

TASMANIA

—
REPORT

OF THE

SECRETARY FOR MINES

FOR

YEAR ENDING DECEMBER 31

1911

Including Reports of the Inspectors of Mines, Government
Geologist, Mount Cameron Water-Race
Board, &c.



Tasmania:

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REPORT OF THE SECRETARY FOR MINES.

Mines Department,
Hobart, 25th April, 1912.

SIR,

I HAVE the honour to submit my report upon the Mines Department and the Mining Industry for the year ending 31st December, 1911.

GENERAL REMARKS.

The aggregate value of the minerals raised during the year was £1,349,497, being a decrease of £82,696 on the value of the output of the preceding year.

The value of the gold won was £25,262 less than the previous year, while the output of silver-lead ores was increased by 10,274·285 tons, and the value by £5785.

The average price of tin was £193 1s. 2d., as compared with £155 12s. 2d. for the previous year. It started at £180 5s., and reached its highest (£231) in June.

The average price of fine silver for the year was 2s. 2·549d. per oz., as against 2s. 2·610d. last year. The highest monthly average was in November, when it reached 2s. 3·719d.

The average price of copper was £56 1s. 9·267d. per ton, as against £57 3s. 2·387d. last year.

ASSISTANCE TO PROSPECTORS.

A sum of £1000 was placed upon the estimates for the year 1911-12 for the purpose of assisting prospectors to further develop their discoveries. "The Appropriation Act" did not receive the Royal Assent until the 21st of December, 1911, and there was only one applicant for assistance under the vote prior to the end of the year, and a sum of £50 was granted. The whole of the amount has since been applied for and allotted.

REWARD FOR THE DISCOVERY OF A VALUABLE DEPOSIT.

A sum of £100 was paid to Mr. A. V. Chester, the applicant for a monetary reward under Section 158 of "The Mining Act, 1905," for the discovery of a valuable mineral deposit at Mt. Balfour, a sum of £201 having been received for the first two years' rent on land applied for under mineral leases and retained by the Crown. The total area of the land at present held under lease is 1245 acres. In addition there are applications for 364 acres, and an area of 420 acres was also applied for but was subsequently abandoned.

Mr. L. K. Ward, Assistant Government Geologist, when requested to report upon the claims set forth by the applicant, said:—"The discovery of copper ore on Lease 2699-M by Mr. Chester has materially assisted in the development of the Mt. Balfour Mining Field. The credit of opening up this new field is in the main due to Messrs. W. W. F. and T. C. Murray, who first proved the existence of payable copper ore, and whose success has doubtless been of no little assistance to Mr. Chester. The latter, however, made an important discovery of ore on Section 2699-M, at a time when little work had been done by Messrs. Murray Bros. The lode has been traced continuously for a considerable distance, and at the point where it has been prospected by the Balfour Copper Mines, No Liability, has a width of approximately 70 feet. This property is certainly one of the most valuable of those

located within the limits of the whole field, and merits the attention which it is receiving. A brief statement of the prospects of the Mt. Balfour Copper Mines has been published in the Geological Survey Report No. 1, pp. 20-21. Mr. Chester's discovery of copper ore on Section 2699-m has led to the pegging-out of practically all the area enclosed by that portion of the Mt. Balfour chart which lies to the northward of Tin Creek, and it is due primarily to his efforts that the Stanley-Balfour railway project has been carried into execution."

Mr. Chester is the first person to receive a reward under the Act.

APPENDICES.

Appended will be found the following reports:—

The Annual Report of the Mt. Cameron Water-race Board.

Report of the Government Geologist.

Report of the Chief Inspector of Mines.

Reports of the Inspectors of Mines.

GOLD-MINING.

The total quantity of fine gold won during the year was 31,100·873 oz., valued at £132,108; as against 37,048·053 oz., valued at £157,370; being a decrease in the value of £25,262 on the previous year.

Beaconsfield.—The yield from this district was 21,474 oz. of gold. The Tasmania Gold Mine, Limited, was the chief producer. The company's battery crushed 50,294 tons of quartz, producing 21,326 oz. of fine gold, which, together with money obtained from the sale of wood ashes from the old concrete flooring, gave a total value of £92,478 sterling. Included in the above were 6840 fine ounces obtained from treating 11,525 tons of concentrates and old chlorination tailings in the roasting and grinding plants, and 662 fine ounces obtained from treating 22,000 tons of battery sands in the cyanide plant.

During the year the average number of men employed was 479.

Developmental work on the lode during the year has been the extension of the 1370-foot level east and west, and the cutting of the lode at the 1500-foot level. Where cut the lode was better than at the 1370-foot level, but it is as yet impossible to say whether this improvement will be maintained. Work carried out at the 1370-foot level during the year has been disappointing.

The pumping plant has been extended in Hart's shaft to the 1370-foot level.

Grubb's shaft has been extended to the 1500-foot level, and one unit of the pumping plant has been installed at that level; the chamber to contain the second unit is being cut out. The plat, crosscut, and the necessary floodgate have been completed at that level.

The work during the year has been carried out at a loss.

A portion of the North Tasmania Mine has been let to a party of miners. Six men have been employed on that work, who raised and crushed 102 tons, yielding $333\frac{1}{2}$ oz. of fine gold; value, £1412 sterling. The lode from which this stone was obtained consists of a hanging-wall leader of an average width of about 3 inches.

The total quantity of gold won by the company is 787,200 oz., from 929,504 tons of quartz. The total amount paid in dividends up to 1905 was £772,671 15s., since which date no dividends have been paid.

Apart from this mine there is not much doing on the field. The King George Company commenced developing some alluvial ground at the old West Extended Tasmania Mine. A tunnel was driven and gutter-wash cut. Work was suspended towards the close of the year pending the raising of further capital. The Coronation Gold Mining Company commenced shaft-sinking on ground to the north-west of, and adjoining, the North Tasmania. A lode, distinct from that of the latter mine, is known to

exist on the property. At Salisbury some prospecting has been done, and an attempt at development made on a mine called "The Duchess," but work was soon suspended.

Lefroy.—The total quantity of gold won from this field was as follows:—

	oz.
New Pinafore Gold Mine	60·25
Creek Cyanide... ..	30
	<hr/>
Total	90·25
	<hr/>

A good deal of prospecting has been done, but so far no discovery of a payable nature has been made. The New Pinafore Company was working at the old Industry Mine (Laird's), about 5 miles east of Lefroy, but did not obtain payable results. The Pointon Prospecting Syndicate, prospecting in the same locality, failed to get to a payable lode.

Pearce's Gold Reef, at Lower Turner's Marsh, about 12 miles east by road from Lefroy, was opened up at the surface, and a shaft was commenced and sunk 25 feet, but the show was abandoned. The lode is a strong one, and carries fair prospects of gold, and it seems a pity it was not tested at a depth.

The Pinafore Company is working on alluvial ground at Back Creek.

The Coronation Prospecting Syndicate made a discovery about $1\frac{1}{2}$ mile west of Lefroy, and close to George Town-road. Some sinking was done to test the lode. The New Pinafore Company is now working this claim.

Lisle and Golconda.—The total quantity of gold won was 167·5 oz., an average of 18 men being employed.

The New Wyengatta Gold Mine ceased operations altogether during the year. The New Panama Gold Mining Company worked intermittently for some few months, but is now idle. At the Pyramid Mine, Mr. Parsons is still

engaged in trying to discover the lode, but so far has not been successful. The Lebrina Gold Mining Company did a good deal of work in prospecting a gold reef, but is now idle.

Alluvial and Gold-dredging Companies.

Gold was obtained by the following companies in streaming their tin drifts:—

	oz.
South Mt. Cameron Tin Mining Company ...	51.25
Briseis Tin and General Mining Company ...	38.11
South Mt. Cameron Dredge	9.75
	<hr/>
Total	99.11
	<hr/>

Mathinna.—The total quantity of gold won was as follows:—

	oz.
New Golden Gate Company	1238.65
Golden Horseshoe Company	16
Others	46.5
	<hr/>
Total	1301.15
	<hr/>

The New Golden Gate Company employed an average of 20 men, crushed 1225 tons of quartz, treated 1785 tons of sand, and obtained 1238.65 oz. of gold. The total quantity of quartz now obtained from this mine is 279,873 tons, which has yielded 234,266.65 oz. of gold.

An attempt was made in London to get capital for deep-sinking. There still remain between the 600 and 900 feet levels large bodies of stone worth about 7 dwt. to the ton. It was demonstrated that this could, with the aid of up-to-date machinery, crushing, and concentrating appliances, be made to yield a profit that would cover the cost of sinking to a further depth below the 1800-foot.

level. No business eventuated, and the old mine is now closed down, probably for all time.

A good deal of sinking and driving was done by this company at O'Brien's section, 8 or 9 miles to the north of Mathinna; but the lode did not prove to be payable below the old adit-level.

Davies Gold Mining Company.—An attempt was made to prove the value of what is known as the "Old North City of Hobart Reef," from a shaft sunk to a depth of 105 feet by the Tasmania Consols Company. At this depth, driving in a northerly direction on the lode was carried on for some time, but since November no work has been done, and it is not likely that this mine will start again.

The Golden Horseshoe persevered for a long time, but failed to get on to payable gold. The Miner's Dream Syndicate (the only mine on the field at present) has done some adit prospecting, and is still at work, but has not as yet got any stone as good as that taken from its old underlay shaft.

Alberton.—Nothing has been done on this field during the year.

At South Mt. Victoria the Golden Cloud Mining Syndicate had some work done on a lode said to be well worth prospecting, but nothing of a payable nature was discovered.

At the New River, east of Alberton, the Wyniford Company is sluicing for alluvial gold, but with only moderate success.

Warrentinna Field.—This old mining field, after being practically abandoned for a number of years, has been revived by the Golden Mara Mining Company, whose mining operations are on what was known as Bayley's Lease, on which there is an old shaft and tunnel, and on the old East Volunteer ground, where there is also a shaft and tunnel. The new company commenced operations during the last half of the year. Driving north on the lode—or

more correctly, continuing the old lode drive left by the previous owners—was the first work undertaken. From this several tons were sent to the Mt. Lyell Company for treatment, and the result is so satisfactory in gold and silver contents that the company has decided to raise sufficient capital to thoroughly open up the mine and erect a battery and concentrating plant. The cause of failure by the previous owners of this property was probably because they had no suitable concentrating plant; crushing and amalgamating was the process, and probably not more than one-fourth of the gold contents of the ore was recovered.

West Coast.—The quantity of gold won from alluvial workings was 85·08 oz.

A little prospecting has been done at Woody Hills, Howard's Plains, Princess and King Rivers, Mt. Huxley, Linda, and Harvey's Creek, from all of which stone carrying gold has been found; but none have up to the present established anything payable.

Messrs. J. Burrows, E. Dardus, W. Stewart, and J. Cocking report the discovery of gold on the east side of Frenchman's Cap.

SILVER-LEAD MINING.

The quantity of silver-lead ore produced was 61,501·195 tons, valued at £253,361, being an increase in quantity of 10,274·285 tons, and an increase in value of £5785.

The principal producers were:—

	Tons.	Value. £
<i>Zeehan Mines.</i>		
Zeehan-Montana	2232·88	37,857
Zeehan Western	553·7	7021
Zeehan Queen	293·15	731
Oonah	3738	2894
Mt. Zeehan (Tas.)	1184	4070
South Comstock, Block 10	501·75	1184
Tasmanian Smelting Company's Sections... ..	10·575	234
T.L.E.	13·92	115

	Tons.	Value. £
<i>Dundas Mines.</i>		
Anderson's	100	400
Adelaide	341·27	4161
Hercules	19,260·36	60,502
Mt. Zeehan (Tas.), Dundas Sections	1303	23,774
Ring Valley	470	3760
Mariposa	94	128
Comet	8614·45	6789
Kapi	17·85	135
<i>Mt. Farrell Mines.</i>		
North Mt. Farrell	2598·74	24,517
Mt. Farrell	14·5	239
Mackintosh	3	48
<i>Rosebery Mines.</i>		
Primrose	5156	17,346
<i>North Pieman Mines.</i>		
Chester Mine	9112·05	3595

Zeehan District.—Zeehan-Montana Mine, Limited.—The work carried out at this mine has been confined to No. 2 lode and its branches north of the shaft at Nos. 2, 3, 4, 5, and 6 levels.

No. 2 level has been driven 800 feet north from the shaft, and has just intersected No. 3 slide. Several small shoots of ore have been met with in this drive, and stoping is being carried on with varying results.

No. 3 Level.—After passing through No. 3 slide, a small shoot of ore about 40 feet long was driven through, but for the last 80 feet there is only what appears to be the wall or track of the lode visible. The end of this drive is 987 feet north from the shaft. This level is 130 feet below the bottom level of the old Tasmania Crown Mine workings, and is well under the bottom level driven. The water from the Tasmania Crown Mine is gradually draining through these workings, and it is probable that during the summer this end will be connected with the Tasmania Crown Mine, and thus extend the workings into that part of the property.

No. 4 Level.—This drive is in 1400 feet north from the shaft, and has been driven about 300 feet north of the slide. Small bunches of ore were met with on driving the last 300 feet, but the lode did not pay. Stopes are being carried along over the drive for a length of 400 feet. A portion of these stopes is in the slide itself, and on the whole is producing fair quantities of ore.

No. 5 Level.—The main drive is in 1250 feet north of the shaft. The last 60 feet has been driven on a lode north of No. 4 slide, and is now approaching the lode-matter at present being worked at No. 4 level. The lode at this level is in very hard ground, and so far is very poor.

No. 3 Slide, No. 5 Level.—Recent exploratory work carried out in this slide some distance west from the main track of No. 2 lode has developed a new make of lode-matter which, although not as yet payable, looks encouraging.

It is characteristic of the mine that the principal and most valuable of the ore-bodies have been found in and near the principal slides. Considerable difficulty is sometimes experienced in locating the ore-shoots, owing to the many faults which dislocate the many leaders and veins.

The following summary gives a detail of the work done during the year:—

	Lineal Feet.
Stopes	12,599
Main drives	1919
Crosscuts	192
Rises	415
Winzes	63
	—————
	15,188
	—————

2·876 miles, or 531,580 cubic feet, of excavation.

Output.—13,408 tons of lode-stuff have been raised, which produced 2307.69 tons of galena ore, containing 146,034 units of lead and 194,236 oz. of silver, or 63.3 per cent. lead and 84.2 oz. of silver per ton.

Men Employed.—The average number of men employed during the year was 180.

Zeehan-Western, Limited.—Main Shaft: During the year mining operations at this point have been confined to the 78-foot level, No. 3 branch lode. The company has driven 82 feet north on this lode, and is now stoping over the level. There is a fair reserve of stoping ground remaining above this level. The vein is small, but pays fairly well.

South Boundary Shaft.—This is an incline shaft sunk on what is known as No. 1 lode. This shaft has been sunk a further depth of 107 feet, making the total depth below surface of 180 feet.

There are two levels here, one at 78 feet, the other at 178 feet.

No. 1 Lode, No. 1 Level.—The north drive on this lode has been driven a total distance of 180 feet. Stoping is now being carried on over this level with fair results.

No. 1 Lode, No. 2 Level.—The main drive has been driven along the lode for a length of 180 feet. The lode is at present very poor, but is producing a little ore in the stopes. Two rises have been put up on the lode from No. 2 to No. 1 level, affording excellent ventilation.

No. 1 Level.—A crosscut has been driven east from the shaft a total distance of 195 feet. This crosscut has passed through three small veins of galena ore. The first vein was cut at a point 35 feet from the shaft, the second vein at 90 feet, and the third at 160 feet; these have been numbered 2, 3, and 4 lodes respectively.

No. 2 Lode, No. 1 Level.—The north drive on this lode has been driven a distance of 80 feet. The ore-vein

is from 2 to 3 inches wide, mostly clean ore. The end is still being continued.

No. 3 Lode, No. 1 Level.—The north drive on this lode has been driven 90 feet. The vein is fairly continuous, but small.

No. 4 Lode, No. 1 Level.—The south drive on this lode has been driven 60 feet. The vein is rather small, but produces sufficient ore to about pay cost of driving.

No. 2 Level.—A crosscut is being driven east from the shaft at this level to cut No. 2 lode.

Summary of Mining.—The work carried out during the year is as follows:—

	Feet.
Main shaft	107
Winzes	132
Rises	115
Crosscuts	61
Drives	868
Stopes	4165
	5448

or 196,128 cubic feet.

The work has produced 599 tons of galena ore; net value at the mine, £8651 14s. 11d.

The company has employed an average of 30 men, and 10 tributers have also been employed.

South Boundary Shaft (Surface).—A new head-gear has been erected on this shaft during the year, together with winding engine and boiler.

Hoisting is being carried out with two cages running on the incline. Ore-sheds, blacksmith's shop, and general buildings complete the equipment at this shaft.

Zeehan-Queen, Limited.—The work done on this company's mine during the year ending 31st of December,

1911, was confined to the operations of tributers. A good deal of surface trenching and prospecting was done, together with a little tunnelling, but unfortunately without discovering anything of value.

The average number of men employed was six.

The average output was:—Ore, $35\frac{3}{4}$ tons, containing 1996 oz. silver and $21\frac{1}{2}$ tons lead, value £306; flux, 257 tons, containing 1483 oz. silver and 4 tons lead, value £69; total, $292\frac{3}{4}$ tons, containing 3479 oz. silver and $25\frac{1}{2}$ tons lead, value £375.

The Mt. Zeehan (Tasmania) Silver-Lead Mines.—A considerable amount of driving and sinking was done without obtaining any profitable results.

The ore raised, as given below, was obtained by tribute parties.

	Tons.	Silver. oz.	Lead. tons.	Net Value. £	No. Men.
Ore	301	19,018	123·5	2475	22
Flux.	991	7178	8·5	179	...
Pyrites.	833	...	...	425	...
Total	2125	26,196	132·0	3079	22

On the company's Dundas Blocks section, at the Five-mile, crosscuts east and west from the main shaft at No. 1 level have been driven a total distance of 535 feet.

The lodes intersected have been numbered 1 to 7. Nos. 3, 4, 6, and 7 lodes are of little value. Nos. 1, 2, and 5 lodes showed payable ore-bodies, which have been profitably worked from No. 1 level upwards, and show very fair prospects for profitable development in depth. A total of 1700 feet has been driven on the several lodes.

One thousand nine hundred and thirty-seven tons 11 cwt. of ore, containing 93,541 oz. silver and $849\frac{3}{4}$ tons lead, have been mined, realising £16,519 10s.

A pumping plant is being installed in preparation for deepening the main shaft.

Kynance Prospecting Syndicate.—Work has been confined principally to prospecting about the surface. A little stoping has been done in the mine, and about 2 tons of galena were sent to the local smelters. A good deal of seconds has been stacked at the mine. During the early part of the year a branch of good ore was discovered at the 80-foot level, between 3 and 4 feet wide.

Lyell District.—The Tasman and Crown Lyell Company has continued operations on the silver-lead-zinc deposit. A concentrating plant has been erected, and a 10-head stamp-battery is being erected.

Dundas District.—An output of about 80 tons of low-grade ore suitable for fluxing is sent to the Tasmanian Smelting Company's works daily.

During the last few months the Adelaide Mine has been unwatered, and the ore left by the previous company is being mined, and prospecting by means of crosscutting is being carried on.

Operations at the Ring Valley Mine were twice interrupted by outbreaks of fire in the mine, causing a considerable amount of damage and the stoppage of all developmental work from August until the end of the year. However, the mine is now in good order, and work will probably be resumed at an early date.

The shaft has been sunk a further depth of 40 feet, the total depth of same below the adit-level being 137 feet. At 130 feet a station was made, and a drive was extended 90 feet north. A drive was also put in 30 feet south. The total quantity of ore obtained was 273 tons, valued at £2440.

The average number of men employed was 18.

Mt. Read District.—The Hercules Gold and Silver Mining Company employed an average of 93 men.

The following is a report of the work done:—Ore broken and sold.—

Ore.	Tonnage	Gross Value.	Net Value.	Gross Value. per ton.	Net Value. per ton.	Metal Contents.			
						Gold.	Silver.	Lead.	Zinc.
		£	£	s. d.	s. d.	oz.	oz.	tons.	tons.
Silver Lead Sulphide	13,021	44,454	12,422	68 3	19 1	2384	1,8,977	1107	4478
Zinc Blende.....	6239	51,263	16,276	164 4	52 2	925	60,693	452	2515
Total	19,260	95,717	24,698	...	...	3309	189,670	1559	6993

Underground.—The main works accomplished were in Nos. 3A, 3, 4, and 5B levels, and consisted of—

	Feet.
Drives	723
Crosscuts	373
Rises and winzes	192
Total... ..	1288

Ore Production.—The output has been obtained from the block of ground between Nos. 3 and 4 levels and from Dawson's "B" and "E" ore bodies; the latter has been the chief producer. The stopes being operated upon are now of some magnitude, as the following table will show:—

Level.	Ore-body.	Stope.	Length.	Breadth.	Height.	Cubic Measurement.
			feet.	feet.	feet.	feet.
3	"E"	Main	77	39	8	24,024
4	"Dawson's"	2nd	59	18	7	7,434
4	do	3rd	37	24	7	6,216
4	"B"	1st	120	31	7	26,040
4	do	3rd	110	31	7	23,870
4	do	4th	95	23	7	15,295
4	do	5th	70	22	7	10,780
4	do	6th	22	14	7	2,156
4	"E"	Main	233	48	7 $\frac{1}{2}$	83,880
4	do	1st	202	47	7 $\frac{1}{2}$	71,205
4	do	2nd	200	33	7 $\frac{1}{2}$	49,500
4	do	3rd	145	34	7 $\frac{1}{2}$	36,975
4	do	4th	145	29	7 $\frac{1}{2}$	31,537
4	do	5th	145	22	7 $\frac{1}{2}$	23,925
4	do	6th	60	24	7 $\frac{1}{2}$	10,800

Development Work.—This work has not been gone on with as much as was desirable, chiefly owing to the difficulty in obtaining competent miners; however, wherever attempted the results have been fairly satisfactory. In the 3A level the ruby silver ore has been exploited, and proved to be a vein of some length and width; and at 5B.

level the main "E" ore body was intersected, risen on, and proved to have an increased vertical depth of over 50 feet. This is of importance, as it definitely proves the ore body to live down, and also, of course, adds very considerably to the known ore reserves. In the No. 4 level the "E" ore body has been crosscutted and found to have an extreme maximum width of about 90 feet; in addition, the ore bodies have been further opened up by a series of small crosscuts, longitudinal drives, main rises, and ore-passes.

Surface.—During the year a new manager's house, officers' quarters, and offices have been erected, and all the other mine buildings have been repaired and maintained in order. The haulage tramway has been in constant operation, and the whole plant has been working without one stoppage for repairs. The crushing, sorting, and classifying mill at Williamsford has also been in continuous operation, and has worked very satisfactorily.

General.—For the 12 months it may be said that all the various works have been successfully conducted, and without accident of any kind; and providing the labour supplies keep good it should be in future of no difficulty to comply with contracts and maintain a regular monthly tonnage of 2500 tons of lead ore and 500 tons of zinc ore; or 3000 tons per month.

Mt. Read Mine.—The south drive in the 300-foot level has been extended 36 feet. The total distance from the entrance is 989 feet. The lode was very poor, being composed of iron pyrites, with a few blebs of sulphide ore mixed with it. Work was also discontinued here in March, 1911.

On the 1st of April a crosscut was started on the east side of the drive for a distance of 35 feet; but as nothing of value was met with work was suspended. A crosscut was started on the west side of the south drive for a dis-

tance of 63 feet. The country-rock passed through is mineralised schist. This crosscut is still being extended west, in the hope of striking Williams' lode.

Rosebery District.—The Tasmanian Metals Extraction Company is still proceeding with the erection of its extensive works.

The Tasmanian Copper Company is waiting the completion of the above works, and is in a position to supply ore for treatment when called upon to do so.

The Primrose Company sends about 20 tons of sulphide ore daily to the Tasmanian Smelting Company's works at Zeehan.

Mt. Farrell District.—The North Mt. Farrell Company mined and treated over 12,000 tons of crude ore, from which 2598·75 tons of marketable ore were obtained, valued at £24,517. This ore is sent out of the State for treatment.

A little prospecting is being done on the Mt. Farrell and Mackintosh Mines.

The Sterling Valley Company has obtained permission from the Government to lay down a wooden tramline on the road recently constructed. When the work is done machinery will be brought in to properly develop the mine.

North-Western Division.—The usual stoping has been carried out at the Magnet Silver Mine, and some developmental work has been done in the southern part of the mine in No. 6 tunnel, where another make of ore is being opened up. Preparations are now being made to sink 130 feet.

The company has had an average of 195 men employed, and handled 43,517 tons of lode-matter, from which 5844 tons of ore were obtained, the metal contents of which were 1162 tons of lead and 348,224 oz. of silver, of a gross value of £53,601.

Mr. L. K. Ward, Assistant Government Geologist, who visited the Waratah district in December, reports:—

“On the western side of Mt. Bischoff, between the mountain and the Arthur River, lies a group of five mineral sections, upon which active mining operations have now been in progress for two years. This work has been carried out by the Bischoff Balfour Prospecting Association, which was formed in the first place to work a section lying to the north-west of the Silver Cliffs Mine. The latter mine has also been acquired by the association, and there, too, during the past year some prospecting work has been done beyond the sites of the old workings of the former company.

“Upon Section 4613-M, of 80 acres, charted in the name of R. C. Lewis, there are three well-defined lodes. One of these, known as Chaffey's lode, is marked by a strong outcrop of gossan, which follows an east and west course across a ridge traversing the central part of the section in a meridional direction. A tunnel driven on the course of the lode from the eastern slope of the ridge has not been carried sufficiently far to afford definite information as to the nature of the ore body which has given rise to the gossan.

“Another tunnel driven from the western side of the ridge lies to the north of the lode, and a crosscut needs to be driven southwards to prove it at that point. The nature of the lode which has produced the gossan cannot be decided from available data, and the eastern drive on the lode (known as the ‘magazine tunnel’) should be continued under the crest of the ridge.

“A much more valuable ore body, as far as may be judged from present indications, runs through the central part of the section on a bearing N. 30° E., and has been exposed along its length for 250 feet by a low-level tunnel crosscut and drive.

