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COMMONWEALTH OF AUSTRALIA

DEPARTMENT OF NATIONAL DEVELOPMENT

BUREAU OF MINERAL RESOURCES GEOLOGY AND GEOPHYSICS

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THE COMMONWEALTH DEEP LEAD, GLEN INNES.

PROPOSED GEOPHYSICAL SURVEY.

(1) INTRODUCTION.

It was recently suggested by Mr. N. White, Superintendent of Minerals Production, N.S.W., that a geophysical survey be made of the Commonwealth Deep Lead near Glen Innes as part of a campaign to prospect for stanniferous wash beneath the basalt cover. In company with Mr. N. White and Mr. E. Dow, an inspection was made of the area on the 7th and 8th October, in order to determine in the first place whether the problem offers scope for geophysical methods.

A geophysical survey, if carried out, would commence in the vicinity of what is known as the Commonwealth Mine and the inspection was made primarily of that area. At present there is no activity at the Commonwealth Mine, which is actually the site where some alluvial deposits were first dredged for tinstone in 1909 by the Commonwealth Tin Dredging Company, N.L., on PML 25, Ph. Wellington, Co. Gough. This site can be quickly reached from Glen Innes by following the Emmaville Road for about 12 miles and, after passing through a gate on the left, by following a bush track for rather more than a mile.

The mine has been visited from time to time by officers of the New South Wales Department of Mines, but no detailed geological examination has been made. Dredging and mining in this vicinity are briefly referred to in "The Tin Mining Industry", M.R.14, New South Wales Department of Mines, and also in the Annual Reports of the New South Wales Department of Mines for the years 1909, 1934, 1935 and 1936.

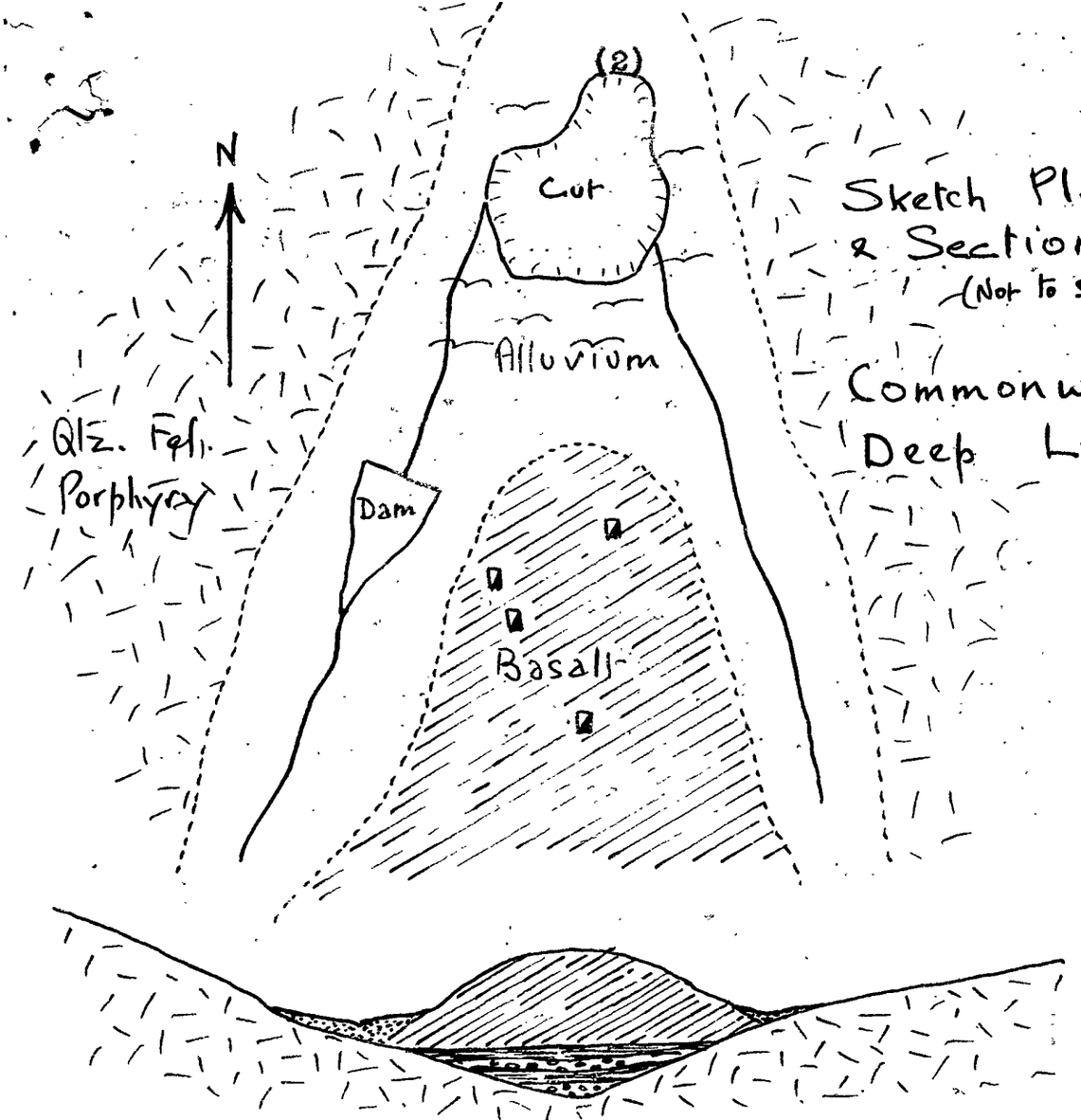
(2) GEOLOGICAL BACKGROUND.

