THE GEOLOGICAL SURVEY OF INDIA, 1846 TO 1947

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NOW that the Empire of India has ceased to exist as a British possession and the control of the services in Hindustan and Pakistan has passed from Whitehall, the records of many British-organised services will be reviewed and then perhaps forgotten. I had attempted to tell the story of the Geological Survey of India ten years ago in my presidential address to the Mining and Geological Institute of India (*Trans. Min. and Geol. Inst. India*, **31**; 1936). It was evident to me then that the beginnings of the Geological Survey of India were not correctly known, and certainly not as represented in the record by Sir Clements R. Markham ("Memoirs of Indian Surveys", p. 216; 1878), nor as given by Sir Thomas Holland in his "Indian Geological Terminology" (*Mem. Geol. Surv. India*, **51**, Part 1; 1926). I began a search for information in India, first among the files of the Geological Survey of India, then in the Record Office in the Secretariat of the Government of Bengal, and finally, on my return to Britain last summer, in the record room at the India Office, Whitehall. The correspondence relating to the engagement of David Hiram Williams and, eventually, after his death, to that of Thomas Oldham and his re-engagement after five years service, show that Oldham was recruited as "successor to Williams", and that, even at the time of his re-engagement by the Honourable Court of Directors of the East India Company, Oldham was addressed as "Geological Surveyor". These facts are quite plain in the dispatches to India and Bengal from London, and may be seen in the Commonwealth Relations Office, King Charles Street, London, S.W.1, through the Superintendent of Records.

Already in 1835 the subject of India's coal supplies for the steamers for inland navigation was under consideration, and this led to the establishment of a Coal Committee in 1836, with Dr. John McClelland (Medical Services) as secretary. The reports of the (Indian) Coal Committee of 1838 and 1846 are well known, but it has so far been practically unknown that John McClelland had conducted correspondence with Charles Lyell and with R. I. Murchison on the question of employing trained geologists in India. The earliest letter I have seen is dated February 10, 1841, from McClelland to Lyell, expressing a desire for a scientific examination of the coalfields of India; the second is dated September 22, 1842, from Murchison to McClelland, in which reference is made to the appointment of Sir H. De la Beche to the post of "geologist of the Ordnance Survey"; and the third is dated May 10, 1843, from Lyell to McClelland, also referring to the establishment of geological surveys in Canada, etc. Then there is a letter, dated August 16, 1843, from the Coal Committee to the Secretary to the Government of Bengal, enclosing the correspondence with Lyell and Murchison, and asking that they might be consulted on this matter of a proper geological survey of India. This was followed by a letter ("Steam", No. 2091, dated September 4, 1843) from the Government of Bengal to the Government of India, with a strong recommendation from His Honour, the Deputy Governor of Bengal. The Government of India, in turn, wrote the following letter:

Home Department
Marine.
No. 13 of 1843.

To
The Hon'ble the Court of Directors
of the East India Company.

Hon'ble Sirs,

We have the honor to submit the accompanying communication from the Government of Bengal respecting the best means of ascertaining, with precision, the hitherto undeveloped resources of the country in the production of coal.

The papers which we transmit will explain to your Hon'ble Court the grounds on which the Hon'ble the Deputy Governor urges the expediency of adopting a system of scientific inquiry both with the view of securing success to such attempts as are made by Govt. and of promoting confidence among private speculators to embark in undertakings for obtaining coal, and in expressing our concurrence in the views and recommendations of His Honor, we beg to request that the selection of the Geologist to be sent out by your Hon'ble Court, may be left to Mr. Murchison, the President of the Geological Society in London.

We have, etc.

Fort William,
The 14th October, 1843.

There then followed a search in England for a suitable geologist to be sent out to India to begin the Geological Survey, and it was not until December 1845 that the following letter was dispatched from London by the Honourable Court of Directors of the East India Company:

Marine Department.
No. 8 of 1845.

Our Governor General of India in Council.

Para. 1. With reference to your letter No. 13 dated the 14th October, 1843, we have to inform you that we have engaged Mr. D. H. Williams to proceed to India for the purpose of making a Geological Survey of those districts in which Coal Fields are situated, with the view of obtaining accurate information respecting the resources possessed by that country for the production of Coal and determining in what manner they may be best turned to account.