“The ore body has a complex structure, consisting of a number of connected fractures rather than of a single

lissure. The workings show it to be poor where first cut, but to improve materially where followed southwards. A shoot of milling ore was encountered at a distance of 70 feet from the adit crosscut, and has been already proved to be about 100 feet in length. Short crosscuts from the drive on the course of the lode show the width of the shoot to be at one point at least 16 feet, but the limits of width have not been reached. This shoot carries bunches and strong veins of very clean galena, which has a high silver tenor, over an ounce to the unit of lead.

“ The face of the drive is in poor lode-matter, but may possibly lie a little to the east of the main portion of the shoot. A short crosscut or, better, a deviation of the main drive, is needed to determine this point.

“ This shoot is most promising, and every endeavour should be made to attack it at a lower level by another adit, for the topography of the country is favourable.

“ The prospecting of the lode can only properly be carried out in the manner which is now being adopted by the management, viz., driving on the course of the lode and putting out short crosscuts at frequent intervals to prove the width.

“ Another lode in the same section, with a north and south strike, has been prospected at the surface and underground. At the surface the gossan carries galena at more than one point, but the underground developments are not encouraging.

“ The new work done south of the Silver Cliffs Mine, in Section 5061m, has proved the continuation of the No. 2 lode of that mine, but the results obtained are not so satisfactory as those obtained on the Section 4613-m, mentioned above.

“ There are two places within Section 4733-m at which work should be continued. In the first place no attempt has been made to trace the lode exposed on the cliff-face in a southerly direction. Again, on the northern boundary of the section it is advisable to prospect for the northerly

extension of the same lode at a point where some gossan is showing above the creek level.

“A more detailed discussion of the lodes, together with an account of the geology of the district, will shortly be published by the Geological Survey of Tasmania.”

Northern and Southern Division.—The Round Hill Mine produced 44 tons of ore, valued at £260; eight men being employed.

The mine is now being worked by a tribute party; about 12 men are employed, and the results obtained since they commenced sending out ore, during the last quarter of the year, appear to be satisfactory. The concentrating plant is operated by water-power. Want of sufficient water is a drawback during the summer months.

The Devon Mine, after being idle for a long time, resumed operations about the middle of the year; a party of tributors worked for a couple of months, but gave it up. The mine has since then been idle.

COPPER-MINING.

The quantity of blister copper and copper ore produced was 8308 tons, valued at £408,649; being a decrease of 556·27 tons on the previous year.

The Mt. Lyell Mining and Railway Company, Limited.—The ores and metal-bearing fluxes treated by the company were as follows:—

	Dry Weight.			
	tons.	cwt.	qr.	lb.
Mt. Lyell Mine ore... ..	165,334	11	2	18
North Lyell Mine ore	95,556	5	0	25
Purchased ore	255	15	2	9
Metal-bearing flux from North Lyell Mine... ..	415	0	2	20
<hr/> Total <hr/>	<hr/> 261,561 <hr/>	<hr/> 13 <hr/>	<hr/> 0 <hr/>	<hr/> 16 <hr/>

Quantity and value of metal produced:—

Blister copper, 6022 tons, containing—

	£	s.	d.
Copper, 5951 tons, valued at ...	342,966	1	11
Silver, fine, 388,848 oz., valued at	42,830	14	3
Gold, fine, 7888 oz., valued at ...	33,536	15	0
Total	419,333	11	2

Renovations at the reduction works, including the railways, have been attended to; also the completion of a second dam of increased capacity; in addition to which attention has been directed towards installing a hydro-electric scheme at Lake Margaret, which, it is understood, will materially reduce generating costs.

The well-equipped main shaft at the Lyell Blocks Copper Mine has been sunk 330 feet below their deepest adit, bringing it to the same depth or zone of the 850-foot level of the North Lyell Mine, which has proved so prolific; while on the southern boundary of this last-mentioned mine a series of deep holes have been bored by the Lyell Consols, without intersecting anything of importance.

At the Lyell Comstock the mine has been resampled for experimental purposes, which, it is stated, may lead to the erection of a separating plant suitable for treating the ore on this property.

The syndicate at Darwin under the supervision of Mr. James Souter continues prospecting, but beyond this no other work in this direction has been done in that locality.

Mt. Balfour Field.—The quantity and value of copper ore produced from this field was as follows:—

Murray's Reward, 2083 tons, value £21,367.

Central Balfour, 197 tons, value £1473.

Total, 2280 tons, value £22,840.

Very little mining is being done on this field. On the Reward Mine the Murray Bros. keep up a good output of

high-grade copper ore. A little mining is being done at the Central Balfour and at the Chester sections on the north end of the field, but it is chiefly tin-mining which is keeping the place going, about 70 men being engaged in the industry at present.

East Coast.—The Scamander Copper Mine sunk a shaft 80 feet and crosscut for the lode at 75 feet. The result was apparently not satisfactory, as operations were discontinued before the close of the year.

Heazlewood.—The Jasper Copper Mine has been closed down pending a decision as to the most suitable method of treating the ore won.

TIN-MINING.

The quantity of tin ore raised was 3953·05 tons, valued at £513,500; an average value of £129 18s. per ton.

This shows an increase of 252·04 tons on the previous year.

The statistics for the year are:—

	Ore Won,	Miners Employed.	
	Tons.	Europeans.	Chinese.
Northern and Southern Division	43·73	188	—
North-Eastern Division	1893·63	2472	285
Eastern Division	414·15	1246	153
North-Western Division	1306·63	1874	—
Western Division	294·91	802	—
Total	3953·05	6482	438

Northern and Southern Division.—The Shepherd and Murphy Syndicate, at Middlesex, obtained 43·73 tons of tin ore, employing an average of 44 men.

Lodes Nos. 4, 5, and 6 have been worked on from the bottom on No. 3 adit crosscut, which is 1200 feet in length. A rise was put up at 104 feet east from this level, on No. 4 lode, and connected with a winze coming

down from the creek-level adit. The distance between the two levels is 150 feet. Stopping at the east end on Lodes Nos. 4 and 5, above the creek adit, is about finished. Hitherto the ore from this adit had to be sent down to the mill by means of an aerial ropeway; in future, however, all the ore broken above the No. 3 or bottom level will come out to the mill at that level.

Mill.—Further improvements have been made, and the result is a very complete and efficient plant.

The capacity of the magnetic separator department has been doubled by the erection of a second separator.

North-Eastern Division.—The Briseis Tin and General Mining Company, Limited.—The output of tin ore was 547 tons, an average of 111 men being employed.

The overburden has been removed on the northern side of the river and tin drifts worked on the southern side. Thirty thousand pounds were paid in dividends.

The chief work of interest has been the working of ground immediately to the south of the Ringarooma River previously worked to a shallow depth by the Krushka Bros. As the lead runs northward under the river it has been decided to divert the river northward to admit of the extension of the faces already opened out. This necessitates the diversion of the Moorina main-road for about 60 chains to the southward to cross the worked-out portion of the lead, and the erection of a new bridge over the river, which are now in progress.

The only new plant of interest used was a 24-inch belt conveyor, raising hopperings 50 feet on a 1 in $2\frac{1}{2}$ grade.

A new turbine-driven gravel pump to lift 90 to 100 feet is being erected.

The pump-thrust bearings are of the roller type, and the turbine thrust is that patented by Mr. A. G. M. Michell, of Melbourne, the designer of the turbine.

The turbine will run drowned, the water passing from it with sufficient pressure for the face nozzle; 250 feet head

is being used for power, and about the remaining 120 feet for nozzle.

The Arba Tin Mining Company, No Liability.—The following work was carried out at the mine:—

Sluicing out cut for No. 3 inclined haulage, which necessitated taking out 209,273 cubic yards.

Construction of Haulage.—This is now completed, and includes the following works:—

Erection of poppet legs 52 feet high. Excavating and grading incline, laying rails and sleepers (40-lb. rails) on sleepers (6 ft. by 8 inches by 5 inches), and ballasting same.

Construction of settling-bin at tunnel level, with the necessary delivery and overflow races, also top bin on surface and tail-race from same.

Erection of Babcock boiler and winding engine, with shed over same. To complete this haulage another bin will be put in 50 feet below the drainage tunnel, and this work will be carried out during the next three months, in readiness for the coming wet season.

The total quantity of drift and overburden removed from all faces was 242,935 cubic yards, and the total output of black tin for the 12 months was 116 tons 12 cwt., equal to 1'07 lb. per cubic yard of drift and overburden sluiced, the working cost being 6'32d. per cubic yard. Fully 90 per cent. of the ground sluiced was raised 132 feet to the surface by means of pumping and hauling.

The average number of men employed was 44, and in addition 20 men were employed cutting and carting fire-wood for six months of the year.

The total quantity of water coming into the mine was 47 sluiceheads. Tailings are now being dumped in the worked-out part of the mine south of No. 2 haulage.

The Pioneer Tin Mining Company, Limited.—The company obtained 573 tons of tin ore and paid £43,309 in dividends; an average of 96 men being employed. This company has shown very satisfactory results by increased

output, greater efficiency in handling the drift, and reduced costs. The Frome dam has been raised and the storage capacity of the reservoir has been nearly doubled. Conveyors and machinery for distributing the tailings on the dump are being installed.

Garibaldi Tin Mining Company.—This company obtained 15½ tons of tin ore, employing an average of 15 men. The company is working on the Wyniford River flat—a rough place—and has to contend with timber on the surface and boulder wash below.

The Aberroe Tin Mining Company, working at Aberfoyle, obtained a regular, if rather small, output during the year.

Steam gravel pumps are being introduced into the district, and promise to be a success for elevating the tin gravels to a suitable height for sluicing.

Mr. George Watt, late mine manager of the Purdue Tin Mine, commenced by installing a portable engine and pump to work on Amber Creek. The area was small—a rock-bound flat—probably not exceeding 1 acre in extent, but from which about 25 tons of tin were won in a comparatively short time. The plant has been removed, and is now working on the flats and terrace of the old Doon Tin Mine, on the north bank of Ringarooma River, down stream from Gladstone, owned by Messrs. Watt and Shields. A barge is being built to carry the pump and engine. A similar plant is about to be installed by C. Daw and party to work ground on the east bank of the Old Chum Creek, half a mile above its junction with the Mussel Roe River.

The Purdue Mine and plant was purchased during the year by C. A. McDonald, Limited. A patch of tin ground left by the old company has been worked out. It is understood that the pumping-plant will now be removed, probably to the owner's property at South Mt. Cameron.

The smaller mines, as also single claims round about Gladstone, have been doing fairly well during the year.

There was a better supply of water than in previous corresponding periods. A dry time was experienced for about eight weeks from the 1st of October.

The South Mt. Cameron Tin Mining Company has done fairly well, the output being $88\frac{1}{2}$ tons of tin for the year. A very large area of ground has been worked. Operations are now being carried on a good distance back from the river. The fall and get away for the tailings is therefore diminished, and although the pumping-plant always supplies sufficient water for sluicing, there are times when the low state of the river causes an accumulation and block of tailings at the outlet of the tail-races.

The South Cameron Dredging Company has been working the "Dorset" dredge, but is not meeting with much success. There is no doubt a payable run of tin in those extensive flats, but this should be located by boring before the dredge is started. Four tons 13 cwt. of tin ore, and 7 oz. 2 dwt. of gold, were obtained.

Clifton Creek Tin Mine (McDonald, Ltd.).—This mine was started in the early part of the year. The plant comprises a steam-engine and gravel-pump mounted on a barge. The ground being worked is about 12 feet in depth. The wash is elevated to a height of 30 feet into a large sluice. The water-supply is limited. The sludge-water from the sluice is run off into settling dams, from whence it is gravitated back to the working face and used over again. Forty-five tons 7 cwt. of tin ore were obtained, valued at £5790; 26 men being employed.

The New Banca Company, at South Boobyalla, has not done much during the year. Some fairly good tin-drift was discovered in a run beside the worked-out ground of the Wilberforce Creek. A long column of pipes is laid, and this ground will be opened up when the rainy season sets in.

Weld River Tin Mining Company.—The proprietor of this (Mr. James Thomson) has purchased the leases and water rights of the Moorina Tin Mining Company. A

column of pipes has been laid directly across the river from the water-race on the south, to the mine on the north side.

The Imperial Tin Mining Syndicate is prospecting a tin lode. Some shaft-sinking and tunnel-driving has been done.

Other Claims.—The Clyde, Waverly, Abbotsford, Federal, and Bell's Hill Companies are working, but call for no particular mention.

Mr. B. V. Smith is opening up a tin lode at Branhholm, near Ruby Flat. A "Pencroft" dry crusher, driven by a small steam-engine, is in use for reducing the stone. The lode is well defined, and about 5 feet in width. Values are said to be over 1 per cent.

The Weld Tin Mining Company.—The Company has taken over the old Moorina Mine, and the two mines are being worked conjointly. Work has been chiefly confined to the old Weld Mine. Twenty-four and a quarter tons of tin ore, valued at £2700, has been won, 17 men being employed. A good deal of work has been done. Machinery and pipe-line have been erected, at a cost of £600.

The Rio Grande Tin Mining Company started during the year. Prospecting results before flotation were reported to be very good. Work up to the end of the year, however, did not disclose anything encouraging. The Fancy Creek Tin Mining Company, employing about 13 men, obtained 14 tons 13 cwt. of tin ore, valued at £1788. The amount expended in wages was £1350. During the early part of the year sluicing operations were greatly retarded on all the faces, owing to the damage done to the water-races by the heavy rains in March, 18 inches of rain falling in one week. The dry weather set in early in September, and owing to the shortage of water work at the Waverly face was stopped. Three, and at times four, faces have been working. Sluicing has been carried on in two lode-formation faces, with an average depth of 50 feet, which have given a fair margin of profit.

The two alluvial faces on the terraces of Elliott's and Wintle's Creeks have also been worked profitably.

Eastern Mining Division.—The Anchor Tin Mine, Limited.—A good deal of time was lost on account of shortage of water due to the generally dry season, for in spite of the March rainfall (24 inches) the year, on the whole, was a dry one. For six months a little more than half the battery was crushing on this account, the number of stamps operating during that time being frequently under 50 per cent., and seldom reaching 70 per cent. When water was plentiful, work was hampered by the scarcity of suitable labour. In March the greater part of the 24 inches recorded fell in two days, causing floods and serious damage. The rain-gauge is kept at the mine, and in the ranges (1000 to 1500 feet higher) there was evidence of much more rain than that recorded at the mine. Though temporary repairs allowed work to be restarted within two days, it was some months before all damaged works were reinstated.

The aerial ropeway, between the Australian Mine and the Anchor battery, started running at the end of February, and has continued running without a hitch ever since. This line is in two sections, of a total length of $1\frac{3}{4}$ miles to a fall of 1200 feet.

There is an intermediate crusher station where the stone is broken to a suitable gauge for the battery.

From the Anchor Mine 91,916 tons of stone were crushed, and from the Australian Mine 26,395 tons, for a return from both of 194 tons 9 cwt. tin oxide. There were from 120 to 150 men employed at the two mines. The tin returns were satisfactory, and improved towards the end of the year.

The prevailing scarcity of labour materially affected the Company's operations. It delayed the construction and seriously increased the cost of the aerial ropeway, and retarded the output when water was plentiful, and also renewals and improvements in the battery and elsewhere.

The stone treated from the Anchor Mine came principally from the eastern side, where upwards of 50 feet of

overburden had to be removed. The difficulty of getting water on to this, and the amount of hard rock in it, made its removal a slow and costly business. The ore at the Australian Mine has been taken from the ground at first prospected, but arrangements are being made to connect other deposits with the aerial tramway.

New Roy's Hill Company.—The company completed the erection of its plant and started crushing about the end of July. Three thousand five hundred and fifty-three tons of stone crushed produced 24 tons of tin ore, valued at £2800.

At Gipp's and Story's Creeks a number of men are at work on tin and wolfram, and are reported to be doing fairly well.

The South Esk Tin Mining Company.—The quantity of gravel removed by hydraulic sluicing was about 55,623 cubic yards, from which $14\frac{1}{2}$ tons of tin ore were obtained; six men being employed.

Western Mining Division.—**Renison Bell Tin Mining Company.**—20,888 tons of ore have been mined and milled, and 129·85 tons of tin produced, which realised £15,122.

A good deal of prospecting and developmental work has been done. The results on the whole have been satisfactory. This is particularly the case on the northern portion of the property, where a payable ore-body has been discovered. At the end of the year this ore-body had been proved to contain high tin contents in a trench 60 feet in length across the ore-body, which averages 2·1 per cent. metallic tin. The tramway to the southern ore-bodies has been completed, and is working very satisfactorily. The large dam has also been completed, and has supplied sufficient water for power and dressing purposes, excepting during a few days in the dry season. The enlargement of the dam is under construction.

The mill and various tramways are all in first-class order, and are working well.

Boulder Tin Mining Company.—About 6500 tons of ore have been treated for a return of 54 tons of tin oxide, assaying up to 70 per cent. tin, valued at £6244. The amount paid in wages was £5683. In addition contracts were let which absorbed £1129 in labour.

The company has vigorously pushed forward with the erection of the new mill and plant. About three miles of tramway have been constructed to work the faces and connect with the Emu Bay Railway line.

The Montana Tin Prospecting Syndicate.—About 7000 cubic yards of detrital matter has been sluiced for a return of $35\frac{1}{4}$ tons of tin ore, valued at £3886, 22 men being employed. The tailings are being stacked for future treatment.

Penzance Company.—The erection of a stamp mill is nearing completion, and will be ready for work by the time the rainy season sets in.

Central Renison Bell Company.—The company holding this property under offer of purchase is steadily prospecting the various lodes with satisfactory results.

X River Mines.—The mines in this district, although only in the prospecting stage, are opening up well, and give every promise of adding considerably to the output of tin in the near future. The district has recently been inspected and reported upon by Mr. L. K. Ward, Assistant Government Geologist.

North Pieman River.—A good deal of prospecting is being done between the Huskisson and Wilson Rivers, with very satisfactory results.

Stanley River.—This district is quiet at present. The deep alluvial deposits appear to be well worthy of systematic treatment.

The Assistant Government Geologist was instructed to report upon the mines in the district, but while on the way he received notice of his appointment as Government Geologist in South Australia, and had to return. His suc-

cessor will probably be directed to visit the field shortly after his appointment.

Mount Heemskirk.—The Federation Tin Mine is carrying on prospecting operations, and is also working to advantage some of the tin lodes on its property.

North-Western Mining Division.—The Mt. Bischoff Tin Mining Company.—The output of dirt from the mine, both surface and underground, which was delivered to the mills for crushing and concentration totalled 204,722 tons. From the material treated, 1100 tons of concentrates were obtained, of an estimated value of £143,000. The average number of men employed was 407.

Developmental as well as productive work has been systematically carried on, and many things done with a view of improving the economical winning of the ore. During the year additions to the milling plant, in the shape of a new 10-head battery, with the attendant concentrating machines have been erected, the installation of an aerial ropeway, and the erection of a central rock-breaking station. A new dam at the Waratah River has been constructed, and it is anticipated that it will conserve, together with the other dams in existence, a sufficient body of water to enable the company to carry on operations during the driest season. Underground, the work accomplished has been very satisfactory. Developmental and prospecting work on the Queen lode has been carried on, and all necessary work done to keep the faces well in advance of the ordinary operations for winning crushdirt, and as far as possible in such a condition that the ore could be won at the lowest possible cost.

Stoping was carried on between all the levels of the Queen lode, and some very fair-grade ore obtained.

During the year, 579 feet of levels were driven, and 347 feet of rises were accomplished.

A lode was discovered on the northern slope of the mount, and a level was driven along it for a distance of 192 feet, and a very fair ore-body opened up.

The milling and concentrating plant has been running uninterruptedly, and the grade of the concentrates and the ore recoveries has been maintained at the usual high standard.

The electric locomotive on the main line between the mine and the mills, and those hauling underground have been in constant use.

The quantity of material transported over the main line has been greatly diminished since the installation of the aerial ropeway.

The working cost for the year averaged 4s. 2·869d. per ton of crude ore treated.

The company paid £52,500 in dividends. The total quantity of tin ore raised by the company is 70,698 tons, and the total amount paid in dividends is £2,287,500.

Mt. Bischoff Extended Tin Mining Company, No Liability.—No. 2 Level.—Stoping has been continued above this level in payable ground north of Hammond's shaft. A rise has been put through to the surface.

No. 3 Intermediate Level.—Stopes above this level have been worked out, with the exception of pyritic stopes south.

The B Level has been driven south to 110 feet, and is in payable formation.

No. 3 Level.—The hanging-wall drive was continued south and holed to the footwall level at 428 feet; average value is 1 per cent. metallic tin over a width of 3 feet, which is very payable.

No. 5 Intermediate Level.—Stopes above this level show payable ore. A rise from the end of the drive has since been holed to No. 3 H.W. level.

No. 5 Level.—The south drive has been continued to 397 feet, and a rise from the end has been holed to No. 5 intermediate level.

No. 6 Intermediate.—The drives north and south have been extended 67 feet and 65 feet respectively. Stopes above this level have given payable ore.

The winze below this level is down 120 feet in a poor formation at present, with occasional patches of payable tin.

The mill treated 13,767 tons, for a yield of 181 tons 9 cwt. calcined tin oxide. A large amount of trenching has been done on the leases to determine the value of the detrital deposits.

Weir's Bischoff Surprise Company.—Three thousand tons of detrital matter have been treated, for a return of 15½ tons of tin oxide, valued at £1247 16s. 2d.; five men employed.

COAL-MINING.

The total quantity of coal raised amounted to 57,067 tons, valued at £26,214; being a decrease of 25,378 tons on the previous year.

The raisings at the different collieries were:—

Colliery.	Tons Raised.	Men Employed.
Cornwall	24,060	70
Mt. Nicholas	30,058	79
Spreyton	1496	7
Mt. Cygnet... ..	210	2
York Plains	539	2
Ida Bay	60	4
Enterprise	30	3
Illamatha	128	2
Jubilee	20	3
Tasma	96	4
Catamaran	370	4
Total	57,067	180

Cornwall Colliery.—Work has been successfully carried on, and the workings of the No. 1 Mine, where a good deal of the output has been produced, have been advanced a considerable distance into the very settled country on

the western sections of the leasehold; while the main heading of No. 3 Mine has been advanced a distance of 876 feet into good country, working a total distance of 1796 feet from the entrance. This mine is worked under the bord and pillar system, and a good face of coal exists. Towards the end of the year a new mine (or No. 4) was opened up on the western side of the No. 1 Mine, but on the same seam, and is now in a distance of 217 feet, the coal from which is proving very satisfactory.

The quantity of coal raised for the year was 24,060 tons, valued at £11,428, and the number of men employed was 70.

Mt. Nicholas Colliery.—The ventilation of the mine has been improved by the reconstruction of the furnace at the up-cast shaft. Other improvements, such as straightening and enlarging air-courses, timbering, &c., have been carried out. The colliery is now in good working order, with a long-wall face of over 500 yards in length, and is capable of an output of 200 tons per day. Unfortunately, however, there is not trade for more than half the quantity, or even less in the summer time.

The Enterprise Colliery has been working intermittently with a few men, and selling coal locally. It is reported that this property has now passed into new hands, and that the mine will soon be working on an extensive scale.

Spreyton Colliery has worked steadily during the year, for an output of 1496 tons of coal; seven men employed.

York Plains Colliery.—The proprietor (Mr. J. C. Griggs) keeps a couple of men getting out coal. The output is not large, but is increasing year by year. This anthracite coal is only used by brewers, malsterers, and for kiln-drying, &c.

Mt. Cygnet Colliery.—Some work was done in the old mine for a short time. It is the intention of the owners to drive a new dip heading to the east of the old one, which is now no longer convenient to work from.

WOLFRAM.

The output of wolfram ore was as follows:—

	Tons.	Value. £
Shepherd and Murphy Mine, at Middlesex	22·49	2473
Avoca Mines	38·15	4249
Lady Barron Mine	9·32	1047
Total	69·96	£7769

BISMUTH.

The Shepherd and Murphy Mine, at Middlesex, obtained from its tin ore 14·37 tons of bismuth, valued at £5748.

The Lady Barron Mine obtained ·025 tons, valued at £10.

TASMANITE SHALE.

The Government Geologist (Mr. W. H. Twelvetrees) spent some months during the latter part of the year in making a thorough examination of the country between Railton and Latrobe. His report will shortly be published, and will be very interesting. Immense beds of shale are known to exist, and will probably be worked to advantage in the near future.

The Tasmanian Shale and Oil Company started operations near Latrobe early in the year, but shortly afterwards closed down for want of capital.

The Railton Shale Oil Company's property is situated on the west bank of the Mersey River, near Railton, and comprises 1045 acres held under mining lease. This proposition is now being placed on the market. Previous optionees have expended a considerable sum of money in carrying out boring tests with a view of determining the limits of the shale seam on the property, and their manager (Mr. R. W. Powell, Jun.) reports that he estimates

the possible tonnage of tasmanite shale as disclosed by the bores at 1,963,197 tons.

The present vendor has had a dozen men at work on the leases near the point selected for the first mining operations. Surveys have been carried out and about 80,000 bricks for retorts and other buildings have been made from the clay derived from the shale capping, and things are in a forward state for starting mine work as soon as the new company is floated. Some shallow excavations have shown the shale at this spot to be of the usual quality, and the seam to have the same characteristics as prevail throughout the shale area. The market products are intended to embrace fuel oil, petrol, and turps substitute; and it is anticipated that the shale residue after retorting will be disposable as manure, &c. Firewood and mine timber are plentiful on the property. Adit mining will be adopted, and the retorts will be erected within about 2 miles of the Railton Railway-station.

LIMESTONE.

