

Gold Coast – 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.



Gold Coast Geological Survey. Part of the Headquarters buildings, Saltpond, Gold Coast. Photo: D.C.G.S. Plate XII.

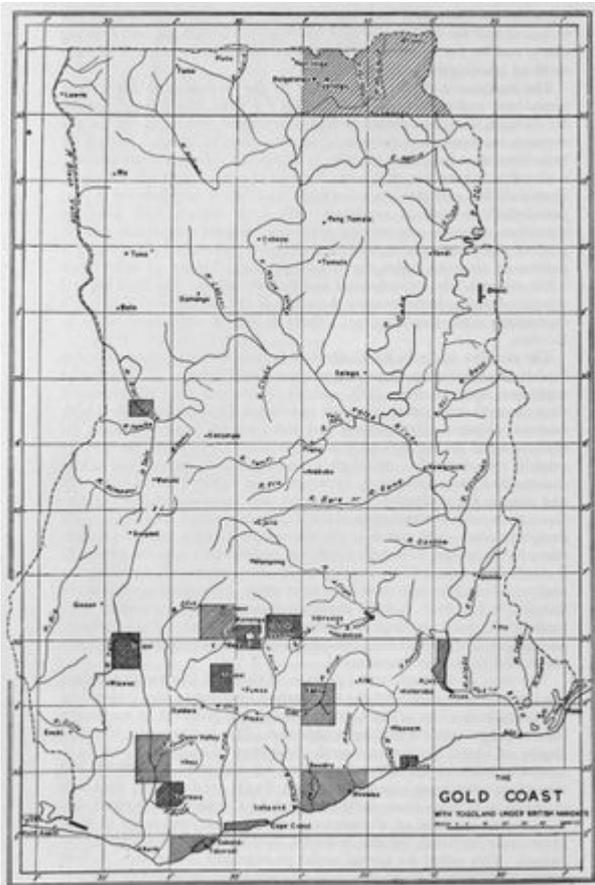


Gold Coast Geological Survey. Diamond-drilling limestones in the Western Province. Photo: D.C.G.S. Plate XII.



[Photos: D.C.G.S.]

Gold Coast Geological Survey. Outcrops of haematite ore, North Togoland. Photo: D.C.G.S. Plate XII.



Geological mapping by the Gold Coast

Gold Coast^[1]

The Gold Coast Geological Survey was established in 1913 with A. E. Kitson (later Sir Albert Kitson) in charge and with one assistant geologist. It was expanded in 1919, and between 1919 and 1939 the professional staff usually numbered five or six, although during and immediately after World War II the number was reduced for lengthy periods to two. Until 1925 the work of the Department was confined to rapid reconnaissance-traversing of the country during which the manganese, alluvial diamond and bauxite deposits, all observable at the surface, were discovered. This type of work was continued between 1925 and 1939, when detailed maps of the goldfields were prepared and Bulletins and Memoirs were published. The increased price of gold in 1931 gave a great impetus to gold mining and prospecting, and for some years the Geological Survey was chiefly concerned with the development of this industry. A Water Supply Section of the Department was started in 1937, but lapsed in 1942 after many wells, dams and ponds had been constructed in the Northern Territories.

The activities of the Department are summarised below. For the first seven years of the period under review progress was made possible only by the provision of C.D. and W. funds from the Central Allocation for Geological Surveys. Thereafter, the recognition by the Gold Coast Government of the value of the work of the Department was shown by the allocation of Gold Coast funds for further expansion, largely as a result of advice from Dr. Dixey. The Gold Coast Government is also indebted to Dr. Dixey for valuable advice on water-supply development and for the fact that the Geological Survey was sufficiently prepared to put this work in hand. In 1946 the professional staff of the Survey consisted of only two officers—a director and one other, although the establishment totalled 6. Following the formation of the Directorate of Colonial Geological Surveys and the provision of C.D. and W. funds, the establishment was increased by 7 geologists and 1 petrologist, and recruitment was energetically pursued. By 1951 the new establishment was filled, and it was very fortunate for the Gold Coast Government that this expansion had been effected, as otherwise the demands for geological advice in connection with development projects could not have been dealt with and delays would have resulted.