2. Mr. Williams has been strongly recommended to us by Sir Henry De la Beche, Director General of the Geological Survey of the United Kingdom under whom Mr. Williams has been for several years employed. Sir Henry informs us that he has surveyed many of the Coalfields in Wales and in the West of England and has executed very valuable maps and sections relating to them. He also represents him as having been in early life engaged in the working of Collieries and as being perfectly qualified to examine the Coal Districts of India, either geologically, or practically as well as to superintend Coal works.

3. These high testimonials leave no doubt of the fitness of Mr. Williams for the important duty which it is proposed to confide to him, and we trust that his labours will have the effect of ensuring success to such mining operations as Government may think proper to undertake and of encouraging private speculators to embark in similar attempts.

4. Mr. Williams left England with the mail of the 20th of the present month (Decr.) and will proceed to Calcutta to place himself under the orders of your Govt. The period of his engagement is limited to five years. He is bound to serve in any part of the East India Company's Territories to which you may direct him.

5. We have agreed to allow him a salary of £800 a year to commence from the date of his arrival in India exclusive of such travelling allowances as you may think reasonable; and we have also granted him £200 in aid for

his outfit and passage to India, and we have guaranteed him the like sum for his return to this country on the expiration of his period of service. He has also been furnished with a set of Instruments such as he is likely to require in India, in order that he may not be prevented from entering immediately on his duties. These instruments, a list of which is transmitted, are similar to those used in the Geological Survey of Great Britain and have been selected by Sir Henry De la Beche.

6. One of the parts of the Deed of Covenant entered into by Mr. Williams is forwarded in the packet for your information and guidance.

We are, etc.

London,
23rd Decr., 1845.

David Hiram Williams arrived in Calcutta on February 4, but did not report for duty, by letter, until next day, February 5, 1846. He was instructed by the Government of India (letter No. 134, Home Dept., Marine, dated February 7, 1846) to place himself at the disposal of the Government of Bengal, and by this Government posted to the Raniganj area. Williams' first field report, from camp at Raniganj, is dated March 31, 1846, and his first progress report, from Spence's Hotel, Calcutta, is dated August 10, 1846. From this report it is evident that Williams had noted: par. 4, the Coal Measures resting directly on the crystalline rocks; par. 7, two groups of coal seams—one with ten seams of coal around Raniganj and the other with fourteen seams of coal near Taldanga near the Barakar River; par. 8, coal near Induhghur (Jharia town), four miles south of the Fitcoory bungalow (ruins near Dhanbad at the Grand Trunk Road—he thus discovered the Jharia coalfield); par. 11, the importance of railway communication; and in a later field report, dated May 3, 1847, he records that the coal near Taldanga was of caking (coking) quality. His last known report is dated December 9, 1847. Williams had planned a series of investigations up the Damodar valley and had secured geological assistants—Mr. Haddon and Mr. Jones—when he contracted jungle fever and died in Hazaribagh in the house of Dr. Callum on November 15, 1848. And, while R. G. Haddon was reporting this sad affair and assuming charge of the Geological Survey at Hazaribagh on November 15, 1848, the body of J. R. Jones, the other assistant, was brought in in a palki. When Williams' death was reported to the Honourable Court of Directors in London in a letter dated January 31, 1849, they replied (letter No. 24, Marine Dept., dated Nov. 28, 1849) to "Our Governor of the Presidency of Fort William in Bengal" complaining of delays in the transmission of reports and as not having news of Williams' death until the autumn of 1849. They record their appreciation of the work done by Williams and propose to publish his reports, and desire McClelland to continue the work, while they add that:

Para. 6. We propose to take immediate steps for securing the services of a suitable successor to Mr. Williams.

and ending "We are your loving friends . . . etc.".

Their next letter (No. 27 of 1850, Marine Dept., Dec. 11) to "Our Governor General of India in Council" includes

"We desire that the earliest attention of the Geological Surveyor (Professor Oldham) whom we have lately appointed, and who will proceed to India this month, be directed to the subject."