Reporting on his visit to Clothier's limestone quarry, near Claremont, which he inspected on account of a discovery of copper ore there, the Government Geologist (Mr. W. H. Twelvetrees) says:—"The quarry, a couple of miles west of Claremont station, is being actively worked, and a regular output of lime established. The quality of the product ensures a good demand for it by the city builders. A north and south face has been opened along the base of Mt. Faulkner, and is now being worked at a height of about 25 feet, in stone which is dipping west into the hillside at a gentle angle. The face is separated into two quarries by a fault which has displaced the beds on either side for a vertical distance of about 40 feet. The beds which were first worked in the lower and northern quarry are now being worked in the upper and southern one. The available face will increase in height as the workings are carried into the hill, when the successive benches will be

opened up. The underlay of the strata into the hill is a slight disadvantage, but it is not anticipated that there will be a troublesome accumulation of water. A band about 3 feet thick, consisting of waste stone of a clayey nature, runs horizontally through the entire quarry, and narrower bands of similar material occur along the horizontal joints which separate the different beds or 'tiers,' as they are called. This stuff is rejected in working. Local experience indicates that the stone becomes more argillaceous as it extends into the hill, but the work seems as yet on too limited a scale to enable any safe opinion on this point to be arrived at. None of the lime has been sold yet for manurial purposes, and perhaps the soil in the neighbourhood is already sufficiently calcareous without further additions; but there must be a good deal of land in this part of the country which would benefit by lime dressing. The stone which is being worked makes lime of excellent quality. It is full of fossil shells. The marine remains noticed in the limestone were *Protoretepora ampla*, *Fenestellae* of various species, *Stenopora*, a spinose *Productus*, *Spirifera tasmaniensis*, *Spirifera stokesii*, *Spirifera duodecimeostata*, *Aviculopecten limaeformis*, *Eurydesma cordatum*. Mr. R. M. Johnston (Government Statistician) has assisted in the specific determinations. A little organically precipitated pyrite is noticeable here and there, and in the unworked part of the quarry the infiltration of iron-bearing solutions from the surface, following the course of vertical joints, has resulted in the deposition of limonite. A little mild excitement has been caused by the discovery of some copper ore (bornite) in the lower quarry, and hopes were entertained that a metaliferous vein might be found. After close examination of the site of the discovery I could come to no other conclusion than that the ore found was an included boulder. The matrix in which it occurred is the Lower Marine limestone of the Permo-Carboniferous system. This limestone is known to characteristically contain stones foreign to the

immediate locality, assumed to have been transported by ice; and, as a matter of fact, at Clothier's quarry it frequently carries stones of quartz, porphyry, and granite. Stones of copper ore, therefore (a mineral known to occur at the Humboldt Mine, beyond Tyenna) may also very well exist in the rock without, however, giving any value to it as a source of copper."

PYRITES MINING.

Iron pyrites for the manufacture of sulphuric acid and in connection with artificial manures continues to be produced on the West Coast. The Mt. Lyell Company exploits its deposit of this mineral at the Chester Mine for this purpose, and a steady output is kept up and exported. 9112.05 tons, valued at £3595, were produced.

OSMIRIDIUM.

Although this mineral has for many years been known to exist in the bed of the Savage River on the West Coast, and in the rivulets and creeks heading from the Serpentine country, it was not until early in the year that any effort was made to obtain the mineral, owing probably to there being so little demand for it, the difficulties and hardships encountered in searching for it, the low price offering for it, and to the fact that there was no ready local market for disposing of it. However, a demand has been created, and the mineral is readily disposed of locally; consequently, about 100 men are employed in searching for this mineral, which at present is more valuable than gold.

During the wet season the miners have to confine their operations to the rivulets and streams, as the Savage River is in flood, and can only be worked to advantage in the summer months.

The mines are scattered over a large area, leading from the head of the 19-mile Creek down to the Rio Tinto section, a distance of over 6 miles, of very rough precipitous country.

The principal drawback the miners have to contend with is getting stores on to the ground. There is a splendid road as far as the turn-off, but from there to the river it is very bad indeed.

The quantity obtained was 271.88 oz., valued at £1888, an average of £6.914 per oz. The present price is £7 10s. per oz., and there are two buyers at that figure. This price may be regarded as very satisfactory.

No quotation is given in any of the leading American, English, or Australian mining journals for osmiridium, but pure iridium is quoted at £13 per troy oz. The former contains iridium and osmium in different proportions, as will be seen from the following analyses, made of osmiridium from the Ural Mountains, which district furnishes most of the native alloy. The yearly production amounts there to about 200 oz.

Iridium.	Rhodium.	Platinum	Ruthenium	Osmium.	Copper	Iron.
77.20	0.50	1.10	0.20	21.00	...	=100
43.94	1.65	0.14	4.68	48.85	0.11	0.63=100

Owing to its unique qualities iridium finds an extensive use. Most of the metal produced is probably used for hardening steel.

Thus far little use has been found for osmium, except for certain kinds of incandescent lamps.

Osmiridium, as well as iridium, is used to a considerable extent for manufacturing purposes. The native alloy serves, on account of its extreme hardness, infusibility, and indifference to reagents, for watch and compass bearings and the pointing of fountain pens. Of the native osmiridium only 10 per cent., however, is available for pen points, as it occurs in very small grains.

As there is a greater demand for iridium than either osmium or osmiridium (341 lb. of iridium were imported into the United States of America during 1909, and only 4 lb. of osmium for the same period), and considering that

iridium is obtained principally from the native alloy after chemical separation, it would appear that £7 per oz. is a very reasonable price for the latter metal (osmiridium).

The price of 1 oz. of osmiridium, on the basis of the first analysis given above, would, for the total metals present, be approximately £12 to £13 per oz. This amount would be reduced on allowance being made for the returning charge. The price ruling for pure osmium in 1909 was about £7 per troy oz.

About three months ago the Hon. the Premier received a letter from one of the miners residing on the field complaining that the local buyers were only giving about £7 per oz. for osmiridium and were selling it in London at about £20 per oz. The Premier immediately cabled to the Agent-General (Sir John McCall), who applied to the Director of the Imperial Institute of the United Kingdom, the Colonies, and India, and the following information was received by him in reply, which will doubtless be of interest to those concerned in the industry:—

“ 17th February, 1912.

“ I have communicated with the principal firm in London who deal in this material, and they have replied as follows:—

“ ‘ We regret to say that it is utterly impossible for such a quotation to be given without extreme risk of being entirely misleading. There is probably no other mineral which varies more in its composition, even in a highly-concentrated state, than osmiridium, and transactions in this mineral are invariably based upon each parcel *per se*. Even a sample affords no reliable basis for negotiation, and inasmuch as physical properties (size of grains, &c.) enter as a factor into the calculation of value, you will readily comprehend how it is that we say that no ‘ market price ’ for osmiridium can be given, for variations of 50 per cent. and more are not uncommon.

“ ‘ If, and when, however, any sample of actual production may come before you, we should be happy to examine same and endeavour to assist you.’ ”

“ ‘ I am, however, making further enquiries on the Continent, and will inform you of the results in due course.’ ”

“ ‘ 1st March, 1912.’ ”

“ ‘ In continuation of my letter, No. 658/1912, dated the 17th of February, 1912, on the subject of osmiridium, I beg to inform you that the following replies have been received from the Continental firms of whom enquiry was made:—

“ ‘ 1. The value of osmiridium depends upon the current demand for its constituent metals. The offer of one of the constituent metals on the market in any quantity immediately lowers its price to an unprofitable degree, and as a result refiners are left with stocks for which it is difficult to find purchasers. Further, this ore can only be valued after analysis of each consignment, as the metals of the platinum series which it contains are present in very variable proportions. It cannot find a ready market similar to that for platinum ore, which is purchased according to its richness in platinum (a metal in regular use), in the same way as is done in the case of gold ores.

“ ‘ 2. Osmiridium is of higher value if the shape of the grains is such that they can be used for pen-points. In Europe osmiridium is generally bought in order to extract the metals of the platinum series, but we may mention that the amounts of osmium and iridium present vary very much. As there is hardly any fixed market price for the metals of this group the price of osmiridium also varies greatly; but we may say that the price is between marks 3.50 and marks 5.50 per gram (February, 1912).’ ”

“ ‘ You will gather from the above information, and that furnished in my letter of the 17th February, that no definite quotation can be given for osmiridium, as the price depends on many factors, and varies very considerably.’ ”

Definite valuations could only be given as the result of the examination and analysis of each consignment."

" 3rd April, 1912.

" With reference to your letter, No. 824/1912, dated the 14th March, 1912, on the subject of osmiridium, with enclosure, I beg to point out that the price of £7 per oz. stated to be obtained for the material in Tasmania is very similar to the quotation of 3.50 to 5.50 marks per gram given by a leading continental firm, as stated in my letter of the 1st of March.

" In view, however, of the statement made by the same firm that osmiridium realises the best prices if it consists of grains suitable in shape for pen-points, enquiries have now been made of the two firms of pen-makers as to the price which they are paying for the material. Both firms have referred the Imperial Institute to the large London dealers quoted in my letter of the 17th of February, but one of them has mentioned that the present price of osmiridium suitable for pen-points is £11 per oz.

" This price for special material is not a great advance on £7 for the raw osmiridium, from which it has to be selected. It hardly seems worth while, therefore, to make further enquiries, unless Mr. Allen can furnish the names of any firms selling osmiridium at £20 per oz., 'or are buying it at that price.'"

POTTERY CLAY.

In my last report I mentioned that I had forwarded a collection of clays from different parts of the State to the Agent-General in London, in the hope that attention might be directed to our clay deposits, if the results obtained proved satisfactory. The following is an extract from his reply, dated October 6, 1911:—

" I have the honour to inform you that I have obtained from the Director of the Imperial Institute a report on the four specimens which were furnished by Mr. W. H.

Wise, of 'Glenmont,' Kingston. This report contains much valuable information as to the quality of the clays and the uses to which they could be put; but it will be seen that although they could probably be utilised locally, they are not considered valuable enough to be exported to Europe. In connection with this matter I desire to state that I have not yet been able to obtain from Mr. T. Lees-Field a report on the china clays which were sent from Tasmania for his information, but I hope I shall be successful in doing so very shortly."

Extract from the letter received from the Director of the Imperial Institute, London, dated 16th September, 1911:—

"I beg to give the following information regarding the four samples of clay from the Kingston district of Tasmania which you forwarded to the Imperial Institute with letter, No. 703/1911, dated the 16th February last.

"No. 1.—This sample weighed about $3\frac{1}{4}$ lbs., and consisted of a greyish-white, homogenous china clay. A little sandy material was present, but it was in a very finely-divided condition. When mixed with water the clay was plastic, and worked well; and when fired at about 1100° C. it yielded a strong pottery of a good white colour. This material would be quite suitable for the manufacture of pottery, and, in admixture with other materials, for making porcelain.

"No. 2.—This sample weighed about 1 lb., and consisted of a compact ochreous yellow clay, with a few streaks of white material. It was plastic when mixed with water and worked well. When fired at about 1100° C. it produced a strong pottery of a light brick-red colour. It would be suitable for the manufacture of common coloured pottery.

"No. 3.—Weight about 3 lbs. A fine, white sand, admixed with a little clayey matter. On washing with

water, 80 per cent. of siliceous residue was obtained. On account of its lack of plasticity the crude material could not be worked on the wheel. Tiles were made from it and fired at about 1100°C ., but they were very friable. On heating to a temperature approaching 1500°C . they became a little stronger, without softening.

“ This material could probably be used in the crude state for the production of refractory bricks, or for admixture with other materials for porcelain manufacture.

“ No. 4.—Weight about $3\frac{1}{4}$ lbs. An ochreous yellow sandy clay in a powdered condition, and containing some particles of black organic matter, which were removed before technical trials were carried out.

“ A washing test gave 25 per cent. of micaceous and siliceous residue. The clay, freed from the organic matter, but not from the siliceous matter, was fairly plastic when mixed with water, but did not work well on the wheel, and the finished article had a rough appearance.

“ A vessel made from this clay and fired at about 1100°C . gave a fairly strong pottery of light terracotta colour. Tiles made from the same material and fired at the same temperature were strong, but rather porous. When heated to a temperature of about 1410 to 1450°C . the material began to soften, but did not become much more fusible on raising the temperature to about 1500°C . The resulting material was brownish-grey in colour.

“ This clay could probably be utilised for the manufacture of common stoneware or bricks.

“ The results of the examination show that these four clays could probably be utilised locally in the various ways already indicated, but they are not valuable enough to be worth exporting to Europe. A firm of commercial experts who were consulted on this point stated that even No. 1, which is the best of the four materials, appeared to be only of similar value to certain English clays sold at about 10s. per ton f.o.b. English ports.”

PRECIOUS STONES.

Several enquiries have recently been made as to where diamonds are being obtained in the State, owing probably to the appearance of a paragraph in one of the newspapers drawing attention to the manufacture by a local firm of jewellery set with "Tasmanian diamonds." These diamonds, so called, are topazes, and when nicely cut and set look well, and make very handsome brooches, pendants, &c. I have recently had a number of topazes, rock crystals, and sapphires cut by Mr. E. H. Becker, of 41 Post-office Chambers, 114A Pitt-street, Sydney, New South Wales, who is also a purchaser of precious stones.

Mr. Charles A. Flynn, Agent for Foreign and Domestic Minerals and Gems, Los Angeles, California, is also a purchaser of gem stones, and is making a special business of placing Australian gems of merit on the market in California.

Sapphires of small size are very common in the tin-drifts of the Ringarooma and Portland districts, but are rarely worth saving; some very large and fine stones have, however, been obtained. With them are associated garnets, spinels, zircons, topazes, and occasionally beryls and chrysobels. Very large but impure beryl crystals have been found at Ben Lomond. Topazes are very common in the tin-drifts, some very large ones having been found. They are often cut and called locally "Flinders Island diamonds," this island being one of the best places for collecting them. Rock crystals, amethysts, and other varieties of crystallised quartz are not uncommon, some of the large smoky crystals of the Mt. Cameron district being much prized by the Chinese, who collect them and send them to their own country for sale. Some very large and flawless crystals have been valued at pretty high figures. Wood-opal is common in the tertiary drifts of the South Esk Basin, but no precious opals are yet known to have been found, though some of the recent basalts show a common variety.

The following Return shows the Quantity and Value of Mineral Products for the State of Tasmania during the Year ending 31st December, 1911.

Mineral.	Quantity.	Value.
		£
Gold*..... ozs.	31,100·873	132,108
Silver-lead Ore tons	61,501·195	253,361
Blister Copper †	6022	385,797
Copper and Copper Ore... "	2286	22,852
Tin Ore "	3953·05	513,500
Coal "	57,067	26,214
Shale "	500	250
Wolfram "	69·96	7769
Bismuth "	14·395	5758
Osmiridium..... ozs.	271·88	1888
Total.....	...	£1,849,497

* Fine gold, including gold contained in blister copper and silver-lead bullion.

† Value of gold deducted.

GEOLOGICAL SURVEY BRANCH.

The Government Geologist (Mr. W. H. Twelvetrees) and the Assistant Government Geologist (Mr. L. K. Ward) have been fully engaged during the year. The report of the Government Geologist is appended.

Mr. Ward left the Department on the 31st of December to take up the appointment of Government Geologist in South Australia.

During his term of office Mr. Ward proved by his work to be a capable and painstaking officer, and gained the confidence and respect of the Department and the mining public.

The services of the Geologists are in great demand, and it is impossible to comply with the many demands made for their services, and the time has arrived when this branch of the Department should be increased by the appointment of at least another assistant geologist.

INSPECTORS OF MINES.

The three inspectors have satisfactorily discharged their duties in the districts allotted to them. Their reports are appended.

MINING MANAGERS' EXAMINATION.

Three candidates presented themselves for examination during the year and succeeded in obtaining second-class certificates. Copies of the papers set at the examination are appended.

DIAMOND-DRILLS.

The drills were not employed during the year.

DEPARTMENTAL STAFF.

The following changes in the staff of the Department have been made during the year:—

Miss A. L. Dickinson, Registrar of Mines, Gladstone, resigned 23rd January, 1911.

A. G. Smith appointed Registrar of Mines, Launceston, *vice* L. R. Sams, from 1st May, 1911.

P. A. Driscoll appointed Clerk, Launceston office, *vice* A. G. Smith, promoted, from 1st July, 1911.

A. B. Haden, Engrossing Clerk, Hobart, retired, from 31st December, 1911.

L. K. Ward, Assistant Government Geologist, resigned 31st December, 1911.

F. S. Grove, on loan to Mt. Cameron Water-race Board.

REVENUE.

The revenue for the year amounted to £20,556 15s. 10d., being a decrease of £1664 2s. 2d. on the previous year. This amount does not include a sum of £2755 19s. 10d. deposited as survey fees on applications for leases.

CONCLUSION.

In conclusion, I desire to thank the officers of the Department, and also the officers of the Mines Drafting Branch of the Surveyor-General's Department, for the loyal and efficient manner in which they have performed the duties allotted to them.

I have, &c.,

W. H. WALLACE, Secretary for Mines.

The Hon. the Minister for Mines.

DIAMOND-DRILLS.

Statement of Work done to 31st December, 1911.

Year.	Locality.	Direction of Bore.	No. of Bores.	Total Distance Bored.	Average cost per foot, inclusive of Labour and Fuel.
No. 1 DRILL.					
1882-3	Back Creek—For Gold	Vertical	7	feet. 1330	£ s. d. 0 10 9
1883	Lefroy—For Gold	Ditto	4	1011	0 5 3
1884	Tarleton—For Coal.....	Ditto	1	401	0 5 6
1886	Longford—For Coal	Ditto	2	1585	0 4 0½
1886-7	Harefield Estate—For Coal	Ditto	1	725	0 6 5
1887	Cardiff Claim, Mount Malcolm—For Coal.....	Ditto	1	562	0 17 11¾
1888	Killymoon Estate—For Coal.....	Ditto	1	504	0 4 7¾
1889-9	Seymour—For Coal	Ditto	5	2266	0 7 8½
1889 } 1890 }	Beaconsfield (Phoenix G.M. Co.)—For Gold	Ditto	1	781	2 0 2
1890	Beaconsfield (East Tasmania G.M. Co.)—For Gold	Ditto	1	978	0 14 9½
1891	Spring Bay—For Coal	Ditto	4	937	0 6 10
1891	Ravensdale—For Coal	Ditto	1	114	0 11 1½
1891-2	Back River, Prosser's Plains—For Coal.....	Ditto	2	854	0 6 1¾
1892-3	Lefroy (Deep Lead Syndicate)—For Gold.....	Ditto	4	979	0 15 9
1893	Lefroy (East Pinafore Co.)—For Gold	Ditto	1	317	0 10 3
1895-6	Sandfly—For Coal	Ditto	4	2130	0 11 5
1898 } 1900 }	Blue Tier (Anchor Co.)—For Tin	Ditto	9	876½	0 9 1¾
1901-2	Llandaff—For Coal.....	Ditto	3	1944	0 7 4
1902	Recherche (Catamaran Co.)—For Coal	Ditto	2	956	0 9 3
1903	Ditto (Moss Glen Co.)—For Coal	Ditto	2	667	0 7 6
1908	Sorell Creek, New Norfolk—For Coal	Ditto	1	218	Not obtainable
TOTAL.....		...	57	20,135½	

No. 2 DRILL.					
1882	Beaconsfield—For Gold	Horizontal, underground	1	68	No record
1883	Mangana—For Gold	Ditto	1	546	0 15 1
1884	Guy Fawkes Gully, near Hobart— For Coal.....	Vertical	1	612	0 5 6
1885	Malahide Estate, near Fingal— For Gold	Ditto	5	1397	0 5 6
1886	Carr Villa, near Launceston—For Coal	Ditto	1	571	0 5 4
1886-7	Waratah (Mount Bischoff Alluvial T.M. Co.) - For Tin	Ditto	7	1548	0 6 1½
1887	Waratah (Mount Bischoff T.M. Co.)—For Tin	Ditto	7	841	0 11 8
1887	Ditto	Horizontal, underground	1	53	0 7 8
1888	Old Beach—For Coal	Vertical	1	593	Abt. 0 10 9
1888	Campania—For Coal	Ditto	1	600	0 7 7½
1888	Richmond—For Coal	Ditto	1	500	0 5 1¾
1889	Back Creek—For Gold	Ditto	4	787	0 8 5½
1891	Macquarie Plain s—For Coal.....	Ditto	2	989	0 4 5½
1891	Jerusalem—For Coal	Ditto	1	344	0 4 9½
1892	Langloh Park— For Coal	Ditto	4	1249	0 5 3¼
1893	Southport—For Coal	Ditto	1	612	0 5 3
1894	Zeehan (Tasmania Crown S.M. Co.)—For Silver ...	Horizontal, underground	2	319	1 0 2½
1902	Eden—For Coal ..	Vertical	2	566	1 0 7½
1902-3	Farm Cove—For Coal	Ditto	1	571	0 5 6
TOTAL.....		...	44	12,766	

Aggregate number of bores 101
 Total distance bored 32,901½ feet

W. H. WALLACE, Secretary for Mines.

No. 1.

RETURN showing the Quantity and Value of Gold won during the Years 1880, 1881, 1882, 1883, 1884, 1885, 1886, 1887, 1888, 1889, 1890, 1891, 1892, 1893, 1894, 1895, 1896, 1897, 1898, 1899, 1900, 1901, 1902, 1903, 1904, 1905, 1906, 1907, 1908, 1909, 1910, and 1911.

Year.	Quantity.	Value.
	OZS.	£
1880.....	52,595	201,297
1881.....	56,693	216,901
1882.....	49,122·3	187,337
1883.....	46,577·5	176,442
1884.....	42,339·95	160,404
1885.....	41,240·95	155,309
1886.....	31,014·5	117,250
1887.....	42,609·15	158,533
1888.....	39,610·95	147,154
1889.....	32,332·65	119,703
1890.....	20,510	75,888
1891.....	38,789	145,459
1892.....	42,378	158,917
1893.....	37,687	141,326
1894.....	57,873	217,024
1895.....	54,964	206,115
1896.....	62,591	237,574
1897.....	77,131	296,660
1898.....	74,233	291,496
1899.....	83,992	327,545
1900.....	81,175	316,220
1901.....	*69,491	295,176
1902.....	*70,996	301,573
1903.....	*59,891	254,403
1904.....	*65,921	280,015
1905.....	*73,540·5	312,380
1906.....	*60,023·4	254,963
1907.....	*65,354·25	277,607
1908.....	*57,085·1	242,482
1909.....	*44,777·366	190,201
1910.....	*37,048·053	157,370
1911.....	*31,100·873	132,108
	1,700,687·492	6,752,832

* Fine Gold.

5 cm

Diagram showing Total Quantity & Value of Gold won in Tasmania during the years 1880-1911

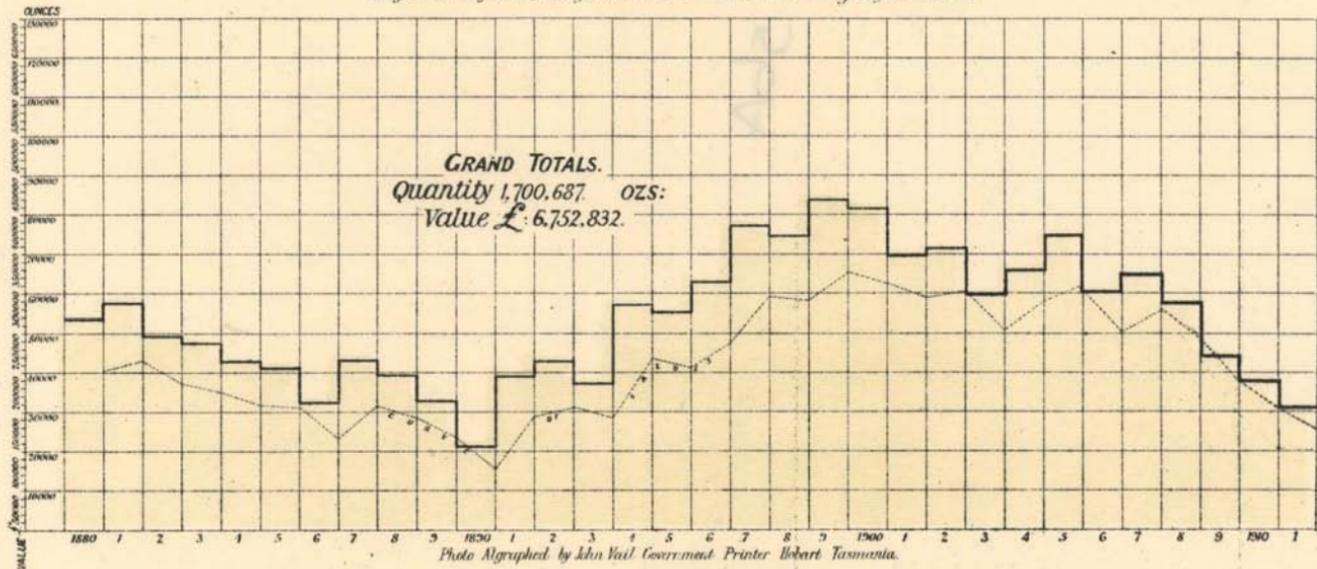


Diagram showing Total Quantity & Value of Coal raised in Tasmania during the years 1880-1911

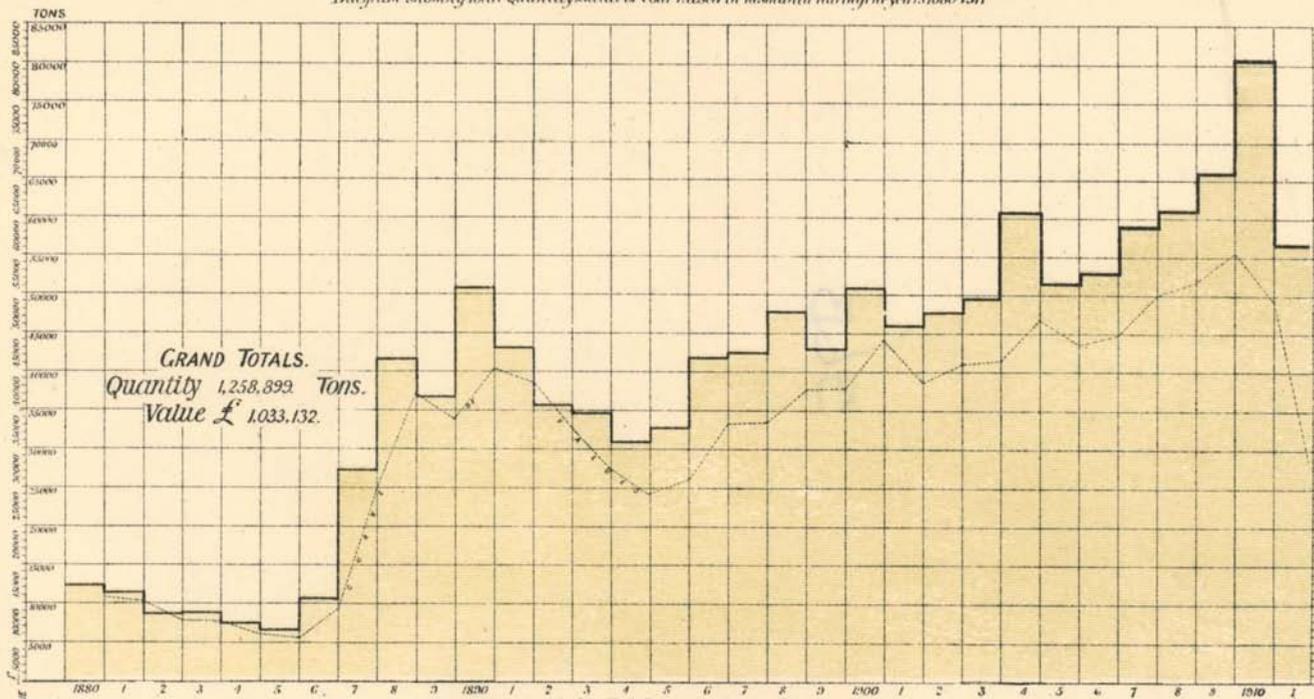
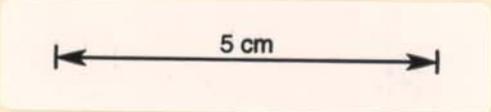


Photo Algraphed by John Vail Government Printer Hobart Tasmania.



