URMISCB/8-16

29/24/22/581

file 13
Report no 2 (8)

1931-32
pub 30

SCHOUTEN MAIN

This tinfield is reached by following the Nine-mile Beach from Swansea, round the head of Oyster Bay. The beach, backed by sand-dunes, forms a fine level stretch suitable for driving or riding at low-water. The rock on the west side of the Bay, at Shaw's Bluff, south of the Meredith River, is diabase, which re-appears on the east side at Hepburn's Point and Buckley's homestead, and joins the granite half a mile east of the point. Dr. Milligan also mentions a greenstone vein, running nearly N. and S. along the ridge of one of the granite mountains, near Wineglass Bay.

Schouten Main is the name used for that part of the mainland which is at the head of Freycinet's Peninsula, and consists of granite, with the exception of some Silurian metamorphic sandstone on the crest and east slope of the hill overlooking Bluestone Bay and the diabase which I have mentioned. There is also some Tertiary sandstone between Buckley's and Gill's. The granite is variable in character, being sometimes the even-grained pink biotite (dark mica) granite of Mount Cameron; sometimes the coarse grey pseudo-porphyritic granite of the Blue Tier; sometimes a fine red-grained variety, like that occurring in the pebble-beds of the Mesozoic sandstones. At one place it merges into a quartzless variety, containing augite (augite syenite), called locally "green granite" (at Charlie's Creek). In all its numerous modifications it is, geologically, one and the same, a part of the huge mountain mass of Devonian age, which forms the bulk of Freycinet's Peninsula.

Prospectors at one time or another have gone through the Peninsula searching for tin, gold, and coal, and on Schouten Main it is estimated that as much as 150 tons alluvial tin ore have been won. This tin, it is conjectured, must have been shed from reefs, and these reefs or lodes have been diligently sought for, though it must be said that no great amount of money has been expended in the search. It is, of course, quite possible that large lodes exist in the granite, and have eluded discovery hitherto; but my observations led me to refer the alluvial ore to two sources, which would be quite efficient distributors. These are -

1. Small quartz veins enclosing coarse tin.

2. Greisenised bands of granite containing small quantities of ore.

In the course of ages the degradation of the granite would account for the release of more tin that has been recovered, without the aid of any large reefs. These large reefs, I believe, are visionary.

I inspected Gill's sections, comprising two 80-acre blocks and a prospecting area of 370 acres, west of Bluestone Bay. A large flat west of the sections yielded a good deal of the alluvial tin referred to above. Another flat is just on the boundary-line between the two sections. The alluvial tin there was found 25 years ago, and was worked first by Messrs. Gill, Mayson, Gemmell, Glover and Jack. The wash on the 80-acre block is from 1 to 2 feet deep, and has given from 3 ozs. to ¼ lb. to the dish, a ton of ore having been once extracted from a space of three square

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yards. The tin is mostly ruby and resin, rarely black, and the crystals are not much rounded. The quality is good, some of it having gone as high as 75 per cent. The last return was 72.2 per cent. The two Koglins and party worked on these flats in 1875-7. It is considered they left all the wash which returned only one or two ounces per dish; and those who have watched the history of the work here believe that there is as much tin still in the drift as has come out of it. The flat between the two sections ought to yield something, provided, water could be got to give pressure enough for a nozzle. This should be looked into.

I may mention as a matter of scientific interest, that the wash here adds one more to the list of localities where buttons of volcanic glass (obsidian) have been found. Some were discovered by Mr. Bingham in the tin-wash, 3 or 4 feet deep.

The country-rock is a pink to white or grey granite, with a little dark mica in it. In the granite is a greisenised zone, running through both sections in a north-westerly direction. Within this zone are bands of rock, from which the felspar has mostly disappeared, leaving a quartz-mica rock slightly chloritised by the decomposition of the original dark mica, which has given place to silvery muscovite. The rock in this form is a tin granite, such as characterises the large stanniferous formations at the Blue Tier (formerly called quartz-porphyry), and is identical with the tin-bearing stone of the Anchor, Liberator, and Australian mines. There are five parallel exposures or outcrops in a belt of 700 or 800 feet wide.