The subject was the introduction of railways in various areas such as those to which Williams had directed attention. Then their further letter (Marine Dept., No. 9, March 5, 1851) to "Our Governor of the Presidency of Fort William in Bengal" followed with the counterpart of the covenant entered into by Prof. Oldham,

". . . lately attached to the Irish Branch of the Geological Survey of the United Kingdom whom we have approved to the situation of Geologist, in succession to the late Mr. D. H. Williams . . ."

In the above letter reference is made to their letter No. 24 of November 28, 1849, showing they had chosen "a suitable successor to Mr. Williams" as early as possible. Previous to Oldham's arrival in India (March 5, 1851), McClelland had carried on the duties which Williams had begun, and McClelland submitted the annual "Report of the Geological Survey of India for 1848–49". He had designated himself as 'officiating superintendent', Geological Survey, and had asked (letter dated March 23, 1850) to be relieved of his geological duties. The Department was therefore (letter dated April 1, 1850) temporarily placed under the charge of the deputy surveyor general, Captain Thuiller, R.E., from April 30, 1850, who addressed Mr. R. G. Haddon as assistant geological superintendent. Thus when Prof. T. Oldham arrived, he was in direct touch with the Surveyor General of India, but he was addressed as Geological Surveyor by the Government of India (letter No. 290, Home Dept., of March 21, 1851, from W. Grey, Esq., Under-Secretary) and informed that his services had been placed at the disposal of the Government of Bengal.

No. 189 dated Fort William, the 24th March, 1851.

From
The Secretary to the Government of Bengal
To
Professor T. Oldham.

Sir,

I am directed by the Deputy Governor of Bengal to transmit herewith, for your information, the accompanying copy of a letter from the Under-Secretary to the Government of India, in the Home Department, No. 291 dated the 21st instant, and to request you to proceed to the Sylhet Hills, with the view of prosecuting your researches there until the season will permit of your examining the Valley of the Damoodah. You will address your reports to this office.

2. At the time of the death of Mr. Williams the Establishment of your office was as following:—

Mr. Haddon	Rs350
Mr. Jones	Rs350
A sub. asst. surgeon	Rs100
A writer and interpreter	Rs50
	Rs850

3. Before Dr. McClelland made overcharge of the office the Establishment was as follows:—

Mr. Haddon	Rs350
Mr. Theobald	Rs100
Mr. Gomes	Rs100
	Rs550

The persons still borne upon your establishment are:—

Mr. Haddon	Rs350
Mr. Gomes	Rs100
	Rs450

4. Mr. Haddon and Mr. Gomes are at present on detailed duty at Purnear. But on your intimating to His Honor that their services will be required by you in your

researches in the Sylhet Hills, they will be directed to join at Sylhet, or Cherra forthwith.

5. You are requested to report upon the establishment you may think it necessary to employ.

I have the honor, etc.,
W. Grant,
Secretary to the Govt. of Bengal.

So Prof. Thomas Oldham entered upon his duties as 'geological surveyor' in succession to Mr. D. H. Williams, and when his period of five years expired and his services were secured by his re-engagement for a further period of five years, the Honourable Court of Directors of the East India Company wrote as follows (letter, India Public Dept., No. 16 of March 5, 1856):

". . .

Para. 2. The duties of the Geological Surveyor have been greatly enlarged since Mr. Oldham assumed charge of the office and the establishment which he has to control has been likewise increased owing to the simultaneous prosecution of geological researches in different parts of the country. In consideration, therefore, of the greater labor and responsibility thus attaching to the office, and of the experience which Mr. Oldham has now acquired, we sanction the increase of his salary from the present rate of Rs888 to Rs1,100 per mensem.

Para. 3. We observe with some surprise that the President in Council, as one of the reasons for the increase of Mr. Oldham's salary states that he is paid little more than his assistants. . . .

Para. 4. We take this opportunity of observing that we have not received so regularly as we would desire, reports of the progress of Mr. Oldham's labors. We are apprehensive that the operations of the Department may not have been carried out in a systematic and regular plan. We think it desirable that you should direct your attention to the importance of giving such a character to the work on which Mr. Oldham is engaged, as the only means of rending his employment personally useful and we desire that, in communicating to him his re-engagement you call on him to submit a general scheme in which his future investigations should be carried on, and that when a plan of observations shall have received your sanction, it should be adhered to with as little deviation as possible. We desire a full report of his past labors and any maps he may have made be sent to us.

