AR1920

TASMANIA

REPORT

OF THE

ACTING-SECRETARY FOR MINES

FOR

YEAR ENDING DECEMBER 31

1920

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

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Report of the Acting-Secretary for Mines.

Mines Department,
Hobart, 20th June, 1921.

SIR,

I HAVE the honour to submit my report on the Mines Department and the Mining Industry for the year ending 31st December, 1920.

As I was only in charge for some five weeks of the period under review (having been appointed on and from the 22nd November, 1920), I have been somewhat handicapped in preparing the report on the industry for the full twelve months.

GENERAL REMARKS.

The aggregate value of minerals raised during the year was £1,421,104, being an increase of £120,014 on the value of the output for the previous year.

The most marked increases are shown in lead and osmiridium, while there were also increases in silver, copper, and coal. The decreases were in tin, wolfram, iron pyrites, and scheelite. The fall in the price of the latter compelled the King Island Scheelite Company (the only Tasmanian producer) to close down, and no ore was produced during the latter part of the year. The decrease in the production of wolfram was mainly owing to the destruction by a bush fire of the S. and M. Company's plant at Moina early in the year.

The system of showing quantities and values of metallic contents of ores, instead of those of the ores only, inaugurated in 1919, appears to have been introduced through a misunderstanding of what the Commonwealth Statistician desired to obtain. It has now been made clear that

information was desired respecting the metallic contents of ores in addition to, and not in substitution for, the information formerly supplied, and in order to furnish this so far as is possible, I have reverted to the former practice of showing silver-lead, blister-copper, and copper ore.

In looking closely into the matter, with the view of furnishing all possible information, it was found that the quantities shown under the heading "Silver-lead" included concentrates, hand-picked ore, and crude ore. Consequently the figures are misleading, and I have, therefore, omitted quantities for 1919 and 1920, and simply show the value.

The additional returns, however, show the quantities and values of the silver and lead contained therein, and also the silver and copper contents of blister copper.

AID TO MINING.

The period under review has been a very uncertain one for silver-lead and other base metal producers, mostly through a series of strikes having caused the cessation of both shipping and smelting. Despite these disabilities, the Zeehan field has done fairly well.

At the No. 2 Argent the electrical pumping unit has not yet arrived from Europe, so all returns have come from above water-level. Some of the ore-shoots, though short, proved to be very productive.

At the No. 6 Argent the water has been easily controlled by the new steam plant. The mine has been a steady producer, and has provided employment for about 60 men. From the bottom, or 125-feet level, a winze has been sunk by means of an auxiliary pump to 40 feet. From this level the main lode has been driven on for over 100 feet, and has disclosed a fine shoot of ore.

Several other tributers have met with moderate success. Tributers have received assistance to the average extent of 6s. 9d. per foot for 733 feet of driving. Some promising lodes have been cut, which may prove of importance when further driven on.

Surveying and Assaying.

Tributers have again been accorded the privilege of having their surveys made free of charge. Also, useful information was supplied to several parties in relation to ore-dressing power, the delivery of water in races and pipes, and similar data.

In the assay department the work has been very heavy. This office is now called upon to do the whole of the assaying for the Zeehan district, in conjunction with that received from outside centres. Samples to the number of 1106 were treated, and these entailed 2490 metal determinations. Also 270 mineral identifications were made without fee. The determinations covered a wide range, embracing most of the industrial metals.

A metallurgical investigation of the tin-bearing ores of Renison Bell, as regards the composition, the heavy dressing losses, and improved treatment, was undertaken and brought to a successful issue.

The total quantity and value of ore sold during the year was as follows:—

	Quantity. Tons.	Value. £ s. d.
Silver-lead ore	1,598·00	37,057 1 5
Pyritic ore	911·35	1,042 2 6
Total	2,509·35	£38,099 3 11

The amount received from ore sales was £31,716 5s. 10d., which was distributed as follows:—

	£ s. d.
Paid to tributers	26,960 10 4
Royalty paid to lessees	951 10 8
Miscellaneous payments to State	50 6 6
Royalty paid to State	3,753 18 4
	£31,716 5 10

EXPENDITURE.

	£ s. d.
Salaries	450 0 0
Wages	18 10 0
Office expenses	7 14 4
Assay material	99 7 1
Assistance to prospectors (749 feet driven) ...	250 0 0
Advance to No. 6 Argent Prospecting Syndicate, No Liability	600 0 0
Miscellaneous expenses	79 1 3
	£1,504 12 8

RECEIPTS.

	£ s. d.
Royalty paid by tributers	2,135 6 0
Assay fees	74 16 0
Sale of stores (Port Davey)	4 9 10
Sale of 2 h.p. International engine	12 0 0
Sale of 2-inch centrifugal pump and tools	10 10 0
	£2,237 1 10

No. 2 Argent Prospecting Syndicate, N.L.

Purchase and Construction of Plant.