No. 1 has been worked upon by a long trench and a shaft about 15 feet deep. The stanniferous band of country is here 50 to 60 feet wide, carrying thin greisen veins. The boundary of the belt on each side is dark mica granite. The shaft sunk N.W. of this trench is in the tin granite formation, which is intersected by vertical quartz veins. The jointing of the formation is in the direction of the extension of the zone, N. 30°W. The samples which I took from the stone in the shaft did not yield any tin when assayed by the Government Analyst, but in September, 1899, the Government assay showed traces of tin and copper in stone from the bottom of the shaft; also 3 per cent. tin from a bunch of ore in the trench; and from a leader below, 1.6 per cent. metallic tin. There is an increase of pyrites towards the bottom of the shaft, and the latter is to be sunk a few feet further to see whether the improved mineralisation means anything.

On the northern section, to the N.E. of the works just alluded to, a cut has been made into tin granite (greenish mica-quartz rock), called No. 4 lode. This greisen is exposed at surface about 1 ft. wide, and goes down in a series of bands. In the side of the cut a dab of rich tin ore was met with, and I was told that a little had also been found in the bottom. Mr. J.S. MacArthur (Glasgow) reports the assay of the good ore from here as 6.31 per cent. tin. I picked up a piece from the pile at surface, which Mr. W.F. Ward, Government Analyst, has assayed. I yielded 4.6 per cent. metallic tin. This, however, must not be taken as a representative sample. It only shows what can be found sporadically. Further samples which I took from the pile were assayed by Mr. Ward and yielded 1.2 per cent. metallic tin. This little pile contains the

remainder of the patch of ore, but I could find no tin in the face. As tree roots penetrate the formation to nearly the bottom of the cut, care should be taken in sampling not to include the soft material between the joints. This cutting will be advanced a little further under the cover to see whether the tin found in the bottom continues.

No.5, higher up the hill, towards the north boundary of section, is an outcrop consisting of granite with bands of greisen. This appears to be on the strike of a long tourmaline joint further south. It is on a small knoll of granite boulders. No tin is visible in the stone, and none was obtained therefrom by assay. This line of stone has been traced a few chains north and south.

Still higher up the hill a greisen vein occurs in granite, composed of coarsely crystalline quartz, large flakes of muscovite, lithia mica and tourmaline. A width of 18 inches is exposed, but a shot or two would uncover the whole for better examination. The samples which I brought away, however, on assay in the Government laboratories, returned no tin. The vein runs in a northerly direction in pink granite, with very little dark mica in it.

Still ascending the hill to the Pimple, 600 feet above sea-level, the crest is reached on Section 4779-93M, 37 acres, A. Dilger, where, overlooking the sea, the Swansea Prospecting Association has opened a hole about 7 feet deep, in soft granite rock veined with quartz and greisen. The felspars are becoming chloritised, and a little tourmaline is visible, enclosed in the mica. This is on the strike of the Gill outcrops. The samples which I took from here, upon assay, did not return any tin.

S.E. of Gill's south section is an area of dark brown metamorphic sandstone of nearly a square mile in extent overhanging Bluestone Bay. As nuggets of gold have been picked up on the slope above the mine, it has been surmised that the sandstone formation may have been the source. These nuggets are sometimes in crescentic forms ½" diameter, and in pellets like wheat grains. It is possible that some reef is still undiscovered in this sandstone, for it is a Silurian rock anterior to the granite, which has impregnated it with mica.

