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TWO MINOR AUSTRALIAN GOLDFIELDS AND THE ANTIQUITY OF MAN IN AUSTRALIA.¹

THE goldfield of Forbes and Parkes is situated about 200 miles to the west of Sydney, where the old rocks of the East Australian Highlands disappear beneath the Black Soil Plains. Low spurs from the Palæozoic rocks project westward into the plains, and wide valleys of alluvium run eastward into the foothills. Gold was found during 1861 in the river gravels at Forbes, near the bank of the Lachlan River, and a gold-quartz lode was discovered in the following year at Parkes, on Gooban Creek, a tributary of the Lachlan. Further leads and lodes were

discovered at both localities. Mining on the field has, however, been very irregular in its results. The alluvial deposits at Forbes yielded 212,547 oz. in 1862 and 71,493 oz. in 1863; but since then the output from both fields has varied from 57,851 oz. in 1875 down to as low as 1583 oz. Mining at Forbes has at times ceased entirely, and the field is now almost derelict. In the hope of reviving mining there, Mr. Pittman, the Government geologist of New South Wales, arranged for a geological survey of the field to collect trustworthy evidence as to its past history and determine the most likely directions for future mining. The problem of the field is mainly physiographic; and the work was entrusted to Mr. E. C. Andrews, who has already made his mark as an able physiographer. His interesting report is a valuable contribution to the geology of central New South Wales.

The main gold supply of the field has come from its leads, which are buried river channels containing auriferous gravels. These old river beds lie beneath the alluvium, and their working has been hampered by the excessive water with which they are saturated. Alluvial mining has ceased owing to the difficulty of following the deposits into the deeper ground. The methods of deep-lead mining were developed in Victoria, where, as a rule, the gold is found most abundantly in the deep, central river channels. In the Forbes area, however, for reasons which Mr. Andrews clearly explains, some of the richest patches of gold are on the sides of the buried valleys, and he advances weighty arguments that the deep drifts of the old Lachlan Valley would, if discovered, prove too poor in gold for profitable working.

The lode mines of the field are of two types. The foundation of the area consists of Ordovician and Silurian rocks associated with intrusive andesites and andesitic lavas, and covered in places by some Devonian rocks. To the east are some large areas of granite of post-Silurian, but pre-Devonian or Devonian, age. The gold-quartz lodes are associated with the intrusive andesites or occur along crush-zones. Mr. Andrews concludes that the gold has been introduced into the lodes in solution, and did not come from the igneous rocks, and that where gold has been found in igneous rocks in New South Wales it is of secondary origin.

The report includes one item of anthropological evidence that may prove of unusual importance. Hitherto Australia has remained the one continent on which there is no direct evidence of the antiquity of man. It has often been pointed out that, in spite of the thorough search of Australian drifts during mining operations, no early trace of man has yet been found in them. Mr. Andrews records (pp. 19 and 27) the occurrence of some blackfellows' ovens 18 feet below the surface, and associated with remains of *Diprotodon*. It is to be hoped that a more detailed account of this discovery will be published. On the theory that the Australian aborigines entered Australia in the north-west, and were specialised for desert existence, as they worked their way across Central Australia, it is in such localities as Forbes, where mining operations expose the drifts on the borders of the central plains, that early remains of the aborigines would be expected. Though under special conditions 18 feet of alluvium might accumulate in a short time, the association of the ovens with bones of *Diprotodon* appears to indicate that Forbes has yielded the earliest trace of man yet found in Australia. Mr. Andrews holds that the whole series of drifts, of which that containing the ovens is one of the later members, is of post-Tertiary age.

Mr. Andrews's memoir is of great interest and unusual merit. The history of the field, too often neglected in such reports, has been carefully compiled, and the features of the country are graphically described and suggestively interpreted. Considering that the closing of the mines prevented the author from inspecting the old workings, he has collected instructive evidence as to the structure of the lodes. His sections, however, give no strong support to his suggestion that the Silurian rocks have been over-thrust on to the Ordovicians. As such memoirs are for the benefit of the mining industry, the less familiar terms, such as miarolitic, might be explained in footnotes. The most serious omission is the absence of heights from the map. The scarcity of altitudes on Australian maps is at

¹ The Forbes-Parkes Goldfield, New South Wales, Department of Mines. Mineral Resources, No. 13. Sydney, 1910 (issued 1911). By E. C. Andrews. Pp. iii+109+map+7 plates of plans and sections.

General Report on Tanami Goldfield and District (North-western Central Australia). By L. C. E. Gee. Pp. 22+map+19 illustrations. (Adelaide, 1911.)