

# British Territories in Borneo – Colonial Geological Surveys 1947-1956

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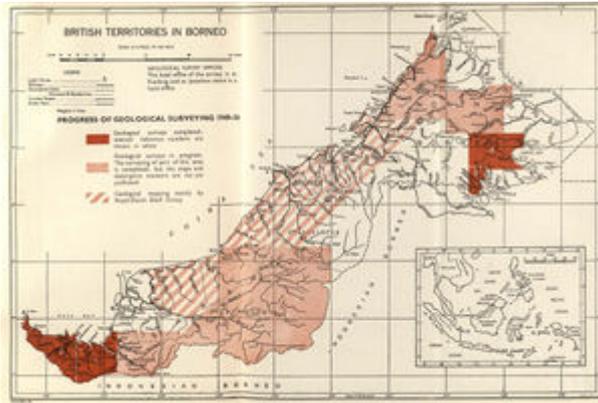
From Dixey, F. 1957. [Colonial Geological Surveys 1947-1956: a review of progress during the past ten years](#). Colonial geology and mineral resources. Bulletin supplement No. 2. London: HMSO.



Geological Survey, British Territories In Borneo. R.A.F. Food Supply Drop to Geological Party, Upper Rajang River, Eastern Sarawak. Seven parachute loads of supplies were dropped in 1954 in a 1 4 acres clearing prepared by the geological party at Long Luar on the Tipper Plieran River. Recovery of supplies, 100 per cent. Photo by G. Whittle. Plate XV.



Geological Survey, British Territories In Borneo. Motor launch L'Aubaine built in 1952 for Geological Survey. Combined sea and river craft, 50 ft. long, range 500 miles, cruising speed 9 knots. Equipped for geological staff, and short expeditions into country. Photo: N. S. Haile. Plate XV.



Coloured Map showing Progress of Geological Surveying, British Territories in Borneo, 1949-56. Plate XVI.

## British Territories in Borneo

The Geological Survey Department, British Territories in Borneo, was established in March, 1949, and operates in the 47,000 sq. miles of Sarawak and 31,000 sq. miles of North Borneo; investigations are also made in the State of Brunei by arrangement with the British Resident. In 1949, the senior staff comprised 1 director, 1 senior geologist, and 3 geologists; there are now 6 geologists, and the post of senior geologist has been up-graded to deputy director. Headquarters are at Kuchin in Sarawak, but a local office is maintained in Jesselton, North Borneo. All departmental expenditure was initially defrayed from Colonial Development and Welfare Funds supplied by the Central Allocation for Geological Surveys, but, since 1952, the Colonies have been progressively taking over financial responsibility and will have done so completely by 1960. The sources of funds for the period 1949-55 were as follows: C.D. and W. Central Geological Surveys Allocation, £132,532; C.D. and W. North Borneo Allocation, £25,287; Sarawak Colony Revenue, £88,504; total, £246,323.

Before the Department was established, almost all of the geological information on British Borneo was restricted to unpublished reports and maps of the Shell Group of oil companies, and "The Geology of the Colony of North Borneo", by M. Reinhard and E. Wenk, which was published in 1951 as Bulletin No. 1 of the Department, was indeed based on this work. Records of mining and prospecting in Sarawak were obtained largely from the Borneo Company Limited, and, in North Borneo, from the archives of the British North Borneo (Chartered) Company, these reports being later issued in other departmental publications. The Department has now published maps on a scale of 1 : 125,000 of 7,300 sq. miles of country, accompanied by descriptive memoirs. Surveys of a further 22,500 sq. miles are in progress, and maps of most of these areas will be published in the near future. The Shell Group are mapping a further 24,000 sq. miles, and their results will be placed at the disposal of the Department. The area in which no new work has yet been done is about 23,000 sq. miles. A 1 : 1,000,000 geological map of the whole territory has been published, together with a similar map overprinted to show the distribution of known mineral resources. A geological map of the whole island of Borneo, including data from maps of Indonesia re-interpreted in the light of recent work in British Borneo, has been prepared and will be published shortly.