Gill's sections are to be further prospected. I think the large tin is likely to have come from quartz veins in the granite, but these ought not to be reckoned upon as a source of supply. The future of the property depends upon whether the greisen zone will pay to work open face, passing the whole of the stone through the battery. No doubt, enriched portions exist here and there, but

these will probably be found too limited in extent, and too far apart to be worked profitably. The whole formation will have to be worked as it stands, or be left alone. It would be comparatively easy to put in a cut right across the zone, and find out its extent and limits. Then bulk sampling must be undertaken, and the average tin contents ascertained. It must be borne in mind that this is a low-grade proposition, and I cannot report more definitely about it until the necessary work is done to provide data for conclusions. I was told that 700 feet of backs could be got in 700 feet of driving-in from the sea coast, if a convenient place for starting a tunnel could be found on the shore-line. Without endorsing the precise height, I have no doubt the figure is not far out, but I do not believe that underground mining will pay in this ground, unless a strong lode be discovered.

I am not at all sure as to the water supply, but some could be got by damming the large flat to the W., once it is worked, and a machinery site could be selected below about a mile from the present workings. For working on a large scale the water question will form a difficulty. Cole's Bay is 2½ miles south in a direct line.

Bernacchi's Gold Quarts Reef :-

From Gill's sections I walked two miles north along the granite range overlooking the sea to Bernacchi's reef, on the sea coat, E. of Fresh Water Lagoon. This was discovered about 23 years ago, when a trial crushing of half a ton in Melbourne is reported variously as returning 13 dwts. and 17 dwts. gold per ton. From the source of information I have reason to believe the former figure is the more reliable. Mr. C.J. Ramsay, of the Morning Star Company, reported, 10th May, 1898, having got out a ton of stone for a trial crushing, but I believe it was not treated. Samples which I took, and which have been assayed by the Government Analyst, yielded only a minute trace of gold; but a battery test is the only fair way of arriving at an idea of the value of the stone.

The reef crops out at sea-level, where a short drive on its course has been put into the cliff, It is a solid reef of laminated quarts, 12 inches to 14 inches wide, white, and mottled green; A two-inch selvage occurs on the footwall, another on the hanging-wall. The dip or underlie is 75° to the S.W. The country-rock is coarse dark-mica granite, pink in tint. On the footwall side of the lode there is a narrow band of dark, slate-like, granitic wallrock, gradually altering to normal country granite a few yards away from the lode.

I saw no pyrites in the stone. I am afraid the reef is one of those which carry no payable mineral at the outcrop. Next to no work has been done on it, and it is in an awkward position for working.

On the saddle of the hill to the S., I observed water-worn pebbles of dark sedimentary rock scattered over the surfaceof the ground. I can only surmise that these have been derived from slate country to the N. Further south a well-defined hard elvan crosses the granite hill. This is a dyke of typical elvan

or granite porphyry, rich in potash mica (muscovite). The rock is a compact, fine-grained admixture of quartz, mica, and felspar, with porphyritic crystals and nests of crystals of quartz and felspar. It contains no mineral.

Jack's Reef:-

This is a veiny quartz reef in granite country, between Gill's and Buckley's, on Crown land. It was opened upon six years ago by a 7-feet cut, exposing a vertical face. The exposed width is 11 feet. It has not been tested hitherto for gold or tin. The samples which I took have been assayed by the Government Analyst, and returned a minute trace of gold - no tin.

The Boulder:-

About a quarter mile further W. is an isolated boulder of quartz, which has excited much interest and curiosity in the district. It is a block of clean quartz, lying in a clayey, pebbly, and quartz wash. The valley is 250 feet above sea-level, and is apparently eroded in cemented Tertiary sand, bluffs of which are exposed in massive beds, 20 feet thick, a little distance to the west of the boulder. The boulder itself is 6 feet x 5 feet x 4 feet is a little smoothed by the action of water, and is composed of dense pinkish quartz, with here and there excessively finely divided pyrites. The ground around it has been excavated, and this shows that it is not in situ but where it has come from can only be conjectured. It has most probably been derived from some reef in granite, country, judging by the rather peculiar appearance of the quartz. It may have been imbedded in the wash while the latter was being deposited. This view removes all difficulty as to its transport, for though the sand bluffs are now 250 to 300 feet above the sea, they were at sea-level at that time, and the granite peaks of the Peninsula would still be high above the deposit. Some stones of slate and sandstone are found in the wash or in the surface soil, but these have no particular bearing on the question.