During the year the syndicate has paid in royalty £184 18s. 1d., and at the 31st December the account stood as under:—

	£	s.	d.
Cost of purchase and construction of plant ...	456	7	3
Repaid by royalty	561	0	1
Credit	£104	12	10

Running and Maintaining Pumping Plant.

Expenditure during the year	Nil		
Credit by rebate royalty payments	£337	5	4

The account at 31st December was as follows:—

	£	s.	d.
Total expenditure	912	2	4
Total rebate	1,240	9	10
Credit	£328	7	6

No. 6 Argent Prospecting Syndicate, N.L.

The amount received from sale of ore on account of the syndicate and sub-tributers was £15,197 13s. 6d., upon which the sum of £2386 1s. 1d. was paid in royalty, £294 4s. 2d. to the lessee company, and £2191 16s. 11d. to the State. Of the latter amount, £975 14s. 8d. was for ordinary royalty; £1209 19s. 10d. in repayment of loans; and £6 2s. 5d. for interest.

The following statement shows amounts advanced, repaid, and balances owing:—

	Amounts Advanced.			Repaid.			Balances Owing.		
	£	s.	d.	£	s.	d.	£	s.	d.
Aid to Mining Act, 1912...	1699	7	10	137	13	11	1561	13	11
Sundry Public Works Suspense Account	600	0	0	222	0	9	377	19	3
Governor - in - Council's Authority, 23/6/19	1357	8	7	554	5	8	803	2	11
Governor - in - Council's Authority, 11/9/19	600	0	0	600	0	0	—		
	4256	16	5	1514	0	4	2742	16	1

APPENDICES.

Appended will be found—

Annual Report of Mt. Cameron Water-race Board.
Report of Government Geologist.
Report of Chief Inspector of Mines.
Report of Chief Inspector of Explosives.
Reports of Inspectors of Mines.

GOLD.

The following return shows the quantity and value of gold won during the year:—

	Ozs.
Beaconsfield	8·6
Lefroy	105·758
Lisle, Golconda	105·550
Mt. Claude	224·800
Mt. Cameron, Mt. Victoria, and Warrentinna	40·295
Mathinna	562
North-West and West Coasts...	5,318·042
Total	6,365·045

Value, £29,796, equal to 6,246·195 oz. fine gold.

Beaconsfield.—Since the Tasmania Mine ceased operations very little gold has been won from the Beaconsfield district, the returns for the year showing 8·6 oz. only.

Lefroy and Back Creek.—The only information of note respecting these once famous centres comes from Back Creek, where prospector Gillam, on the old White-lead, has unearthed some 50 or 60 oz. of rough, ragged specimens, the source of which he is endeavouring to discover.

Lisle.—The Lisle Gold Mine, with two men sluicing, obtained 96 oz. of gold.

The Lisle Hydraulic Gold Mines, No Liability, did not carry on any mining operations during the year.

Mt. Arthur.—Mr. Montagu Dunn, who has taken up an extensive area of ground in the name of F. Wardle, visited London with the view of obtaining sufficient capital to thoroughly test the alluvial and whatever leads or reefs there may be covered by detrital residues or forest scrub on the property. His mode of operations will be to sluice the whole overburden away, and he is bringing in a deep tail-race, which, with a plentiful supply of water should accomplish this. Eight men have commenced operations.

Golconda and Panama.—Here also attention has revived, in consequence of developments made on land held by Dr. Thompson, where payable stone, according to assay values, has been located.

Mt. Victoria.—Work on the Long Struggle sections has recently been resumed for the purpose of extending the main adit to cut the underlie of the surface stone.

Mathinna.—The work in the New Golden Gate Mine for the year has been confined to opening up blocks of stone in the old workings at the 316, 400, and 500 feet levels, from which 970 tons have been raised and crushed at the battery, returning 627 oz. 12 dwt. of smelted gold to the value of £3135.

Prospecting by various parties has continued in the district, the more recent being under the direction of Mr. J. M. Potter, who is favourably known throughout the Commonwealth.

Long Plains.—On the Shore's Surprise Mine the tunnel was extended for some 500 feet without striking any gold-bearing stone. Four or five men were employed.

SILVER-LEAD.

The quantity of silver produced was 623,359 oz., valued at £166,767.

The principal producers were:—

	Ozs.	Value. £
Zeehan Mines.		
Mt. Zeehan (Tas.)	8,489	2,641
Nike	29,419	8,237
Zeehan Montana	2,843	678
Oonah	1,924	493
Swansea (Dunn)	4,081	1,031
Zeehan Queen	7,948	1,941
No. 6 Argent	70,385	18,606
No. 2 Argent	17,763	4,472
Others	16,958	4,260
	159,810	42,359
North Mt. Farrell	140,582	36,887
Magnet Mines	99,358	25,637
Round Hill	53,661	14,015
Mt. Lyell	169,948	47,869
Total	623,359	£166,767

The quantity of lead produced was 3855·639 tons, valued at £142,268.