The site of the mining operations, both the dredging of alluvial and the shaft sinking through basalt, lies in a narrow valley trending in a north and south direction and having fairly steep walls, particularly on the western side. The valley is cut in quartz felspar porphyry which is much decomposed in the floor of the valley where it can be seen beneath the alluvial deposits.

The scene of the dredging operations is marked by an open cut, about two acres in area, in the alluvial deposits. A layer of wash may be seen in the sides of the cut. Several bore holes have been sunk in the past in the vicinity of the cut but definite records of the results obtained are not available. It is reported that the alluvial deposits are about 100 feet in thickness and include three layers of stanniferous wash. The area of the alluvial deposits is very limited since to the north they terminate at a rocky bar across the valley and to the south the basalt is encountered.

The upper part of the valley is filled with basalt. In the area examined the basalt has the form of a narrow ridge along the centre of the valley with a creek on either side of it. Farther south the width of the basalt increases until it covers the porphyry completely and the pre-basalt valley can no longer be followed. The principal topographical and geological features are indicated in the accompanying sketch plan and section.

Several shafts have been sunk on the narrow ridge of basalt, and on the dumps may be found bouldery basalt, wash stones, white and lignitic clays, and porphyry. It does not appear that any considerable bodies of tin-bearing wash were located and worked from these shafts.



It seems therefore that part at least of the alluvial deposits seen in the dredged area extend also beneath the basalt. Further, it is likely that some of the alluvial in the dredged area is the re-distributed form of that under the basalt. There is little reliable evidence upon which to asses the value of the wash in the open cut or beneath the basalt. It is reported that the bores referred to above show the value of the wash in and beneath the open cut to be about 4 lb. of tinstone per cubic yard. It is recorded in the Annual Report of the Mines Department for 1909 that the Commonwealth Tin Dredging Company obtained 24 tons of tinstone in that year and then abandoned operations. It is also recorded in the Annual Reports of the Mines Department that other companies in the years 1934, 1935 and 1936 obtained 42 tons of tinstone, which indicates a value of about 2 lb. of tinstone per cubic yard for the total yardage treated.

It is proposed to sink bores at an early date in the vicinity of the open cut to test the value of the wash prior to further dredging in that area. It has been suggested also that the wash beneath the basalt be traced and tested to determine whether mining by deep lead methods is warranted. It is in connection with this second line of work that the geophysical survey has been suggested. The problem is to trace, in a southerly direction, the deepest portion of the old river channel, now covered by basalt, since that is where further deposits of stanniferous wash are most likely to occur.

(3) GEOPHYSICAL CONSIDERATIONS.

It is unnecessary, perhaps, to point out that in such a problem geophysical methods cannot directly detect the presence of tinstone owing to the relatively small amount present in the total section. In the prospecting of deep leads, geophysical methods are used sometimes to trace the wash directly, but more often to trace the course of the old river channel by measuring the depth to bedrock, or the thickness of the basalt or other cover.

Satisfactory results have previously been obtained on some basalt covered deep leads in New England by the use of the magnetometric method of geophysical prospecting. After reviewing all the available data, however, it is considered that no useful purpose could be served by applying this method in the vicinity of the Commonwealth Mine. It would be necessary to take the magnetic observations directly on a bouldery basalt surface and, under such conditions, intense and irregular magnetic effects arise from the surface and obscure those from greater depths.

It is considered likely that work with the resistivity method of geophysical prospecting would permit estimates to be made of the depth to the wash and bedrock beneath the basalt. This method takes much longer to apply than the magnetometric method and is warranted only where the geological and economic background to a problem gives a reasonable chance of a satisfactory conclusion.

(4) CONCLUSIONS.

It is recommended that no geophysical survey of the Commonwealth Deep Lead be made immediately since there are several unknown factors in the geological and economic background of the proposition which can be clarified by preliminary work. Moreover staff and resistivity equipment are required on more urgent work at the present time and in the near future.

It is considered that a detailed geological survey of the area, including the precise levelling of the shafts, bores, wash etc., would throw much light on the proposition and it is recommended that such a survey be arranged.

When the geological survey has been made and the results of the proposed boring of the exposed wash have come to hand, it is possible that there will be less demand for the resistivity equipment. It is recommended that, in the light of the additional geological and economic data then available, further consideration be given to the carrying out of the geophysical survey of the Commonwealth Deep Lead.

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Canberra.
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