SECOND REPORT ON THE BROOKSTEAD ESTATE TIN LODES.

Geological Surveyor's Office, Launceston, 26th October, 1893.

SIR,

I HAVE the honour to report having again visited the discoveries of tin on the Brookstead Estate, St. Paul's River, on the 27th, 28th, and 29th of last month, and now forward some particulars of the progress made since my former Report of 18th November, 1892.

The development of the property during the past year has not been so rapid as might be expected from its excellent prospects, the delay being due, however, to circumstances connected with the management of the company owning it, and not to any fault of the mine. The Brookstead Proprietary Tin Mining Company, No Liability, who had secured mining leases over the estate from the proprietors of the freehold, after doing some mining work to be hereafter described, and obtaining a battery for crushing, fell into financial difficulties, and failed to comply with the terms of their agreement, whereupon their leases became forfeited, and their machinery and tools were sold by the Sheriff. A new company, "The New Brookstead Tin Mining Company, No Liability," has since been formed, and has acquired similar mining leases to those held by the first one, and bought the battery and tools, and it is expected that work will now proceed with vigour.

The battery of 15 stamps formerly at the Cream Creek mine has been placed in the valley of the Main Creek, some ten chains or so below the entrance to the drive on the main lode. It was in course of erection at the time of my visit, and nearly completed, and was expected to be in running order towards the end of November. The dressing machinery consists of jigs, buddles, and convex slime-tables of the same pattern as those in use in the Mount Bischoff mine. A tramway from the mine brings the ore to the battery. To provide water for the concentrators a dam is in course of construction in the Main Creek, from which a race 132 chains in length is to lead the water to the mill. The dam was half built when I saw it, and the building of the race fluming had just been commenced. The race comes in on the hillside 170 feet above the feeding floor of the battery, and about 200 feet above the Main Creek; at 152 feet below it a Pelton wheel is to be placed, which will drive all or part of the machinery, according to the water available. In wet weather it will probably supply all the power required, but when there is little water it will have to be supplemented by a steam-engine which just now is employed driving a small saw-mill cutting boards for the water-race flumings. The Pelton wheel is placed above the battery, so that the whole of the water may be available for the concentrators. By enlarging the dam and going to some expense in bringing in other creeks by races to discharge into it, it would be possible at all times to have a full supply of water for the present battery for both power and dressing purposes, and this will, no doubt, eventually be done if the mine proves successful. In the meantime, while it is being tested, the existing arrangement will suffice very well. It is expected that the battery will be able to start crushing by the 1st of December.

The principal mining work done has been the making of a drive along the main lode, which is now in 271 feet from the opening set. The approach is about 50 feet long. The face of the drive is about 130 feet vertically below the surface, as the hillside rises rapidly, and the lode strikes fairly into it. The drive has been made unnecessarily wide, namely, eight feet, which has resulted in the extraction of a large amount of barren wall-rock. An ordinary mining tunnel would have been quite sufficient for all immediate requirements. The lode has varied a good deal in size in the distance driven, from about six feet in width down to eighteen inches, and may be put down as averaging three feet. It has been tin-bearing all the way, and, judging from inspection of the heap of 500 tons or so at the mouth of the tunnel, it should be highly payable. The battery test will, however, soon decide whether this is so or not. At 187 feet from the mouth of the drive a winze has been sunk from surface to connect with it, its depth being 85 feet. The stone raised from this winze is about the same quality as that from the drive, so it is probable that the whole block from the tunnel to surface will be worth putting through the battery. This would mean about 4000 tons of ore if the lode averages three feet in width.

Like most of the Brookstead lodes the main lode appears to have a central vein, which is richest in tin ore, splendid bunches being often obtainable from it. On each side of this lies a mass of greyish lodestuff, probably the result of chemical alteration of the wall-rock, from which, however, it breaks away very clean. It consists mainly of granular quartz, much resembling the quartz of the country rock, through which is disseminated a good deal of mica, and often much talc and tourmaline. Tin ore is the principal metallic mineral carried by it, but at times iron, arsenical, and copper pyrites are found, also a little galena, and more blende. These do not, however, appear to be

in such quantities as to be very detrimental to the dressing of the tin ore, and I do not anticipate that any roasting will be required in order to get rid of them. A little fluor-spar ~~of tin~~ often occurs in the joints in the lodestuff, and tourmaline is very common, both these minerals being very usual associates of tin ore here as elsewhere.

