UR 1963/100-102

100.

BORING AT THUREAU'S DEEP LEAD, ST. HELENS

by R. Jack.

DEC/63

Introduction

The deep lead was first reported on by G. Thureau in 1888 and subsequently became known by his name . Working of the surface of the lead started prior to 1888 and continued spasmodically for over 50 years. During this time much of the surface of the lead was sluiced to a depth of up to 15 feet. Exploration of the lead has been very inconclusive, Montgomery (1893) reported that prior to that time numerous shafts had been sunk on the lead but all had to be abandoned before reaching the bottom of the lead owing to the heavy inflow of water. Later exploration was similarly inconclusive as none of the holes bored in the deep lead were bottomed, nearly all being stopped at less than 50 feet though some were continued to over 100 feet.

Thureau's Lead is considered to be the course of the former George River and extends from approximately 7 miles west fo St. Helens to George Bay. It followed a sinuous course which is now followed in part by the Power Rivulet George River and Golden Fleece Rivulet. To evaluate the tin content of the lead a boring campaign was begun by the Department of Mines in the latter part of 1961, and continued until October 1963, during which 49 holes were bored in six areas of the lead.

Geology

The country rock in the area drained by the deep lead is mainly granite, though Mathinna Group sediments occur to the S.W. of Medas Cove and there form the southern boundary of the lead. Except for this area the lead is entirely within granite and all bore holes were bottomed in granite. The path of the old river valley can be easily traced on the present land surface by the abundance of pebbly wash and fine gravel resulting from the erosion and removal of the fine sand and clays from the upper part of the lead. The surface gravel extending to 18 inches in depth is usually stanniferous and its age is probably Recent.

The probable course of the deep lead is shown on the map accompanying this report (Figure). Its course has been determined from the information available, mainly recent bore holes and old shafts. ? The lead now starts in the area drained by the Power Rivulet, though it probably extended further West in Tertiary times and has since been removed by erosion. The lead flowes northerly until it approaches the George River where it swings easterly and in this area two small tributaries join the lead from the firection of Priory. The lead then continues easterly for about 2½ miles before swinging south to a course now followed by the Golden Fleece Rivulet. The deep lead again diverges to the south of the Golden Fleece Rivulet to pass south of a large granite hill at the head of Medas Cove, then the lead continues on a N.W. course to enter George Bay to the south of the present George River.

Dating of spores in the old river sediments has indicated a likely age of Lower Oligocene. The spores were collected by M. Longman of the Department of Mines in the bank of the creek near Bore No 16 on line 3. As these sediments are 20 to 30 feet above the basalt found during the boring of the lead it is probable that the age of the basalt is Lower Tertiary. After the filling of the valley with basalt there was a considerable time break before sedimentation was renewed as the river recut its channel on the edge of the basalt flows. The thickness of the sediment above the basalt varies in the lead and is over 100 feet where intersected on line 2. The age of these sediments is probably Late Tertiary though the topmost beds could have been reworked at a later date by small streams. Sandy gravel is fairly persistant over much of the surface of the lead. These sediments are not one continuous horizon but occur as a series of steps of differing elevation and represent surfaces corresponding to sea levels during the Tertiary. It is probable that the deep lead stream was diverted to the course of the present George River as a result of a rise in sea level of approximately 200 feet. This is thought to have occurred during the Late Tertiary as there is no evidence of sea level fluctuations of this magnitude in the Quaternary. Alternatively the river may have been diverted as the result of faulting or warping but there is no evidence for this in the Late Tertiary or Quarternary

BORING

Boring of the lead was by Ruston Bucyrus 22 R.W. Churn Drill; this gave a 7½ inch external diameter hole with a casing of 6 inches diameter. In all 49 holes were bored, the deepest hole being 272 feet. The total footage drilled was 4811 feet.

Six lines were drilled mainly over the unworked parts of the lead and a full profile of the lead was obtained on each line except line No. 1. On this line 6 holes were completed with little result before adverse drilling conditions caused the abandonment of further drilling. The holes were generally spaced at 300 feet intervals and on line No. 3 at 100 feet intervals in the deeper part of the lead. It is considered that this spacing was close enough to test fully the old lead for economic alluvial deposits. On line No. 1, a geophysical gravity profile was obtained by the Bureau of Mineral Resources before drilling began. This profile corresponds closely with the evidence yielded by the limited amount of drilling done on this line.

The types of sediments in the holes were dominantly sandy clay and clayey sand, with occasional gravel and sand beds. Cemented clay and gravel beds were found near the bottom of the lead. Heavy mineral concentrates from the drill samples were found to consist of zircon, pyrite, garnet, ilmenite, siderite, pleonaste and smaller amounts of cassiterite and magnetite. It was generally found that the cassiterite, garnet, zircon and ilmenite were concentrated in the higher parts of the lead. Pyrite occurred throughout the lead excepting the topmost horizons and occasionally it was replaced in depth by siderite.

On lines Nos. 2,3 and 4 basalt flows were intersected and on line 5 basalt boulders or a very thin

remnant of a flow was found at approximately 100 feet below present sea level. A thin band of sediment occurs between the basalt flow and the granite bedrock but contains no appreciable amount of tin. Holes 38 and 49 near the bridge crossing the Golden Fleece Rivulet were drilled to determine the course of the old deep lead. These holes, being shallow prove that the outlet of the deep lead to the sea is not followed by the Golden Fleece Rivulet, the old lead having diverged to the south of the granite hill before swinging N.W. to enter George's Bay.

The highest tin value of all the samples treated 0.16 lbs per cubic yard calculated to 70% Sn. The tin was only present in trace amounts, i.e. less than 0.1 lbs per cubic yard. The absence of any high tin values in the lead indicates that the sediments in the lead were derived from granite containing very little tin mineralisation and that the reworking of these sediments has not yielded any economic alluvial deposits.

Conclusions

Boring of Thureau's Deep Lead has shown that there is no economically workable concentration of alluvial tin in the deeper parts of the old stream valley. The surface enrichments on the lead were probably the result of reworking of the sediments during the Tertiary sea level changes. This reworking has probably involved the removal of a considerable thickness of sediment to concentrate the tin into a workable deposit. Although the term "deep lead" is used throughout the report and the area has been known for many years as Thureau's Deep Lead, it is considered that the term is incorrectly applied as no economic or even sub-economic alluvial tin occurs deep in the old stream valley. The area has been thoroughly tested and no further boring can be recommended in this buried stream valley.

Reference

Montgomery, A., 1893 - Report on Thureau's Deep Lead, near Georges Bay. Sec. Min. Report 1892 - 1893.