In 1953 most of the staff were absorbed on essential work for immediate application to development projects, and only very little time could be spared for systematic geological mapping. Once again it was necessary to increase the establishment to enable mapping to continue, a fact which was emphasised to the Gold Coast Government by Dr. Dixey and which resulted in the establishment being increased by 10 geologists and 1 chemist. By 1956, the professional staff consisted of a director and 14 geologists, 1 petrologist, 1 chemist and 1 geophysicist, with 2 core drillers. There are still vacancies for 8 geologists and 1 chemist. The expansion of the senior staff has called for a similar expansion of the technical staff for work in the field, laboratories, workshops, and drawing office, and for the operation of core drills; all of the technical staff have received training in the Department.

[2]

The equipment of the Department at the beginning of the review period was rudimentary, providing only for work of a general nature. By contrast, the Department is to-day organised and equipped for the research work which is necessary. Headquarters buildings, which have been erected at Saltpond, include, in addition to office accommodation, a chemical laboratory with room for two chemists and their assistants, equipped for accurate rock analysis and other geochemical work; petrologist's workshops equipped with rock cutting and polishing machines, crushing and sieving machines, magnetic separator, photographic equipment and dark-room; electrical generating plant and gas generator; drawing office for 6 draughtsmen; library of more than 5,000 volumes; and a

mechanical and drill workshop. The museum and storage accommodation occupy the whole of the old premises, but is still inadequate and unsatisfactory. There is also a subsidiary office at Kumasi.

The progress made by the Geological Survey with systematic mapping has been disappointing, largely on account of staff shortage. The post-war expansion financed from C.D. and W. funds was only slightly more than enough—and just in time—to enable the Department to deal with necessary mineral investigations and water supply problems, while recruitment has not yet kept pace with establishment increases designed to remedy this situation. Although a reconnaissance map of the whole country had been completed, little was done before 1947 to subdivide and classify the sediments, metamorphic and igneous rocks of the preCambrian—with the exception of the Tarkwaian, which is comparatively straightforward—and consequently the mapping which has been undertaken has been slow. The task is difficult, but one that must be attempted if detailed mapping is to be done. In this connection, 25 complete analyses of granitic rock types have been made in the laboratory, and the foundation has been laid for rapid progress provided competent field workers with good petrological training can be recruited. The systematic mapping so far completed has disclosed indications of copper and asbestos which will be further investigated.

The chief of the exploration division of Gulf Oil Corporation visited the Geological Survey, and the information supplied to him concerning the Cretaceous rocks of the western littoral was sufficient to encourage his company to start a drilling programme. This is now under way and depths of 11,000 ft. are envisaged. Mapping of haematite beds in a quartzite series of the Buem Formation has indicated that 80,000,000 tons of ore containing about 70 per cent. Fe₂O₃ are available; the ore is only about 30 miles from water transport by the projected Volta Lake. A complete appraisal of all limestone resources has been made in view of frequent inquiries for this material, particularly for cement manufacture. This called for special aerial photography of one area, as well as the examination of deposits in widely separated areas of the country.

Core drilling is proceeding in the Western Region to trace the extension of the manganiferous zone of the Birrimian, and also in the Eastern Region where some nickel has been located associated with sulphides in a basic sill. There has also been some drilling in the Birim diamond field to locate the source-rock of the diamonds which, it is believed, has been found and appears to be a breccia-conglomerate. The weathered source-rock is regarded as payable, and weathering has gone down to considerable depths. Steady progress is being made in the evaluation of alluvial diamond areas, which is necessary for the maintenance of adequate control over African diamond digging. Investigations of kyanite and andalusite showed that, although large deposits are available, the quality is not quite good enough for the market. Other investigations dealt with by the Department included the separation of monazite and ilmenite from beach sands, and the examination by self-potential measurements of an area with copper indications.

