GEOLOGICAL REPORT.

on

THE COX BIGHT TINFIELD

Location and Access: This tinfield is situated immediately inland from Cox Bight, a small indentation of the south coast of Tasmania, about 12 miles east of the South-West Cape.

This part of the State is not connected by road with the settled parts of the State, and the only ready means of access is by sea. From Hobart the journey is approximately 90 miles. The landing at Cox Bight has to be made by row boat on the sandy beach, and is only possible in fair weather.

Another means of access is by boat to Bathurst Harbour, but this would involve a journey of 12 or 13 miles by water (New Harbour Ck.) and land to Cox Bight.

Topography: The land surface rises rapidly from the sea coast to Mt. Counsel 2626 feet above the sea, one of the prominent foothills being Foley's Pimple, 1170 feet in elevation.

A plain rising no more than 100 feet above the sea froms the tract of country between the western beach of Cox Bight and Bathurst Harbour, To the west of this plain, Cox Bluff rises to heights of 2000 feet.

The steams are all comparatively small and have rapid descents into the sea, Of the steams on the Western side of the field, Conliffe Ck. is the largest, and all the steams enter the sea by way of the two lagoons. Numerous small steams occur on the eastern side of the field, Cox Creek being the largest one.

Geology: The oldest rocks occurring within the district are schists of the Proterozoic Period. These rocks consist of quartz, mica, and quartz-mica schists, representing extremely metamorphosed types of original sedimentary rocks. The strikes and dips vary considerably, but the general strike is north and south, and the general dip to the west.

Granite occupies approximately one square mile of the surface to the north and north-west of Point Eric. It is composed of felspar, quartz and biotite. The western part is somewhat porphyritic containing phenocrysts of felspar, and the rock generally resembles the Devonian granites of North-eastern Tasmania Portions of the eastern part of the granite consist of fine even grained ock closely resembling aplitic types. Small dykes of granitic material penetrate the schists at the western side of Point Eric. Quartz veins containing probably cassiterite, molybdenite &c., penetrate the granite and probably also the schists. The granite is thus apparently instrusive into the schists, and so is younger than these rocks. Its general characters and association with tin deposits have caused it to be referred to as of Devonian age.

Deposits ranging in age from probably Upper

Tertiary to Recent occupy th button-grass plains around the foothills of the mountain. These deposits consist of stratified beds of heavy gravels, finer gravels, granitic drift, sand and peat. The gravels are by far the most abundant type and consist of pebbles of quartz and quartz schist up to 10 inches maximum dimension in a finer matrix. The pebbles are generally partly rounded by water action. The beds of peat, sand and granitic drift contain logs and small pieces of wood. These deposits have been formed by the waters of the numerous small creeks draining the hills during apparently periods of heavy rainfall or abundant water. The beds of interstratified peat, sand etc indicate periods of lesser water supply or rainfall during which surfaces similar to those of the present day formed. The time of formations ofthese deposits may correspond with the Pleistocene Glacial Period, the times of formation of the peat etc. corresponding to the inter-glacial epochs.

The surface of the low-lying swamp behind the eastern beach is composed of Recent deposits. Some of the lowest land around the two lagoons may also be partly of Recent age. The sand dunes along beaches are the most recent deposits of all.

Economic Geology :

The only ore occurring in commercial quantities at Cox Bight is that of tin. This occurs as cassiterite in the alluvial deposits of the field. A small amount of molybdenite also occurs in these deposits. The cassiterite and molybdenite must have been derived from primary deposits contained within the older rocks of the field. Practically every creek crossing the granite contains cassiterite in the alluvial deposits, along their courses, and it is certain that a large proportion of the tin ore is derived from the granite and/or contained lodes. Veins of quartz up to two feet in width traverse the granite and several of these have been operated upon by surface workings and adits. One of these near the SW corner 6616/M has been driven on for 70 feet in a general WNW direction. Pieces of the quartz on the dump show cassiterite, molybdenite, aresenopyrite and gilbertitie (white mica). Another formation consisting of narrow veins of quartz and quartz greisen has been opened up in the NW part of 6615/M and found to contain cassiterite. The tin content of these veins is not large, but they represent probably the most important source of the tin ore in the alluvial deposits.

In addition to these veins in the granite, the late W.H. Twelvetrees reports veins of quartz and quartz mica greisen in the quartz schists adjacent to the granite on parts of sections 6614/M, 1526/M and 1525/M immediately to the south of Foley's Pimple. The quartz veins appear to be barren, but it would be remarkable if some of the greisen veins were not tin bearing. It is thus possible that cassiterite might be shed from veins in the quartz schists. Strong support is rendered to this by the fact that in the case of Atkins Creek, Bell Ck., Cox Ck., Tolman Ck., and Pender Ck, cassiterite has been found in the alluvial deposits along thse streams which traverse schist country only and must therefore have derived their tin ore from formations in these rocks. The

cassiterite in Pender Creek in particular, is different in colour etc. from that on the granite area to the west, which also serves to indicate a different source for it. The only alternative to the derivation of cassiterite from lodes in the schists is that it was distributed over a wide area from the sources in the granite in former times. The topography does not in all cases lend itself to such a distribution, and the former explanation of the presence of cassiterit on the schist areas is regarded as the more probable.

