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This Company was formed in 1918 and holds under Mineral Lease a total area of 65 acres, North East Coast, being 55 acres on what is known as the Valley Lead on the Ringarooma River and 10 acres adjacent to leased dam sites Upper Cascade River.

The Mineral Leases include 8413/M 20 acres, 7891/M 25 acres, 7760/M 10 acres on Ringarooma River and 8226/M 5 acres, 8237/M 5 acres Upper Cascade River. Dam Sites, 1873/W 89 acres, 2033/W 3 acres, 2033/W 2 acres, 2003/W 1 acre, total 95 acres. Water rights, 44 sluice heads have been secured on the Cascade River and its tributaries comprising 1883/W 34 sluice heads, 2003/W 4 sluice heads, 2033/W 6 sluice heads, Timber areas, a lease of 1000 acres is held on Cascade River about midway between dam site areas and leases on Ringarooma River. The distance between the latter is roughly 6 miles by direct line south easterly.

SITUATION

The Mine workings are situated on the eastern bank of the Ringarooma River being on a practically level area of land lying between the Main Road and the River. The road winds round the most easterly section of the group.

The Township of Derby lies about 3 miles to the north east and Branxholm a similar distance to the south east.

The North-eastern Railway Line passes within a short distance to the north of the mine. There being four Railway Stations within a radius of 3 miles the locality is well served in the matter of transport facilities both by road and railway.

OFFICIAL REPORTS

The only one of these giving a detailed description of the property with data of output together with information concerning its past history and its present day prospects is embodied in Geological Survey Bulletin No. 35 by P.B. Nye, M.Sc. B.M.E. Government Geologist. Since the date of Mr. Nye's report no material change has taken place regarding the economic position of the Mine.

FORMER WORKINGS AND PRODUCTION

The first Company formed to work the property dates back to the year 1885 when intermittent work on a limited scale was carried out over a number of years. The methods employed to deal with the drift are said to have been very inefficient.

During the years 1905-1909, a former Company (Briseis Extended Tin Mining Co.) worked a considerable area of ground on the lead of drift. The plant used was of more modern design than that of former operators although the expensive methods of power generation by steam boilers was used.

During the period this Company was in operation an area of ground some 14 acres in extent was excavated below the level of the Ringarooma River to an average depth of 42 feet. This excavation is filled with water, consequently an examination of the drift is not possible.

Prior to the year 1905 the output of tin from the property is recorded at 90.5 tons, that is up to the year 1894; subsequent to that time to the year 1905 the recorded output has been supplemented to some extent by small parties working intermittently up to the time the Briseis Extended Company commenced work.

Official records of the output of the latter Company give a total of 428 tons 14 cwt. during the years 1905 to 1909; the largest yield for any year being 153 tons in 1908.

The official yield for each year divided into quarterly periods is as follows:

YEAR	1st Quarter		2ND Qr.		3rd Qr.		4th Qr.		TOTAL	
	Tons.	Cwt.	Tons.	Cwt.	Tons.	Cwt.	Tons.	Cwt.	Tons.	Cwt.
1905					23	13	34	0	57	13
1906	5	1	22	0	7	8	15	0	49	9
1907	19	10	37	0	22	6	38	0	86	16
1908	31	10	30	0	50	0	42	0	153	0
1909	22	13	17	0	25	0	17	3	81	16
									<u>TOTAL</u>	<u>428 14</u>

The output derived from the treatment of the drifts in the past serve to show that considerable quantities of high grade tin concentrates have been obtained from a comparatively limited area of ground. Excepting in one instance, that is the 2nd quarter of the year 1907, when the yield was only 7 tons, the reason for the comparatively low output is not known, the quarterly returns are fairly regular indicating an even distribution of tin ore in the drifts.

GEOLOGY

The deposit of tin bearing drift occurring on the leases is what is known as the Valley Creek Lead.

Valley Creek is a small tributary stream to the Ringarooma River and takes its source on the high granite country lying to the south east of its junction with the main stream. The latter being the largest stream in the district is responsible for the deposition of extensive deposits of rich tin bearing drifts. It takes a sinuous course in a general north easterly direction along the north western boundary of the leases. The River here flows through a level area of land varying from a few chains to half a mile in width.

