

REPORT ON ROOKS RIVER TIN DEPOSIT
CAPE BARREN ISLAND

GEOGRAPHICAL POSITION

Cape Barren Island is the second largest of the Furneaux Group of Islands situated at the eastern entrance of Bass Strait. It is due south of Flinders Island (the largest of the group).

From Lady Barren the chief calling place in the south of Flinders Island, Deep Bay on Cape Barren Island is about 16 miles. Deep Bay is a wide inlet on the north west portion of Cape Barren Island and is said to afford permanent shelter to trading boats, particularly at the western end of the Bay, where fairly deep water extends to within a short distance of the shore.

Cape Barren Island is 25 miles by 10 miles at its widest points, its longer axis has an east-west direction.

ACCESSIBILITY

The Government steamboat trading between Launceston and Flinders Island calls at the west end of Cape Barren Island when circumstances warrant it. There is no regular service to the Island. Facilities for landing and shipping at Deep Bay could be made efficient at comparatively small expense.

TOPOGRAPHY

This report refers only to an area of ground bounded by Rooks River the eastern range of Mt. Munro on the south and South East Creek to the east. This area consists of a wide terrace of alluvial ground rising abruptly to a height of about 30 feet from the western foreshore of Deep Bay extending south westerly on a gradual rise for a distance of about 2 miles, to the base of hills to the east of Mt. Munro. The central portion of the terrace which is treeless excepting for some scattered grass trees and some light scrub has an elevation of approximately 200 feet above sea level.

Beyond the southern and western portion of the plain the eastern range of granite hills rise abruptly to a height of 600 to 700 feet above sea level. At the extreme south a lower ridge forms the termination of the plain in that direction. Between this ridge and northern base of Mt. Munro there is a deep narrow gorge through which a small but permanent stream of water flows. The creek bed at the outer part of the gorge would have an elevation of 150 feet above the general level of the plain. The eastern portion of the area is bounded by bare granite hills lying a little to the east of South East Creek. The northern portion of the area is bounded by Rooks River which takes a general easterly course skirting along the southerly fall of a range of high granite hills forming a divide between the plain and the sea coast on the north of Island. Rooks River forms a sharp divide between these hills and the alluvial ground.

GEOLOGY

The only kind of rock exposed in the area is the tin granite similar to that occurring in the Gladstone district north east Tasmania. The southern portion of

the area examined consists of steeply inclined bare granite hills being the easterly extension of Mt. Munro range. Viewed from the plain these hills have a rather striking appearance in colour due to staining by oxide of iron resulting from the decomposition of the biotite, which is an abundant constituent of the granite. Viewed from the north there are two distinct peaks of similar altitude being about 700 feet above sea level, a steeply inclined valley to the north forms a division between them.

The granite rock of these hills is chiefly of the normal biotite variety although granite porphyry and other modifications are of frequent occurrence.

Black tin oxide in fairly large crystals is distributed over a wide area in the granite. The tin is sparsely distributed through the rock, no concentrations or enrichments of any kind were noticed.

In a heading driven from the western side of the eastern hill a vein of chlorite several inches thick was showing in the hard granite, the chlorite vein in addition to carrying small quantities of tin oxide contained occasional pieces of molybdenite also a little copper and iron pyrites.

From the base of these hills there is a gradual slope to the sea shore at Deep Bay or rather to the western portion of the latter. Through the disintegration of the granite a fairly extensive deposit of tin bearing drift extending to the seashore has accumulated.

There is no doubt but that Rooks River which now flows along the extreme north edge of the alluvial ground played an important part in the distribution of this area of tin bearing drifts lying between the ranges of hills through which the River flows.

HISTORY

So far as can be gathered it is many years since tin was discovered on Cape Barren Island and since that time more or less intermittently a little work has been in progress and a small output maintained. In the years 1918-1919 a Launceston Syndicate called the Cape Barren Island Syndicate carried out productive work on the alluvial ground on mineral leases formerly 4188/M and 5473/M with payable results. A satisfactory output of tin is said to have been made, the Syndicate however ultimately abandoned the property, since that time intermittent work has been carried on by Mr. Fisher and a small output of tin maintained.

MINE WORKINGS

The whole of the alluvial area with the exception of a five acre mineral lease is held under extended prospecting licences in the name of J.H. Watson, M.W. Barrett, and Herbert A. Waddle aggregating 590 acres.

On the southern portion of the area some prospecting work has been carried on the west side high up on the ridge of the most easterly of the two ranges of hills forming the southern portion of the area examined.