It was found 25 years ago by Mr. Gemmell, and half a ton of it was assayed in Ballarat, for 9 dwts. gold per ton. A trial like this is more satisfactory than the assay of the few samples taken by myself, which the Government Analyst reports did not contain any gold. As it is an individual boulder only, its occurrence is not important, unless it can be identified with its parent reef, which is probably not far off. The configuration of the country at the time it was deposited was different from what it is now; hence search for the reef on the hillside immediately above the boulder may be quite fruitless.

Some iron ore not far from Buckley's is of doubtful origin; that is, whether it be veinstone, or merely concretionary; like so much of the ironstone at the head of the bay. An assay of it by the Government Analyst showed that its contents in precious metals were nil.

Schouten Main Mining and Dredging Co's Claim:

I visited these properties comprising

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4 dredging leases, of 39 acres each, and a mining lease of 20 acres, as follows :- D.C. 235, 39 ac. 3r. 9p.; D.C. 236, 39a.3r.9p.; D.C. 208, 39a.3r.29p.; D.C. 209, 38a.2r.31p.; 93M. 4387. 20a.

These are on the Saltwater Creek, on Schouten Main. There is a connection by track both to Buckley's at Hepburn's Point, 2½ miles, and to Cole's Bay, 1½ miles, originally called Meredith's Fishery Bay.

The lower part of the claim is a flat, through which the small Saltwater Creek meanders sluggishly, the ground being full of nearly dead water. The banks of the creek show wash under 2 feet of soil. The part of the flat taken in by the claim is 5 chains on each side of the creek, which in this part of its course flows W. The plain is bounded Nth and Sth. by low granite hills, strewn with sea-sand. In the western portion of this flat four holes have been put down to a depth of 10 feet, the first 4 or 5 feet being in sand, the rest in a wash of small gravel. As far as I could learn, the drift in this part of the property did not show much tin; on the other hand, the holes did not go down to bedrock, on account of the water. The wash has been invaded by the sea, and what tin there is is much finer than in the upper part of the property.

Where the creek changes its course from N. - S. there is a small shallow lagoon, in which a dozen bores have been put down 15 to 20 feet, bottoming on soft granite. I was told that the same quality of wash was met with as that shown in the tin-bearing shafts further north.

Going up the creek from the lagoon northwards, the valley between the hills contracts, and the drift channel north of the camp on the 20-acre section does not exceed a chain in width. Still further north it pinches to about half a chain, widening out again finally to about 4 chains.

For about a mile up the creek from the lagoon a series of 30 holes and small shafts have been sunk to test the ground, which, on the whole, has been well prospected, the intention evidently having been to find out what it is really worth. The first hole is a chain east of the lagoon. It is down 6 feet in sea-sand, and shows a little gravel in the bottom. No. 2 shaft, a little further north, is 12 feet down, with an 8-feet borehole in the bottom. A sand and quartz wash was touched at 3 feet below the soil. No. 3 shaft, to the north, is down about 20 feet in sea sand of granitic nature, and has bottomed on granite. Prospects from this sand, assayed by the Government Analyst, yielded 44 grains metallic tin per dish - 0.042 per cent - about 1/10 oz. per dish, or ¼ lb. to the cubic yard. No. 4 shaft has been sunk 20 feet, and has not bottomed. The wash is here about 3 chains wide, and the gutter seems to be close to the hillside on the west, which rises steeply. No. 5 shaft is sunk 12 feet, and has not reached bedrock. This shaft is near the camp. The wash appears to improve going north. The prospects taken were assayed in the Government Laboratories, and returned 113 grains metallic tin per dish - 0.107 per cent - say nearly ¼oz. per dish, or 1¼lbs. to the cubic yard. A shaft N. of the camp bottomed at 10 feet, where the channel of wash is not more than a chain wide.

Further north a trench has been cut down to the bedrock, a couple of feet in wash, here one chain wide, contracting to half a chain, and of good tin-bearing quality. The prospects washed yielded, on assay by the Government Analyst, 596 grains metallic tin per dish - 0.57 per cent. - say 1¼ozs. per dish, or 6 2/3 lbs. to the cubic yard.