No. 2.

RETURN showing the Quantity and Value of Coal raised during the Years 1880, 1881, 1882, 1883, 1884, 1885, 1886, 1887, 1888, 1889, 1890, 1891, 1892, 1893, 1894, 1895, 1896, 1897, 1898, 1899, 1900, 1901, 1902, 1903, 1904, 1905, 1906, 1907, 1908, 1909, 1910, and 1911.

Year.	Quantity.	Value.
	Tons.	£
1880	12,219	10,998
1881	11,163	10,047
1882	8803	7923
1883	8872	7985
1884	7194	6475
1885	6654	5989
1886	10,391	9352
1887	27,633	24,870
1888	41,577	37,420
1889	36,700	33,030
1890	50,519	45,467
1891	43,256	38,930
1892	36,008	32,407
1893	34,693	27,754
1894	30,499	24,399
1895	32,698	26,159
1896	41,904	33,523
1897	42,196	33,757
1898	47,678	38,256
1899	42,609	38,349
1900	50,633	44,227
1901	45,438	38,451
1902	48,863·5	41,533
1903	49,069	41,709
1904	61,109	51,942
1905	51,993	44,194
1906	52,895·75	44,962
1907	58,891	50,057
1908	61,067·75	51,907
1909	66,161·75	56,237
1910	82,445	48,609*
1911	57,067	26,214*
	1,258,899·75	1,033,132

* Value at pit's mouth.

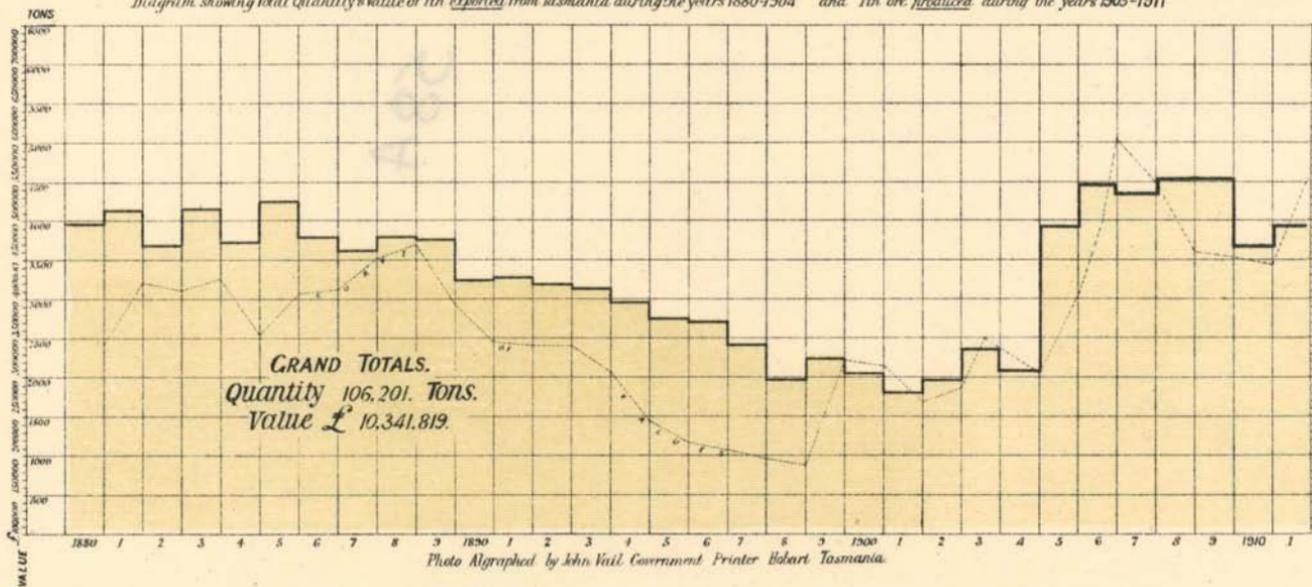
No. 3.

RETURN showing the Quantity and Value of Tin exported from Tasmania during the Years 1880, 1881, 1882, 1883, 1884, 1885, 1886, 1887, 1888, 1889, 1890, 1891, 1892, 1893, 1894, 1895, 1896, 1897, 1898, 1899, 1900, 1901, 1902, 1903, and 1904, compiled from Customs Returns only, and Tin Ore produced during the Years 1905, 1906, 1907, 1908, 1909, 1910, and 1911.

Year.	Quantity.	Value.
	Tons.	£
1880	3954	341,736
1881	4124	375,775
1882	3670	361,046
1883	4122	376,446
1884	3707	301,423
1885	4242	357,587
1886	3776	363,364
1887	3607·5	409,853
1888	3775·25	426,321
1889	3764	344,941
1890	3209·25	296,368
1891	3235	291,715
1892	3174	290,083
1893	3128·5	260,219
1894	2934	198,298
1895	2726·75	167,461
1896	2700	159,036
1897	2423·5	149,994
1898	1972	142,046
1899	2239·25	278,323
1900	2029	269,833
1901	1789·5	212,542
1902	1958·25	237,828
1903	2376·15	300,098
1904	2171·5	255,228
1905*	3891·5	362,670
1906*	4472·75	557,266
1907*	4342·75	501,681
1908*	4520·8	421,580
1909*	4511·2	418,165
1910*	3701·01	399,393
1911*	3953·05	513,500
	106,201·46	10,341,819

* Tin Ore produced : Customs having ceased to issue Returns.

Diagram showing Total Quantity & Value of Tin exported from Tasmania during the years 1880-1904 and Tin produced during the years 1905-1911



5 cm

No. 4.

RETURN showing the Quantity and Value of Silver-Lead Ore produced during the Years 1888, 1889, 1890, 1891, 1892, 1893, 1894, 1895, 1896, 1897, 1898, 1899, 1900, 1901, 1902, 1903, 1904, 1905, 1906, 1907, 1908, 1909, 1910, and 1911.

Year.	Quantity.	Value.
	Tons.	£
1888	417	5838
1889	415	7044
1890	2053	26,487
1891	4810	52,284
1892	9326	45,502
1893	14,302	198,610
1894	21,064	293,043
1895	17,980	175,957
1896	21,167	229,660
1897	18,364	200,167
1898	15,320	188,892
1899	31,519·5	250,331
1900	26,564	279,372
1901	28,774	207,228
1902	46,480	218,864
1903	42,422	192,492
1904	51,138	203,702
1905	75,270·5	246,888
1906	87,117·7	462,443
1907	89,762·5	572,560
1908	63,116·9	322,007
1909	80,378·35	298,880
1910	51,226·91	247,576
1911	61,501·195	253,361
	860,489·605	5,179,188

No. 5.

RETURN showing the Quantity and Value of Blister Copper produced during the Years 1896, 1897, 1898, 1899, 1900, 1901, 1902, 1903, 1904, 1905, 1906, 1907, 1908, 1909, 1910, and 1911.

Year.	Quantity.	Value.
	Tons.	£
1896	41.5	1245
1897	4700	322,500
1898	4955.5	400,668
1899	8598	735,305
1900	9449	907,288
1901	9981	879,625
1902	7745	*462,151
1903	6684	*478,023
1904	8371	*582,540
1905	8610	*704,287
1906	8708	*862,444
1907	8247	*832,691
1908	8833	*603,063
1909	8638	*586,419
1910	8193	*553,822
1911	6022	*385,797
	117,776	9,297,868

* Value of Gold contained deducted.

No. 6.

RETURN showing Quantity and Value of Copper Matte exported during the Years 1902, 1903, 1904, 1905, 1906, 1907, 1908, 1909, 1910, and 1911.

Year.	Quantity.	Value.
	Tons.	£
1902	2500	50,112
1903	3727	83,624
1904	—	—
1905	—	—
1906	—	—
1907	—	—
1908	—	—
1909	—	—
1910	—	—
1911	—	—
	6227	133,736

No. 7.

RETURN showing the Quantity and Value of Copper Ore produced during the Years 1896, 1897, 1898, 1899, 1900, 1901, 1902, 1903, 1904, 1905, 1906, 1907, 1908, 1909, 1910, and 1911.

Year.	Quantity.	Value.
	Tons.	£
1896	34	1020
1897	75	2250
1898	394	8128
1899	1695	26,833
1900	4221·5	63,589
1901	11,221	130,412
1902	5994	65,270
1903	102	790
1904	104	1640
1905	1150·75	52,939
1906	2234·5	72,480
1907	788·25	36,975
1908	1185	6588
1909	1587·8	21,619
1910	671·27	13,150
1911	2286	22,852
	33,744·07	526,535

No. 8.

RETURN showing the Quantity and Value of Iron Ore produced during the Years 1897, 1898, 1899, 1900, 1901, 1902, 1903, 1904, 1905, 1906, 1907, 1908, 1909, 1910, and 1911.

Year.	Quantity.	Value.
	Tons.	£
1897	894	812
1898	1598	1598
1899	3577	3474
1900	5375	5995
1901	612	417
1902	2386	1075
1903	5980	2905
1904	6840	2975
1905	6300	2600
1906	2600	1100
1907	3000	1150
1908	3600	1600
1909	—	—
1910	—	—
1911	—	—
	42,762	25,701

No. 9.

RETURN showing the Quantity and Value of Asbestos produced during the Years 1899, 1900, 1901, 1902, 1903, 1904, 1905, 1906, 1907, 1908, 1909, 1910, and 1911.

Year.	Quantity.	Value.
	Tons.	£
1899	200	363
1900	128	113
1901	46·5	45
1902	—	—
1903	—	—
1904	—	—
1905	—	—
1906	—	—
1907	—	—
1908	—	—
1909	—	—
1910	—	—
1911	—	—
	374·5	521

No. 10.

RETURN showing the Quantity and Value of Wolfram produced during the Years 1899, 1900, 1901, 1902, 1903, 1904, 1905, 1906, 1907, 1908, 1909, 1910, and 1911.

Year.	Quantity.	Value.
	Tons.	£
1899	3·5	99
1900	53·75	2058
1901	—	—
1902	—	—
1903	—	—
1904	15·5	1147
1905	32·25	2371
1906	19·75	1465
1907	40·75	4411
1908	4·5	338
1909	28·35	2494
1910	67·35	7280
1911	69·96	7769
	385·66	29,482

No. 11.

RETURN showing the Quantity and Value of Bismuth produced during the Years 1904, 1905, 1906, 1907, 1908, 1909, 1910, and 1911.

Year.	Quantity.	Value.
	Tons.	£
1904	·3	15
1905	3·5	800
1906	·3	24
1907	·175	27
1908	3·75	462
1909	2·9	980
1910	10·70	4249
1911	14·395	5758
	36·020	12,315

No. 12.

RETURN showing the Quantity and Value of Osmiridium produced during the Years 1910 and 1911.

Year.	Quantity	Value.
	Ozs.	£
1910	120	530
1911	271·88	1188
	391·88	2418

No. 13.

RETURN showing the Quantity and Value of Shale produced during the Years 1910 and 1911.

Year.	Quantity.	Value.
	Tons.	£
1910	364	214
1911	500	250
	864	464

No. 14.

RETURN showing the Quantity of Silver-Lead and Copper Ore smelted for period 25th June to 31st December, 1896, and 1st January, 1897, to 31st December, 1911.

Year.	Ore Smelted.	Products.			Yield.			
		Silver-Lead Bull'n.	Blister Copper.	Matte.	Copper.	Silver.	Gold	Lead.
		Tons.	Tons.	Tons.	Tons.	Ozs.	Ozs.	Tons.
1896	26,028 $\frac{1}{10}$	—	—	2417 $\frac{6}{10}$	1235 $\frac{11}{10}$	75,951	4707	—
1897	90,773 $\frac{1}{10}$	—	3476 $\frac{12}{10}$	257 $\frac{1}{10}$	3583 $\frac{14}{10}$	334,349	16,485	—
1898	170,933	—	4992	—	4783	606,123	24,418	—
1899	275,239	2295	8463	89 $\frac{5}{10}$	8362	1,089,657	27,615	—
1900	363,113	4817	9449	—	9341	1,215,036	26,255	—
1901	355,528	1839	9982	50	9880	800,317	21,717	—
1902	411,736	6825	7727	2882	8841	1,674,816	24,719	6654
1903	399,032	7560	6683	3413	8094	1,855,158	25,238	7529
1904	433,366	—	8371	—	8265	1,896,134	26,809	7754
1905	466,578	9422	8611	—	8596	2,075,431	26,469	9086
1906	479,775	9380	8768	—	8613	2,150,405	24,986	9300
1907	472,658	10,590	8248	—	8145	2,147,120	24,531	10,060
1908	440,145	7181	8834	—	8723	1,654,350	22,008	6850
1909	429,549	6960	8640	—	8534	1,534,780	18,812	6696
1910	386,679	—	8192	—	8093	656,793	11,851	—

No. 15.

RETURN showing the Average Number of Persons engaged in Mining during the Years 1880 to 1911 inclusive.

Year.	Number.	Year.	Number.
1880.....	1653	1896.....	4350
1881.....	3156	1897.....	4510
1882.....	4098	1898.....	6052
1883.....	3818	1899.....	6622
1884.....	2972	1900.....	7023
1885.....	2783	1901.....	6923
1886.....	2681	1902.....	5934
1887.....	3361	1903.....	6017
1888.....	2989	1904.....	6194
1889.....	3141	1905.....	6581
1890.....	2868	1906.....	7005
1891.....	3219	1907.....	7516
1892.....	3295	1908.....	6466
1893.....	3403	1909.....	6054
1894.....	3433	1910.....	5770
1895.....	4062	1911.....	5247

No. 16.

RETURN showing the total Number and Area of Leases issued during the Year ending 31st December, 1911.

Mineral.	No. of Applications.	No. of Sluiceways.	Area Acres.
Barite	1	...	10
Coal	8	...	2107
Copper	29	...	1041
Gold	60	...	737
Guano	1	...	2
Iron	2	...	76
Limestone	3	...	314
Machinery Sites	7	...	29
Minerals	99	...	6735
Ochre	1	...	80
Pyritic Ore	1	...	20
Shale	39	...	7489
Silver	18	...	761
Tin	189	...	5940
Wolfram	9	...	372
Dredging Claims	23	...	369
Water-rights	70	289	332
Mining Easements	9	...	40
	569	289	26,454

No. 17.

*RETURN showing the total Area of Land and Number of Sluic-
heads of Water applied for during the Year ending 31st
December, 1911.*

Mineral.	No. of Applications.	No. of Sluicheads.	Area. Acres.
Asbestos	9	...	567
Bismuth	1	...	78
Coal	19	...	5433
Copper	18	...	991
Clay	1	...	10
Gold	67	...	765
Machinery Sites	5	...	32
Mineral	109	...	6410
Pyritic Ore	2	...	40
Shale	3	...	860
Silver	18	...	1170
Tin	309	...	8200
Wolfram	4	...	95
Dredging Claims	22	...	489
Water-rights	133	480	674
Mining Easements	13	...	40
TOTAL	733	480	25,854

No. 18.

RETURN showing the Number and Area of Leases held under "The Mining Act," in force on 31st December, 1904, 1905, 1906, 1907, 1908, 1909, 1910, and 1911.

Nature of Lease.	In force on 31st December, 1904.		In force on 31st December, 1905.		In force on 31st December, 1906.		In force on 31st Dec., 1907.		In force on 31st Dec., 1908.		In force on 31st Dec., 1909.		In force on 31st Dec., 1910.		In force on 31st Dec., 1911.	
	No.	Area.	No.	Area.	No.	Area.	No.	Area.	No.	Area.	No.	Area.	No.	Area.	No.	Area.
For Minerals, Silver, Tin, &c.	868	Acres. 33,824	944	Acres. 34,325	1307	Acres. 43,036	1844	Acres. 65,047	1269	Acres. 44,099	1143	Acres. 41,637	1141	Acres. 44,001	1025	Acres. 41,311
For Coal, Slate, Shale, &c.	47	7546	45	7185	35	6025	45	7962	45	8745	51	10,590	50	10,608	58	13,049
For Gold	222	2268	195	2087	167	1836	222	2671	111	1344	87	1265	76	1159	73	1220
Dredging	29	469	51	1196	91	2027	79	1494	64	916	47	712	35	441	42	647
Claims																
Mining	39	234	45	282	47	298	75	436	88	453	92	464	84	484	99	606
Easements																
Machinery	—	—	—	—	—	—	—	—	33	133	32	129	33	121	37	145
Sites																
Water-rights	346	1495	251	1477	391	1606	490	1978	511	1003 & 2000	550	1022 & 2210	511	1094 & 1751	502	1060 & 1845
Mineral and Gold		sluice-heads		sluice-heads		sluice-heads		sluice-heads		sluice-heads		sluice-heads		sluice-heads		sluice-heads

No. 19.

RETURN showing the Total Number of Leases in force on
31st December, 1911.

Mineral.	Number.	Sluiceways.	Area.
			Acres.
Antimony	3	...	240
Barite	2	...	160
Coal	29	...	7416
Copper	96	...	4575
Gold	73	...	1220
Guano	1	...	2
Iron	17	...	790
Limestone	7	...	627
Lithographic Stone	1	...	97
Minerals	137	...	12,589
Manganese	1	...	63
Nickel	1	...	20
Ochre	1	...	80
Phosphate Rock	4	...	15
Pyritic Ore	1	...	20
Silver	74	...	4443
Slate	1	...	240
Shale	28	...	5393
Scheelite	1	...	80
Tin	665	...	16,974
Wolfram	12	...	496
Zinc-Lead	1	...	40
Machinery Sites	37	...	145
Mining Easements	99	...	606
Dredging Claims	42	...	647
Water Rights	502	1845	1060
	1836	1845	58,038

No. 20.

RETURN showing the Average Number of Miners employed during the Year ending 31st December, 1911.

	Europeans.	Chinese.
Northern and Southern Division	599	...
North-Eastern Division.....	622	71
Eastern Division.....	531	38
North-Western Division	777	...
Western Division	2609	...
	5138	109

No. 21.

RETURN showing the Amounts paid in Dividends by Mining Companies during the Year ending 31st December, 1911.

Mines.	Dividends.		
	£	s.	d.
Copper	53,344	0	0
Gold .....	...	
Tin	135,662	0	0
Silver	10,870	0	0
Coal.....	2718	0	0
TOTAL	£202,594	0	0

No. 22.

RETURN showing the total Amount of Rents, Fees &c., received by the Mines Department during the Year ending 31st December, 1911.

Head of Revenue.	Amount.		
	£	s.	d.
Rent of Auriferous and Mineral Land.....	18,993	8	3
Fees, ditto ditto	1563	7	7
Survey Fees	2755	19	10
TOTAL	£23,312	15	8

No. 23.

RETURN showing the Mining Companies registered during the Year ending 31st December, 1911.

Number of Companies.	Capital.
12	£28,500

In addition to the above, 12 Agents for Foreign Companies, and 7 Syndicates, under 60 Vict. No. 51, were registered.

No. 24.

RETURN showing Quantity and Value of Minerals and Metal raised in Tasmania from 1880 to 1911 inclusive.

Mineral or Metal.	Quantity.	Value.
		£
Gold	1,700,687·492 ozs.	6,752,832
Silver-lead ore	860,489·605 tons.	5,179,188
Blister Copper.....	117,776 "	9,297,868
Copper Matte	6227 "	133,736
Copper and Copper Ore.....	33,744·07 "	526,535
Tin	106,201·46 "	10,341,819
Iron Ore	42,762 "	25,701
Coal	1,258,899·750 "	1,033,132
Wolfram	335·66 "	29,432
Bismuth	36·02 "	12,315
Asbestos	374·50 "	521
Shale	864 "	464
Osmiridium	391·88 ozs.	2418
Unenumerated prior to 1894....	...	31,988
Total .....	...	£33,367,949

Diagram showing the Annual Value of Minerals & Metals raised in Tasmania from 1880 - 1911

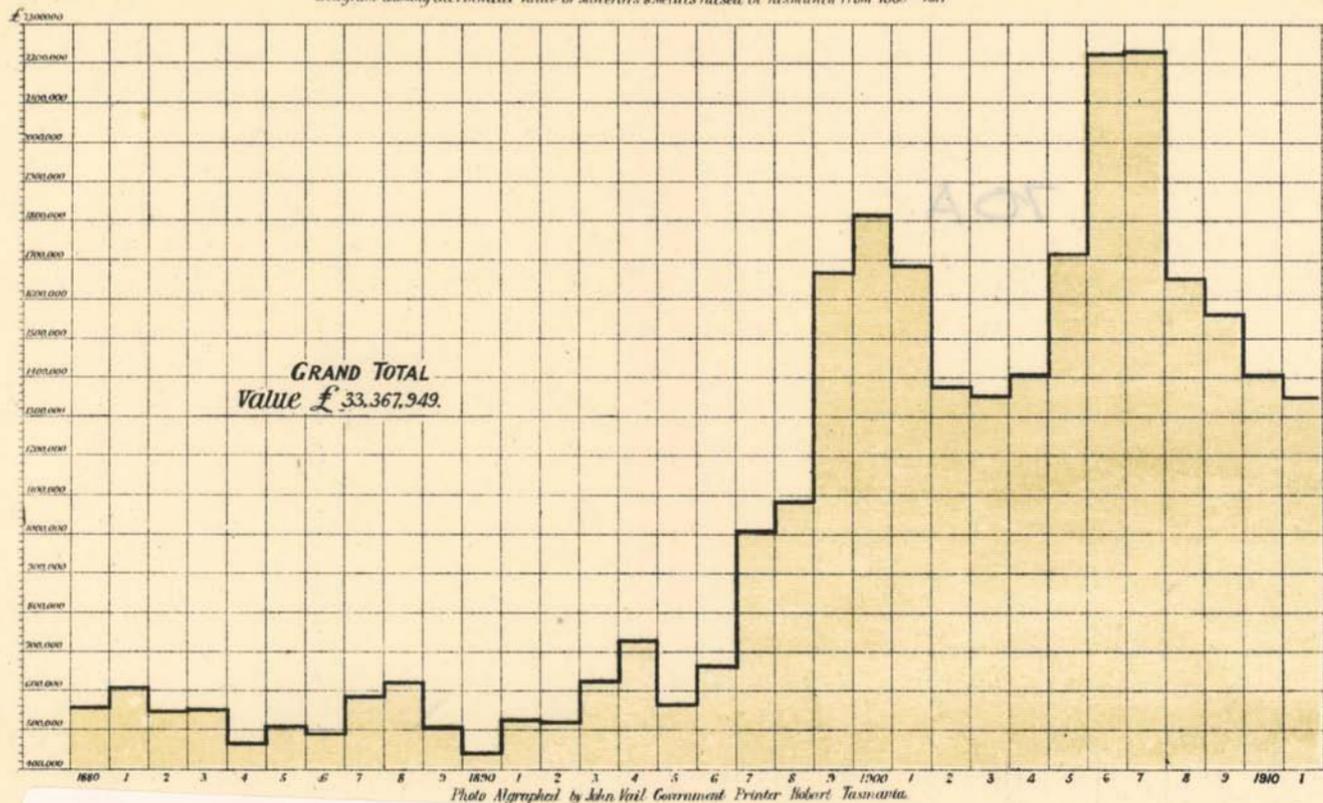


Photo Algraphed by John Veil Government Printer Hobart Tasmania.

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No. 25.

COMPARATIVE Statement of Revenue from Mines, being Rents, Fees, &c. (exclusive of Survey Fees) paid to the Treasury for the Years ending 30th June, from 1881 to 1903, and for Six months ending 31st December, 1903, and for the Years ending 31st December, 1904, 1905, 1906, 1907, 1908, 1909, 1910, and 1911.

Year.	Amount.			Year.	Amount.		
	£	s.	d.		£	s.	d.
1881.....	20,936	5	5	1897.....	25,631	0	3
1882.....	23,077	1	9	1898.....	33,661	13	9
1883.....	15,439	14	5	1899.....	24,696	10	5
1884.....	6981	11	10	1900.....	28,380	11	10
1885.....	11,070	5	7	1901.....	21,569	5	2
1886.....	12,523	10	4	1902.....	19,471	0	1
1887.....	14,611	11	5	1903.....	17,776	14	3
1888.....	23,502	8	4	1903, 1 July to 31 Dec.	14,758	17	1
1889.....	17,254	9	0	1904, Jan. to Dec.	16,631	8	2
1890.....	26,955	4	9	1905.....	20,208	17	0
1891.....	37,829	16	5	1906.....	24,136	12	5
1892.....	17,568	18	4	1907.....	24,794	7	7
1893.....	16,971	9	2	1908.....	20,311	3	0
1894.....	16,732	7	7	1909.....	22,804	1	5
1895.....	15,323	1	9	1910.....	22,221	18	0
1896.....	20,901	13	2	1911.....	20,556	15	10

The above Statement does not include Stamp Duties upon Transfer of Leases and Registration of Companies, nor the Tax payable upon Dividends, from which sources large sums are derived.

