laying some stress on this, India strikes out a new line. Nevertheless, although not given the same emphasis in other countries, industrial intelligence is generally, perhaps always, an important accompaniment of industrial research and most industrial research organisations have some arrangement for intelligence work, frequently in the form of a special department dealing with this work.

In India Industries is a transferred subject and therefore, so far as British India is concerned, a matter for the Provincial Governments. Most Provincial and many State Governments have instituted Departments of Industries, generally under the charge of an officer designated the Director of Industries. Several Departments of Industries, both in the Provinces and in the States, maintain industrial laboratories in which research work is carried out. For some time past it has been generally felt that the activities of these different laboratories suffer from lack of co-ordination and at the Fifth Industries Conference, held in July 1933, this question was raised in a specific form and it was recommended that "some central co-ordinating authority should be set up for the collection and dissemination of industrial intelligence, co-ordination of research and the organisation of industrial exhibitions". This recommendation was accepted by the Government of India and it was decided that a body of this type

should be formed and attached to the Indian Stores Department, a Department which has much contact with industrial matters in India. The Chief Controller of Stores, Sir James Pitkeathly, drew up a scheme which was placed before and accepted by the Sixth Industries Conference held in July 1934 and subsequently sanctioned by the Government of India. This scheme will be found described in detail in bulletin of Indian Industries and Labour No. 52 giving the proceedings of the Sixth Industries Conference.

In accordance with Sir James Pitkeathly's proposals the Government of India sanctioned, with effect from the beginning of the present financial year, the formation of what is known as the *Industrial Intelligence and Research Bureau*. The staff of the Bureau consists of a Director, an Assistant Director and the necessary technical and clerical assistants. It is attached to the headquarters of the Indian Stores Department and is therefore located at New Delhi and Simla. At the same time a Research Branch was formed at the Government Test House, a laboratory situated at Alipore (Calcutta), which is also under the control of the Indian Stores Department. The staff of the Research Branch consists of a Research Officer, an Assistant Research Officer, 8 Chemical and Physical Assistants and clerical and menial staff.

The programme of the Research Branch and all important matters of policy involving the Bureau are brought before the Advisory Council for Industrial Intelligence and Research. This Council consists of the Directors of Industries or corresponding officers of the Provincial Governments and of seven Indian States, representatives of different Central Government Departments, four non-official members nominated by the Government of India and non-official