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Colonial Surveys

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were friendly. At that time we understood that the Lolos were well disposed to foreigners, so did not expect any trouble from them; Brooke said that he might be out for two weeks, or he might return in two days. As he wished to attract as little attention as possible, he only took his interpreter and a few coolies, and asked me to remain at Ningyuanfu to develop photos and look after the rest of the expedition. As time passed and we got no news from him, we began to get anxious, so we sent out natives with letters to find out in which direction he had gone. After some time, they came back with word that they had not seen Brooke, as he had gone further into the country and had been well received by the chiefs. This removed our anxiety, as we thought that he had crossed the country, and it had taken him longer than he expected to return. As we still got no news, we sent in more natives to follow him further; and after some days they brought back word that he had been killed. It was impossible for us to get into the country to recover the body, so we sent in natives; and after a long time the body and two survivors were recovered. The stories of both these men agree. Details as to the murder of Mr. Brooke were given on p. 340 of the *Journal* for September, 1909.

COLONIAL SURVEYS.*

By Captain H. L. CROSTHWAIT, R.E.

SURVEYS, and their resulting maps, are works of such great public utility, both for civil and military purposes, that it is not easy to understand how countries, which have been under our flag for many years, remain so long without them. The Ordnance Survey of the British Isles owes its origin to the rebellion in the Highlands of Scotland in 1745, and the consequent discovery of the deficiency of geographical knowledge, then felt, perhaps, for the first time. The work was actually begun in 1747. About this period, General Roy, the father of the Ordnance Survey, wrote, "If a country has not been actually surveyed, or is little known, a state of warfare generally produces the first improvement in its geography."

In the case of Africa history repeats itself. The cause, more responsible than any other, for the present impetus to mapping in Africa, the effect of which is being felt in varying degrees throughout the Empire, was the war which began in 1899. It would seem, therefore, that General Roy's words, though written so many years ago, still hold good. The South African war was, without doubt, the

* Colonial Reports—Annual, No. 608. The Annual Reports of the Colonial Survey Committee. Wyman & Sons, Ltd. Price 1s. 7d.

principal factor, though perhaps not the only one, that called attention to a state of affairs which, in time of urgent need, found large and important areas without maps of any practical value. Those responsible for the administration of new countries have, as a rule, but a scanty revenue to meet many claims on expenditure. Those claims which are considered most pressing are placed first. Expenditure on survey often assumes an unremunerative aspect, or at least one which will not show any immediate return; consequently it frequently occupies a very secondary place on the list, if it is found there at all.

But the reports of the Colonial Survey Committee bring out very prominently how shortsighted a policy it is not to undertake the mapping of a country at the earliest possible date, and not to place expenditure on this object before many others with only apparently more urgent claims. In East Africa, one report says, "The absence of survey has led from one difficulty to another. The land in some districts is said to have been applied for many times over; other districts partially settled have been closed for further settlement; other districts, again, have not been open for settlement at all. . . . As a consequence, the general development of the country has received severe check. The necessity of seriously and at once dealing with the question of survey cannot be overestimated."*

While the South African war brought out prominently the deficiency of maps in that quarter, we may enumerate, among other reasons which necessitated surveys in different parts of Africa, "the allotment of estates to chiefs and landowners, in accordance with the Uganda Agreement of 1880;"† "a vigorous survey of the Gold Coast Colony was rendered necessary in 1901, on account of the large number of gold-mining concessions taken up by companies."‡ Then, again, the defeat of the Khalifa opened up to survey operations a new, and little-known country of nearly a million square miles.

In another category come the numerous boundary commissions concerned with the settlement of the international frontiers of Africa, from 1890 down to the present time. In the course of their labours it has been found necessary to survey and explore, in the aggregate, very large areas. It soon became imperative to place the general control of so many and various operations under some technical central body. The annual reports of the Colonial Survey Committee for the last four years now lie before us. The committee was formed by the Secretary of State for the Colonies in 1905, "to advise him on matters affecting the survey and exploration of British colonies and protectorates, more especially in Tropical Africa;" and "to make such recommendations as will ensure the rapid and economical prosecution of accurate surveys where these are

* Report, 1906-07, p. 27.

† *Ibid.*, p. 51.