The granite hills come, here, close together, with not more than 1½ chains of alluvial between them. This, then, widens out to three chains, and acquires a stripping or overburden of seven or eight feet. An outcrop of quartz occurs here, running W. of N., and its course parallel with the new direction of the creek, is marked by loose fragments of quartz. Prospecting holes have been put down, one in seven feet of wash, said to be worth half an ounce to the dish, and another through six feet of stripping into four feet of wash, estimated at 4 ozs. to the dish. The expanding alluvial ground has here formed a kind of basin, an ideal position for dredging. Some former prospectors worked in this part of the ground, but no record of their success or otherwise is available. The ground now pinches to almost nothing, and this seems to me the only place where there might be any difficulty in passing the dredge. This part of the claim may be taken as consisting of 10 to 12 feet of stripping and two to three feet of wash, as proved by a line of bores across the valley. The tin gets heavier as the head of the valley is approached.

Further N., where the ground is about two chains wide, shaft No. 7 has been sunk 12 feet, with four feet of wash at bottom, very wet. The prospects taken here, assayed by the Government Analyst, returned 408 grains metallic tin per dish - o.39 per cent - say 9/10 oz. per dish - 4½ lbs. to the cubic yard. The width of the alluvial pinches again. At the northern end of the claims the stripping is six feet, and overlies four feet of wash, which contains a few stones of quartz. The creek forks at this place, and the ground is between three and four chains wide, and the prospects taken (No.8) were the best of any. The results of assay by the Government Analyst are 778 grains metallic tin per dish - 0.74 per cent - over 1¾ozs. per dish, or nearly 9 lbs. to the cubic yard. This situation is, of course, the nearest to the assumed source of the tin, and the yield is, consequently, rather exceptional.

The prospects taken were selected for the purpose of gaining a general idea of the nature of the wash, and not for forming an accurate estimate of the value of the whole deposit. The latter would require systematic sampling from holes sunk regularly in lines across the flat at fixed intervals, and average prospects from fixed horizons in the deposit. Still, they afford some notion of the capabilities of the drift. The average of the places from which my prospects were taken gives 5½ lbs. metallic tin per cubic yard; but I consider it unsafe to include the higher values of 6 lbs. and 9 lbs. to the yard at more than the average of the remainder, which is 2 lbs. metallic tin, or 2.86 lbs. tin ore (at 70 per cent) per cubic yard. This estimate does not fall far short of that put forward by the promoters, who reckon upon 3 lbs. tin ore per cubic yard. I cannot speak with any certainty about the ground in the

lower part of the claim, as the wash there was inaccessible. Taking the ground all through, I should think a width of two chains is a fair average, and the depth is, as may be seen from my remarks, variable from two to 20 feet of sand and wash. The promoters estimate the average as 12 feet. I think this is too high an estimate for the 2 lbs. a yard quality material. The edges of the formation have to be taken into consideration, and not the deepest parts only. The mean thickness of the payable part of the wash can only be ascertained by careful trials.

The proposition is a fair one for a moderate-sized company. The only way of dealing with the ground is by dredging. A bucket-dredge is mentioned in the prospectus, but, from the nature of the flat, I doubt whether a pump will not be found more suitable. Dredging is now carried on in flats, where it would not have been dreamed of some years ago. The proprietors will need the very best expert advice before embarking on the enterprise, for tin-saving is more difficult than gold-saving, and the failures of attempts at dredging in Tasmania hitherto suggest that some general difficulty exists which has not been sufficiently realised. Apart from the quality of the material handled, I think insufficiency in quantity has been the rock on which most of our recent undertakings have struck. With good advice and ordinary care, the tin ought to be extracted from these claims profitably.