Very little has been done since my previous visit on the Christoe lode, which is one lying 94 feet N.E. of the main lode and parallel to it. Some 75 or 80 feet above the main tunnel level another cutting into it has laid bare some extremely rich stuff, even better than that formerly described from lower down the hill. Though this lode is not large, this very rich vein in it will make it well worth stoping out, and when the battery gets to work it will, no doubt, be opened up.

Both these lodes can be traced for long distances along the surface, crossing hills and valleys with great regularity on a course N. 70° W., and generally showing more or less tin in their outcrops. On the east side of the Main Creek they do not seem to be so rich as to where driven upon, and all somewhat split up into veins, but further east again some considerable distance they once more are seen as well-defined bodies of stone.

As described in my former Report, there are a large number of lodes in the Brookstead property running more or less parallel to the main lode. With the exception of a few trenches on the outcrops of these they are still quite unopened, and it will only be necessary to speak of them generally. It is said that there are now about thirty known tin-bearing veins, some very small, others of a fair size, from two up to six feet in width. Without survey I cannot say if this statement is correct, but it seems very credible and likely. Besides those running W.N.W., there are also several lodes with courses between N.W. and N.N.W. which must run into or cut the first and more numerous set; the junctions of the two lines should be worth exploration, as such points are often richest in tin lodes elsewhere. The veinstone is generally quite similar to that of the main lode above described, but some almost pure blocks of tourmaline rock are also found, the mineral being in bundles of interlaced acicular crystals. Most of all the lodes show a central vein or "fissure," which often contains tin and tourmaline. Many of these are merely partings without any included quartz or other deposited matter. It seems probable that there has been a circulation of thermal waters along the fissures, which has caused an alteration in the wall-rock for some little distance, the felspar and mica being largely removed and replaced by talc, tourmaline, and tin ore. In parts where the best tin is found there seems to be very generally much talc, but in the poorer portions the veinstone is mostly hard granular quartz. It is yet premature, however, to attempt to formulate any general rule as to what parts of the lodes are likely to be the best in tin ore, though we may possibly be able to do so when more mining work has been done.

Of the many outcrops of lodes on which shallow trenches have been dug, most contain some tin ore, only in a few cases, however, rich enough to be worth working. In some I saw no tin ore at all though the lodestuff looked promising. The trenches having simply been put down at random where the lodes cropped out most strongly, it would be too much to expect that they should all be found containing rich tin. If they were traced along their courses it is probable that many rich shoots of ore would be discovered. In a district containing so many lodes in close proximity to each other, it is only to be expected that a large proportion will not pay to work. The almost universal presence of some tin in the outcrop is, to my mind, a very favourable feature, indicating the probability of richer parts being found when closely searched after. Outside of the main workings the best shows of ore are on the line of the Main and Christoe lodes, on a hill towards the eastern part of the estate, near the "No. 1" alluvial workings, and on the "western lode" on the spur between the Panel Marsh and Williams's Creek. A lode, about a chain south of the main one, on the first-mentioned hill, also shows a strong body of good tin-bearing stone about three feet wide. Some very rich specimens of tinstone have been found adhering to quartzite on a spur just east of the Panel Marsh Creek, but the lode from which they come has not yet been trenched for. This spur separates the Panel Marsh Creek from Bayley's Marsh Creek, but is divided into two branches on its southern side by a blind gully. The top of the spur is capped with Permo-carboniferous conglomerates and sandstones in horizontal layers; on the eastern branch of the spur these rest upon granite, but on the western one they overlie metamorphic sandstones and slates (Silurian, or even older). It is near the contact of the granite with the sandstone formation that the rich specimens have been picked up, and as a quite similar contact on the other side of the St. Paul's River Valley at Roy's Hill has proved rich in tin, this one also should be well prospected.

