(No. 105.)

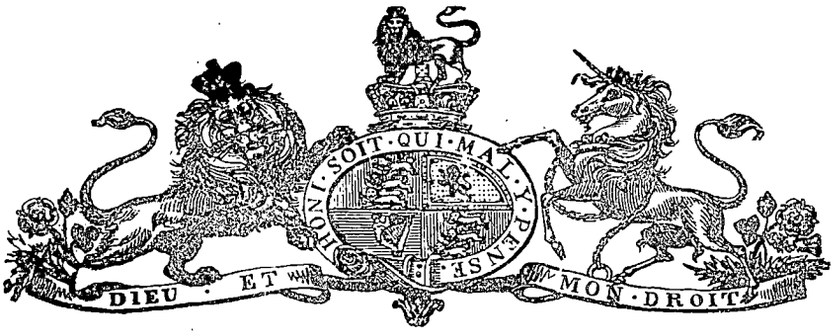
1885.

PARLIAMENT OF TASMANIA.

MOUNT CAMERON HYDRAULIC TIN MINING COMPANY'S WATER RACE:

REPORTS OF MR. G. J. BURKE, MEMB. INST. C.E., AND MR. THUREAU, F.G.S.

Presented to both Houses of Parliament by His Excellency's Command.



GREAT MUSSEL ROE WATER SCHEME.

In accordance with instructions with which I was favoured by the Hon. the Minister for Lands and Works, I have the honor to submit this Report dealing generally with the question of the supply of water derivable for tin-mining operations from the Great Mussel Roe River, and more particularly with reference to the water-race partly constructed by the Mount Cameron Hydraulic Tin Mining Company, and left incomplete owing to want of funds.

On arriving at Gladstone I was met by Mr. James Brown, the manager of the Mount Cameron Hydraulic Company's works, and accompanied by him spent four days in examining the part of the race actually constructed, and the proposed extensions necessary for its completion. During the first three days we travelled on foot from Gladstone towards the head of the Great Mussel Roe and back, a distance of some 50 miles, camping in the Upper Huts, close to the present intake on the Little Mussel Roe River. A severe injury to one of my legs, which quite crippled me, prevented me from going quite up to the proposed main intake on the Great Mussel Roe, and I was compelled to stop short some three miles from this point. The lower part of the district north of Gladstone, in the vicinity of the Aberfoil country, I was able to traverse on horseback, and had the advantage of the company of Mr. Donald Campbell, of Port Ringarooma, a gentleman of great local experience, and one much interested in the tin-mining industry of the district.

The main race of the Mount Cameron Company, as originally projected, was 18½ miles in length, and was intended to derive its supply from the Great Mussel Roe, the proposed intake being at a point about 13 miles S.E. of the township of Gladstone in a direct line, and it was to provide water for the tin claims lying between the Great Mussel Roe and Ringarooma Rivers. Of this 18½ miles of main race 12 have been completed from the tail upwards to the Little Mussel Roe, and 6½ miles from the Little to the Great Mussel Roe have never been commenced. The supply in the length of race constructed is, therefore, received from the Little Mussel Roe alone, the greater river not having been tapped.

The levels for this main race of 18½ miles were, I am informed, taken by Mr. Alexander Clerke, C.E., of Launceston, with instructions to start from the tail and proceed upwards, with an inclination of four feet per mile until the Great Mussel Roe was reached. This part of the work appears to have been executed in a most unexceptionable manner, the laying out of the race presenting a most favourable contrast with others that have come under my notice. In the excavation of the channel the fixed dimensions of six feet in width at top, five feet at bottom, and a depth of two feet, have been fairly well maintained throughout. On the whole the excavated portion of the race may be described as carefully levelled and well constructed, although many minor defects may be observed. No attempt was made to dress the material excavated and deposited on the down-hill side of the race; many trees were left standing in the line of race that should have been removed, and in many places "cuts off" would have improved the line of race without increased expense. Mr. Brown informed me that the carrying capacity of the race when full is 72 "sluice-heads." But I must decline to accept this estimate; such a channel, with the stated fall of four feet per mile, would carry only 53 sluice-heads.

No permanent dam has been constructed on the Little Mussel Roe at the present intake. At the time of my inspection there were nine sluice-heads flowing in the race, and two or three more running to waste through the temporary dam. The supply from the Little Mussel Roe could be further augmented at small expense by intercepting the water flowing in the Old Chum or Ogilvie's Creek, which crosses the race some five miles below the present intake, and which would probably supply a few sluice-heads more. A channel to effect this object was started by the company, but was not completed. Thus the state of affairs at the time of my inspection was,—water flowing in the race, nine heads measured; running to waste in Little Mussel Roe, estimated three heads; water in Ogilvie's Creek, estimated three heads; being a total of 15 heads that could be brought into the present race.