To the north basalt covered sedimentary rocks occur. The land surface rises moderately from the River valley extending in that direction as undulating rich farm and grazing lands; to the south granite hills rise steeply to the elevated tin bearing country surrounding the Derby Braxholm and Weldborough district.

It is not the purpose of this report to dwell in detail upon the general geological features of the district in relation to the deposition of the extensive tin bearing drifts. In Geological Bulletin No. 35 Mr. Nye deals fully with that aspect of the question.

It has been well established that the Ringarooma River in its course to the sea coast flows at a much higher elevation than it did in former periods. The gravels and drifts of the old river bed have been proved to occur at an elevation lying several hundred feet below the present one. The old river bed in places along its course has been completely covered with flows of basalt thereby causing an alteration of direction of flow.

Instances of these facts can be seen in the workings of the Briseis Mine at Derby.

There are no indications, however, of any material alteration in direction of flow of the Ringarooma River between Branxholm and Derby. The low lying drifts probably 100 feet or more below its present level represent the ancient bed of the river forming the main deep lead of the district.

The general flow of basalt no doubt extended across the present valley of the River between the areas now held by the Arba and Briseis Companies respectively without diverting its course. It has since that period cut a new channel entirely removing the basalt from this section of its channel.

The River gravels consist of recent alluvial representing the upper portion of the drift and the ancient drift resting on a bed rock of granite.

The drift as it is today is covered with a layer of several feet in thickness of sand debris carried down the River from sluicing works on other properties above. Below this is a shallow layer of black soil, the next in succession below the original surface soil is a layer of shingle 6 to 9 feet in thickness. Individual pieces of the shingle would range up to 2 inches in diameter. Beneath the shingle are irregular occurrences of pug, several feet in thickness, occurring through the drifts. From records of boring in the area the drifts are found to be composed of clayey sand and pebbles.

The geological data obtained as a result of bores and actual working is definitely established that a well defined load of tin bearing drift extends from the foot of the hill where Valley Creek flows into the valley towards the presumed course of the Main Ringarooma River deep lead junctioning with the latter at a point $\frac{1}{2}$ mile distant.

It is estimated that at the point of junctioning the depth of these leads is 200 feet below the existing surface.

TIN ORE CONTENT OF DRIFTS

A very fair approximation of the quantity of tin contained in the lead can be derived:-

- (1) by the actual known weight of tin oxide sold and the quantity of drift material removed to obtain it,
- (2) The results obtained by boring.

In the early period of productive operations a volume of ground was worked but no reliable data as to the actual yardage treated and the weight of tin oxide recovered is available. At a later period the actual quantity of tin produced is recorded and a very fair approximation of the total quantity of ground treated can be arrived at but unless the weight of the total quantity of tin recovered is known any estimation made is an approximation only. It can be safely stated, however, that disregarding the output of the earliest operations, the quantity of tin that is definitely known to have been produced shows a payable average value of the full yardage dealt with.

The length of the Valley Creek lead from the most Southerly portion of the ground worked on to the point where it should join with the main Ringarooma lead is 45 chains; of this length approximately 22 chains of the upper portion of it has been worked.

The lower section of the drift was not treated owing to plant used being incapable of raising it. Probably not more than half the depth of the lead was worked. Making provision for the increase in depth as it approaches the main Ringarooma lead the quantity of drift material remaining has been computed at approximately 1,000,000 cub. yards which, taking all factors into consideration, is a reasonably conservative estimate.

The data obtained from survey of the excavation on the property apart from any progressive records of the quantity of material treated at the time work was proceeding is sufficiently accurate to make an estimate of the tin content of the drift. Boring operations carried out subsequent to that time had made it possible to form an approximate estimate of the value of the drift below the ground worked. Records of boring results prior to the ground being worked indicated a much lower tin content than the actual returns obtained.

Reference to the accompanying plan and sections will indicate the amount of boring carried out and the area of potential tin bearing ground remaining to be tested.

Copies of the original records of boring results now in possession of the Central Briseis Coy. show that the work of testing the ground was carried out in a systematic manner by competent operators who were independently engaged for that purpose. The records of the work show thoroughness and accuracy which cannot be questioned.