REPORT OF THE MOUNT CAMERON WATER-
RACE BOARD FOR THE YEAR ENDING
31st DECEMBER, 1911.

SIR,

WE have the honour to submit the report of the Board for the year ending 31st December, 1911.

Repairs.—The only repairs done have been those made by the Manager and Channel-keepers, and paid for out of the revenue received from the sale of water.

No. 1 Syphon has been replaced by a race cut in the solid 26½ chains long. Ten chains of this was heavy rock-shooting, the remainder being in clay. There was 5 chains of random rubble wall to build, and a clay dam across a gully about 20 feet deep to construct.

No. 2 Syphon has also been replaced by a race 73 chains long. Nine chains of this was solid rock, the remainder, except about 4 chains of hard cement, being clay. Five chains of clay bank had to be constructed, faced with stone on the water-side, and backed by dry stone wall. Three clay dams had to be built over creeks, two of which were about 17 feet deep, and the third about 12 feet.

No. 3 Syphon.—This has been replaced by a new wooden one. The new column is 263 feet long and 20 inches in diameter, and is constructed of machine-banded wooden pipes. The Little Mussel Roe River is crossed on trestle work 113 feet long. The pressure-box is of random rubble masonry, and the discharge-box of wood. About 2 chains of random rubble walling was required. A good deal of rock had to be shot away in grading the pipe-track from the trestling to the discharge box.

Little Mussel Roe Race.—This has been extended for a distance of 4½ chains, most of which has been through rock. A column of 10-inch machine-banded wooden pipes will connect this race with the main one, and the discharge will be into the intake-box of No. 3 syphon.

Old Iron Flume.—This has been replaced by a race cut in the solid about 14½ chains long. About half of the distance was through solid rock, the remainder being clay. Three clay dams had to be built over creeks about 9 feet deep.

No. 6 Syphon has been replaced by a wooden one 2904 feet long and 30 inches in diameter. This column is built on the continuous stave principle, and is buried in a trench. The boxes are of wood. About 4 chains of race was cut for connecting with the old race, and a clay bank about 2 chains long with a channel to carry the water was built at the intake end. The trench in which the pipe-column was buried was 4 feet wide, and for the greater part of its length about 3 feet deep. The last foot in depth was generally through hard red cement, which added materially to the labour and cost of cutting. The total length of race-cutting, inclusive of grading No. 3 syphon and trench for No. 6, was 153 chains; and the length of syphons constructed 3167 feet.

During the whole of the time under review, and more especially the latter half, labour was very scarce, and mostly of inferior quality. The Resident Engineer had to raise the wages from 8s. to 8s. 4d. per day, and then could not get nearly as many men as he wanted.

The scarcity of labour was felt all through the district, and naturally men prefer to accept work near the townships as against that which is so far away as this.

The whole of the renewal works, with the exception of the laying of the wooden pipes for the Little Mussel Roe intake, and the repairs to No. 1 dam have now been completed.

It is the intention of the Board to build a new bank for the dam, if necessary, instead of patching up the old one, and, if possible, increase the storage-capacity either by extending the area or increasing the depth. It is anticipated that the whole of the works will be completed in two months' time.

The total expenditure during the year, inclusive of the amount expended under 9 Edw. VII. No. 51, was £4997 6s.

The revenue amounted to £1368 10s. 6d., being an increase of £235 14s. 9d. as compared with the previous year.

Statistics for the year are as follows:—

Average per week of claims supplied, 13	
Greatest number supplied in any one week, 17.	
Total number of heads supplied—	
Under fixed or cash scale	2032 ¹ / ₄
Under royalty or credit scale... ..	1033
	<hr/>
Total	3065 ¹ / ₄

Tin ore raised for the year:—Royalty scale, 7 tons 13 cwt. 3 qr. 3 lb.; fixed scale, 47 tons 16 cwt. 2 qr. 7 lb. Total, 55 tons 10 cwt. 1 qr. 10 lb.

Average number of men employed per week, 31.

Total receipts for the year:—Water sold, fixed scale, £1122 18s. 11d.; water sold, royalty scale, £243 11s. 7d.; miscellaneous, £2. Total, £1368 10s. 6d.

Expenditure.—Cost of maintenance and management:—

	£	s.	d.
Salary and wages	540	8	4
Travelling expenses	9	15	4
Repairs to syphon-pipes	1	0	0
Repairs to flumings	332	3	10
Repairs to race	36	6	0
Stores and tools	39	11	0
Stationery and printing	2	14	7
Telephone	17	10	8
Making footpath	4	0	0
Insurance	3	6	0
	<hr/>		
	£986	15	9
Renewals and repairs (9 Edw. VII. No. 51)	£4010	10	3
	<hr/>		
Total	£4997	6	0

Paid to Public Debts Sinking
Fund for the year ending 30th
June, 1911 (including moiety of
rents of mineral land served by
the race, £41 12s. 6d.) £464 2 2

W. H. WALLACE, Chairman.
W. H. TWELVETREES,
E. L. HALL,
JOHN SIMPSON,
S. HAWKES,
CHAS. BARNES,

} Members of
the Board.

MINE MANAGERS' EXAMINATION.

MARCH, 1911.

METALLIFEROUS.

SUBJECT—MINING.

1. Under what conditions would you prefer an underlay shaft to a vertical one?
2. Describe three of the most common methods of stoping out a vertical lode.
3. It has been decided to instal in a quartz mine a Cornish pump with 12-inch diameter plungers, and to use underground trucks which will contain 15 cwt. dry weight. What size of shaft would you recommend? What variations in size would you allow, and why?
4. What are the relative advantages of skips and cages? What safety appliances would you recommend.
5. Describe the uses of compressed air underground and different types of machines or contrivances to which it may be applied.
6. Describe what you consider the best means of securing adequate underground ventilation in deep mines under varying circumstances (*e.g.*, only one shaft on the property)
7. Given, in flat country, a lode estimated by means of boreholes to contain at least 250,000 tons of ore. The lode is low-grade, of a solid nature, and the valuable mineral is disseminated evenly throughout. Width, 8 feet, with good walls; dip, 70 degrees. State system of stoping you would adopt. Sketch longitudinal elevation showing distances apart of levels and rises, and the position of the stope faces.
8. Same as Number 7, except that width of lode is 40 feet and the hanging-wall is inclined to be weak.
9. In solid ground you are required to timber a three-compartment shaft 16 by 6. Show by sketches method of timbering and details of all joggles.
10. Make a sketch showing ore in a stope 40 feet wide supported by timbering on the square-set system. The hanging-wall is heavy; dip, 70 degrees. Six stopes have been taken out.
11. In driving towards old workings which are full of water, what precautions would you take?
12. By means of sketches show what precautions you would take to guard against the results of
 - (a) A broken rope;
 - (b) Overwinding.

SUBJECT—ORE DRESSING AND SAMPLING.

1. Describe what you consider
 - (a) The best type of hydraulic classifier;
 - (b) The best type of hydraulic separator;
 - (c) The best type of slime settler.

2. A heap of coarse sand tailings contains 400,000 tons, and by assay averages $3\frac{1}{2}$ dwt. How would you set about designing a plant to treat same by a cyanide process? Give sketches and particulars of the plant you would recommend as suitable, and fix the rate of wages necessary to make it a remunerative undertaking.
3. Give sketches and particulars of a crushing and concentrating plant to deal with 50 tons per day of lead ore consisting of galena in a gangue of carbonate of iron, quartz, and slate. The product to be bagged for shipment.
4. You are given a 50-pound sample of ore (copper pyrites in a quartz gangue), which represents the average of the lode, and you are to report on the type of wet gravity concentrating plant required and the probable recovery to be expected. State the experiments you would conduct and your method of conducting them.
5. Describe the best ore-dressing plant with which you are acquainted.
6. State the principle on which the new "Flotation Processes" work, and describe the main features of any such process with which you are familiar.

SUBJECT—SURFACE WORK.

- 1.—(a) Describe a diamond-drilling plant;
 - (b) Describe a boring plant suitable for testing alluvial flats.
2. Give sketches of a vertical self-dumping skip to carry 2 tons.
3. Show how to calculate the strength of a rope to lift 2 tons of ore in a skip in a vertical shaft 1000 feet deep.
4. Show the arrangement you would adopt for landing trucks at the surface and breaking ore for stamps.
5. Give a design for a flume to carry 30 Tasmanian sluice-heads of water; trestling to be 20 feet high.
6. What size winding engines would be required to hoist 1200 lb. of ore from a shaft 500 feet deep at a fair working speed? Supply all other particulars, such as size of rope, weight of cages (2), steam-pressure, &c., yourself.
7. In a set of 12-inch pumps with 11-inch pole, 200 feet effective depth, the pump-rod, including all straps, bolts, plunger, &c., weighs 4 tons, and the effective weight of the column below the plunger is 4 cwt.; stroke of pump, 3 feet. What weight of balance-box and contents would be required?
8. A 100-head battery makes 80 drops per minute, the weight of each stamper complete is 1000 lb., and the lift is 9 inches. What horse-power would be required if 25 per cent. is allowed for loss in friction?
9. Two steel plates, each $\frac{3}{8}$ -inch thick, are lap-jointed and riveted together by two rows of $\frac{3}{8}$ -inch steel rivets pitched at 3 inches, the rows being $1\frac{1}{2}$ inch apart. What is the least percentage of strength of the joint?
10. In a safety-valve of the lever and ball type, what proportions must exist between the different parts so that the addition of each pound weight on the end of the lever just increases the pressure in the boiler by 1 pound per square inch? Neglect friction and the weight of the lever and valve.

SUBJECTS—ARITHMETIC, MENSURATION, AND MINE ACCOUNTS.

1. Extract the square root of $9\frac{1}{4}$.
2. Distribute £50 among three miners so that their proportions may be as 5, 11, and 14.
3. If a cubic foot of water weighs 62·5 lb., what is the weight of a cubic yard of pyrite with a specific gravity of 4·3?
4. Supposing miners to be paid 7s. 6d. per cubic yard for driving a level 6 feet high, 9 feet wide, and 100 yards long, what will be the total sum earned?
5. Reduce $\frac{1}{2}$ to a decimal.
6. If an anemometer registers 312 revolutions per minute in an airway measuring 7 feet high and 8 feet wide, how many cubic feet of air pass in a minute?
7. If a tributer has to pay royalty at 7 $\frac{1}{2}$ d. per ton of first-class ore and 4 $\frac{1}{2}$ d. per ton of second-class ore, and the lode yields 23 per cent. of second-class, what would be the average royalty per ton due on the total?
8. Give a specimen of
 - (a) Mine wages-sheet;
 - (b) Analysis of mine costs.

SUBJECT—MINING SURVEYING.

1. Describe the various methods of chaining over sloping ground.
2. A wet drive has to be driven accurately on a flat gradient. Arrange for two lines to be stretched across drive $\frac{1}{2}$ -chain apart and 4 feet above grade for boring through. How would you proceed to set the four pegs necessary?
3. Give the principle of the vernier, and show how to construct one to read to $\frac{1}{100}$ part of an inch.
4. Describe the adjustments of the transit theodolite.
5. Explain the method of reducing and plotting a survey by rectangular co-ordinates. Show how to find the area of an irregular many-sided figure.
6. Describe the various methods of laying out circular curves.
7. Describe your survey of a winze in a lode of irregular underlie.
8. Show how you would estimate the tonnage of ore in a lode and average value in a block developed on four sides.

SUBJECT—MINING GEOLOGY.

1. Give an account of the distribution and nature of the rocks with which the occurrence of gold in Tasmania or Australia is associated.
2. Describe the distinguishing features of granites in which veins of tin ore are found.
3. Mention how you would distinguish
 - (a) Wolframite from cassiterite;
 - (b) Zinc blende from pitch blende;
 - (c) Limonite from manganiferous iron ore.
4. How do faults originate? Describe the different kinds of faults. Explain fully your procedure in attempting to recover the faulted part of a lode. Illustrate your remarks by sketches.

5. Explain the terms "deep lead," "breccia," "cleavage," "unconformity," "pneumatolytic ores."
6. What characters do lavas possess that are not seen in sediments?
7. Describe some secondary changes which are brought about in the upper parts of mineral lodes by the action of descending surface waters.

SUBJECT—MINING LAW.

1. How and to whom is a manager required to report an accident causing loss of life or serious personal injury?
2. How long is the place where an explosion or accident has occurred to be left as it was immediately after such explosion or accident?
3. What works are not prohibited in mines on a Sunday?
4. How are cages required to be tested?
5. What overhead protection is required for men engaged in shaft-sinking?
6. What quantity of pure air is required by "The Mining Act, 1905," to be supplied for each person employed?

COLLIERY.

SUBJECT—MINING.

1. What are the most important considerations to be taken into account when opening up a new colliery?
2. How would you arrive at the number of cubic feet of fresh air to be supplied underground?
3. Describe what you consider the best type of coal-cutting machine, and your reasons for preferring it.
4. Describe in detail an underground haulage system.
5. A coal seam 4 feet thick with good roof is dipping at an angle of ten degrees from the horizontal in flat country, and the area secured is about 1 mile square. Describe with sketches how you would open it up with £5000 working capital.
6. How would you deal with the proposition in Question 5 if you had £40,000 working capital?
7. A coal seam outcropping on a plain has a good roof, 15-degree pitch, and is 4 feet thick. By means of boreholes it has been proved to contain at least 3,000,000 tons of coal of a gaseous nature. State with sketches how you would open up the property to produce 1000 tons per day. Give approximate dimensions of any headings, entries, cross-entries, pillars, &c., that may be required.
8. You are working a mine with naked lights. What precautions would you regularly take to detect the presence of accumulations of fire-damp?
9. Describe with sketches the principle of the "Safety Lamp."
10. State the conditions that are favourable to the "longwall" and "post and pillar" systems of working; also state the respective advantages of each.
11. In a fiery mine which is ventilated by a fan, state where the fan should be placed, and whether it should be used as a blower or for exhausting. Make a sketch of the fan-drift connection.

12. You are working a flat coal seam 6 feet high with a fairly good roof. Show with sketches your method of timbering a room 25 feet wide. Is it advisable to use cap pieces? If so, is soft or hard wood preferable, and why? Given an equal pressure and equal quality of timber, what governs the diameter of the posts?

SUBJECT—MINING GEOLOGY.

1. How do faults originate? Describe the different kinds of faults. Illustrate your remarks by sketches.
2. Name the different varieties of coal, and describe the leading characters of each.
3. Explain the terms "conformable," "under-lay," "strike and dip," "volatile matter," "sill."
4. Give an account of the geology of any coalfield with which you are acquainted.
5. How do you distinguish between (a) diabase and basalt; (b) conglomerate and breccia; (c) clay-slate and schist?
6. Describe the effects which heated igneous magma coming into contact with a seam may be expected to produce on the coal.
7. In boring for possible seams of coal in any district, how would you arrive at any conclusion as to the depth at which unsuccessful boring should be stopped?

SUBJECT—SURFACE WORK.

1. Describe a plant suitable for boring for coal, and method of using, with details of special tools for overcoming difficulties.
2. Give sketches showing construction of a tub to carry 12 cwt. of coal. Arrange for economical lubrication of axles.
3. Show how to calculate the strength of a winding rope to lift 25 cwt. of coal through a vertical shaft 600 feet deep.
4. Describe with sketches a method of economically handling and discharging tubs at the surface of a large colliery.
5. Describe the various methods of screening and preparing coal for the market.
6. Calculate the size of a pair of high-pressure steam-winding engines sufficient to haul 120 tons of coal per hour up an incline 1500 yards long, gradient 1 in 8, speed 4 miles per hour. Each truck to weigh 4 cwt., and to carry 10 cwt. of coal. Assume the average pressure of steam in engine at 30 lb. per square inch.
7. Give the size of steam Lancashire boiler plant to run the above engines under the conditions stated.
8. Give a plan of the setting of above, on level ground, with hard pan, at an excavation of 18 inches.
9. How many bricks would you require to set the above boiler plant?
10. If the feed-pump be worked off the main engines, what size feed-pipe would be necessary?

SUBJECT—MINING LAW.

1. What quantity of pure air is required to be supplied underground for:—
 - (a) Each man or boy.
 - (b) Each horse employed.

2. What percentage of coal must be left standing in the first working in pillars—
 - (a) 200 feet;
 - (b) 200-500 feet;
 - (c) 500-1000 feet—
 from the surface?
3. What sized pillars must be left where seams of less than 4 feet are being worked?
4. What are the conditions under which gunpowder or explosives may be stored in a mine?
5. What is a manager required to do when inflammable gas is found to exist in a mine?
6. What is a manager required to do when dust or fumes mingle with the air in the mine workings?

SUBJECT—MINING SURVEYING.

1. Describe the various methods of chaining over sloping ground.
2. Describe the miner's dial and its use in a colliery, with precautions for accuracy.
3. A seam of coal is 5 feet thick and dips 1 in 6. How many tons to the acre, taking specific gravity of coal as 1.25?
4. On a seam dipping north 1 in 7, what would be the gradient of a road driven south-west?
5. Give the principle of the vernier, and show how to construct one to read to one two hundred and fifty-sixth part of an inch ($\frac{1}{256}$).
6. The levels of six different points in a colliery are to be ascertained in reference to a point on the surface. Describe your work, and give sample of level-book.
7. Describe the adjustments of the transit theodolite.
8. How would you use a traverse-table to find the area of an irregular figure?

SUBJECTS—ARITHMETIC, MENSURATION, AND MINING ACCOUNTS.

1. In a drive 5 feet 6 inches high by 8 feet wide, the velocity of the air is 428 feet per minute. What volume of air travels each minute?
2. Wages were paid at the rate of 7s. 6d. per cubic yard for driving a heading 6 feet wide by 7 feet high by 285 feet long. What did the total wages amount to?
3. What books of account are usually kept by a mining manager? Describe their functions.
4. A cubic foot of water weighs 62.5 lb.
 - (a) If a cubic yard of material weighs 2799 lb., what is its specific gravity?
 - (b) If the specific gravity of coal is 1.29, how much will a cubic foot of it weigh?
- 5.—(a) Express $\cdot 016$ as a vulgar fraction in its lowest terms; (b) express $\frac{1}{11}$ as a decimal.
6. What weight of coal would be obtained from a space worked out 15 yards wide by 7 feet long, the seam of coal being 2 feet 9 inches thick, and yielding 15 cwt. per cubic yard?
7. If a man receives £2 4s. 0d. for getting and filling 24 tons of coal, and pays out 5d. per ton for filling, how much per ton does he receive for getting?

MINE MANAGERS' CERTIFICATES.

The following Lists of Certificates granted since the inception of the Board of Examiners for Mining Managers' Certificates are published in accordance with a resolution passed at the Interstate Conference of Boards of Examiners held in Melbourne in March, 1906 :—

SERVICE Certificates of Competency granted by the Board of Examiners.

No. of Certificate.	Name.	Date of Certificate.
1. 92	Davies, Joseph	28 Sep. 1892
2. 92	Ruffon, Geo. Donald	28 Sep. 1892
3. 92	Sinclair, George Peace	28 Sep. 1892
4. 92	Heighway, John Felton	28 Sep. 1892
5. 92	Irvine, Peter	28 Sep. 1892
6. 93	Daniel, John	29 Mar. 1893
7. 93	Marshall, John Henry	29 Mar. 1893
8. 93	Aaron, Gabriel	29 Mar. 1893
9. 93	Webb, George	29 Mar. 1893
10. 94	Payne, John Greaves	3 Apr. 1894
11. 94	Wesley, William Henry	3 Apr. 1894
12. 94	Andrews, Thomas	3 Apr. 1894
13. 95	Richards, Moses John	17 Apr. 1895
14. 95	Richards, Stephen Eddy	5 Nov. 1896
15. 98	Stubs, Joseph Thomas	20 Jan. 1898
16. 98	McCrackan, John	20 Jan. 1898
17. 98	Heery, Luke	5 Mar. 1898
18. 98	Curtain, Cornelius Henry	13 Apr. 1898
19. 98	Clerk, Frederick Malcolm	14 Apr. 1898
20. 99	Craze, John	25 Jan. 1899
21. 99	Tilley, George Reynolds	17 Apr. 1899
22. 99	Hooper, Thomas Martin	17 Apr. 1899
23. 99	Vincent, Thomas	17 Apr. 1899
24. 1900	Brown, William	9 Jan. 1900
25. 1900	Rosewarne, David Davey	4 Oct. 1900
26. 1901	Buddon, William	1 Mar. 1901
27. 1901	Yeates, Alexander	29 Apr. 1901
28. 1902	Ireland, Mark	22 Apr. 1902
29. 1902	Woolcock, John	23 Sep. 1902
30. 1903	Powell, Robert William	5 May, 1903
31. 1904	Muir, John James	27 July, 1904
32. 1904	Moyle, John	5 Dec. 1904
33. 1904	Ridley, John	12 Dec. 1904
34. 1906	Brough, Daniel	23 Apr. 1906
35. 1906	Birrell, Samuel	23 Apr. 1906
36. 1906	Barker, George	24 July, 1906
37. 1907	Wisch, John G. A.	6 Nov. 1907
38. 1910	Gullock, William	4 Mar. 1910
39. 1910	Kelly, Aloysius	24 May, 1910

CERTIFICATES of Competency granted by the Board of Examiners.

No. of Certificate.	Name.	Date of Certificate.	Class of Certificate.
1. 92	Dunstan, Alfred John	28 Sep. 1892	First class
2. 92	Ekborg, Benjamin Pher- son	28 Sep. 1892	Second class
3. 92	Hill, Charles	28 Sep. 1892	Second class
4. 92	Booth, John Robert	28 Sep. 1892	Second class
5. 92	Stapleton, Michael	28 Sep. 1892	Second class
6. 92	Lewis, Philip	28 Sep. 1892	Second class
7. 92	Hanlon, Christopher	28 Sep. 1892	Second class
8. 92	Williams, Luke	28 Sep. 1892	Second class
9. 92	Macandrew, Harold	28 Sep. 1892	First class
10. 92	Harris, William	28 Sep. 1892	First class
11. 93	Stapleton, Michael	29 Mar. 1893	First class
12. 93	Hanlon, Christopher	29 Mar. 1893	First class
13. 93	Potter, Joseph Matthew	29 Mar. 1893	First class
14. 93	Hilder, Alfred	29 Mar. 1893	Second class
15. 93	Matthews, Peter	29 Mar. 1893	Second class
16. 93	Richards, Stephen	6 Sep. 1893	First class
17. 94	Brain, Austin Lionel Bennet	3 Apr. 1894	First class
18. 94	Thorpe, Walter	3 Apr. 1894	Second class
19. 95	Williams, Luke	17 Apr. 1895	First class
20. 96	Levings, Joseph Henry	6 May, 1896	First class
21. 99	Goodall, Thomas Charles	14 Apr. 1899	Second class
22. 1900	Schloesser, Robert	19 May, 1900	First class
23. 1900	Nicholls, Charles Berres- ford	19 May, 1900	First class
24. 1900	Sale, William Robert	19 May, 1900	Second class
25. 1900	Williams, Richard	19 May, 1900	Second class
26. 1900	McPeake, John	1 Aug. 1900	First class
27. 1901	Sawyer, Basil	20 Feb. 1901	First class
28. 1902	Provis, John	22 Apr. 1902	First class
29. 1902	Bird, Robert Chisholm	22 Apr. 1902	Second class
30. 1902	Briggs, William Albert John	22 Apr. 1902	Second class
31. 1902	Bartlett, William Henry	22 Apr. 1902	Second class
32. 1902	Phoenix, William	22 Apr. 1902	Second class
33. 1902	Wright, Herbert E.	22 Apr. 1902	Second class
34. 1902	Craze, John	30 Apr. 1902	Second class
35. 1903	Waller, Richard Fitz- arthur	5 May, 1903	First class
36. 1903	Brickhill, Hector Gordon	5 May, 1903	First class
37. 1903	Barker, Reginald Fredk.	5 May, 1903	First class
38. 1903	Vincent, Thomas Henry	5 May, 1903	First class
39. 1903	Crittendon, James Henry	5 May, 1903	First class
40. 1903	Weston, Eustace Moriarty	12 Aug. 1903	First class
41. 1903	Clark, Lindsay Colin	31 Aug. 1903	First class

CERTIFICATES of Competency—continued.

No. of Certificate.	Name.	Date of Certificate.	Class of Certificate.
42. 1904	Martin, Edward Patrick	17 Feb. 1904	First class
43. 1904	Herman, Hyman	29 Apr. 1904	First class
44. 1904	Murray, Russell Mervyn	29 Apr. 1904	First class
45. 1904	More, George Allan	14 Oct. 1904	First class
46. 1905	Beamish, William Abraham	3 Jan. 1905	First class
47. 1905	Andrews, Thomas J.	1 May, 1905	Second class
48. 1905	Hitchcock, William E.	1 May, 1905	First class
49. 1905	Smith, George Oliver	18 July, 1905	First class
50. 1906	Rockett, Hildreth Peyton	23 Apr. 1906	Second class
51. 1906	Hales, Richard Chilman	23 Apr. 1906	Second class
52. 1906	Debenham, Arthur John	28 June, 1906	First class
53. 1906	Coote, Charles Edward	18 Oct. 1906	First class
54. 1907	Marks, Oscar Sidney	8 Mar. 1907	First class
55. 1907	Phelan, Bernard Fredk.	23 Apr. 1907	Second class
56. 1907	Moline, Arthur Howard Pritchard	23 Apr. 1907	First class
57. 1907	Macartney, Ross Kenneth	23 Apr. 1907	First class
58. 1907	Williams, Thomas James	8 May, 1907	First class
59. 1908	Hooke, Arthur Warner	18 Mar. 1908	First class
60. 1908	Adams, Oliver Linley	25 Apr. 1908	First class
61. 1908	Seal, Leonard Presley	19 Nov. 1908	First class
62. 1909	Watt, William Shand	20 Apr. 1909	First class
63. 1909	M'Intyre, William Keverall	20 Apr. 1909	First class
64. 1909	Bruschle, Conrad C.	8 May, 1909	Second class
65. 1909	Reid, William Daniel	30 June, 1909	First class
66. 1909	Brook, Reginald H. T.	5 Aug., 1909	First class
67. 1910	Martin, A. E.	17 Feb. 1910	Second class
68. 1910	McKenny, S. D.	24 Mar. 1910	Second class
69. 1910	Smith, Chas. Lonsdale	30 June, 1910	First class
70. 1910	Allen, Douglas Vernon	9 Sept. 1910	First class
71. 1910	Alabaster, Rupert Cecil	28 Sept. 1910	First class
72. 1910	Bedford, Max E.	24 Nov. 1910	First class
73. 1911	Rough, John H.	24 Apr. 1911	Second class
74. 1911	Vandean, Henry Alexander	25 May, 1911	First class
75. 1911	Garrett, James Edward	6 June, 1911	First class

COLLIERY Certificates of Competency granted by Board of Examiners.