The excavation of the race for the greater part of its length was of the easiest possible nature; but in the middle three miles, and for a mile or so further up, a considerable amount of excavation in rock was necessary. To save the cost of this, in many places the race was carried round the granite spurs in flumes. In parts slight erosion has taken place, owing to an insufficient slope in the sides where the soil is soft; but, as I have said before, the channel is, on the whole, a good one, though possessing minor defects.

On the 12 miles there are 19 lengths of fluming, with a total length of about three quarters of a mile. Some of these are, as previously stated, carried round spurs to avoid excavation: in such cases the boxes rest on bearers let into the ground, the others are across creeks crossed by the race. Many of these are small; but across the Old Chum and two other creeks are flumes of considerable size, from 200 to 600 feet in length, and from 45 to 70 feet high. From the intake, for a length of about one-third of a mile, the race runs in fluming down the course of the Little Mussel Roe. All along the line of race there is timber of excellent quality and suitable dimensions for constructing the framing for the flumes, so that, although all the carpenter's work is of the most rough and ready description, and a cheap style of construction has been adopted, the flumes are in tolerably good condition at the present time, and with proper care will continue so for some time to come.

From the tail of the main race two smaller channels have been cut, which distribute the present small supply of water to a few tin claims in their vicinity. These channels—the North and the Amber Creek branch—aggregate about seven miles in length. They are 3 feet wide and 1 foot 6 inches deep. On the Amber Creek branch are three lengths of fluming,—one, over the creek, about 300 feet in length and 50 feet high, and another about a quarter of a mile of low fluming. These channels call for no particular remarks otherwise.

I have stated that the present flow in the race is nine sluice-heads, which could easily be increased to 15, or 38 heads short of the carrying capacity of the race—53 heads. I saw the Great Mussel Roe in several places, and am satisfied that it can not only supply the extra quantity required, but would, I estimate, be capable of increasing the present supply to 100 sluice-heads.

In the completion of the 6½ miles of race to the head of the Great Mussel Roe there is no difficulty to be apprehended, although the average cost per mile will probably exceed that of the existing part of the race, as the country is more rocky as the head of the river is approached. The works at the head in a river of this character can be carried out in a substantial manner at moderate cost.

The northern extension of the race for the purpose of working the tin country below Gladstone, on the right bank of the Ringarooma, would probably be about 15 miles in length. In this part of the district a large extent of land has been taken up on mining leases, which remains unworked owing to want of water; and it is here that the supply from this race would be in greatest demand. As far as I can gather the prospecting has shown that payable tin is known to exist over a large area, which requires water alone to develop its resources. The water need not be delivered at a very high pressure, as the deposit is very friable, and nozzles, worked with a moderate head, would be effective. The nature of the deposit can be seen on examination of the excavated material from any of the numerous trial shafts sunk. Owing to the formation of the country immediately below the present tail of the race, the question of this northern extension will require careful consideration in case its construction is ever undertaken. Two breaks occur in the water-shed running right across between the Ringarooma and the Mussel Roe; deep valleys whose bottoms are much below the level of the race. Mr. Brown has shown me the proposal for crossing these, which he laid before his directors, and which contemplated carrying the race over these valleys in continuation of its present level. The first valley he proposed to cross with fluming 59 chains in length and a maximum height of 74 feet. The second he proposed to cross by fluming 1 mile and 47 chains long, with a maximum height of 92 feet. By an immediate sacrifice of some 40 feet of head both these heavy and expensive works would be reduced to reasonable limits; and that reduction is essential I am quite persuaded, as the expense of the construction of over 2½ miles of such high fluming, and the cost of maintenance when constructed would, in my opinion, be out of proportion to the utility of the work. This is the main point in connection with this extension; and it will be most important to determine by how much the height of the fluming can be diminished, so that the cost of crossing these valleys may not be excessive, without, at the same time, leaving insufficient pressure for the workings lower down.

This race, if completed and in working order, would, I have no doubt, be a valuable property, unless the estimate of the mineral resources of the district made by those best qualified to judge is very much astray. In its present state it is, in my opinion, of little or no value to anyone, as the revenue derived from the sale of water would, I should think, hardly exceed the cost of supervision and maintenance, the latter item, it must be remembered, being one that will increase steadily with the age of the fluming. The correctness or otherwise of this surmise can, however, be tested by referring to the company's returns.