QUARTZ COUNTRY AT CUTTING-GRASS MARSH, NEAR BUCKLAND:

Cutting-grass Marsh is a marshy flat of 80 or 90 acres, about nine miles N.W. of Buckland, about 900 feet above sea-level. It lies just east of Woodsdale Bluff, called Bluff Hill. The treeless marsh-soil consists of humus and sand-grains resting on sandstone, knolls of which protrude a little from the plain. Hills of the same sandstone surround the marshy ground. There are no fossils to guide in the determination of the horizon of the strata; as the stone is not felspathic, it may belong either to the Lower Mesozoic or the Permo-Carboniferous. In the flat there is an outcrop of cellular iron ore, about three or four feet wide, which can be traced at intervals through the paddock in a direction S.E. - N.W. It has not been opened upon sufficiently to disclose what it really is, but, from the stone occurring the paddock on the strike, I am inclined to think that it is simply a band of iron oxide in the sandstone, due, probably, to the influence of adjacent igneous rock (diabase). No gold was found in the stone when assayed in the Government laboratories, and the occurrence does not differ essentially from similar outcrops in the Swansea area. It has no value as a carrier of economic ores.

On the north side of the marsh there is a hill range, 300 feet high, on the summit of which is a trench, 10 feet deep, which has been cut down into a band of broken quartz and sandstone, about 10 feet wide, on a face of quartz which appears to be the south wall of a reef. The reef itself has not been cut into nor fully exposed. A few fathoms to the west a shaft has gone down 15 or 20 feet in a broken quartz formation, but it appeared to me a little too far south to cath the reef. The samples of quartz which I took have been assayed by Mr. W.F. Ward, Government Analyst, but returned no gold. The sandstone

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is a yellow quartzose variety. A few years ago some four or five men worked here for Mr. Goodwin, and gold in small quantities was reported. Since then prospects have been taken repeatedly without results. There are very likely parallel veins in the neighbourhood as the hill to the north is also strewn with pieces of quartz. The quartz of this occurrence has an unfavourable vitreous appearance, with a tendency to be lumpy, and altogether different from the dull, mottled, massive stone of our gold quartz reefs. A little specular iron is present in the brown oxidised matter. The age of this sandstone is much later than that of the auriferous quartz reefs in the Silurian slates of the State; and the deposition of the quartz was, probably, in infiltration veins, confined to the sandstone strata. I saw some samples of quartz from French's show, three miles east of this. Some of it is radiating, mammillary, and chalcedonic quartz, of a resinous appearance; just the sort of silica which might be expected to be derived by infiltration from the surrounding rock.

Of course, the above reef has not been properly broken into, but I have little faith in it as a gold-producer, as its silica cannot have been directly expelled from the granite, which had already cooled, and even been exposed by denudation before these sandstones existed. The sandstones themselves consist of material derived from the waste of the granite hills. If gold has ever been found in this quartz, it would only be in infinitesimal quantities derived from the sandstones, which had collected it from the waste of older hills.

I have very little doubt that the diabase exists at no great depth below this freestone basin, though the nearest exposure of it which I saw was at Johnny Mac's cutting, between Mr. Jas. Cornish's farm, on the Marsh, and Buckland.

The chart accompanying this Report is a sketch map of the geology of the district. The part referring to the country E. and S. of Swansea and Schouten Main embodies my own observation; the features of the Peninsula and Schouten Island are from the best information which I could gather.

Appendices I to V. are official Registers of the bores put down at and near Seymour by the Government, in 1888.

Appendix VI. is a tabular statement of analysis of coal referred to in the present Report, and of other Mesozoic coals in Tasmania, together with analyses of Newcastle coal, New South Wales and England, for comparison.

I have to tender my best thanks to many gentlemen in the Swansea district for help and information, and to all who formed the Committee for facilitating my examination, especially to Mr. E.O. Cotton, Mr. F.M. Gill, Mr. J.H. Jessen, and Mr. Jas. Lyne, who accompanied me, and Mr. A. Threlkeld Mason, who amassed a great deal of useful information for me.

I have the honour to be
Sir,
Your obedient servant,
W.H. TWELVETREES
Government Geologist

W.H. Wallace, Esq., Secretary for Mines, Hobart.