WORKING FACILITIES

The situation of the leases is very favourable for the disposal of tailings and debris. The area is practically cleared of timber excepting light scattered scrub and occasional large trees.

The overburden consists of material which can be readily removed by the plant designed to deal with the drift. The Ringarooma River, which flows by within a short distance of the area, is the main drainage channel of the district and affords a ready means of an effective discharge of sludge, the

coarser material of the drift can be disposed of in the worked out ground as productive operations proceed.

The overburden is represented by sluiced material from workings on adjacent mines covering portions of the area to a depth ranging up to 6 ft. Below this is original surface soil and shingle in that order, the total average depth of overburden would not exceed 10 to 12 feet.

The surface of the area is low lying in relation to the River and in this respect it would be necessary to make provision to prevent the River from overflowing banks into the workings. This is a matter of small concern as regards cost.

It is quite probable in the event of the Valley Creek lead being again exploited the operators would procure and include the areas which are available along the course of the main lead at and beyond its junction with the latter. Such operations would probably lead to the diversion of the Ringarooma River from its present sinuous course to the northerly edge of the valley. With comparatively small expense the River could be turned to a straight channel situated well beyond the limits of any workings designed to treat the drifts of the deep lead.

Past attempts to work the lead have been under conditions disadvantageous to the operators, the natural facilities offering to deal with the drift material to be raised and treated were not availed of. The costly method of generating power by steam under modern conditions imposes an undue burden on operating costs and general inefficiency compared to the use of water power. The Central Briseis Company has spent a considerable amount of capital in the preliminary constructional work of excellent water power scheme.

GENERATION OF POWER

Dam Site It has been stated in the foregoing that the Central Briseis Company hold a number of water rights on the Cascade River and its tributaries aggregating in all to 44 sluice heads (one sluice head is equivalent to a flow of 24 cub. feet per minute). In this locality the Company hold dam site areas aggregating 95 acres, situated at an elevation of 1,300 feet above the level of the mine workings, the direct distance between these points being about 5 miles.

The intial work in connection with provision for the storage water to ensure a continuous supply throughout the year was commenced some years ago by the present Company but was discontinued through lack of capital to complete the project.

The work done, however, will be of great assistance in considerably reducing the cost for the ultimate completion of the scheme.

The survey of the site has given data with regard to length and height of embankment of dam, which is as follows:- Height 40 feet, width at base 180 feet at lowest part, length 950 feet, estimated quantity of material necessary to construct it is 35,000 cubic yards. For outlet purposes a tunnel has been driven a distance of 200 feet through hard

granite rock.

Timber and fillings for sluices are delivered on dam sites. The water in dam when full will cover an area of 60 acres, the estimate storage capacity is 200 million gallons.

The official rainfall recorded at Upper Cascade (which includes dam site area) by the Commonwealth Meteorological Department over a period of six years indicates an average annual precipitation of 61.5 inches. The lowest for any of these years is 56.50 and the highest 69.10, the average from year to year is very regular.

The estimated watershed is 4 square miles, this, with an average of 60 inches per annum is equivalent to 3,500 million gallons and would be sufficient, with the provision for storage indicated, for continuous work, for the quantity used daily allowing for loss in evaporation, seepage and other causes.

Water stored in dam will be diverted to the Cascade River channel, the intake of race on the latter is two miles below dam site.

Water Race The earthwork sections of the water race have been completed, the total length being $5\frac{1}{2}$ miles with a fall of 8 feet to the mile. The incomplected sections consist of a length of $1\frac{1}{2}$ miles of wooden fluming and about a length of 20 chains of syphon across some low lying country.

The earthwork portions are substantially constructed and the banks well consolidated.

The vertical fall from race outlet to surface of ground at mine workings is 530 feet distance between these points, being 3,700 feet. The race is designed to carry 30 sluice heads of water.

Power At the level of bottom of drift the head would be increased to 630 feet making due allowance for friction etc. the effective head would be equal to 500 ft. with a flow at 20 sluice heads under that pressure the power available would be 450 B.H.P.

This quantity of power would be sufficient for raising the gravel by hydraulic elevations or with gravel pumps.