I understand that two propositions have been suggested to Government by the owners of this race. 1st. A subsidy or loan from Government to enable the Company to complete the race. 2nd. Government to effect an absolute purchase of the race. Regarding the first proposal, I would advise that Government, before acceding to it, should require from the Company detailed plans and estimates for the completion of the race upwards to the Great Mussel Roe, and downwards in the direction of the Aberfoil country, and should be satisfied that such estimates were sufficient; that no moneys should be paid by Government until it was shown that work of equivalent value had been done on the race; that all contracts for the completion of the work should be subject to the approval of Government. In fact, that the providers of the money should have full control of the expenditure and the right of supervision at all times. Further, I would advise that, in the interest of the mining community, a maximum charge for water should be fixed; that proper arrangements for the accurate measurement of water should be made, and that the question should be carefully considered how best to secure impartiality in distributing the supply; the last, I know from experience, being a matter of vital importance.

Should it be decided to enter into negociations for purchasing the Company's interest in the race, I would advise that the following particulars should be supplied to Government by the Company:—Original estimate for the cost of the existing work; actual cost of the same; plans and estimates for the 6½ miles from the present intake to the proposed intake on the Great Mussel Roe. The survey having been completed so far, I presume all these particulars can be readily supplied. It would also be desirable for Government to spend a small sum of money in running a rough survey from the present tail, in order to determine how a race crossing the two valleys already referred to on fluming of moderate height would serve the tin-bearing country north of Gladstone. That such a race would effect its purpose I have no reasonable doubt; but it would be most injudicious to accept this assumption and not test its accuracy by running a line of levels.

It would also be necessary to have a careful measurement made of all the work actually done, from which an accurate estimate of what its cost should have been might be prepared, and thus enable Government to judge whether the expenditure incurred by the Company was fairly represented by the amount of work done. I am disposed to think that the Company acted unwisely in not availing of Mr. A. Clerke's services to a greater extent, and would, probably, have saved considerably by so doing.

Regarding the value of the work done, and the probable cost of that remaining to be done in order to complete the race, I cannot pretend to offer any save a very rough estimate, an approximation made from my notes taken during inspection without any measurement in detail. This fact being borne in mind, I give the figures:—

	£
Cost of existing race and branches	5500
6½ miles of race to Great Mussel Roe (large amount of rock)..	3900
15 miles of race, northern extension....	5250
Dam and works at head.....	750
Surveys and supervision.....	1000
	£16,400

G. J. BURKE, *M.I.C.E.*

Collins-street, Hobart, 3rd June, 1885.

WILLIAM THOMAS STRUTT,
GOVERNMENT PRINTER, TASMANIA.

Collins-street, Hobart, 1st September, 1885.

SIR,

IN reference to the proposed purchase of the Mount Cameron Hydraulic Tin Mining Company's Race for the sum of £7000, or £1500 more than the amount of my rough estimate, I have the honor to make the following remarks.

The sum of £5500, put down in my Report for the cost of existing works, was, in my opinion, an absolute minimum, it being my duty, acting on behalf of Government, to set such a value as this on a property to be purchased. This I explained verbally to the Hon. the Minister for Lands and Works and to yourself.

Afterwards, on July 16th, when the Hon. the Minister asked me if £7000 would be too high a price to pay, I replied at once that it would be a liberal, though not an excessive amount, and that on this basis Government would be fully justified in effecting a purchase.

I have, &c.

G. J. BURKE, *M.I.C.E.*

The Secretary of Mines.

SUPPLEMENTARY Report on the Mussel Roe River, or the Mount Cameron Hydraulic and Tin Mining Company's Water Scheme.

[Mr. Thureau's Report upon the supply of water from the Mussel Roe River by the Mount Cameron Hydraulic Company's Water-race is embodied in Parliamentary Paper, No. 151, Session 1884.]

Inspector of Mines Office, Launceston, 22nd August, 1885.

THIS Company's race, for conveying water to the eastern tin deposits at the Ringarooma River, when completed will command ground for working commencing a little above the "Middle Huts" on the Mussel Roe River; a low dividing range of granite separates same from the fluviatile tin deposits situate west of the island in the Mussel Roe River marked 16 on the geological sketch plan. The latter deposits have been wrought to some extent with average results by means of the present intermittent supply of water obtainable from the yet incompleted race of the Company, and about 600 acres are held there under lease.

