

# Northern Rhodesia — 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.



Northern Rhodesia Geological Survey. New Survey building, Lusaka, east and south elevation. Double storey wing: administrative and geologists' offices, museum and library. Single storey wing: drawing office, laboratories and (in basement) stores, etc. Photo by Sylvia Waller, Northern Rhodesia Information Dept. Plate XI.



[Photos by Sylvia Waller, Northern Rhodesia Information Dept.]

Northern Rhodesia Geological Survey. Interior of main chemical laboratory. Entrance to physical-methods laboratory in right corner hidden by fume chambers. Photo by Sylvia Waller, Northern Rhodesia Information Dept. Plate XI.



During the course of this mapping, a number of important contributions to geological knowledge have been made. Among the most significant of these may be mentioned the establishment of the Karroo succession in the Zambezi Valley on the Northern Rhodesian side and its correlation with the Southern Rhodesian succession; the recognition of a glacial stage at the base of the Karroo, which establishes for the first time the most northerly extension of the Dwyka glaciation; the discovery of Dinocephalian remains in the Karroo of the Zambezi Valley; the identification of a carbonatite and associated minerals near Isoka, in the Northern Province, and the discovery of an entirely new phosphate mineral, isokite; the working out of the succession and structure in the Katanga System in the Mumbwa-Lusaka District, and the demonstration of granitisation at the base of the Katanga System and the post-Katanga age of certain granitic intrusions. Limited advances were possible in correlation over inter-territorial boundaries, including the recognition of rocks equivalent in age to the Shamvaian of Southern Rhodesia.

In the sphere of mineral investigation, mention may be made of the discovery of pyrochlore, monazite and apatite in the carbonatite of Nkombwa Hill, Isoka District, and in four carbonatites found in the Feira District; and the discovery and prospecting of some 15-17 million tons of coal in the main seam of the Kandabwe coalfield, the lowermost six feet of which yields coal with an average ash content of 22.0 per cent. and calorific value of 10,500 B.Th.U. per lb. Another interesting discovery was that of germanium in various copper ores and in metallurgical products from the dumps of the old Sable Antelope Mine at Mumbwa. Although there is no evidence that the area can be worked economically as a source of germanium alone, the possibility of extracting the metal, as well as silver, as useful by-products during the treatment of the copper ore should nevertheless be kept in mind, provided sufficient copper ore reserves are available to warrant metallurgical operations. Finally, the recognition of radioactive mineralisation, though feeble, in certain areas in the Central Province is to be noted; investigation into the incidence and possible sources of radioactivity elsewhere is in progress.

In connection with local economic development, the Geological Survey has been able to help in a number of ways. Thus, when the decision was taken in 1951 to investigate the possibility of producing cheap hydroelectric power from a project to dam the Kafue River, the Geological Survey was asked to carry out the preliminary geological investigations and exploratory work. This it did between September, 1951, and May, 1954, when a careful and detailed geological survey and examination was made of the proposed dam site, of the alignment of the proposed tunnels, the power station sites and surge chambers, and the storage basin. The work was completed before the project was shelved in favour of the Kariba scheme, but it established the eminent suitability of the geological setting and the practicability of the scheme. In 1953, the need to increase the supply of limestone suitable for use at a local cement factory involved the Department in an investigation into sources of suitable stone, a problem which was satisfactorily solved in collaboration with the geological advisers of the company concerned. In 1956, the Department was called in to assist in the Kariba hydro-electric scheme and was asked to locate suitable aggregate for the coffer-dam and the main dam structure, and also to advise on the difficulties of terrain that were met in the exploratory tunnel to the underground power station site and in the power house and transformer hall areas. This led to a good deal of detailed observation and underground mapping, which is still proceeding. At the same time, the opportunity was taken of extending the surface mapping to the area of Basement Complex terrain which flanks the Kariba on the northern side of the river before this country becomes hidden by the flooding of the Kariba lake.

The post-War development of Lusaka has resulted in a large amount of building, especially in multi-storey blocks. Certain problems are presented by the prevalence over the whole of the commercial area of the town of limestone which is commonly penetrated by sink holes and cavities of variable, often considerable, dimensions; these are seldom readily detectable on the surface without probing,

and the water-table, even at low ebb, is rarely more than 8-10 ft. below the surface. Opportunities have been taken by the Public Works Department and by building contractors to seek the advice of the Geological Survey on matters relating to building foundations or drainage problems. Advice, too, has been sought, and given by the Department, on such subjects as the suitability of clays for bricks or tiles, and of rocks for roadstone, railway ballast, or concrete aggregate. Samples of minerals and ores submitted by members of the public, prospectors, and mining organisations were examined throughout the period under review, and, where necessary, analyses were supplied. The valuable help given by the Mineral Resources Division of Colonial Geological Surveys was much appreciated, particularly during the first five years when the Department's facilities for rendering this service were still very inadequate. Progress was also achieved in the designing and building of a new headquarters for the Geological Survey.

**The Department issued the following publications:**

Annual Reports 1951, 1952, 1953, 1954, 1955.

Records of the Geological Survey 1952, 1953, 1954.

Report No. 1 The Limestone and Slate Deposits of the Fort Rosebery District, by P. L. A. O'Brien, M.A.

Bulletin No. 2 The Geology and Mineralisation of the Big Concession, Mumbwa District, by R. T. Brandt, M.Sc., A.R.S.M., A.M.I.M.M.

**Publications in course of preparation include:**

Bulletin No. 1 The Karroo System and Coal Resources of the Gwembe District, North-eastern Section, by H. S. Gair, M.Sc.

Bulletin No. 3 The Geology and Mineral Resources of Northern Rhodesia, by W. H. Reeve, M.Sc., F.G.S.

Report No. 4 Explanation of the Geology of Quarter Degree Sheet 1527 NW. (Matala-Luiri), Mumbwa District, by K. A. Phillips, B.A. (Oxon.), M.A. (Ontario).

Report No. 5 Explanation of the Geology of Quarter Degree Sheet 1727 NW. (Masuku), Choma District, by J. Hays, M.Sc., F.G.S., A.M.I.M.M.

Mineral Map of Northern Rhodesia, Scale 1 : 2,000,000.

Records of the Geological Survey, 1955.

## **Mineral occurrences**

Apatite

Building materials

Carbonatite

Cement and cement materials

Coal

Copper and copper ores

Germanium

Limestone

Monazite

Pyrochlore

Radioactive minerals

Silver

Water supply

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