An approach for a tunnel having a bearing of S. 40 deg. E. has been cut through hard granite. In cutting the approach a vertical vein of chlorite up to an inch or two in thickness has been driven on this vein carries small quantities of tin oxide also occasional splashes of molybdenite, flattened lumps up to $\frac{1}{2}$ inch diameter being frequently met with, as well as small quantities of copper and iron pyrite.

Higher up on the ridge above the approach there is a general distribution of tin oxide in well formed large crystals in the granite over a wide area. A short distance up the hill above the approach of tunnel referred to there is evidence at the surface of a distinct formation of more oxidised rock than that generally exposed on the hill. It was with the object of testing this formation at a depth of 20 to 30 feet below the outcrop that the tunnel was commenced. On the crest of the ridge above the approach some shots have been put into the granite outcrop. The granite here carries encouraging quantities of tin, also a little iron pyrites. In any of exposures made there is not a sufficient concentration of tin in the granite to be payable.

ALLUVIAL TIN DEPOSIT

The Rocks River alluvial deposit covers an area of several hundred acres in extent, lying between the eastern range of hills of Mt. Munro on the south and Rocks River on the north. The area extends from the base of the hills approximately 300 feet above sea level to the western shores of Deep Bay. At the sea shore where Rocks River flows into Deep Bay the general level of the plain forming the alluvial area is about 30 feet above sea level, the plain then takes a more or less gradual rise inland. The area is practically free of bush, some portions of it are sparsely covered with grass trees.

In several portions of the upper part of the area old workings of limited extent can be seen and from the general appearance of the faces it is many years since work was in progress.

The only work at present being carried out is on the mineral lease of 5 acres in the name of A. Archer. Hydraulic sluicing under a pressure of less than 20 feet is in progress here on a face of drift 15 feet deep. A paddock of ground $\frac{1}{2}$ acre in extent has been worked. The drift consists of fine quartz gravel in which occurs interstratified narrow bands of pipe clay. The upper portion (4 to 6 ft.) of the drift carries very little tin, below this some very rich bands of wash dirt occur. The richer portions of the drift are very dark brown in colour and consists of white pearly waterworn quartz pebbles of an average size of about 1 inch in diameter intermixed with dark coloured fine gravel and a small proportion of clay. Two distinct layers several inches thick of this class of wash occur in the lower half of the face and are about 4 feet apart.

The dark staining of the wash dirt is due to the oxidisation of iron pyrites which occurs in lump form in the lower portions of some parts of the area.

The wash dirt in the face is very favourable for working, having comparatively very little clay associated with it. The largest sized pebbles would not exceed 1 inch diameter. The drift for the most part is incoherent, some parts however are slightly cemented but with a reasonable pressure of water the whole of the

gravel would break up with difficulty.

Facilities for the disposal of tailings by gravitation are very favourable, several steeply inclined deep channels have been cut to connect the face with Rocks River.

Going south and south west from this face there is every indication of the drift continuing for a considerable distance. At the face being worked there appeared to be indications of the wash dirt increasing in depth below the present floor. Some lower portions of the wash taken out during the time of this examination showed exceptionally rich tin. Owing to the danger from falls of earth it was not possible to obtain full bulk samples from that portion of the face being worked. Some samples were taken from other parts of the face, the results of these will be supplied when assays are completed.

At the time the Cape Barren Island Syndicate worked the area known as Fisher's Workings a considerable amount of boring a short distance to the south and south east of the working face was carried out. From records obtained from plan of workings and bores, 56 bore holes were put down. The average depth of bores being 18½ feet, the average tin content is given as 0.25 lbs. to the cubic yard.

The highest result obtained is given as 2.79 lbs. to the cubic yard from a bore 16 feet deep situated at a short distance south of the south west portion of Fisher's workings. The results of half the number of bores put down are blank or 'little tin'.

The deepest recorded bore is given as 45 feet returning 0.27 lbs. to the cubic yard. This bore is situated about 4 chains due south of that showing the highest result. The next best result is given from a bore 20.5 feet deep situated at a short distance due west of the west end of face, the record for this is 1.9 lbs. to the cubic yard. From records on plan an area at the extreme west portion of Fisher's workings of 11,000 cubic yards yielded approximately 9 tons of tin oxide, equivalent to 1.8 lbs. per cubic yard.

In reviewing the results of the boring operations referred to it is observed that a number of the holes situated in the most productive portions of Fisher's Workings have not been put down a sufficient depth to get an average value of the drift. Four holes put down immediately south of the central portion of the workings show a depth of 5; 7½; 7 and 3 feet respectively with no recorded tin results. These bores are misleading as the known depth of wash there is 16 feet, the lower section of which as shown by dish washings from the face nearby carries well payable quantities of tin. A further series of five holes to the south east of these are similarly too shallow to be of any value in testing this particular area of ground.