The speed of mapping has been increased by the availability of air photographs taken by the Royal Air Force covering more than 80 per cent. of the territory, and, in addition to providing the necessary basic maps, the photographs are also used for photogeological interpretation in which the staff of the Directorate of Colonial Geological Surveys has given great help, both from London and by spending months in the field in Borneo. Very considerable help has been given by the Shell Group who permit use of all their unpublished reports and maps, and also make palaeontological

determinations for the Department. Assistance in this latter respect is also given by the British Museum (Natural History).

Although the oil company investigations had led to fairly detailed knowledge of the Miocene and younger sediments, little was known of the older deposits and of the widespread intrusive and volcanic rocks. It is therefore in these realms that the Department has made its greatest contributions. Perhaps the most striking result so far is that, with the exception of a small part of west Sarawak, the complete geological history of the territory has been shown to be contained within the Tertiary period and the Upper Cretaceous. For example, certain hornblende-bearing rocks in North Borneo, tentatively interpreted by Reinhard and Wenk as crystalline schists of possible pre-Cambrian age, have now been recognised as Eocene intrusions. The Danau Formation in the Lupar area of Sarawak, originally thought to be Permo-Carboniferous, has been shown to be of Upper Cretaceous age. The Slate Formation of North Borneo, thought by Reinhard and Wenk to be possibly older than the Danau Formation, is now considered to be a phyllitic facies of the Eocene and to correspond with the Rajang Group in Sarawak, from which Eocene foraminifera have now been obtained. The only rocks still referred to pre-Cretaceous periods are restricted to a small part of west Sarawak.

The ages of the main orogenic periods in east and west Sarawak, in doubt before 1950, have now been shown to be Upper Eocene and probably Upper Miocene to Lower Pliocene. Intrusion of ultrabasic to dioritic rocks in North Borneo was probably associated with the earlier of these two periods. Volcanic activity took place mainly in Upper Cretaceous, Lower Miocene, and Quaternary times. The youngest of these activities has only recently been recognised, although it was widespread in the Rajang Valley of Sarawak and on the east coast of North Borneo. In the latter place it has given rise to exceptionally rich soils, and mapping of the Quaternary volcanic rocks is of obvious importance in an area with a predominantly agricultural economy.

The geomorphology of British Borneo is of exceptional interest and so closely reflects the nature and history of the rock formations that photo-geology has proved a potent technique in reconnaissance surveys.

Bauxite, discovered in west Sarawak by the Department in 1949, was prospected by the British Aluminium Company, and it is expected that a locally formed company will commence mining shortly. Interest has been shown several times in the coal seams of Silantek in Sarawak, examined by the Department between 1949 and 1954. The coal of Silimpon, the manganese of Taritipan, the black sands of Marudu Bay and Banggi Island, and the gold of the Segama Valley, all in North Borneo, and the gold, antimony, and mercury deposits of the Bau area and the beach sands of Bintulu in Sarawak, have also been examined. Of these, the only considerable potential seems to lie in the Silimpon coal, but even in this case the mining and transport difficulties will probably prevent its being worked. Phosphate deposits—guano and rock phosphate—in caves in limestone hills in British Borneo have been investigated and the reserves estimated. The applicability of geochemical prospecting methods in Borneo has been tested at the Karang copper deposit in North Borneo, and the technique is now being applied in geologically similar but more accessible country. Stibnite was discovered in North Borneo in 1955, but the occurrence has since been proved to be economically unimportant. Records of former mineral exploration have been closely studied, and the programme of geological mapping has been devised so that almost all known mineral occurrences have now been examined. Results have so far been generally disappointing; the greatest possibility for the discovery of exploitable mineral deposits would now appear to lie in the copper-bearing areas of North Borneo.