Alluvial Workings.—Not very much has been done in the matter of working the alluvial ground on the property since my last report. In the Main Creek three holes were sunk near the battery, reaching bottom at 16 feet, 30 feet, and 18 feet respectively, but very little tin was obtained. The material passed through proved to be nearly all diabase greenstone from the range to the north, and there was but little granite. This shows that the main part of the alluvial filling of this creek has come from a distance and from the non-stanniferous rocks, and makes it probable that the tin derived from the erosion of the granite formation will have to be looked for much lower down the stream, and most likely it is mainly buried deep in the bottom of the St. Paul's River valley. The terraces along the north side of the valley have not yet been tried on a working scale, though some

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fairish prospects have been obtained from one or two small holes sunk in them. The old workings near the mouth of the Panel Marsh Creek have had a little more work done on them, and some fair tin was got in the surface soil on the east side. A shaft was sunk here on a terrace to a depth of 40 feet without reaching the bottom. At the No. 1 alluvial workings, towards the east end of the estate, a tributor was at work at the time of my visit, and was getting some tin by ground-sluicing. To work this creek satisfactorily, however, a better supply of water is required, and if this were got with pressure enough for hydraulicking, I think the whole of the old workings and a lot of new ground could be sluiced from side to side of the valley. I am pretty confident that the alluvial ground will yet prove of very great value, but only when it can be worked by the hydraulic method in a wholesale fashion. The ground should be systematically tested in dry weather by means of shafts to ascertain its value and depth. In the portions near the St. Paul's River it is probable that the bottom, and likely the best tin, will lie below the level of the stream. It will take much patience and expense to test the gravels thoroughly enough to say with confidence that they can be profitably worked, but no scheme for making a large race should be entertained until this has been done.

My second examination of this property has confirmed the favourable opinion formed of it the first time. The facilities for working are exceptionally good, and the lodes are very numerous and very generally tin-bearing. With cheap mining and milling, and the ability to raise ore from a number of different places simultaneously, there should be a steady and continuous output of tin. With the lodes in their present undeveloped condition one cannot say with any certainty that they are payable, but it may be said with every confidence that there is much reason for believing that they will turn out well, and every inducement to give them a trial. Should even only three or four of them prove good lodes the property would be a very valuable one. As the company now have a battery on the ground, it will be an easy matter to make trial crushings from the various lodes from time to time, and those worth further development may thus be properly tested. The company have a great undertaking before them in the opening up of such a large area of ground and so many lodes, and the policy to be pursued will demand very serious consideration. In my opinion work should not be confined too strictly to the mine and battery now in hand and the rest of the lodes be left untouched, for the reputation of the district would then be staked solely on the main lode, and should this fail great discouragement would result. It would be better to do as much prospecting in other parts of the property as possible concurrently with working the present mine, and any profits from this might well be devoted to exploration of new ground rather than to dividends for some time to come. An immense amount of prospecting has yet to be done to find out what lodes are worth mining; but the sooner this is done the sooner will the company be able to increase their output of tin and the value of their dividends. When the lodes have been proved sufficiently the question of dealing with a number of scattered mines will crop up, and it will have to be decided whether to have several batteries at different points or to bring the ore by a system of tramways to one central dressing works. The present mill is well situated for working the lodes crossing the Main Creek, but would be very hard to reach with ore from mines in the valleys of, say, Williams's or the Panel Marsh Creeks. Even if the company decide not to attempt to work the whole of their leases themselves, but dispose of some of them to other companies, it is probable that it would be better to have concerted action with respect to water supply and dressing works than for each company to have its own mill.

As this Report is intended only to supplement that of 18th November, 1892, I have avoided as much as possible repeating what is there said, and both Reports should be read together.

I have the honor to be,
Sir,
Your obedient Servant,

A. MONTGOMERY, *M.A.*, *Geological Surveyor.*

The Secretary of Mines, Hobart.