‡ *Ibid.*, p. 30.

required, and the rendering the results available as speedily as possible for the use of the Home Government, the Colonial Governments, and the public."* It consists of a representative of the Colonial Office, the Director-General of the Ordnance Survey, and the officer in charge of the Geographical Section, General Staff. Under the guidance of a committee of this kind, it has been possible to produce African maps on a uniform system. A uniform plan of numbering, based on the General Staff map of Africa, on a scale of 1 : 1,000,000, has been adopted for the whole continent. This would hardly have been possible except under the direction of some central body. Then, again, a uniform set of scales for topographical maps has been arranged, all of which are multiples of the standard million scale.

While the committee was originally concerned with British Africa alone, it now advises on, and reviews annually, the survey operations in Ceylon, the Federated Malay States, Jamaica, Trinidad, British Honduras, and Fiji. It is, therefore, possible to ascertain the progress of surveys, both topographical and cadastral, in a considerable number of colonies and protectorates, and to arrive at the exact state of the mapping in each area, together with other fundamental operations connected with the work.

The latest report shows that during the year ending March, 1909, 28,000 square miles have been topographically surveyed in British Africa, exclusive of boundary commission surveys. The largest outturns were in the Cape and Orange River Colonies, of 14,500 and 7000 square miles respectively. This brings the total for the last four years, in the South African colonies, that is, since the commencement of the work, up to 113,000 square miles, on the $\frac{1}{125000}$ and $\frac{1}{250000}$ scales. While great credit is due to all concerned, this large outturn is partly owing to the nature of the country in South Africa being generally favourable to rapid survey operations, and to a comparative absence of detail. In the Cape the field work was carried out by a party of officers, seconded from their regiments, under a Royal Engineer officer; while in the Orange River Colony the Colonial Survey Section of the Ordnance Survey was utilized.

Two boundary commissions were in the field: the Anglo-German Yola-Cross River Commission (British Commissioner, Lieut.-Colonel G. F. Whitlock, R.E.) and the East Africa-Sudan-Abyssinia (British Commissioner, Major C. W. Gwynn, C.M.G., D.S.O., R.E.). The area surveyed and explored by these commissions amounted to 34,000 square miles.

We may here draw attention to the very beautiful model of Mount Ruwenzori, which has been constructed, in the Geographical Section of the War Office, from the maps of the Anglo-Congolese Boundary Commission of 1907-08, a photograph of which appears as a frontispiece to the report.

* Report, 1905-06, p. 30.

A tabular statement has been prepared showing, in a concise form, the progress of the delineation of British frontiers in Africa from 1890 to date.

A number of index-charts are bound with the volume, indicating those maps in progress and already published, from which the sheet number and scale of any desired map can be obtained. In connection with the general progress now being made throughout the empire, it may be mentioned, though not referred to in this report, that the Militia Department of the Dominion of Canada is producing some excellent maps on a 1-inch and $\frac{1}{2}$ -inch scale.

The geodetic work of the year is represented by the measurement of a section 165 miles long, extending from $1^{\circ} 10' N.$ to $1^{\circ} 10' S.$, of the Great Arc of the meridian of $30^{\circ} E.$ As this portion of the arc falls partly in the Congo State, its measurement was undertaken by a joint British and Belgian party. Contributions towards the expense of the undertaking were made by the Royal Society, the Royal Geographical Society, the Royal Astronomical Society, and the British Association. A base of 16,532 metres was measured in the Semliki valley by means of Invar wires. The time required for this operation was only thirty-eight days. Two 10-inch Repsold theodolites were used for the triangulation.

Technical details are naturally avoided, as they would be out of place in these reports. But one cannot help thinking that if the committee could arrange, with the different bodies concerned, for the separate publication of the more elaborate accounts, descriptive of the actual methods adopted in the field, they would, from the great variety of country which has to be surveyed, form a most useful guide to others engaged in similar work. For instance, we should like to know details of how the very accurate traversing, used as a substitute for triangulation in the dense jungles of the Gold Coast, was carried out. Then there is the system "minute squares," adopted for certain cadastral surveys in the Sudan, incidentally referred to in the report. But without details we do not know what the special advantages of this method are, which seems to be a departure from the usually accepted principles of survey.

These are only a few examples of how a detailed account might be made useful to surveyors in other countries. The mere mention of these, and other matters, makes us wish to know more. It is possible accounts have been published, in which case, perhaps, reference foot-notes might be added to the Annual Report.

The committee are certainly to be congratulated on the order and system they have succeeded in introducing into Imperial Surveys.