We are your affectionate friends,

. . ."

I think that the correspondence I have quoted and referred to will make it very evident that India owes a great debt to Dr. John McClelland in initiating a Geological Survey and very much more to the Honourable Court of Directors of the East India Company in providing the personnel and in taking a close interest in the establishment of the department on sound lines, also to the Government of Bengal for the consideration they showed Oldham after the losses suffered by the deaths of Williams, Jones and, soon after, Haddon, from the effects of jungle fever. It may be, and has been, claimed that in the century completed by the Geological Survey of India on February 5, 1946, the whole of India should have been thoroughly examined and mapped. That this could have been done only by having a large staff and elaborate equipment will be seen from the fact that an experienced geologist can map about 500 square miles a season on an average. There have been, roughly, a hundred and twenty geologists with average field service of barely eight years each, so that the area that could have been mapped is about 500,000 square miles, which was barely a third of the Indian Empire. This does not allow for all the detailed work that has been carried out, and in spite of which the Geological Survey of India had examined practically the entire region of India, part of Burma and some adjacent countries, by the end of its centenary year 1946. Instead of a cadre of thirty to forty officers, the department was already in need of three hundred to four hundred officers at the outbreak of war in 1939 to conduct a thorough economic exploration and exploitation on the lines which Mr. David Hiram Williams was to follow, to say nothing of the important branch of water-supply and of questions of engineering geology.

THE BRITISH-KENYA MIOCENE EXPEDITION, 1947

ONE of the discussions at the Pan-African Congress on Prehistory, which took place at Nairobi in January of this year, was concerned with the fossil remains of Miocene apes which have been found in Kenya during recent years. Some of the delegates to the Congress also visited Rusinga Island (near the Kavirondo Gulf of Lake Victoria) where Early Miocene deposits particularly rich in such fossils had been discovered by Dr. L. S. B. Leakey and Dr. D. G. MacInnes of the Coryndon Museum, Nairobi. It was here that Dr. Leakey found in 1942 a practically complete mandible of the extinct anthropoid ape, *Proconsul*, originally described on the basis of portions of the jaws and teeth discovered at Koru by Dr. A. T. Hopwood.

The opportunities provided by the Pan-African Congress served to focus attention on the great importance of these Miocene sites, and as a result a British-Kenya Expedition to Rusinga Island was organised with the aid of a grant of £1,500 from the Royal Society supplemented by a gift of £250 from the Aga Khan. The expedition was led by Dr. Leakey as field director, with the assistance of Dr. MacInnes as palæontologist. A very detailed geological study of the Miocene beds in the island was included in the programme, in order to supplement the preliminary survey carried out by Dr. P. E. Kent in 1934–35 (see *Quart. J. Geol. Soc.*, **100**, 85; 1944). The geological work of the expedition was supervised by Dr. R. Shackleton, of the Imperial College of Science and Technology, London. While the expedition concentrated its attention on Rusinga Island, brief reconnaissance work was also carried out at Mwafangano, Karungu, and on the Uyoma mainland, and a few days were spent on the Miocene site at Songhor. Work was begun on July 10 and the season ended on November 13.

The principal aim of the Expedition was to obtain further remains of the Early Miocene fossil Hominoidea, and to collect the associated fossil fauna and flora in as much detail as possible for a correlated study of the contemporary environment. Full reports of the season's work will take some time to prepare, but it is now possible to say that the results have been eminently satisfactory. More than 1,300 fossils have been collected, and these include about thirty more specimens of the fossil Hominoidea (probably representing five different genera). Among the more important hominoid discoveries are the palate and mandible of a medium-sized ape (regarded provisionally as *Xenopithecus*), a part of a mandible (including the symphysis) of an ape considerably larger than *Proconsul*, the left half of a palate of an infant Hominoid probably referable to *Proconsul*, and some fragments of limb bones.