Water power for breaking down the drifts to the elevator or pump can be obtained from the Ringarooma close by. Pressure from this source up to 100 ft. would be available when working to the bottom of the lead.

On the line of water race about a mile direct from the mine a drop of 130 feet occurs. This is a source of power which can be utilised if needed to augment the total, making the latter 540 B.H.P.

COST

The estimated cost to complete the partly constructed scheme is £20,000 made up as follows:

Construction of Dam	£5,000
" " " Water race, fluming etc.	4,000
Power Pipe line, 20 inches diameter	4,000
Equipment at Mine, Tailrace, stages etc.	3,000
Contingencies 25% of estimate	4,000
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TOTAL	£ 20,000
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The above does not include estimated cost of making use of fall in race of 130 feet for generation of electric power which is not essential to the main scheme.

OUTPUT OF TIN

The quantity per month of drift treated should not be less than 20,000 cub. yards. At a basis recovery of 1 lb. per yard that quantity would yield 9 tons of tin oxide, value at present-day price of tin is £1,260.

The work formerly carried out gave an average return of 1.2 lbs. per cubic yard. Seeing that there is every likelihood of the tin content of the drift being richer in the lower portion of the lead, a higher yield than the above should be confidentially anticipated.

The estimated total cost of treating the drift is 5.7d per yard including 10 per cent. over and above the actual estimated cost, which is equal to a monthly expenditure working two shifts daily of £475.

Against this a recovery of 1.2 lbs. of tin per cubic yard would realise, with tin at present market rates, £1,512. Any increase in the quantity of the tin in the drift would correspondingly increase the margin of profit as would any improvement in the market price of tin.

BORING

The first essential work to be undertaken in dealing with a property of this description is to systematically test it by means of boring. The boring work carried out herein referred to is sufficiently reliable, so far as the area tested is concerned. An extensive area on the line of the lead remains to be proved in order that more definite data as to approximate value and quantity of drift can be placed before investors.

A mechanically operated drill is necessary to carry out the work, by such means it could be completed thoroughly and quickly. A larger sized hole could be bored than would be possible by hand labour. On this area there is every facility for carrying out the work. The drill could be moved from point to point at a minimum of cost.

CONCLUSIONS

The existence of a deep lead of payable tin bearing drift has been established. A comparatively small portion of it has so far been exploited. In addition to the Valley Lead, the main Ringarooma Lead at the point of junction of these offers unusually favourable possibilities for the location of extensive concentrations of cassiterite in the drifts of the ancient river bed channel.

The great extent of elevated tin-bearing granite country through which the Ringarooma River courses with its many swiftly flowing tributaries carrying down the disintegrated material of the tin granite rocks to the more or less level channel of the former is sufficient evidence, apart from any known occurrences, that the former valley has been the repository of rich concentrations of tin bearing alluvial ground. In many places along the original valley of the main stream it is covered with basalt rock. Where the latter remains the cost of working the drifts is greatly increased.

In the case of the Valley Creek lead extending for half a mile to its junction with the main lead and fully a mile on the latter below the junction, there is no basaltic overburden to be removed to reach the drifts. This feature of the area is very favourable from a working costs point of view.

The natural facilities for working the ground offer every inducement for dealing with the drifts on a low scale of costs.

A considerable sum of money has been spent by the present Company in an endeavour to make provision for the fullest use of these facilities by the construction of water-race, etc. Unfortunately, the scheme as formulated was not completed owing to lack of capital. The money spent on the work is a very valuable asset to present or future lessees.

All the engineering work in the general lay-out in connection with the scheme has been completed, in this respect the remaining portion of the work would be straight forward.

The values of the tin recovered from that portion of the lead worked is sufficient inducement to justify a thorough investigation of the area by boring operations.

I wish to record my appreciation of the assistance rendered and information supplied by Mr. Donald Fraser the Company's Engineer.

Mr. Fraser is responsible for the lay-out of the prepared power scheme and to him the writer is indebted for the estimate of costs of the various works which are sufficiently liberal under present day conditions to complete the scheme.

J.B. Scott
STATE MINING ENGINEER

Mines Department,
HOBART

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