The Mussel Roe proper tin deposits trend from the Middle Huts in a north and north-westerly direction until they ultimately merge into those which traverse the country in the direction of the Campbell and Aberfoyle leases, marked A and C respectively. There is good evidence of the more recent Tertiaries, *i.e.*, "raised sea beaches" (stanniferous) south south-east of the Esk Company's ground, after disintegration and subsequent denudation, to have caused the deposition of tin-bearing gravels in the Esk and other companies' ground. Beyond those leases, in Messrs. Mollison and Moore's ground, the tin-bearing gravels become altered in their lithological character, and from being confined in a narrower channel—here and there obliterated—denote the existence of a pliocene or prehistoric river-bed filled with stanniferous deposits, as seen also in the Imperial and Scotia* Companies' ground. These older deposits occur at some height above high-water mark in the Ringarooma River, the country beyond falling gradually towards the sandy and shingly delta near the mouth of the Mussel Roe River. As the ground becomes nearly level near the Scotia, and the surface exhibits coarse to fine wash for a width of nearly two miles, it is impossible to tell, without boring, whether or not the action of the sea water or waves has destroyed the narrower pliocene channel, and caused the tin ores to be distributed in the manner of sea beaches or "terraces." The fact of a line of shafts having been sunk west of the ground between the Scotia and Aberfoyle ground, and a deep shaft (56 feet) having passed through tin-bearing gravels all that depth, and that the Campbell and Aberfoyle Companies (A, C) have proved in a very systematic manner, by means of numerous shafts, the existence of tin ores over a large extent of ground, the containing gravel of which rested upon a stratum of mobile quicksand, and which measured from 20 to 25 feet in depth, induces me to conclude the latter to have been the case. †

Taking the extension of ground in which tin ore has been found or proved to exist, from the Middle Huts to the extreme limits of the Aberfoyle and other proprietors' leases, it will be perceived from the plan to measure about ten miles in a direct line, subject to some immaterial deductions, however, from natural interruptions, such as denudation of tin-bearing gravels from the underlying bed rocks.

That a very considerable scope of mineral-bearing country exists admits of no doubt, the valuable contents of which are, however, lost to the Colony at present owing to the want of a continuous and copious supply of water. My examinations there were made during the first days of September, and even at that period the water resources from the preceding winter rains had been totally exhausted, and no sluicing or other work could be done till after the next autumn rains.

The level nature of this part of the country, and the average considerable thickness of the tin-bearing strata in several parts of the runs of gravel and the delta, present difficulties as to how to dispose rapidly of the tailings or other *débris* resulting, as water running in open races would not effect that separation. This may be achieved by means of conveying the water in sheet iron pipes from a reservoir constructed at an elevation, in order to work under pressure with the "Gravel Elevators," which were fully described in the Inspector of Mines Report for 1883.

G. THUREAU, *F.G.S.*

The Secretary of Mines, Hobart.