The advice of the Department on the geological aspects of engineering problems, quarrying, and water supplies is constantly being sought by other Government Departments and local commercial

concerns. Engineering matters on which advice has been given include the siting of port installations, foundations for airfields, widening of a railway tunnel, land-slips in railway and road cuttings, foundations for wharves and power stations, coastal erosion, flood control, reclamation schemes, classification of reclaimed land for different types of development, and the siting of sewers. Wells, partly artesian, sited by the Department at Sandakan in North Borneo have yields as high as 10,500 gallons an hour, and the water supply of Labuan has been trebled by five new bores. Boring for water in Sarawak is also being tried with moderate success, and the advice of the Department has been sought on numerous occasions regarding the siting and construction of shallow wells for village water supplies. Stone, sand, brick, and lime supplies for post-war reconstruction, particularly in North Borneo, and for the building of roads and airfields, have been in great demand, and the Department has played an important part in discovering and developing suitable sources; between 1952 and 1955, the value of stone and building materials produced in Sarawak and North Borneo rose from about £250,000 to about £370,000.

**Publications and maps issued by the Department, or in hand at the time of writing, include:**

Annual Reports for each year from 1949 to 1955.

The geology and mineral resources of the Strap and Sadong valleys, west Sarawak, including the Klingkang Range coal, by N. S. Haile.

The coal deposits and a summary of the geology of the Silimponon area, Tawau District, Colony of North Borneo, by P. Collette.

The geology and mineral resources of the Kuching-Lundu area, west Sarawak, including the Bau mining district, by G. E. Wilford.

The geology and mineral resources of part of the Segama valley and Darvel Bay area, Colony of North Borneo, by F. H. Fitch.

The geology of the Colony of North Borneo, by M. Reinhard and E. Wenk.

Geological accounts of west Borneo, translated from the Dutch, edited by N. S. Haile.

Geological map of British Borneo, 1 : 1,000,000.

Mineral resources map of British Borneo, 1 : 1,000,000.

Geological map of British Borneo, 1 : 3,500,000.

Sketch-map showing Sarawak geology, 1 : 3,000,000.

Geological map of the Strap and Sadong valleys, west Sarawak, 1 : 125,000.

Geological map of the Silimponon area, 1 : 125,000.

Map of the Queen Seam, Silimponon coalfield, North Borneo, 1 : 15,000.

Geological map of the Kuching-Lundu area, west Sarawak, 1 : 125,000.

Geological map of the Bau mining district, west Sarawak, 1 : 50,000.

Geological map of the upper Segama Valley and Darvel Bay area, North Borneo, 1 : 125,000.

The geology and mineral resources of the Kudat and Kota Belud area, North Borneo, with an account of Taritipan manganese deposits, by E. A. Stephens. (*In hand.*)

The geology and mineral resources of the Jesselton-Kinabalu area, North Borneo, by P. Collenette. (*In hand.*)

The geology and mineral resources of the Lupar and Saribas valleys, west Sarawak, by N. S. Haile. (*In hand.*)

The geology and mineral resources of the Upper Rajang and adjacent areas, east Sarawak, by H. J. C. Kirk. (*In hand.*)

The mineral resources of British Borneo, by F. W. Roe. (*In hand.*)

The geology of British Borneo, by F. W. Roe. (*In hand.*)

The geology and mineral resources of the Sandakan area and parts of the Kinabatangan and Labuk valleys, Colony of North Borneo, by F. H. Fitch. (*In hand.*)

## **Mineral occurrences**

Coal

Gold

Guano

Manganese

Oil

Phosphates

Road metal

Water supply

## **British Territories in Borneo — Staff list**

***Geological Survey Department, Kuching, Sarawak***

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E. B. Wolfenden, M.Sc., F.G.S.

## ***Jesselton, North Borneo***

### **Deputy Director**

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### **Geologists**

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