III.—Geological Survey, Western Australia. Bulletin No. 29,[1] Parts I and II: A Report upon the Geology, together with a Description of the Productive Mines of the Cue and Day Dawn Districts, Murchison Goldfield. By Harry P. Woodward, Assistant Government Geologist. 8vo. With maps and sections. Perth, W.A., 1907.

MR. HARRY P. WOODWARD, a well-known pioneer of West Australian geology, has supplied in this report much valuable information respecting the mining districts which it embraces, forming part of the great "Murchison Goldfields."

Part I (Cue and Cuddingwarra Centres) opens with an account (section 1) of the Cue mining district. The township of Cue is the official centre of the Murchison goldfields, and is connected by railway with Perth; it is 1,485 feet above the sea-level, and lies upon the western edge of a broken granite plateau, which extends for a considerable distance to the eastward. Starting in 1891 as a mere digger's camp, it became changed in 1893 into a mining centre; reefs were opened up, of which several passed into the hands of companies with ample machinery to develop them. Nevertheless, it was soon discovered that the production did not justify these preparations, and failure resulted. In spite of adverse conditions, however, the district has yielded since the earliest records appeared from 15,000 to 20,000 ozs. of fine gold per annum.

*Geology.*—Gold deposits occur in the crystalline series in more or less lenticular-shaped amphibolite belts, surrounded by gneissic granite, the whole being intersected by numerous felspathic dykes. In the district under review the amphibolites are more coarsely crystalline in structure than is usual in the auriferous belts, while the quartz reefs in them are of rare occurrence. In the acidic series, however, instead of gneissic granites there appears to be a magmatic intrusion of granodiorite, a rock intermediate between the hornblende granites and the quartz diorites, and containing numerous productive lodes.

A characteristic feature of the Cue district is the occurrence of table-topped hills rising abruptly about 60 feet above the general level of the country. These hills are the denuded remnants of a once extensive plateau.

*Mining.*—Section II contains a detailed description of the mines of Cue, with tables showing their yield from about 1896 to 1906, according to the length of time they have been worked.

Numerous illustrations from photographs showing the physical features of the country and coloured geological maps accompany the report.

Part II deals with a portion of the area included in the Day Dawn mining district, which adjoins the Cue district to the southward. Owing to excellent management mining in this area is carried on very profitably, the most productive of the mines having yielded, up to the end of 1906, 778,606 oz. of gold, out of 844,023 tons of ore crushed. Over 95 per cent. of this yield comes from one mine.

[1] See also Geol. Mag., Dec. V, Vol. III (1906), p. 277.

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*Geology.*—The geology of the Day Dawn district differs materially from that of Cue, the granodiorite of the latter being entirely absent. The whole area is therefore classed as greenstone, with its schistose and altered forms due to hydration and the attendant forces, such as compression, elongation, crushing, and shearing. The term greenstone is meant to include not only the normal hornblende schists, amphibolites, etc., but also the diorites, diabases, and andesites which occur in this district, though they are generally so highly altered at the surface as to render the delineation of their boundaries a very difficult task.

The amphibolites are highly foliated and hydrated near the surface. A magmatic igneous intrusion occurs, composed probably of diabase, the augite of which has been changed into hornblende and epidote. The lodes of the district occur in the "igneous zone," in the "contact zone," and in the "amphibolite zone," the principal productive mines being contained in the contact zone, in which, though there are only eight gold-bearing reefs, the production is 97 per cent. of the total yield.

Section II is devoted to a full description of the productive mines of the district, and it concludes with two appendices containing (1) a list of the Cue rocks, (2) notes on some typical Cue rocks, by E. S. Simpson, F.C.S.

This report is also well illustrated.

We must congratulate Mr. Woodward upon the ability with which he has conducted the survey of this important mining area. He has shown no less a grasp of the economic problems presented to him in the course of his work than of the geological ones.

A. H. F.

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IV.—Report relating to the Geology of the East Africa Protectorate. By H. Brantwood Muff, B.A. Colonial Reports—Miscellaneous. No. 45, East Africa Protectorate. London: H.M. Stationary Office, 1908. With map and 2 text-illustrations. Price 6*d*.

WE welcome the publication of this important and interesting report, which has been issued at a price that may be regarded as exemplary.

Mr. Muff was engaged between December, 1905, and September, 1906, in investigating the geology of the East Africa Protectorate, mainly with the object of reporting on the prospects of obtaining better supplies of water for drinking and other purposes. The region consists of a long but comparatively narrow belt of country, extending from the Island of Mombasa on the coast of the Indian Ocean to Port Florence on Victoria Nyanza, a distance of 580 miles as measured along the course of the Uganda railway.

This region comprises (1) the *coastal belt* formed of raised coral rock and sands, followed inland by a mass of shales and underlying sandstones, with occasional limestones, that dip towards the coast, and are in great part of Jurassic and in part probably of Triassic age. This coastal belt extends for 57 miles, and rises to over 1,000 feet above sea-level.

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