No. of Certificate.	Name.	Date of Certificate.	Class of Certificate.
1. 1902	Brain, Austin Lionel Bennet	28 Sep. 1902	First class
2. 1907	Wallace, Archibald Campbell	23 Apr. 1907	Second class
3. 1907	Williams, Thomas James	8 May, 1907	First class
4. 1910	Ledger, William	6 Sept. 1910	First class
5. 1911	Griffin, Daniel Martial Counsel	24 Apr. 1911	Second class
6. 1911	Dawson, Samuel Joseph	13 July, 1911	Second class

GEOLOGICAL SURVEY OF TASMANIA.

REPORT OF THE GOVERNMENT GEOLOGIST.

Geological Survey Office,
Launceston, 14th May, 1912.

SIR,

I HAVE the honour to submit my report for the year ended 31st December, 1911.

The following bulletins and reports have been prepared during the year and sent forward for publication:—

- Bulletin No. 10.—The Mt. Balfour Mining Field, by L. Keith Ward, B.A., B.E., 27th June, 1911.
 Bulletin No. 11.—The Tasmanite Shale Fields of the Mersey District, by W. H. Twelvetrees, 28th December, 1911.
 Bulletin No. 12.—The X River Tinfield, by L. Keith Ward, B.A., B.E., 28th December, 1911.
 Report No. 2.—The Silver-lead Lodes of the Waratah District, by L. Keith Ward, B.A., B.E., 30th December, 1911.

The above publications, besides contributing in an important degree to our knowledge of the general geology of the districts under review, deal with their economic geology and the mining properties as far as the present stage of development of the latter at present permits. The Balfour field, to which of late years the attention of investors has been attracted, has now for the first time been systematically examined and described. A favourable forecast is made of future copper and tin mining in this field.

The bulletin referring to the X River tinfield presents the results of an examination of a district which, though as yet undeveloped, promises well as a contributor to our tin-ore output. The lode-outcrops are important, and rich lode-stuff is common. It is expected that the preliminary prospecting now in progress will result in confirming the hopes which are entertained of the field as a tin-producer.

The report on the silver-lead lodes of the Waratah district covers an inspection of galena deposits in the neighbourhood of the Silver Cliff Mine. The ore-bodies are described, and certain suggestions made for prospecting.

Bulletin No. 11 deals with the Tasmanite Shale fields of the Mersey district. During the year the examination of the deposits of Tasmanite Shale in the basins of the Mersey and Don was completed. Ever since 1851 (and perhaps even earlier) this combustible shale has been known to exist in the Mersey district, but it was not until 1901-2 that some prolonged experiments conducted at the Great Bend of the Mersey by Messrs. Black and Esdaile placed it beyond doubt that various oils of commercial value could be extracted from it.

Renewed attention was paid to the deposits in 1910-11. The Latrobe Shale and Oil Company proved the extent of its seam by diamond-drill boring near Railton; and the Tasmanian Shale and Oil Company made an abortive attempt to initiate the oil

industry at the Mersey Bend, near Latrobe. Initial difficulties connected both with retorting and finance led to suspension of work, and for a time the enterprise has received a set-back.

My investigations have led me to the belief that the elements of a successful industry exist, and that the enterprise involves no intractable problem. Doubtless the work for some time to come must be to some extent experimental.

In examining the district I found that most of the deposits were situate in the basin of the Mersey; one only is in the valley of the Don. It appeared to me that the seam or seams at the Mersey Bend, China Flat near Railton, Nook-road, and the Minnow cover altogether an area of 2000 acres, which may possibly contain 12,000,000 tons of Tasmanite shale. Experiments have shown that the crude oil content of fair average quality shale is about 40 gallons per ton; and that this can be fractionated into various marketable products.

The nature of the deposits and their geological relations are discussed in the bulletin which is in the printer's hands. Geological sections and map of the district are also being issued. Up to the present Tasmanite shale has been discovered only in the country drained by the Mersey, Don, and Minnow Rivers. The experience gained in the examination of this area should be of use in judging the likelihood of discoveries in other parts of the island. In this respect attention has to be directed to occurrences of Upper Permo-Carboniferous strata. These are developed at Porter's Hill, Sandy Bay, and at the Henty River on the West Coast. The Porter's Hill beds do not appear to show any signs of Tasmanite, but it cannot be said that the Henty area has undergone a complete examination. The Lower Marine beds are known there, and also fresh-water strata belonging to the horizon of the Mersey coal measures. Tasmanite has not been recorded from this district, but whether it exists or not cannot be positively stated without a prolonged examination of the locality.

The association of salt with petroleum is a well-known and widely-observed fact; that is to say, the water traversing or emanating from oil-bearing beds is usually highly saline. Salt pans are frequent in oil areas. Efflorescence of salt is sometimes due to the capillary uprising of water from oil-beds, and salt lakes in several countries were worked for their salt a long time before their connection with oil sources was established. This being the case, it would seem desirable to examine the geology of the areas in the Midlands in which salt pans have been long known to occur. If any springs of sulphurous water occur in those districts, the likelihood of a discovery would be decidedly increased. A complete investigation might possibly be the means of initiating an industry of first-class interest and importance.

Work of the Geological Survey.

The Geological Survey, established as it is in a country abounding in minerals and having a mining industry in process of development, is naturally looked to chiefly to render assistance to the public in the direction of economics. The way in which its duties are discharged is largely in expounding the principles of geology as applied to the exploitation of mineral deposits and in mapping out the distribution of ores in the island.

In answer to sundry enquiries it may be stated frankly that examinations of mines for individual owners are not undertaken, nor is technical industrial work a function of the Survey. Such work as sampling mines, making commercial estimates of costs and output, giving professional advice, and dealing with engineering problems can rarely be undertaken without trespassing on the province of the engineer and trade expert.

The geologists are fully occupied in applying to the various mining fields the broad principles which govern the nature and structure of ore-deposits, and in preparing maps illustrative of the geologic structure of the mining districts. In this way information is supplied impartially for the benefit of all.

It is desirable that more and more time be devoted to the preparation of maps, which in some cases might very well precede the complete bulletins, giving valuable information to the mineowner which he can readily extract for his own use. It is to be hoped that appropriations will be made enabling more work to be done in this direction.

The publications of the Survey as planned are of three classes: Bulletins, reports, and records.

The bulletins furnish descriptions and discussions of the mineral deposits of various districts in a more or less complete way. Completeness of treatment is assisted by observing uniformity in the divisions under which the subjects are discussed in these publications. Thus, in each bulletin the chapters are divided into Previous Literature, Physiography, Geology, Economic Geology, and Mining Properties; and illustrative maps are added.

The reports, in some cases anticipatory of the bulletins, deal briefly with the fields or mines examined, and may be regarded mostly as either preliminary or less elaborately prepared productions than the bulletins.

The third class of Survey publications comprises the records. These will be issued at irregular intervals, and are designed to deal with the more scientific aspects of Tasmanian geology, such as palaeontology, petrology, stratigraphy, &c. The first of this series, comprising notes on marine fossils from the tasmanite spore beds of the Mersey, by Mr. W. S. Dun, Palaeontologist to the Government of New South Wales, has been prepared, and will shortly be issued.

The bulletins and reports are supplied free to the public on application to the Mines Office either in Hobart or Launceston.

Some reports and bulletins, owing to heavy demand for them, are now out of print; and it is a matter for consideration whether they should be reprinted, without additions or with supplementary progress notes of work carried out since the date of their first issue. The latter course would involve fresh visits, but appears to be the more desirable course.

The Survey suffers serious loss by the departure of Mr. L. K. Ward, B.A., B.E., Assistant Government Geologist, who severed his connection with the Department at the end of the year in order to take the important position of Government Geologist for South Australia. Mr. Ward has been with us a little over four years, and proved himself a brilliant officer, having the interests of the Survey wholly at heart and devoting himself enthusiastically and with marked success to the elucidation

tion of the geologic structure of the areas in which he worked. With his entrance into the service this branch was constituted a Geological Survey, and he must share in the credit for any measure of success it has since enjoyed, for his attainments and co-operation have been of great service.

Such interruptions of the continuous work of the Survey are inevitable, and their effect will always be most markedly felt while we continue to carry out our work with an extremely limited staff.

Field Work.—The examination of the Mersey shalefield was completed during the year. In December the Waratah silver-lead area and the tin-ore properties in the X River district were examined. For a considerable portion of the year the Assistant-Geologist was absent on sick leave, owing to illness contracted in the execution of his duties. This interfered with the field programme, preventing the contemplated survey of the Stanley River field. When a new assistant is appointed this field will be the first to receive his attention. The long-promised examination of King Island will probably be carried out during the summer season of 1912.

Other parts of the island also require visiting, notably the Jukes-Darwin Range, the survey of which has been long asked for, but which has been continually postponed owing to unavoidable diversion of programme. These postponements have not been from any disinclination to undertake the work, but are the result of a very limited geological staff, which is taxed to the utmost in meeting demands made upon it simultaneously from different directions. The remedy would appear to lie in the appointment of a second assistant. The work of the Survey has gradually acquired a wider and more stable character, and as a result the district examinations and preparation of the publications take more time than formerly. Consequently, unless additions to the staff are made, all requirements cannot be satisfactorily met.

Topographical Surveyor.—In addition to the need for a second assistant, I wish to bring under your notice the fact that the Geological Survey labours under the disadvantage of having no topographer on its staff, and as the Lands and Surveys Department does not issue any topographic maps, the geologists have to manage as they best can, and their time being taken up with the special work devolving upon them, sketch-maps are the utmost that it is possible for them to prepare. Consequently, with gradually increasing precision and detail in the work, much of the present mapping will eventually have to be done over again.

The mineral charts supplied by the Mines Department for the use of leaseholders and prospectors show merely the boundaries of existing mining leases or purchased lots with the main roads and rivers, often exhibited in a very sketchy way. Streams are as a rule marked on the charts only where they happen to cross the boundaries of leases, and no attempt is made to show relief. The area comprised in the charts is shown only as a plane surface with sometimes a little hatching to indicate mountainous country, but without showing the shapes and sizes of mountains. Tracks are not always plotted.

All this affects the geological work injuriously, and much time is lost by officers in the field in locating natural features, especially when they find themselves in large land-grant areas

of ancient date now cut up into small farms, the boundaries of which are not shown on the maps, and *a fortiori* when they are in large districts of unsurveyed land.

I would therefore respectfully suggest, as a much-needed measure, the appointment of a topographical surveyor, to be attached to the Department of Mines, and to be exclusively employed in surveying topographically the areas included in the mineral charts. He ought really to be a member of the Geological Survey staff, as is usual in other States, but for convenience sake he might be attached to the Department of Mines in Hobart, where he would be near the other draftsmen and handy for the Government Printer.

This would be of enormous use to the Geological Survey, and also be of permanent value. Maps showing the topography of the country, or topography and geology combined, would assuredly be in great demand by all connected in any way with the mining industry. They would show the relief of the ground by contour lines, all roads, tracks, races, creeks, bridges, and other permanent features. They would thus give valuable information at once to the numerous miners and mineowners who are interested in dams, water-races, and levels generally; and moreover, all information shown on them would be of a definite and lasting character. Moreover, the work would not interfere with or duplicate the work of any other department, and would without question be of great use to the Department of Mines.

University Cadets.—With the idea of extending our work in an economical way, I take this opportunity of again referring to the encouragement which the Government might give to students of geology at the Tasmanian University by offering to allot a district to a student who may be desirous of working up material for a thesis in the summer months, the Government paying travelling expenses and publishing the results as a geological survey bulletin. This would perhaps be appreciated by an enthusiastic student, would benefit the University, and facilitate the work of geologically examining the island. The selection of the district to be investigated would rest with the Geological Survey, which would also exercise control over the publications.

Coal Resources.

Pursuant to instructions, I prepared in December a report on coal measures in Tasmania for the International Geological Congress to be held in Ottawa in 1913. The congress will discuss the question of the coal reserves of the world, and its deliberations are to be founded on information which it has requested from the different countries.

Coal is found in Tasmania in beds or seams, occurring in strata which belong to the following geological periods:—

3. Tertiary: Brown coal and lignitic deposits.
2. Mesozoic: Upper Coal Measures.
1. Permo-Carboniferous: Lower Coal Measures.

The Lower Coal Measures are in the following fields:—
 (1) Avoca; (2) Mt. Nicholas and Fingal; (3) Thompson's Marshes; (4) Llandaff-Seymour; (5) York Plains; (6) Mike Howe's Marsh; (7) Longford; (8) Colebrook; (9) Schouten Island; (10) Spring Bay and Prosser's Plains; (11) Compton and Old Beach; (12) Lawrenny-Langloh; (13) Sandfly; (14) Ida

Bay; (15) Hastings and Southport; (16) Recherche and South Coast; (17) Tasman's Peninsula.

Deposits of lignite and brown coal are widely distributed in beds of Tertiary age, but at present their economic value is only potential.

In the imperfectly developed state of our coalfields it is almost impossible to make any useful estimate of our reserves. The following figures, which are based on such information as is available, can only be taken quite approximately as indicating the probable amount:—

Seams in Lower Coal Measures ...	11,000,000 tons
Seams in Upper Coal Measures ...	54,000,000 tons
Total	<u>65,000,000 tons</u>

besides unknown reserves in strata fringing the Central Tiers.

Limestone Caves.

Caves in the other Australian States are placed under the control of the respective Governments, being considered as national assets, the conservation of which is a public function.

In New South Wales caves visited by tourists were for many years under the control of the Mines Department, and the Geological Survey carried on the exploration and improvement work connected with them. In 1907, however, they were transferred to the Intelligence and Tourist Department.

In Victoria such caves (171 miles from Melbourne) are controlled by the Government Tourist Bureau and Land Settlement Office.

Western Australia also has caves along the shores of the Indian Ocean, and they are managed by a Caves Board.

The discovery of new and attractive caves at Mole Creek during the past year led the Northern Tasmanian Tourist Association to suggest that they be acquired by the Government, and that future discoveries be reserved in land titles when issued.

In reporting on this subject during the past year I recommended that, wherever possible, our caves be acquired by the Government, and I proposed the creation of public caves boards for their preservation and development. Under such an arrangement the Mole Creek and Ulverstone caves would come under the jurisdiction of a northern board in connection with the Northern Tourist Association, and a southern board would control the caves at the Junees, Mt. Field West, Ida Bay, &c. Provided the necessary funds are available, these boards, strengthened by the aid of the Railway Department, ought to be able to manage the whole business with advantage to the State.

Museum.

The Survey collections in the Victoria Museum have been added to, and will be increased with increasing provision for cases. The collection made by the officers of the Geological Survey on their field journeys and the valuable donations of minerals, rocks, and fossils made from time to time by mining companies and private individuals make the Museum an educational and advertising centre of great value to the mining community in general. A substantial portion of the building.

is devoted to a permanent exhibition of the ores and economic minerals of the island. These exhibits are under the control of the Geological Survey, and the new departure has continued to excite considerable interest in the city. The ores of the different metals are exhibited, and in addition separate cases are assigned to large mines or to mining districts. Coal and shale exhibits have their cases; building materials and materials useful in the arts likewise; as well as fossils and specimens illustrating geological processes. Tasmanian rocks are classified and shown, and also a general collection of minerals. A special feature is the allotment of cases to new discoveries and minerals attracting public attention for the moment. The geological district maps which accompany the Survey bulletins are being framed and hung on the walls of the Museum. Mr. Thos. Stephers, M.A., Hobart, has kindly donated his original map of the geology of the North-West Coast, which illustrated his paper on that subject published by the Linnean Society of New South Wales.

Many enquirers at the office recently have been referred to the Museum collections, which are becoming of distinct value to the State.

In every country museums are regarded as necessary adjuncts to geological surveys and mines departments. In the States of the Australian Commonwealth large sums have been expended in building and maintaining them. They are distinct in their aims from those of national museums, which have their own place and functions, and they fulfil more than one purpose. They secure the conservation of the survey type collections, which absolutely have to be preserved in some way or other, and they advertise our resources and place them before the investor, settler, or traveller in a compact and striking form. In this direction their value cannot be assessed, and time and money laid out on them are well spent. Moreover, they must not be regarded exclusively as an assemblage of industrial exhibits, though they are that to a large extent. The mining and geological gallery ought also to show the power of museum exposition to inform the general public of the leading principles and fundamental facts of the science of economic geology, displaying the material in such a way as to create and satisfy a desire for information in this important department of knowledge.

Office.

Mr. F. S. Grove has been occupied the whole of the year on Government race-construction at Gladstone, and Mr. W. D. Reid has efficiently carried out his duties in his absence.

The correspondence during the past 12 months comprised 2754 letters, bulletins, &c. Our exchange-list for the library is on a satisfactory footing. Grateful acknowledgments are tendered to the proprietors of Australian and Tasmanian newspapers and periodicals for copies supplied to the office.

Two additional rooms in the Public Buildings have been handed over for our use, and will soon be ready for occupation. These will greatly relieve the present pressure on our space.

I have, &c..

W. H. TWELVETREES, Government Geologist.

Secretary for Mines, Hobart.

REPORT OF THE CHIEF INSPECTOR OF MINES.

Launceston, 31st May, 1912.

SIR,

I HAVE the honour to present my report on the inspection of mines for the year ended 31st December, 1911. Herewith please find statistical statement and diagram relating to accidents which have occurred during the past year.

I beg to append annual reports prepared by the district inspectors of mines, viz., by Mr. M. J. Griffin, Inspector for the Northern and Southern, Eastern and North-Eastern Divisions; Mr. Jas. Harrison, Inspector for the Western and North-Western Divisions; and Mr. C. H. Curtain, Inspector for the Lyell District.

The aggregate number of men employed during the year at the mines and smelting works throughout the State was 5247. The number of fatalities was four, and of non-fatal, recordable, injuries, 77. The death rate from accident was 0.762 per thousand, as against 1.386 per thousand in 1910.

The number of non-fatal accidents is unusually high. It is swollen by many minor injuries (bruises, sprains, and cuts), which appear to have kept the sufferers from work for a period exceeding 14 days. In many instances there is reason to believe that the length of absence is not entirely due to disablement, and the accidents ought not to find a place on the register; but such cases are difficult to distinguish statistically. When men take a few days' holiday at the end of a short term of absence through a slight accident the manager can only notify that they have not returned to work within the 14 days, and their names are improperly added to the accident list. The inspectors will in future require to be thoroughly satisfied before accepting doubtful cases.

The strictness with which proper accidents are notified also accounts in some measure for the statistical increase in recent years. This is borne out by a glance at the registers for the last two decades. While the first decade shows fewer accidents than the last, the last shows fewer fatalities than the first. Legislation has followed the miners' dangerous occupation more closely and sympathetically. Government inspection has been more continuous, and occurrences underground have been notified more attentively. Though the records show an increase in the number of mishaps, the increase is apparent, not real. On the other hand, the ratio of fatal accidents is diminishing. The figures of single years are apt to be misleading. More reliable results are obtained by comparing groups of years. Thus the fatalities during the last four periods have been as follows:—

	Per 1000.
1893-1897	1.527
1898-1902	1.411
1903-1907	1.088
1908-1911	0.935

These lamentable occurrences evidently can be restricted and reduced, and if those who control and operate the industry—Government, owners, and workmen alike—will unite in aiming at total prevention, happy results must assuredly follow.

For the sake of comparison I quote the latest figures from other States available in the office:—

			Fatalities Per 1000.
New Zealand	1910	...	2.43
Queensland	1909	...	2.15
Western Australia	1910	...	1.64
New South Wales	1911	...	1.35
Victoria	1910	...	0.82

The amendment of "The Mining Act" during the year has resulted in giving effect to the humane and rational principle of the recognition of the right of miners to call the attention of the manager to anything unsafe in the mine, and thus to claim the services of the Government inspector in a regular and authorised way. Our legislation, in providing for workmen's inspections, is thus brought into line with that of the other States in the Commonwealth, and employers will have to recognise this as the normal state of things. The success of the measure largely depends upon it being made to work smoothly and without friction. It may be mentioned that the workmen's inspectors are not check inspectors. Their duties are to consist rather in supplementing the Government inspection, not in checking or controlling it; and the mistaken use of the term "check inspector," founded on misapprehension, should be discouraged. The object is not to interfere with the Government inspectors, nor to keep a watch on them; but to provide men pursuing a dangerous calling with a legitimate channel for making known their fears and wants. If the provision is carried out harmoniously, and in a reasonable way, the effect must be to improve the conditions under which miners work, and to affect our accident list favourably.

When any addition is next made to the regulations under the Act it will probably be advantageous to regulate the mode of appointment of workmen's inspectors in order to prevent uncertainty and irregularities, and to provide the Department with definite and reliable information in respect of the appointment. The regulation might provide that the election should take place by ballot, and that the appointment should be by the majority of employed persons attending a duly-convened meeting, the chairman of the meeting to notify the mining manager of the result of the election, and the latter to forthwith notify the Secretary for Mines.

The General Rules of the working part of the Act were amended during the year, principally in the direction of ensuring greater safety to men employed. Some improved rules for mine ladders, winding speeds, and rope tests were substituted for the older ones, and a few minor alterations made where experience suggested them. An important rule was added making the use of dust-prevention and sanitary appliances compulsory.

When "The Mining Act" amendments were being framed last year I drew up a scheme of subdivision, by which the General Rules were divided into groups, embracing severally the various rules relating to each subject. Owing, I believe, to the expense of printing, this suggestion was not adopted. Nevertheless, such subdivisions will eventually have to be introduced, as with the continual additions it is becoming increasingly difficult to pick out readily any desired rule in the Act as published.

The only case in which it was necessary for an inspector to take proceedings this year was that in which a miner at the Tasmania Gold Mine returned to a missfire hole within 15 minutes, recharged and exploded it, to the injury of another miner, who, ignorant of the second charge, approached the face just before the explosion. The defendant pleaded guilty, and was mulcted in fine and costs.

An information was laid against the proprietor of the Mt. Cygnet Coal Mine for neglect to furnish copy of plan of underground workings, as required by Section 174 of "The Mining Act, 1905." On production of the plan the charge was not proceeded with.

The inspectors report that the ventilation in the mines in their several districts has, on the whole, been satisfactory; that the sanitation regulations have been carried out, though some of the smaller mines are rather lax in this respect; and that the general health of the miners is apparently good.

With regard to miners' phthisis, I have been in communication with Dr. J. S. Purdy, the Chief Health Officer, who reports to the following effect in respect of the Lyell District:—

"Prior to April, 1911, two cases of lung disease in miners were observed—one, a case of pneumokoniosis, in which the sufferer died; the other, a case of pneumokoniosis, in which the subject has since gone farming.

"From the 7th April to the 30th June, 1911, two cases of miners with pneumokoniosis were observed, one of whom is still living, but not working; the other (a slight case) is still working.

"From 1st July, 1911, onwards, there have been two cases of acute pneumonia, who have both died. One of these cases was an alcoholic. There are at present four men affected with pneumokoniosis still working at the mines, one with bronchial asthma and pneumokoniosis at present in hospital, and one not working."

The Chief Health Officer is of opinion—and I strongly concur with him—that it would be an excellent arrangement if there could be some form of insurance for miners, which would include pneumokoniosis, and so allow men to leave their work, which, if continued underground, will ultimately lead to a fatal result.

With the view of fixing a standard temperature limit, the question of underground temperatures will be studied closely in the ensuing year.

Owing to the discharge of a workman in connection with union disputes a serious strike commenced at the Mt. Lyell Mines on the 23rd September, and the smelters were not blown in again until the 11th December.

I have pleasure in recording my acknowledgment of the unfailing attentiveness and scrupulous discharge of duty on the part of the inspectors for the several districts.

Postscript.

Dr. J. S. Purdy, Chief Health Officer, reports further recases of miners' lung disease for year ending 30th June, 1911, as follows:—

“Dr. Hamilton, of Queenstown, reports that he had no cases for this period. The only cases of lung diseases (which were five cases of pneumonia) were of men working in the smelters. The matron of Devon Hospital reports that John Maxwell, 73 years, Mt. Lyell, underground, was admitted on 1st June, 1910, and died 17th August.

“Dr. Davis, Beaconsfield, reports that there were no cases of miners' phthisis in his district for the period under review.”

I have, &c.,

W. H. TWELVETREES, Chief Inspector of Mines.

The Secretary for Mines, Hobart.

COMPARATIVE Table of Statistics of Accidents in and about the Mines of Tasmania from 1st July, 1892, to 31st December, 1911.

Period.	Number of Miners employed.	Number of Accidents.	Number of Persons.		Total Killed and Injured.	Average per 1000 Killed and Injured.	Average per 1000.	
			Killed.	Injured.			Killed.	Injured.
1 July, 1892, to 30 June 1893	3295	28	4	25	29	8·8001	1·214	7·586
" 1893 " 1894	3403	25	7	20	27	7·934	2·057	5·877
" 1894 " 1895	3789	26	4	24	28	7·390	1·058	6·332
" 1895 " 1896	4160	22	7	16	23	5·529	1·682	3·847
" 1896 " 1897	4303	36	7	31	38	8·831	1·627	7·204
" 1897 " 1898	5530	36	13	33	46	8·318	2·351	5·967
" 1898 " 1899	6180	35	9	34	43	6·957	1·456	5·501
" 1899 " 1900	6834	19	7	16	23	3·365	1·024	2·341
" 1900 " 1901	7017	29	8	23	31	4·417	1·140	3·278
" 1901 " 1902	6438	38	7	35	42	6·524	1·088	5·437
" 1902 " 1903	6484	44	6	43	49	7·557	0·925	6·632
" 1902 " 1903	6484	44	6	43	49	7·557	1·428	3·569
" 1903, to 31 Dec., 1903	5604	27	8	20	28	4·977	1·454	10·497
1 Jan., 1904 " 1904	6192	73	9	65	74	11·951	1·454	10·497
" 1904 " 1905	6586	34	7	30	37	5·618	1·063	4·555
" 1905 " 1906	7004	65	4	61	65	9·280	0·571	8·709
" 1906 " 1907	7516	68	6	64	70	9·314	0·798	8·515
" 1907 " 1908	6464	60	6	58	64	9·900	0·928	8·972
" 1908 " 1909	6054	54	6	49	55	9·085	0·991	8·093
" 1909 " 1910	5770	63	8	57	65	11·265	1·386	9·878
" 1910 " 1911	5247	80	4	77	81	15·437	0·762	14·675

TABLE showing Rate per Thousand Killed and Injured in the different Divisions for the Year 1911.