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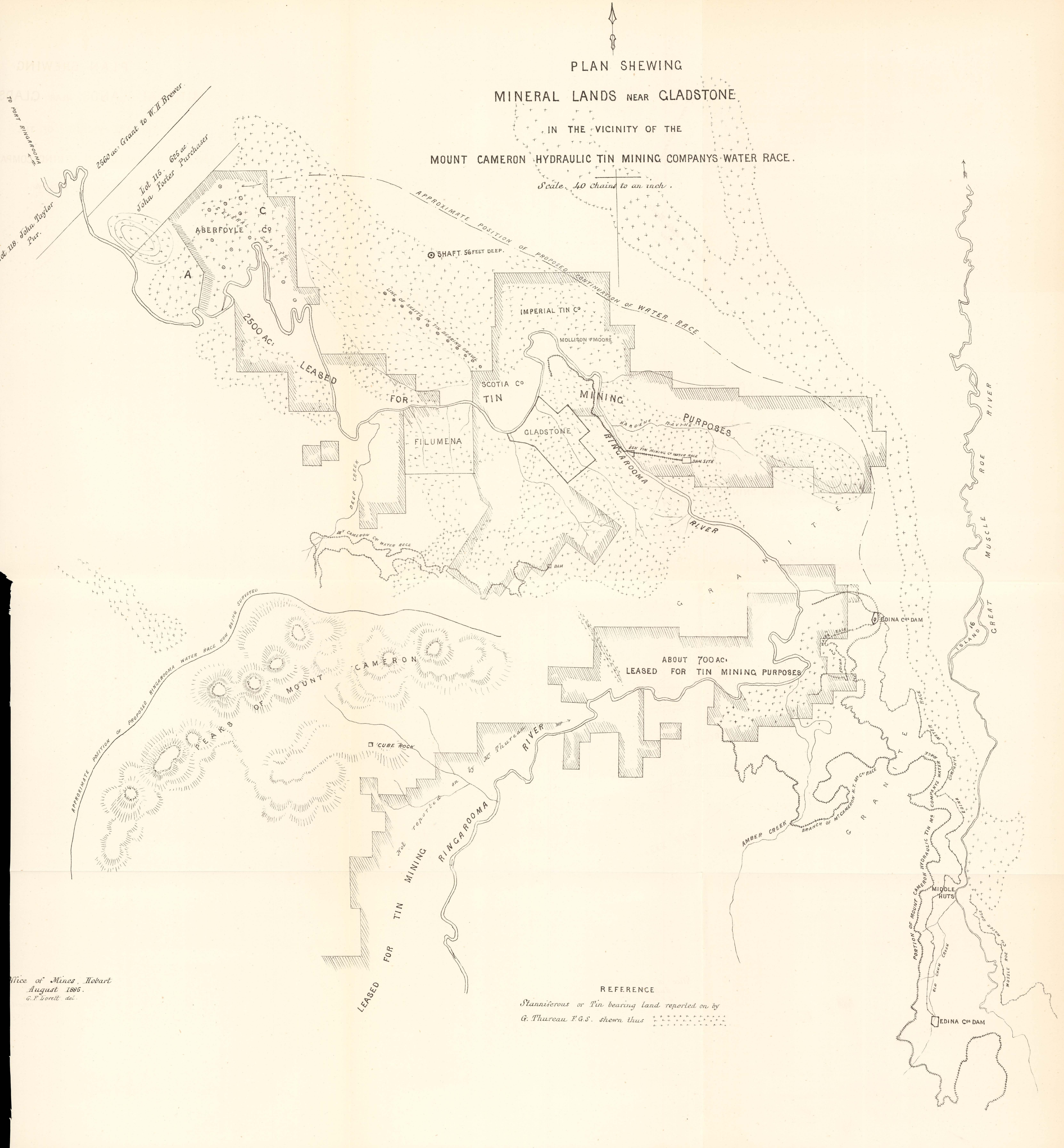
* I was informed that this Company had obtained 16 tons of tin ore from half an acre of ground; they had erected a powerful steam-pumping plant, forcing the water 190 feet vertical to their workings, at a weekly expense, it is stated, of £50 sterling. This was found to be too expensive, especially as the *harder* gravel needed the greatest possible pressure for dissolving before sluicing.

† It was stated that pan prospects taken from these shafts had been very encouraging, if not rich; and in my presence several samples taken indiscriminately from the several spoil heaps at the side of those shafts gave from a couple of pennyweights to eight ounces of fine ore per dish.

WILLIAM THOMAS STRUTT,
GOVERNMENT PRINTER, TASMANIA.


PLAN SHEWING
MINERAL LANDS NEAR GLADSTONE
IN THE VICINITY OF THE
MOUNT CAMERON HYDRAULIC TIN MINING COMPANYS WATER RACE.
Scale 40 chains to an inch.
TO PORT RINGAROOMA
2560 ac: Grant to W. H. Brewer
Lot 115. 625 ac. John Foster Purchaser
Lot 118. John Taylor Pur.
ABERFOYLE Co
A
C
SEVERAL SHAFTS
SHAFT 56 FEET DEEP.
APPROXIMATE POSITION OF PROPOSED CONTINUATION OF WATER RACE
LINE OF SHAFTS IN TIN BEARING GRAVEL
IMPERIAL TIN Co
MOLLISON & MOORE
2500 AC: LEASED FOR TIN MINING PURPOSES
SCOTIA Co
GLADSTONE
FILUMENA
HARDENS RAVINE
ESK TIN MINING Co WATER RACE
DAM SITE
RINGAROOMA RIVER
DEEP CREEK
Mt CAMERON Cos WATER RACE
DAM
GRANITE
EDINA Cos DAM
WATER RACE
EDINA Co
ABOUT 700 AC.
LEASED FOR TIN MINING PURPOSES
APPROXIMATE POSITION OF PROPOSED RINGAROOMA WATER RACE NOW BEING SURVEYED
PEAKS OF MOUNT CAMERON
CUBE ROCK
Not reported on by Mr Thureau
RINGAROOMA RIVER
LEASED FOR TIN MINING
AMBER CREEK
BRANCH OF Mt CAMERON H. T. Mg Cos RACE
PORTION OF MOUNT CAMERON HYDRAULIC TIN Mg COMPANYS WATER RACE
EDINA COMPANYS WATER RACE
MIDDLE HUTS
OLD CHUM CREEK
MUSSLE ROE Cos WATER RACE
EDINA Cos DAM
ISLAND 16
GREAT MUSCLE ROE RIVER
Office of Mines, Hobart
August 1885.
G. F. Lovett del.
REFERENCE
Stanniferous or Tin bearing land reported on by
G. Thureau F.G.S. shewn thus