The occurrence of tin bearing lodes in the schists is important, as it implies a possible extension of the field as regards both lode and alluvial deposits. The field would include not only the granite area but the schists in the vicinity of the granite.

The Alluvial Deposits :

The field can be conveniently divided into a number of areas which are not merely arbitrary, but represent definite expressions of the topography and geology.

Pender Creek Area :

This area includes the most easterly tin-bearing part of the field. It embraces sections 6801 and 6800 and the eastern portions of 6802/M and 3515/93M. The principal portion is that along Pender Ck. through 6802, 6801 and 3515/M. Narrow workings have been carried out up the bed of the creek and other on the south bank of the creek. The creek has an alluvial flat ranging in width up to one chain along its course, all of which may carry tin ore as in the workings. Dish prospects from the faces and old workings gave results ranging up to several pounds per cubic yard. The cassiterite is grey, brown and amber in color, and is generally paler than that found on the areas to the west. Some of the pieces are angular and are attached to reef quartz, indicating the probable presence of quartz veins in the valley of Pender Creek. Tin ore is also present in small quantities in the small unnamed creek in section 6800/M.

The deposits do not cover any extensive area and are shallow, so that this area does not form a larger proposition. It would probably be worked by hydraulic sluicing methods. Water could be obtained from Pender Creek by the construction of small dams and also from Cox Creek and its tributaries. Difficulty might be experienced in disposing of the tailings by gravitation and elevation by gravel pump or blower might be necessary.

Plateau Area :

This area includes the plateau to the north-east of Point Eric. It joins the north and south range of hills between Point Eric and Foley's Pimple along the line of water race 1485/M and has a gentle slope to the south-east. Its eastern boundary is determined by Cox Creek and the range of hills to the east thereof, while its southern boundary is the scarp face arising from the button-grass swamp near the coast.

The total area as far north as Cox Creek would be approximately 160 acres, and as far as Burke Crk. approx. 200 to 220 acres. This plateau has been formed by the material washed down from the hills to the east and north. As these hills include granite and schists in the vicinity of the granite. It is certain that considerable quantities of cassiterite have been washed into the deposits of the plateau. The greater part of the workings of the Cox Bight field have been carried out at the southern or south-western end of this plateau and considerable quantities of tin ore must have been obtained therefrom. These workings have been restricted to an area of 40 acres. The remainder of the plateau has not been worked and practically not prospected. A few (4 to 6) old shafts appear on the surface of the plateau, but it is not certain that the shafts were bottomed or what results were obtained. The more northern part of the plateau would receive material from the schists near the granite, and not directly from the granite. The presence of tin-bearing veins in the schists however renders it possible that the deposits contain cassiterite. Certainly the plateau does not seem to have been sufficiently tested and further shafts or bore holes would be justified..

The depth of the ground ranges up to 12 feet and would average between 6 to 10 feet. The gravels consist of pebbles and boulders of quartz and quartz schist ranging up to 12" and occasionally 18" in dimension, with finer material.

Dish prospects of the bottom wash in the faces and sides of the worked ground gave results ranging up to 5 to 6 lbs. per cubic yard. Working results of parts of the ground gave similar results for the full depth of wash, but of course, it cannot be expected that the ground would average anywhere near this figure.

The deposits would be best worked by hydraulic sluicing methods. Water supplies under suitable pressure could be obtained from Cox and Burke Creeks and also from Conliffe Ck. A race exists as far as Cox Ck. but new races would have to be cut to the other creeks. Tailings could be readily disposed of over the scarp face on the south and eastern sides of the plateau.

Flat Area :

This area includes the low-lying button-grass flat which occurs immediately inland from the sand dunes of the eastern beach. The flat has a length of 80 to 90 chains and a width ranging from 8 to 20 chains approximately. At its western end, the flat is bounded on the north by the scarp of the plateau area, and the eastern end it merges into the deposits along Pender Ck. Its southern boundary is the sand dunes or the beach. This area has not been worked at all, and has been tested to only a small extent. It is only a few feet above sea level and shaft sinking would be difficult on account of the water in it.

The flat is apparently of recent origin and might be expected to consist of raised beach material. The few shafts sunk on it however are reported to have found seven feet of peat with varying depths of wash under it.

The late W.H. Twelvetrees refers to three shafts

sunk at its western end near Goring Ck. and the wash contained tin ore although not payable. Two other shafts have been sunk near the bend of Cox Ck. and the materials stated to have yielded tin ore. More recently a shaft was sunk by Hayes near an old one of Gorings and it is stated that the ground is of good value. Samples of the bottom wash on the dump gave a good dish prospect.