Immediately after the Second World War there was an intensive campaign for the development of water supplies which gathered momentum as the years went by. The emphasis from the beginning was on the extension of urban supplies, with wells, ponds and dams in the rural areas, and some 1,200 villages and localities requiring small supplies—mostly wells—were visited during the 10-year period under review. Foundation investigations for dam sites for seven town supplies were carried out. Some opposition was encountered at first to boring for water, but when Government was advised by Dr. Dixey with the support of the Geological Survey, that boring would be effective at least in some areas, policy was reversed and an intensive boring programme was begun in 1953. This naturally involved the Geological Survey with problems at the outset—as indeed does any new large-scale venture embarked upon suddenly without previous experience or preparatory research—but fortunately the expansion of the Survey, financed by C.D. and W. funds, had taken place and men and equipment were at hand, with the consequence that there were no delays. There are now 16 drills in operation, and 418 sites have been selected chiefly by locating weathered zones

in featureless gneiss terrain by electrical resistivity methods. Some 316 holes had been drilled up to 30th March, 1956, 73 per cent. of which now provide supplies of good water, with an average yield of 1,050 gallons/hour.

During the last twelve months for which records are complete, namely, April 1955—March 1956, 258 sites were selected and 157 wells were bored, 83 per cent. of which provided good rural supplies with an average yield of 1,780 gallons/hour. The water is usually drawn from depths of from 150 to 450 ft. For such a country as the Gold Coast, it is perhaps unnecessary to emphasise the hygienic quality of such borehole supplies as compared with those from shallow sources.

As the result of research by two geologists extending over four years the detailed geological investigations of the great Volta River Project have now been completed. Detailed geological mapping with core drilling has also been completed for the proposed Bui hydro-electric scheme. Other work carried out by the Department dealt with the design and construction of the new harbour at Tema, extensions to Takoradi harbour, foundations for the 800-foot single arch suspension bridge across the River Volta, routes for new railways, sites in Accra where earthquakes are experienced, and sites at Takoradi where sulphurous shales and the sliding of sandstone beds on shales present problems. The rapid development of the country has also led to numerous inquiries for quarry sites and sand deposits.

The following publications have been prepared during the period under review:

Bulletin No. 15 Chemical Analyses of Gold Coast Rocks, Ores and Minerals (Junner and James), 1947.

Bulletin No. 16 Progress in Geological Investigations and Mineral Developments in the Gold Coast (Junner), 1946.

Bulletin No. 17 Cretaceous and Eocene Fossils from the Gold Coast (L. R. Cox), 1952.

Bulletin No. 18 The Rocks of the Sekondi Series of the Gold Coast (A. T. Crow), 1952.

Bulletin No. 19 Geology of the Bawku-Gambaga Area (Edmunds). *In the press.*

Bulletin No. 20 Geology of the Volta River Project (Tevendale). *In preparation.*

Bulletin No. 21 Some Applications of Geophysical Methods to Geological Problems in the Gold Coast (Gay and Kosten). *In the press.*

Bulletin No. 22 Geology of the Bui Dam Site (Gay and Crow). *In the press.*

Bulletin No. 23 Limestones of the Gold Coast (Mitchell). *In preparation.*

Memoir No. 7 Reports on the Geology and Hydrology of the Coastal Area East of the Akwapim Range. (Junner and Bates), 1945.

Memoir No. 8 The Geology and Hydrology of the Voltaian Basin. (Junner and Hirst), 1946.

Memoir No. 9 Reports on the Bibiani Goldfield with Coloured Geological Maps (Hirst and Junner), 1946.

Maps Geological Map of the Gold Coast and Togoland under British Trusteeship, Scale 1 : 1,000,000, 1955.

Annual Reports For each year.

Mineral occurrences

Andalusite

Asbestos

Bauxite

Beach sands

Building materials

Cement and cement materials

Copper and copper ores

Diamonds

Gold

Ilmenite

Iron and iron ores

Kyanite

Limestone

Manganese

Monazite

Nickel

Oil

Water supply

Gold Coast — Staff list

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Chemist-Assayer

L. A. Cook, B.Sc.

1. [↑](#) While this Report was in the press, the Gold Coast attained independence within the British Commonwealth on 6th March, 1957, and took the name of Ghana.
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