Division.	Average Number of Men employed.	Number of Accidents.	Number of Persons.		Total number Killed & Injured.	Average per 1000 Killed and Injured.	Average per 1000.	
			Killed.	Injured.			Killed.	Injured.
Northern and Southern	599	21	Nil	22	22	36·727	Nil	36·727
North-Eastern	693	12	1	11	12	17·316	1·443	15·872
Eastern	569	2	Nil	2	2	3·514	Nil	3·514
North-Western	777	13	2	11	13	16·731	2·574	14·157
Western	2609	32	1	31	32	12·265	0·383	11·881
	5247	80	4	77	81	15·437	0·762	14,675

ANALYSIS of Statistics for the Western Division.

Division.	Average Number of Men employed.	Number of Accidents.	Number of Persons.		Total Number Killed & Injured.	Average per 1000 Killed and Injured.	Average per 1000.	
			Killed.	Injured.			Killed.	Injured.
Mount Lyell	1471	17	1	16	17	11·556	0·679	10·876
Zeehan, &c.	1138	15	Nil	15	15	13·181	Nil	13·181
	2609	32	1	31	32	12·265	0·383	11·881

TABLE showing the Number of Persons Killed and Injured in and about the Mines of Tasmania during the Year 1911.

PLACE OR CAUSE OF ACCIDENT.	INSPECTION DISTRICTS.													
	Northern and Southern Division.		North-Eastern Division.		Eastern Division.		North-Western Division.		Western Division.				TOTAL.	
	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Zeehan and other Districts.		Lyell District.			
Killed.									Injured.	Killed.	Injured.	Killed.	Injured.	
<i>UNDERGROUND—</i>														
Falls of Ground	4	...	...	...	1	...	5	...	5	1	2	1	17
<i>Shaft Accidents—</i>														
Things falling down shafts	1	...	...	...	...	...	1	...
Haulage	1	...	1
Falling down passes and shafts.	1	...	...	...	...	2	1	2
Total	2	...	...	...	...	3	2	3

Diagram showing the ratio of Fatal Accidents
in Mines in Tasmania.

Rate per 1000 men employed.

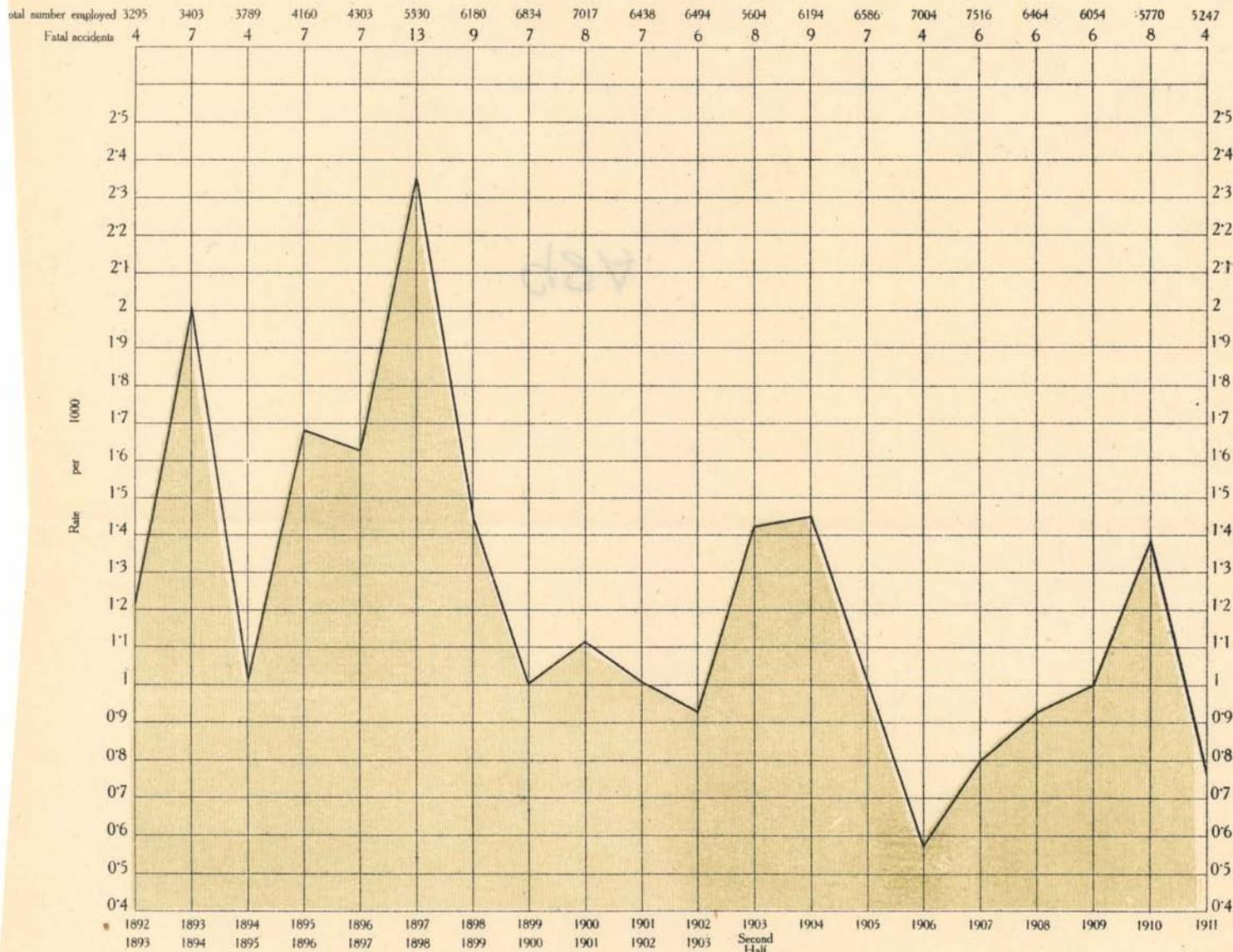


Photo Algraphed by John Vail Government Printer Hobart Tasmania.

5 cm

<i>Miscellaneous (underground).</i>														
Haulage—														
Trams, &c. ....	...	1	...	...	...	...	...	...	...	...	...	...	1
Sundry accidents.....	...	6	...	...	...	...	1	...	...	...	5	...	12
Explosives .....	...	4	...	...	...	...	...	...	1	...	...	...	5
Total .....	...	11	...	...	...	...	1	...	1	...	5	...	18
<i>Total Underground . . .</i>	...	15	1	2	6	...	6	1	10	3	38
ON SURFACE—														
Smelting-works.....	...	...	...	...	...	...	...	...	1	...	...	...	1
Machinery .....	...	1	...	...	...	...	...	...	...	...	...	...	1
Falls of stone.....	...	...	...	4	...	...	...	...	...	...	...	...	4
Tramways .....	...	...	...	...	...	...	1	...	2	...	1	...	4
Falls of persons.....	...	2	1	2	...	...	...	...	2	...	1	1	7
Explosives .....	...	...	...	...	...	...	2	...	...	...	1	...	3
Miscellaneous.....	...	4	...	5	...	1	...	2	...	4	...	3	19	
<i>Total Surface</i>	...	7	1	11	...	1	...	5	...	9	...	6	1	39
GROSS TOTAL, 1911.....	...	22	1	11	...	2	2	11	...	15	1	16	4	77
Total during 1910.....	2	20	...	2	...	5	...	7	...	6	6	17	8	57

REPORTS OF INSPECTORS OF MINES.

MR. INSPECTOR GRIFFIN (Launceston) reports:—

I have the honour to submit my report as Inspector for the Northern and Southern, North-Eastern, and Eastern Divisions of the State, for the year ending 31st December, 1911.

Number of accidents, 35. Casualties: fatal, 1; non-fatal, 35—total, 36.

I am pleased to be able to report that only one fatal accident occurred during the year. The circumstances in connection with this were of such a nature that no blame was attachable to anyone.

Fatal Accident.—Thomas Crook, a married man, age 50 years, was working on wages on James Smith's tin-slucing mine near Branxholm. He generally worked with the owner, no other men being employed. He was at Branxholm with Smith on Sunday, 18th June, and returned alone to the mine, about 3 miles distant, on the evening of that day. On Monday morning some Chinese working on the creek below Smith's claim noticed, about 10 o'clock, that the sluice-water was beginning to run clear, and concluded that Smith was cleaning up. When, however, at knock-off time in the evening the water was still running they became alarmed, and went to Smith and Crook's camp. Not finding anyone there they called on Mr. Fred. Hawkes, who accompanied one of them (Lung Kee) to the working face of Smith's claim, where, with the aid of lanterns (it was then 6 p.m., and quite dark) they found the dead body of Crook, lying face uppermost, on the floor of the face, the back part of his head and neck resting on a smooth spar, part of the sluice-race log work next to the face. The water was still running, and had partly washed away portion of a heavy fall of earth that evidently took place early in the day. There were no marks or signs of violence on the head or body, and from the position in which it was lying it is pretty certain that the unfortunate man never moved after he fell. Dislocation of the neck was the cause of death.

The face where the accident happened is about 12 feet in depth. The equipment and method of working with regard to safety is fairly good. There are various theories as to how the accident happened; some think he was barring down, and slipping away from the top with the fall of earth was hurled against the log work, where the body lay. I am of opinion, however, that this could not be. A pick was found lying on the soft granite floor of the face a few feet nearer to the foot of it than where the body lay. I think Crook must have got the fall of earth down all right, and that after returning to the nozzle (which was in a safe place on a stone-heap) he noticed a large lump which was partly blocking the run of stuff into the tail-race, and taking a pick descended to break it up. The face floor was sloping, and rather slippery. Something may have startled him—probably a fall of more earth from the face—and in stepping aside to get clear he

lost his footing and fell backwards, the back part of his head and neck coming in contact with the spar already referred to.

Of the non-fatal accidents, 13 were serious; the remaining 22 being for the most part of a trivial nature.

Serious Accidents.—Fred. Bonser was attending to a nozzle in the overburden face of the Arba Tin Mine. He went close to the face to hook out a lump of cement, and was struck by a small slip of earth from the face, which tore the flesh from knee to ankle on outside of his left leg. Men on the afternoon or night shifts were not required to go nearer to the face than the nozzle. Bonser had no right there, and has only himself to blame for the accident.

At the Mt. Nicholas Colliery, Thomas Pickett was working on wages on coal at a cut-through, where the seam was faulted. A large block of coal fell out of the face, knocking down a couple of props, and the last timber set of the gate road. Pickett was overwhelmed, and when extricated a few minutes later by men who were not long in coming to his assistance it was found that his right arm was completely severed above the elbow joint. A skip behind which he fell broke the force of the fall, and the ends of timbers striking the rib of the coal at the roadside prevented the full weight from descending on him, otherwise he would have been crushed to death. It is surmised that his arm must have been cut off by a blow from the falling timber on the edge of the skip. Spragging is only compulsory before "holing," or undercutting, the coal is commenced; nevertheless, a careful and experienced miner would, in a case like this, have spragged the face coal before he commenced shovelling coal into the skip. The overman, too, was somewhat lax in his supervision, or he would have insisted on every precaution being taken when cutting through the faulted seam.

At the Tasmania Gold Mine, John Burton and his mate (J. Rush) were both injured by an explosion of gelignite when charging holes in the western pump-chamber at 1500-foot level in Grubb shaft. These men had finished the boring of a set of five holes left by the day-shift men, and commenced to charge them. The holes were all bored with big steel, except the last one, which was finished for about 12 inches at the bottom with a smaller drill. When it came to charging this last hole two plugs, clumped, were inserted, and stuck were the hole commenced to narrow near the bottom. Force was used with the tamping rod, and an explosion occurred. Burton was terribly burned about the face and hands, so much so that it was feared his sight was completely destroyed; happily this was not the case. Rush had one side of his face and a hand badly burned. These men say they were using a wooden tamping stick when the explosion occurred, but an investigation has shown this to be untrue. Two wooden sticks were provided for use at the place. One of these I found the day following the accident standing with some drills in the plat 30 or 40 feet away from the chamber face; the other was subsequently found behind a leg in the chamber. Both were intact, and showed no sign (either the one or the other) of having been blown out of a drill-hole. Diagonally across the chamber, about 30 feet from the hole in which the explosion occurred, was found a machine drill 4 feet 6 inches in length, and of small steel. This was bent

a little at one end, and a mark on one of the timber legs of the chamber showed clearly where it struck. There can be no doubt whatever but that this steel drill was being used for tamping when the explosion occurred.

Wm. Henry Wheeler, a single man, age 58 years, was working by himself on his tin section at Upper Cascades in the sluice-race, when he was caught and pinned down by the feet and lower parts of his legs by a slip of earth and stones from the side of the race. This happened at 2.30 p.m. on Tuesday, 19th December, and he was not discovered or extricated until the following Friday afternoon, having then been 73 hours in a perilous position without food or drink. Fortunately for him, he was in a sitting position, with his hands free, otherwise he would have been tormented to death by flies. When discovered Wheeler was in a dreadfully emaciated state; his feet and legs were bruised and benumbed from the weight of stones lying on them in the sluice-water, that continued to run all the time. He was removed to the Launceston General Hospital, where it was found necessary to amputate his left leg at the knee; his right foot was also amputated. The pluck and vitality of this man are the wonder of everyone who has come in contact with him. He has lived through the whole ordeal, and, to use his own words, "does not mean to die yet."

The foregoing are some of the more serious accidents. The remainder need no further notice than what is set forth in the tabulated list of accidents appended to this report. On reference to this it will be seen that nearly 50 per cent. were registered as "serious," on account of the sufferer being absent "throughout at least 14 days from his ordinary work." In very many cases, however, men do not return immediately after they have recovered from the injury sustained, preferring to take a few days on their own account, for business or recreation; or it may be that they have a claim under "The Employers' Liability Act," and prefer to go on half-pay for a time. Thus the list of accidents called serious is unduly swelled.

Accidental Explosions.—In the case of Percy Betts, injured at the Devon Mine, it is possible that portion of a plug of gelignite may have got into a crevice in the floor when the level was first driven some years ago. Men working there at that time appear to have been rather careless, as loose gelignite and caps were found on a ledge in same level. I am satisfied that Betts did not bore into an old bottom. As to the explosion by which Burton and Rush were injured in the pump chamber at the Tasmania Mine, this, I think, can scarcely be termed 'accidental,' for when a man deliberately uses a steel drill to force gelignite into a drill-hole, and an explosion occurs, it amounts to one of two things—wilful defiance of all rules in connection with the use of explosives, or a deplorable want of knowledge in such matters.

Ventilation.—The ventilation of both coal and metal mines is on the whole good. At the Tasmania Mine good ventilation has been maintained in all working places excepting at bottom levels going west. In driving these levels a lot of gas is met with coming from the rock strata, and also when heavier water is struck. Ventilation by natural means cannot effectively cope with this; mechanical appliances are required, and

costly machinery would have to be installed. It is not often, however, that much inconvenience is felt. Sometimes the men have to be removed and put to work at other places for a day, or perhaps two, when unfavourable atmospheric conditions prevail. In such case interference on the part of the inspector is uncalled for.

The North Tasmania is now worked intermittently by a tribute party. At times the ventilation is very good, and will remain so as long as the wind is from a certain quarter, but a change to the north or north-west generally causes trouble. The mine is well equipped with cage and ladderways; there is also a second shaft or means of exit. The party are careful not to run any undue risk when air is bad.

Sanitation.—The sanitary conveniences provided are generally good. Some few of the smaller mines are rather lax in this respect. The difficulty of getting men to use the conveniences provided is a drawback. Food is thrown about in the crib-places instead of being put into the receptacles provided for scraps and waste, but the offender is seldom caught.

With regard to water supplied for drinking purposes, men seldom drink cold water when at work; they generally use tea or coffee. Pure water for use in their camps is of more importance, and it is seen that this is provided wherever men live on the mine.

Health of Miners.—This, on the whole, is apparently good. No cases of pulmonary phthisis, so far as I can learn, have occurred.

Prosecution.—Frank McIvor, a miner employed in the Tasmania Gold Mine, was proceeded against for having returned to, and recharged and exploded, a missfire hole, within 45 minutes from the time of lighting the fuse in the first instance. McIvor and his mate, Snoxall, worked at a place in the 1370-foot level, where two drives—hanging-wall and main lode—meet. Two holes were charged, and McIvor ignited the fuse of each and retired by way of the hanging-wall drive. One charge missed fire. This he revisited within 15 minutes, and having inserted another charge, fired and exploded it. A man named James White, working in the main lode drive, and not knowing that a "missfire" had occurred, approached the face to return a shovel he had borrowed. The smoke from the first explosion prevented him from going close up. He put down the shovel and was just about to turn back when the second charge of the missfire hole exploded. A small fragment of rock struck White on the leg, but fortunately no serious injury was sustained. McIvor pleaded guilty to the charge, and was fined 10s., with 8s. costs.

Magazines and Explosives.—Magazines are generally well kept and in good order. There was one exception, however. A small magazine for day supply at an open-cut mine was found to be in a dangerous condition, with an open keg of powder, loose gelignite, caps, and primers, together with tools, ropes, &c. The manager was absent. The man in charge admitted that his chief experience in the handling of explosives had been on railway works.

The manager of the Mt. Nicholas Colliery took proceedings against a miner named Nolan for taking into and storing in the colliery gunpowder not required for immediate use. It

appears the colliers are allowed a $\frac{1}{2}$ -lb. of powder each for a day's supply; if not used it should be returned to the magazine. Nolan stored up his own, as also some of the other men's powder, until he had in all about 27 lb. secreted in a bag, beside one of the working roads in the colliery. For this breach of rules and regulations he had to pay nearly £4 in fine and court costs.

Equipment, Machinery, &c.—The equipment of the mines, on the whole, is very good. Only in one case was it found necessary to condemn a rope; this was a light line used on an air-hoist for winze-sinking. Ropes, chains, and shackles receive care and attention as required by the Act. No serious breakages of machinery have occurred during the year.

Mines Newly Opened, or Reopened.—The New Roy's Hill Tin Mine Company completed their plant—10-head battery, with classifiers, jigs, and card tables, also steam haulage for underlay shaft (52° dip)—in August, and have been working since then.

At the Anchor Tin Mine, the "Otto" ropeway, $1\frac{1}{4}$ mile in length, was finished early in the year, and is working well. This ropeway is used for carrying tin rock from the top of the hill (Australian sections) to the battery, 1200 feet difference of elevation.

The Cliff Tin Mine (McDonald, Ltd.) has installed powerful machinery—steam engines, gravel pump, barge, &c., to work the mine at South Mt. Cameron.

Gravel pumps, mounted on barges, and operated by portable steam engines, are coming into use on the north-eastern tin mines, and are found to be most suitable for working low terraces or creek flats, where the wash must be elevated for sluicing. If only a small area has to be operated on, a barge is dispensed with. The portable engine is hauled to a place where the ground is known to be deepest, the pump is inserted, and probably a sump found of sufficient depth to receive the wash by gravitation from a considerable area.

Mr. George Watt, late mine manager of the Purdue Mine, was one of the first to introduce a plant of this description. He commenced on a small rock-bound flat on Amber Creek, near Gladstone. The area was probably not more than one acre in extent, and appeared to be more boulder than wash. It was good enough, however, to yield 25 tons of tin when operated on by the gravel pump.

The Pioneer Tin Mine Company has raised the Frome River reservoir dam, nearly doubling the storage capacity, which is now 840,000 gallons.

The Scamander Copper Mine Company installed a small steam winding-plant and sunk a shaft to a depth of about 80 feet.

At the Tasmania Gold Mine, Grubb shaft was sunk 30 feet, making the total depth 1530 feet. A crosscut was driven from the 1500-foot level, in which a substantial floodgate is constructed. Permanent pit-work was installed in the eastern pump chamber, and the western chamber was approaching completion at the close of the year.

Hart's shaft was sunk 26 $\frac{1}{2}$ feet, making a total depth of 1398 feet; and a plat cut at 1370 feet.

The old main shaft has been strengthened and sunk (7' \times 7'), and connected with a short footwall drive at the 1000-feet

level. This shaft is now used exclusively for ventilation purposes. It is being continued down as an underlay in sound footwall country, and will be equidistant from the lode at each level it passes through.

Coal Mines.—*Mt. Nicholas Colliery.*—The furnace at upcast air-shaft has been reconstructed and enlarged, giving a better fire-grate surface. This, and the straightening and enlarging the return-air course has very much improved the ventilation of the mine. Other improvements have been carried out in the way of retimbering portions of roads and main heading. The long-wall is now fully 500 yards in length, and the colliery is capable of an output of 200 tons per day. Unfortunately there is only trade for half this quantity.

Cornwall Colliery.—In the working of this colliery the old pit has had for its limit going westward the brow of a down-throw fault that completely cut off the seam. Recently prospecting disclosed the continuation of the seam west of the line of faulting. The electric haulage has been extended round the slope of the hill, and a new pit is now opened for long-wall working. This new discovery has given a fresh lease of life to the operations of the Cornwall Colliery Company.

Catamaran Coal Mine.—Comparatively little has been done in the way of development work at this mine during the year. A steel tram (2-feet gauge, and $1\frac{1}{2}$ miles in length) has been laid on the old sawmill tram foundation, from the mine to the jetty at Catamaran Creek, where coal-bins have been erected. An attempt has been made to open up the seam by means of a tunnel-dip heading, entering from a point a little to the east of the old-shaft workings. The Durkin Bros.—practical coalminers, recently arrived from England—entered into an agreement with the owner (Mr. E. C. James) by which they undertook to open up and work the coal seam on a royalty basis. It was understood that these men had sent to the Old Country for a goodly number of practical miners to come out and join them. Something happened, however, and the whole scheme collapsed. Probably the cause of this was the imposing of too stringent conditions on the part of the owner, and the want of sufficient funds by the men, who foolishly thought they could open up and work a coal mine with only a few pounds to start with. The mine is now idle.

Shale.—The Tasmanian Shale and Oil Company completed the erection of retorts and commenced oil extraction in May last, but were unsuccessful in their first effort, and ceased operations in August. It would seem that the right methods of extraction for shale of this kind were not applied. The retorts are said to be of the wrong type—probably too large, for one thing—and the result was an extraction of less than 50 per cent. of the oil contents.

LIST of Accidents in Inspector Griffin's District for Year 1911.

Casualties—Fatal, 1 ; non-fatal, 35 ; total, 36.

Date of Accident.	Name of Mine.	Locality.	Cause of Accident.	Name of Sufferer.	Married or Single.	Nature of Injuries.	Particulars.
1911. 10 Feb.	Arba Tin Mining Co.	Branxholm	Fall of earth in open cut face	Bonser, Frederick	Married	Flesh stripped from outside of leg from knee to ankle	Was attending to nozzle in open cut face; went too close to remove a stone, a small quantity of earth and cement fell, a portion striking him on leg.
20 Feb.	Garabaldi Tin Mining Co.	Pioneer	Maul slipping	Stewart, William	Ditto	Cut on head	Was fixing up pressure pipes; held a stake for his mate to drive with a maul. The maul came off the handle and Stewart received a blow on the head.
28 Feb.	Briseis Tin and General Mining Co.	Derby	Stone slipping when being loaded on to truck	Geale, Reuben	Single	Top of one finger torn off	Whilst loading truck a large stone rolled back and caught his hand, tearing off top of one finger.
3 April	Tasmania Gold Mine Ltd.	Beaconsfield	Struck by a piece of rock and fell down stope	Burns, John	Married	Three scalp wounds, also cuts & bruises about right side of body	Was barring down after firing in No. 5 stope, Block 301, a large piece of stone came away suddenly, and the stage carried away. He fell down the stopes about 15 feet at hanging-wall side.
19 April	Ditto	Ditto	Truck leaving the rails and colliding with hanging wall	Page, Arnold	Single	Second and third fingers of left hand severely bruised	Trucking at 1250-ft level. Truck left the rails and jammed his hand against the hanging-wall.

25 April	Lady Barron Prospecting Syndicate	Moina	Axe slipping	Foster, James	Married	Severe cut on inside of instep	Enginedriver was cutting wood for engine; axe slipped and gashed his foot.
16 May	Tasmania Gold Mine Ltd.	Reaconsfield	Quartz rolling in chute	Lynch, Con.	Single	Cut on back of right hand	Was clearing quartz chute, 352 Block; a piece rolled, inflicting a nasty cut on back of his right hand.
24 May	Ditto	Ditto	Machine-drill breaking	Shuttleworth, Richard	Widower	Sinews of second finger cut and bone splintered. Slight cuts on other hand	Was working machine drill; drill broke off at chuck; he attempted to hold it, whilst his mate turned off the air, and got his hands cut and a finger nearly jammed off.
9 June	Ditto	Ditto	Fall from a ladder	Bomford, Archie	Single	Bruised armpit	Was climbing a 12-ft ladder at reduction works; slipped and fell from top, striking his right arm on furnace.
19 June	Ditto	Ditto	Slipped whilst walking through flood gate	King, J. T.	Married	Hip twisted	Was walking through flood-gate at 1000 ft. level; slipped and fell twisting his right hip.
19 June	Smith's Tin Section, 589M	Ruby Flat, Branxholm	Supposed to have slipped and fell backwards, striking a log	Crook, Thomas	Ditto	Fatal. Dislocation of neck	Was working alone in open-cut face attending to nozzle, and evidently fell backwards, his head striking a log; was several hours dead when found.
23 June	Devon Mine	Middlesex	Explosion of gelignite	Betts, Percy	Single	Ankle sprained and bones about it slightly fractured	Tributor. Was drilling a hole, single-handed, into floor of old adit level. An explosion occurred, supposed to be gelignite that got into crevice of rock,

LIST of Accidents in Inspector Griffin's District for Year 1911—continued.