This flat would require further testing by shafts or bore-holes in order to determine its tin content and whether it could be economically worked. Its position requires that it should be treated by dredging, or else hydraulic sluicing with drainage pumps and gravel pumps and or blowers to elevate the material. The area (approximately 100 acres) and depth (up to 17 feet) would render the area a small dredging proposition.

Lagoon Area:

This area embraces the country inland from the western beach and includes the two lagoons. Numerous creeks such as Dutchman, Meldon, and Knight or Glover drain the foothills of Foley Pimple and flow in general south-westerly directions. These streams flow into one or other of the lagoons which are connected and have a single exit to the sea from the larger lagoon. The foothills gradually merge into the button-grass plain around the lagoons.

The above mentioned creeks all traverse the granite end have formed narrow tin-bearing deposits along their courses. Narrow workings have been carried out in each of these streams the largest being in Knight Creek. Dish prospects from the bottom wash in these workings gave results up to 6 lbs. per cubic yard.

As these creeks helped to form the deposits of the button-grass plain it is obvious that the latter should contain some cassiterite at least. This applies particularly to the western part of the plain, while the western part has been formed by streams flowing over the schist country. The total area of plain within the vicinity of the lagoons would be approximately 400 acres, of which it is possible that 200 to 250 acres received material from the erosion of the granite.

In order to test this ground a number of shafts and bores were sunk in 1913. These ranged in depth from 8 to 39.5 feet, the greater number being over 20 feet deep. Of the 13 shafts only three were bottomed.

During the writers visits shafts Nos. 2, 21 and 22 were unwatered and examined.

The No. 2 shaft showed the following section :

4' soil and peat.
3' wash.
6' peat and peaty soil with timber.
13' wash
Soft granite bottom.

Prospects taken from the bottom, one foot or two feet of wash, gave good results, while those from higher up in the bottom layer of wash and from the top

layer also yielded a little tin ore.

No. 22 shaft: gave the following section :

6' soil and peat.
20' wash with thin layers of peaty sand. Wash is fine at top and coarse at bottom.
3'6" Granite drift.

Not bottomed.

The granitic drift contains little, if any, tin ore. The wash contained tin ore throughout, the prospects at the bottom being fair and being poorer towards the top of the wash. The question as to whether this is the lowest layer of wash could only be determined by following the shafts.

No. 21 Shaft : This shaft bottomed on granite at 18 feet. The bottom wash gave variable results. Some of the prospects were good and yielded coarse tin ore similar to that to be obtained from the dump of the shaft. Prospects from higher points in the wash gave small amounts of tin ore.

These results prove that some of the ground is tin bearing and that the bottom layer of wash contains payable quantities of cassiterite at two points. It is unfortunate that all the shafts were not bottomed as the extent of tin-bearing ground would have been more definitely proved.

More recently (during 1926) a short boring campaign was carried out by Tasmanian Tin Co.

One line of nine bores was put down in an east and west direction to the north of the lagoons. The logs of these bores is notkknown, but it was stated that no tin ore was obtained in this line or the others around the larger lagoon.

Bore BI. is within 25' of the No. 2 shaft described above, and it is remarkable that some tin ore was not obtained from the bottom few feet of wash at least.

Bore B 4, is stated to have been sunk in an old bore hole. While this would give results as to depth it is hardly likely to give reliable results as to values.

Between bores B 8 and B 9. a series of holes are reported to have bottomed on sandstone at 4 feet. With deeper bores at each end this is hardly likely. During the writers visit a shaft was sunk close to one of these bores to a depth of 7' 6" in gravels. It could not be bottomed on account of water, but the gravels extended another 18 inches at least, so evidently the 4' holes have little or no value as regards testing the ground.

While this latter boring campaign points to the fact that the ground is valueless, the evidence of the earlier shaft sinking cannot be disregarded. On general geological grounds it is to be expected that the eastern part of the plain should be tin-bearing.

The actual values of the ground and the extent of payable tin-bearing ground, if such exists, can only be determined as a result of further shaft sinking and / or boring.

The shafts have shown the wash to extend to depths of nearly 30 feet. The material consits of gravels containing pebbles of quartz and quartz schist up to 12 inches in largest dimension. In some layers the wash is cemented together by dark sand, but generally it is much freer.

The deposits would probably be best treated by dredging if a sufficient area of payable ground were proved to exist.

Conclusions :

The different parts of the Cox Bight tinfield have been discussed separately above and the features of each described.

It is evident that the three largest propositions are the Lagoon, Flat, and Plateau areas, the two former representing possible dredging ones, and the latter an hydraulic sluicing proposition.

The areas, however, have not been sufficiently tested to determine the actual extent of payable ground in each case to ascertain whether the above propositions would be economically sound.

The future of each area, and of the field therefore, depends up further testing of the deposits.

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