The results of the bores prove that the payable concentrations of tin in the drift are unevenly distributed in this alluvial area, it will therefore be necessary to carefully test the ground by further boring before any comprehensive scheme to carry on productive work is formulated. The richer portions of the drift should naturally lie between Fisher's workings and the base of the hills to the south east.

A few chains to the south east of Fisher's workings old alluvial workings show a face of wash of similar depth and character to that of the former except that in colour it is much lighter. Owing to the fallen-in state of the face of these old workings, which extend for a distance of several chains by a chain in width, a representative sample of the drift could not be obtained.

Some 20 chains south of Fisher's workings further areas of ground have been sluiced in the earlier days of the field, these are of limited extent, the depth of wash is from 8 to 10 feet in depth. Dish prospects show payable quantities of tin. Further south near to southern extremity of the alluvial area a small amount of sluicing has been done along the course of a small stream on drift 3 to 4 feet in depth. The bed rock is very irregular 'potholes' in which often contain rich accumulations of coarse tin, individual crystals of oxide up to and exceeding $\frac{1}{2}$ inch in diameter are said to be frequently met with. Dish samples washed at the time of the examination for the purposes of this report showed a remarkably clean sample of tin the grain size of the crystals averaging $\frac{1}{4}$ inch diameter.

On the higher ground of the alluvial area where the drift becomes shallower towards the base of the hills, the grain size of the tin is much larger than in the deeper ground on the general level of the plain.

The tin oxide in the drift of Fisher's workings is black in colour, and of even grain size (about $\frac{1}{16}$ inch).

METHOD OF WORKING

This alluvial area is ideally situated for working by hydraulic sluicing methods there being as stated ample fall for the disposal of tailings by gravitation. A good nozzle pressure is essential to break up certain portions of the drift which have become slightly cemented, the greater portion of it will readily break up with a low pressure of water. The area is served with a well constructed water race 2 feet wide x $1\frac{1}{2}$ feet deep. This race has an elevation of 100 feet above the floor of Fisher's workings, a comparatively short length of pipe line would connect its termination with the ground in the vicinity of the latter.

With a permanent water supply available at the race the head pressure would be sufficient for all purposes; without the former if continuous work is to be attempted a working scheme for the use of 'return' water will be necessary involving the installation of a power unit and pump.

WATER SUPPLY

The water supply available from streams in this area excepting in the winter months is said to be very limited. Rooks River is a small permanent stream and for a number of months of the year should carry sufficient water for sluicing purposes, the water from this stream and a small tributary can with comparatively small expense be diverted into the water race referred to.

The successful working of this area of ground providing a sufficient quantity of payable ground is proved will depend solely on an efficient water supply being available for the greater portion of the year. If there is insufficient water in the drier periods for hydraulic sluicing under natural head pressure, a 'return'

water scheme would greatly prolong the working period.

Naturally the question to suggest itself is the storage of water, this matter warrants careful investigation. As above referred to, there is a deep gorge between the low granite ridge at the southern extremity of the alluvial area described and the eastern slope of Mt. Munro through which flows a small permanent stream coursing in a north easterly direction into the valley of Rooks River. The mouth of the gorge is narrow and deep affording good facilities for the construction of a dam there being abundant material suitable for that purpose in the form of granite boulders on the banks above.

Going upstream the gorge widens gradually, eventually opening out into a wide basin. A survey of the locality is necessary in order to obtain data relative to cost of embankment and quantity of water it is possible to conserve.

The elevation of this potential dam area is approximately 50 feet above the level of the intake of the water race referred to.

It is stated on good authority that other sources of water could be made available by means of a connecting water race to pick up streams on the southern slopes of the hills on the south of the alluvial area, this matter is also worthy of investigation.

Conclusion and Summary

From the foregoing it will be gathered that the Rooks River tin area is one of much promise. The tin zone in the granite hills warrants close examination for indications of enrichments on which if located, developmental work could be undertaken.

The alluvial ground however offers the best inducement for productive work. Lack of enterprise hitherto in exploiting this area is undoubtedly due to the absence of a continuous water supply and to some extent its isolation, the latter should offer no obstacle whilst the former can to a great extent be overcome by the adoption of more up to date methods of alluvial mining. It is essential that more or less intensive boring should be undertaken in order to locate and follow up the payable leads of drift, this work should be carried out well ahead of the active productive operations.

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