Date of Accident.	Name of Mine.	Locality.	Cause of Accident.	Name of Sufferer.	Married or Single.	Nature of Injuries.	Particulars.
1911. 28 June	Tasmania Gold Mine Ltd.	Beaconsfield	Fall of stone from face	Fleming, Thomas	Married	Wound on right leg, slightly crushed foot	Was working in 203 Block; a piece of stone rolled from the face striking him on the right leg and inflicting a wound, also crushing his foot.
5 July	Briseis Tin and General Mining Co., Ltd.	Derby	Adze slipping	Williams, Allan	Single	Cut on right leg	Was adzing timber at Mutual Hill works; adze slipped and cut his right leg.
14 July	Ditto	Ditto	Ladder rest giving way	O'Connor, Wm. Albert	Married	Abrasion of shin-bone and concussion of shoulder	Was attending to electric light; placed ladder against pole that gave way and let him fall to the ground.
14 July	Ditto	Ditto	Stone rolling	Callender, Walter	Single	Nail crushed off one finger	Was loading stone on to truck; a large stone rolled and crushed off his finger nail.
24 July	Tasmania Gold Mine Ltd.	Beaconsfield	Rupture, supposed to over-strain screwing up a bolt	Cully, Charles	Married	Rupture	Was working at a machine drill; supposed that he hurt himself screwing up a bolt.
26 July	Ditto	Ditto	Lath giving way	Hill, Henry	Married	Cut on hand, and bruise on shoulder	Whilst getting up on to concrete east pump chamber 1500-ft level, he took hold of a lath that gave way letting him fall.

3 Aug.	Ditto	Ditto	Fall from a barrow plank	Gurnesy, Walter	Single	Leg badly sprained above ankle	Was wheeling a barrow load of wood along a plank to truck ; slipped and fell, injuring his leg.
3 Aug.	Pioneer Tin Mining Co.	Pioneer	Falling on rock	Das, Harold	Ditto	Cut on arm	Was building a stone wall at surface ; tripped and fell on a rock, cutting his arm rather badly. Was off 1 ¹ / ₂ days.
7 Aug.	Tasmania Gold Mine Ltd.	Beaconsfield	Stepped on nail	Dougherty, Joseph	Married	Foot pierced by a nail	Employed as water-man at 1000-ft. level. Stepped on a nail which entered his foot ; was off work 21 days.
21 Aug.	Ditto	Ditto	Stone rolling down rill	Price, Wilfred	Single	Thumb badly bruised	Was shovelling quartz into 302 Block, stone rolled down rill and caught him on right thumb ; off 21 days.
6 Sept.	Briseis Tin and General Mining Co. Ltd.	Derby	Sand and debris slipping on surface rock	Wise, Ernest	Ditto	Shock, and severe bruise over lower ribs	Was working with his brother at surface ; a quantity of sand and clay slipped from the bare rock above, both men were overwhelmed and carried down slope.
27 Sept.	Tasmania Gold Mine Co. Ltd.	Beaconsfield	Unknowningly approaching a missfire refired	White, James	Married	Bruise on calf of leg	Shots were fired at face in 1370-ft. level, one missed, and was recharged and again fired unknown to White, who approached to return a shovel, and was hit by a fragment flying from blast.
10 Oct.	Ditto	Ditto	Fall of stone in stope	Barrett, George	Ditto	Cut on fore-arm requiring four stitches	Was stoping in 301 Block, picking at point of back laths ; a lump of stone came away, striking him on the left fore-arm.
18 Oct.	Ditto	Ditto	Caught by machinery in motion	Hope, Percy J.	Single	Bruised ankle	Was cleaning L.P. direct winding engine ; got his foot between guide bar and connecting rod.

LIST of Accidents in Inspector Griffin's District for Year 1911—continued.

Date of Accident.	Name of Mine.	Locality.	Cause of Accident.	Name of Sufferer.	Married or Single.	Nature of Injuries.	Particulars.
1911 31 Oct.	Mt. Nicholas Colliery	Mount Nicholas	Fall of coal	Picket, Thomas	Married	Arm completely severed above the elbow	Was cutting through a fault in coal and neglected to sprag; a fall of coal knocked out some timbers, beneath which he fell; his right arm was severed, presumably, by a blow from timber on the edge of a skip.
2 Nov.	Anchor Tin Mine, Ltd.	Lottah	Miss-blow of spawling hammer	Baily, A.	Single	Back of hand badly bruised	Was working in Australia face and received an accidental blow on the back of his hand from a spawling hammer. Was off work 20 days.
8 Nov.	Tasmania Gold Mine Ltd.	Beaconsfield	Adze slipping	O'Keeffe, Denis	Married	Cut 1½ inch low down on inside of instep	Was dressing timber at surface; adze slipped inflicting a cut on his instep. Was off 14 days.
16 Nov.	Briseis Tin and General Mining Co.	Derby	A fall through losing his footing	Lucas, Ernest Wm.	Single	Jarred hand	Fell whilst working in face and jarred his hand. Was off work 19 days.
20 Nov.	Ditto	Ditto	Piece of cement falling in face	Clear, Wm. Daniel	Married	Bruised foot	Was working in tin face; a piece of cement fell on his foot, bruising it rather badly. He was off work 16 days.
6 Dec.	Tasmania Gold Mine Ltd.	Beaconsfield	Slipped on a sheet of iron	Johnstone, George	Ditto	Knee twisted or badly sprained	After repairing automatic feeder in mill, he stepped on to a sheet of iron, and slipping, sprained his knee.

7 Dec.	Ditto	Ditto	Stepping into hot ashes	Keefe, Wm.	Single	One foot badly burned, the other slightly	Whilst cleaning economiser flue, he inadvertently stepped back into hot ashes.
10 Dec.	Ditto	Ditto	Explosion when charging a hole	Burton, John	Married	Severe burns about the hands, face, and eyes	Was working in pump-chamber at 1500-ft. level and charged a number of holes, gelignite stuck in last one; force was used with steel bar, an explosion occurred.
10 Dec.	Ditto	Ditto	Ditto	Rush, John	Ditto	Burns on one side of face and eye	Was working with Burton, when the latter used a steel machine drill as a tamping bar.
19 Dec.	Wheeler and Grace's Tin Lease 4961M	Upper Cascade River, Weld-borough	Slip of rock and debris in side of sluiceway	Wheeler, Wm. Henry	Single	Severe bruising of left leg, necessitating subsequent amputation of limb	Was working by himself in tail-race of his tin section, a slip from the side pinned him down by the legs, in which position he remained for 73 hours before he was discovered; left leg amputated.

MR. INSPECTOR HARRISON (Zeehan) reports :—

Accidents.—In submitting my annual report I regret to say that there have been two fatal accidents. One took place at Balfour and one at Magnet. There were 28 accidents during the year, most of them being of a minor character. Three took place at the Tasmanian Smelting Company's works, and three at the Metal Extraction Company's works in course of erection at Rosebery. The accompanying list gives the cause and nature of injuries.

Safety Appliances.—These have been attended to, and instructions given for their renewal wherever required.

Ventilation.—The ventilation of the mines is generally good, and I have not had any complaints on that score during the year.

Magazines.—Magazines are kept in good order. A good many of them are closed down for the present. I am pleased to state there has not been any necessity to take legal action against either managers or men during the year.

Zeehan.—Silver-lead mining is very quiet on the Zeehan field at present. The only mines working are the Montana, Western, and Mt. Zeehan (Tas.), the latter depending principally on the work of tributors.

Returns from the outlying districts are of a far more encouraging character.

Dundas.—The Zeehan Dundas Blocks Mine has completed the extraction of ore from the 90-foot level, and started to sink another 100-feet; but after getting down about 45 feet below the plat the water became too heavy for present appliances. A powerful pumping plant has been obtained, and it is now in course of erection. The future of this mine is looked on as bright.

Comet.—The mine supplies the Tasmanian Company's smelters with large quantities of suitable fluxing ores.

Adelaide.—This property, after lying idle for a considerable time, was taken in hand by the company working the Comet. They also purchased the Andersons', and are now working both properties from the Adelaide main shaft. Their energy has been rewarded by the opening up of new shoots of ore of good assay values. Preparations are being made for the unwatering of the deeper levels.

Comstock.—The only mine doing any good is the Block 10, which is held on tribute by a party of working men, who send out about 40 tons of galena to the local smelters per month.

Kynance.—A few men are doing some prospecting on the property.

Mt. Read and Rosebery.—The Hercules Mine is a splendid property. The output is about 100 tons per day of sulphide ore to the Tasmanian Company's smelters, and an export of about 400 tons per month of zinc sulphide. The manager, Mr. C. Moxon, experiences considerable difficulty in obtaining a suitable supply of miners. This retards the progressive work, as all available labour is required to keep up the output.

Mt. Read.—A few men are kept constantly employed prospecting.

North Jupiter.—Manager is getting ready for sending out sulphide ore.

Prizrose.—An output of sulphide ore, about 40 tons per day, is kept up without any trouble.

The Tasmanian Copper Company and the North Tasmanian Copper Company are idle, pending the completion of the metal-extraction works, which we are given to understand will be ready in the near future. There is abundance of ore opened up ready for treatment.

Dalmeny.—This is, in my opinion, a good property, and should be in active work instead of lying idle.

Mt. Farrell.—The North Mt. Farrell Mine still continues to keep up a good output of good-grade galena. The returns from the deeper levels are most encouraging. The manager, Mr. Woodruff, is getting ready to sink for another level.

Mt. Farrell.—Prospecting is going on, with improved results.

Mackintosh.—A little prospecting is going on.

Sterling Valley.—This promising show is to be equipped with a good pumping and winding plant as soon as a connection by tram is completed with the Mt. Farrell tramline.

North Pieman.—The Chester Mine, under the management of Mr. Luke Williams, is sending out regular consignments of sulphide rock to the Mt. Lyell Company's superphosphate works.

Waratah.—Mt. Bischoff Company.—The manager is constantly erecting saving appliances, and increasing his crushing-power. The mine shows several years' work in sight.

Mt. Bischoff Extended.—The 10-head battery is kept constantly going, with satisfactory returns.

Whyte River.—Cleveland T.M. Company.—This mine is worked principally on the open-cut system on lode-matter that gives a return of slightly over 1 per cent. tin oxide.

There are a few mines in the district doing a little prospecting.

Heazlewood.—The Mt. Jasper Copper Mine.—Work has ceased on this mine for the last few months. Prospecting the lower adit has been somewhat disappointing. The company purchased the Long Tunnel Mine at Mt. Stewart, and removed the men to open up that property. Since taking it over the plant has been overhauled, the main shaft unwatered, and driving for the lode continued. The latest report states that the lode has been struck, giving good assay returns.

Savage River.—About 40 or 50 men are employed mining for osmiridium, most of them doing well.

Heemskirk.—On the Federation Mine the owner, Mr. J. S. Munro, is getting ready to prove the lodes at a depth by means of an oil-engine for pumping purposes.

On the north side of the mount the McGinness Bros. discovered a good tin lode, but water proved too heavy for the appliances they had. The show is worthy of further prospecting.

Tasman River.—The leases held by Captain Fisher and party have changed hands. A strong company has now got possession, and intends working the flats on a large scale. I understand the plant is to be put in position without any unnecessary delay.

N.E. Dundas Tinfield.—Renison Bell T.M.—During the year an additional five-head battery has been put in position, and a good supply of water-power obtained for driving same. The company has plenty of crushing-dirt in sight.

Montana Tin Syndicate are still employed sluicing the detritus. A 10-head battery has been purchased, and will be put in position as soon as possible.

Boulder T.M. Company.—A 10-head battery has lately been completed, with all necessary saving appliances, and better returns can now be looked for from this mine.

Penzance T.M. Company.—A complete 10-head stamp-mill is just about completed. The manager, Mr. T. Moore, expects to make a start crushing towards the end of the month.

The Dreadnought (Morton and Brumby) sections are being taken over by a Sydney syndicate.

X River.—There are several large bodies of ore being opened up in this new tinfield. The prospects are of a most encouraging character. The Government has decided to construct a couple of miles of a steel tram, which will connect with the Emu Bay Railway, and give the companies an opportunity of getting machinery on the ground. This is considered by all practical mining men to be a move in the right direction. There is a very large tract of tin-bearing country lying between the Pieman River and Mt. Ramsay, but better facilities must be given to prospectors to get mining material on the ground before it is possible to ascertain its value.

Stanley Field.—The Reward Mine, on which large sums of money have been spent in equipping it with a hydraulic elevator, has not turned out as well as was at first expected. A tin expert has been engaged from the N.E. Coast to sample the property and report on same. About 10 tributors are at work in the vicinity, and about a dozen men are employed opening up the Mt. Lindsay Mine.

Mt. Balfour.—On the Balfour field there is only one copper mine at work at the present time, namely, the Murrays' Reward, which is keeping up the usual output of high-grade ore. I do not consider the field has had fair play. The class of machinery sent there from the neighbouring States was of a most unsuitable character, with the result that in nearly every instance the depth attained was not more than 100 feet, and that at only great expense. There has been considerable leaching going on in the large ore-bodies near the surface, and in every instance an improvement was met with in the ore as depth was attained; but as I have already stated, the plants were no good, and time and money were simply wasted. There are about 50 men working on alluvial tin-wash, and most of them are doing well.

LIST of Accidents in Inspector Harrison's District during the Year 1911.

Fatal, 2 ; non-fatal, 26 ; total, 28.

Date of Accident.	Name of Mine.	Locality.	Cause of Accident.	Name of Sufferer.	Married or Single.	Nature of Injuries.	Particulars.
1911. 27 Jan.	Mt. Bischoff Tin	Mount Bischoff	Fall of tim- ber	Hayes, Henry	Single	Hurt penis	Pulled a piece of timber down, which hurt his groins.
3 Feb.	Magnet Silver	Magnet	Fall of stone	Saville, John	Married	Burst finger	While barring down, stone fell on finger.
6 Feb.	Mt. Bischoff Tin	Mount Bischoff	Fall off truck	Jones, Owen	Single	Compound frac- ture of right leg	Fell off moving truck.
14 Feb.	Magnet Silver	Magnet	Fall of tim- ber	Davis, A. J.	Ditto	Bruised back	While putting in set of timber cap fell on him.
16 Feb.	Mt. Bischoff Tin	Mount Bischoff	Ditto	Smith, Walter	—	Broken ribs	Pulled timber down on himself.
13 Mar.	Metals Ex- traction Co.	Dundas	Cut by saw	Storey, J. O.	Single	Lacerated hand	Right hand came in contact with circular saw.
28 Mar.	Zeehan Mon- tana	Zeehan	Fall of rock	Jeffries, Ed. William	Ditto	Bruised breast and side	Rock fell from face of stope.
1 Apr.	Ditto	Ditto	Ditto	Dhu, Roderick	Married	Broken rib	Injured by fall of rock from wall of stope.
5 Apr.	Magnet Silver	Magnet	Fall of stone	Richards, John	Ditto	Bruised foot	Caught by a stone while barring down.
8 Apr.	Montana Tin Syndicate	Dundas	Ditto	Jones, Albert	Single	ditto	Ditto.
9 May	Boulder Tin	Ditto	—	Matheson, William	Ditto	Bruised finger	Injured while feeding battery.
29 May	Magnet Silver	Magnet	Fall of stone	Gregory, Oscar	Ditto	—	While putting in a set of timber a stone fell.
31 May	Zeehan Montana	Zeehan	Fall of stones	Doney, Archd.	Married	Cut head	Fall of loose stones down a man way.
6 June	Magnet Silver	Magnet	Fall of debris	Hall, Nicholas	Ditto	Bruised back	While cutting a hitch for log stones fell.

LIST of Accidents in Inspector Harrison's District during the Year 1911—continued.

Date of Accident.	Name of Mine.	Locality.	Cause of Accident.	Name of Sufferer.	Married or Single.	Nature of Injuries.	Particulars.
1911. 17 June	Magnet Silver	Magnet	Fall	Lewis, Wm.	Single	Bruises	Fell 18 feet.
27 June	Zeehan Montana	Zeehan	Explosion	Trevarthon, John	Married	Cut head and back	Remained too long endeavouring to fire No. 3 fuse.
5 Aug.	Boulder Tin	Dundas	Run over	Corrigan, John	Widower	Right leg broken	Slipped, got leg under truck, horse started.
5 Aug.	Metals Ex- traction Co.	Ditto	Fall of tim- ber	Ansell, Alfred	Single	Left arm broken	While helping carpenter timber fell.
16 Aug.	Tasmanian Smelting Co.	Zeehan	Fall of ladder	Male, Clement	Ditto	Concussion	Ladder on which he was working slipped and fell on tram line.
25 Aug.	Murray Reward	Balfour	Fall of tim- ber	Haslem, George	Married	Cut head	Block of wood fell down incline shaft.
4 Sept.	Zeehan Montana	Zeehan	Blasting	Madden, T.H.	Ditto	Bruised foot	Shot in leading stope broke back laths, and let stone down.
2 Oct.	Magnet Silver	Magnet	Fall down shaft	Bricknell, A. H.	Widower	Numerous	Was pitman, and was attempting to repair knocker line.
30 Oct.	Ditto	Ditto	Explosion	Briscoe, Christopher	Single	Burns	While bulling a hole shot went off.
24 Nov.	Tasmanian Smelting Co.	Zeehan	Fall	Beard, Joseph	Married	Injured leg	Crushed between two trucks, and fell into ore bin.
27 Nov.	Metals Ex- traction Co.	Dundas	Fall of tip	Kerr, D.	Single	Bruised back	While trucking, the tip gave way, and he fell.
1 Dec.	Hercules	Mt. Read	Fall	Gannon, John	Ditto	Bruised ankle	Fell from leading stope to main level, 7 feet.
13 Dec.	Pioneer	Balfour	Explosion	Thunder, Herbert	Ditto	Fractured skull	While loading a hole charge went off.
19 Dec.	Tasmanian Smelting Co.	Zeehan	—	Dhu, Roderick	Married	Contused forearm	Caught by a railway truck.

MR. INSPECTOR CURTAIN (Queenstown) reports:—

Accidents.—In accordance with expectations suggested by my last annual report, there have been few accidents, and apart from Marshall's fatality, all the sufferers have been able to resume work. In Marshall's case, this accident should not have happened, as the facts disclosed at the enquiry conclusively showed that he was chiefly to blame himself. Briefly stated, he took up a position under a known piece of affected (drummy) ground that was close to the working face in order to "pop" a boulder. The latter, with much better advantage, could have been attacked from the top or opposite side, which was out of danger of the influence of the ground that came away and killed him. The occurrence was a painful repetition of similar circumstances that have attended almost all the fatal casualties that have taken place in the past.

Working Conditions.—On the whole these should bear favourable comparison with those of other States in the Commonwealth. Our mines have their own particular characteristics, which, if observed and allowed for by those employed, should materially assist in diminishing the danger that is admittedly attached to their operations. This is not written with any desire to minimise what has happened, but solely with the view of reminding those directly concerned, so that they may take keener interest, not alone in their own welfare, but also in that of others who lack prudence and experience.

General.—Matters relative to inspections, enquiries, health, of miners, ventilation, dust sanitation, &c., coincide so closely with last year's conditions that what I then wrote need not be repeated. At the North Lyell Mine the management intends to enlarge the changing-house. This is needed, and when completed it will be appreciated.

The ropes and cages have been tested within stated periods, and those in use at the termination of the year were in satisfactory working order. The air in all the mines was cool, and, except in cases where machine-holes were bored dry, wholesome, which accounts for the general health of the miners, which, by the medical officers, is returned as being satisfactory.

LIST of Accidents in Inspector Curtain's District for the Year 1911.

Fatal, 1; non-fatal, 16; total, 17.

Date of Accident.	Name of Mine.	Locality.	Cause of Accident.	Name of Sufferer.	Married or Single	Nature of Injuries.	Particulars.
1911. 9 Jan.	Mt. Lyell Blocks	North Lyell, in the town of Gor- manston	Fall of rock- drill	Steele, Henry Thomas	Married	Instep of left foot bruised	Steele was leader of a shift em- ployed sinking the main shaft, and while altering the machine in use, it slipped, and falling on his foot injured it.
11 Jan.	Mt. Lyell Mg. & Ry. Coy., North Lyell Mine	Ditto	Fall of cap- piece	Strachon, Charles	Ditto	Bruised on back and shoulders	Strachon was assisting to man- handle a heavy leg along the floor of 22 stope at the 850-ft. level, when it "butted" into some insecurely-stayed timbers, thereby causing a cap to fall and strike him.
16 Jan.	Ditto	Ditto	Fall of rock- drill	O'Donnell, William	Single	Small bone of ankle fractured	O'Donnell was an "offsider" in the substopes at the 700-ft. level, and while assisting to take down a drill in order to more satisfactorily "rig it," it fell on him.
31 Jan.	Ditto	Reduction Works, town of Queens- town	Explosion	Carey, John	Married	Flesh wounds over body	Carey had charge of the feed floor, when an explosion, at- tributed to gelignite in the ore, took place, and incapaci- tated him for some weeks.

23 Feb.	Mt. Lyell Mg. & Ry. Coy., North Lyell	North Lyell, Gorman- ston	Fall off rope	Allard, Ernest Bertrim	Ditto	Left ankle broken & other sprained	Allard, a shift boss, for the purpose of repairs was examining an ore pass in 18 stope over the 850-ft. level, and while being hauled back, lost his hold and fell.
2 Mar.	Mt. Lyell Mg. & Ry. Coy., Mt. Lyell Open Cut	Gorman- ston	Jammed between loaded truck and footwall	Pitt, Joseph	Single	Bruised and cut about groin	Pitt was a machine-hand, and while carrying steel on bench IVC. to the blacksmiths, was caught as stated.
7 Mar.	Mt. Lyell Mg. & Ry. Coy., North Lyell	North Lyell, Gorman- ston	Chip off spawl	Carey, William	Widower	Eye injured	Carey has returned to work, but his eye is permanently injured.
11 April	Mt. Lyell Mg. & Ry. Coy., Flux Quarry	Queens- town	Fall of rock	Mitzen, Andrew	(?)	Fore-joint of big toe crushed, necessitating amputation	Mitzen was barring down when the piece of rock he was engaged on canted and caught him.
15 April	Mt. Lyell Mg. & Ry. Coy., North Lyell	North Lyell, Gorman- ston	Fall of rock	Marshall, Clarence Wilmot	Married	Intestines ruptured. Fatal.	Marshall was engaged "popping" boulders in the 24 stope over the 1000-ft. level, when a slab-shaped piece of the hanging-wall came away and pinning him against the rock he was boring, caused death.

LIST of Accidents in Inspector Curtain's District for the Year 1911—continued.

Date of Accident	Name of Mine.	Locality.	Cause of Accident.	Name of Sufferer.	Married or Single.	Nature of Injuries.	Particulars.
1911. 12 May	Mt. Lyell Mg. & Ry. Coy. North Lyell	North Lyell, in town of Gorman- ston	Collar-tie or stay drew out	Ryan, James Joseph	Married	Bruises about the back, &c.	Ryan and others were working on the first floor of 20 stope over the 850-ft. level, and believing some ground was coming away made a hasty exit. For the purpose of swinging himself clear he resorted to the temporary tie-piece or collar-stay of one of the main sets. Its nails (wire) drew, which caused him to fall backwards somewhat heavily on a heap of ore that necessitated his removal to the casualty ward.
30 May	Ditto	Ditto	Fall down ore-pass	Dobbie, George	Single	Bruised about the back and limbs	Dobbie and his mates were mullocking 23 stope over the 1000-ft. level, and in order to avoid a rush of soft "filling," mounted the unsupported portion of an ore-pass which, giving way, permitted him to fall through and sustain the injuries stated.

13 June	Mt. Lyell Mg. & Ry. Coy., Re- duction Works	Queens- town	Collapse of staging	Hayton, William George	Married	Contusions about hips and back	Hayton, a plumber, was assisting to put on water pipes round No. 3 furnace, when the staging he was working on gave way, and falling with it he received the injuries stated.
27 June	Mt. Lyell Mg. & Ry. Coy., North Lyell	North Lyell, Gorman- ston	Instability of cage	Wright, Henry	Ditto	Bruised about neck & shoulders, and two ribs broken	Contrary opinions were expressed about this accident. Wright stated the cage had stopped opposite the level (850-ft. plot); he desired to leave it, and as he was about to do so, it dropped back and pinned him against the shaft timbers. The driver asserts that the cage had not reached this point before the "current" cut out; which probably was correct, as the gauge chart registered such an occurrence having happened.
3 July	Tasman and Crown Ex- tended	Comstock, Gorman- ston	Uprooting of small tree	Nordstrom, Joseph	Single	Fractured left thigh, and bruises about back and body	Nordstrom was engaged in the erection of the concentrating plant, and for the purpose of hauling logs into position had made fast to a small tree that, uprooting with the strain, fell upon him.

LIST of Accidents in Inspector Curtain's District for the Year 1911—continued.

Date of Accident.	Name of Mine.	Locality.	Cause of Accident.	Name of Sufferer.	Married or Single.	Nature of Injuries.	Particulars.
1911. 3 July	Mt. Lyell Mg & Ry. Coy., North Lyell	North Lyell, Gorman- ston	Personal exertion	Anderson, William	Single	Ricked, or strained back	Anderson stated that after stand- ing some timbers in the 300-ft. level, he was in the act of stooping for a hammer when his back gave way; he be- came quite helpless, which necessitated his removal to the casualty ward, where he re- mained for some time.
5 July	Mt. Lyell Mg. & Ry. Coy., Mount Lyell	Gorman- ston	Fall of ore	McGregor, John	Married	Three principal bones of elbow broken, with a lacerated muscle	McGregor and others were about to place back-logging over the main timbers, and for this purpose had recourse to knocking the "crown chocks" out. The latter had "weight," for, when released, a quantity of ground came away and injured McGregor.
28 Aug.	Mt. Lyell Mg. & Ry. Coy., North Lyell	North Lyell, Gorman- ston	Fall of rock	Ware, Alfred	Ditto	Small toe broken	Ware and his mates were barring down in 24 stope over the 1000- ft. level, when a piece of schisty ore slipped off the side, and jamming his foot against the timbers caused the injury as stated.