The principal producers were:—

	Tons.	Value.
Zeehan Mines.		£
Mt. Zeehan (Tas.)	33·87	1,322
Nike	253·5	9,933
Zeehan Montana	7·783	252
Oonah	13·996	503
Zeehan Queen	81·75	2,825
Swansea (Dunn)	140·88	4,958
No. 6 Argent	491·7	18,706
No. 2 Argent	96·44	3,485
Others	121·420	4,283
	1241·339	46,267
North Mt. Farrell	1349	49,980
Magnet Mines	600·5	20,728
Round Hill	664·8	25,293
Total	3855·639	£142,268

Northern Division.—Mt. Claude.—Round Hill Mine.—The following is a statement of work done on the mine during the year ending 31st December, 1920:—

Mine Development.—During the first half of the year the main No. 1 tunnel was driven along the northern wall of the lode a further distance of 132 feet. At this point a crosscut was put out south-westerly to test the width of the lode. The crosscut was driven 23 feet, and cut what appeared to be the south wall. At this point the lode showed a width of 33 feet, 20 feet of which was payable milling ore. Since crosscutting the lode the main south-eastern drive has been driven a further distance of 124 feet. The drive has been carried 12 feet wide, with fair milling ore the whole distance. This end has during the year been driven a total distance of 256 feet. The leading stope has been kept forward following up the end, keeping at about 40 feet behind the end, other stopes following at about distances of 80 feet behind each face. The stopes are producing ore of similar grade to that produced from the end. The face of this drive is now in 1295 feet from the surface approach of tunnel.

No. 1 Tunnel, North-Western End.—After crosscutting and discovering the western wall, as explained above, this drive was driven back along the wall for a distance of 136 feet. The lode in this drive has been more than ordinarily productive. The width of lode carried in the end has been 12 feet. A rise has been put up from the end of the drive

communicating with a prospecting drive off the stopes, and stoping has been carried off the rise. This provides excellent ventilation to both the stopes and main level.

No. 2 Tunnel.—This tunnel has been driven a distance of 130 feet during the year. The lode in the end has been rather patchy, and the end is now in the slide.

Rises.—Several rises have been put up in the lode from No. 1 tunnel to prospect the lode and to provide ventilation.

During the year the mill has treated 8138 tons of lode-stuff. This produced 1210 tons of concentrates, which contained 209 oz. gold, 52,293 oz. silver, and 674 tons lead, or an average assay value of 3 dwt. 9 grs. gold, 43·2 oz. silver, and 55·7 per cent. lead per ton.

The average number of men employed during the year was 40.

Vandyke.—This is a small prospecting show on the Claude-road, employing two men, but from which no returns have been made up to the present.

North-Western Division.—Magnet Silver Mine.—Work in connection with ore-breaking was principally confined to No. 13 level, and the rise and stopes above the same, the best of the ore being hand-dressed, and the remainder treated at the concentrating mill.

The south adit is still being extended, but nothing of any value has been met with.

The construction of the dam has proceeded, and water was admitted and allowed to accumulate to what was considered a safe level.

The electrical plant was put into commission, portion of it being very satisfactory.

The average number of men employed was 89.

The Victoria Magnet.—This company is still carrying on prospecting operations.

Compass.—Some underground work was done with the view of picking up the continuation of the Magnet Silver Mine formation to the north, but without success.

Persic Silver Mine.—The drive on the lode-channel was continued and connected to the winze sunk from the level above, very little ore of a payable nature being encountered. Work was stopped towards the end of the year.

Mt. Jasper Copper Mines, No Liability.—Work on the above company's leases has been confined to the Mt. Wright section, viz., a silver-lead lease. Driving on lode was continued north to 70 feet from No. 2 adit, and south to 100 feet. Two stopes were taken above south crosscut

for a distance of 50 feet. During the latter period of the year, a winze was sunk on the lode to a depth of 30 feet. This has opened up the lode much better, and the country is becoming settled. The lode is about 3 feet wide, with 12 inches of clean firsts on hanging-wall, having an average assay value over all of about 35 oz. silver and 20 per cent. lead. The clean seam assays 120 oz. silver and 87 per cent. lead. The latter is bagged, and the balance transported to the mill, where it is concentrated.

When in full swing 12 to 15 men are engaged.

Air-drills are being installed, which will overcome the slow hand process of drilling.

Western Division.—The Mt. Zeehan (Tas.) Silver-Lead Mines Limited, during the year started active operations on their Britannia lease, extending the lower adit to intersect, at a lower level, the ore-body previously worked with success by Messrs. Davenport and party. At the close of the term the formation had not been cut. The company also made a lot of alterations and additions to their concentrating mill, and the manager reports that results were satisfactory. A sample of the tailings, being retreated by this mill was sent away to be tested by the flotation process, but it was fully shown that the ore was not suitable for treatment by this method.

Work proceeded at their No. 2 Argent Mine on similar lines to that carried out during 1919 by various tributers from adit levels. One of the tributers met with good results, and the others have done fairly well.

From the No. 6 Argent Mine a considerable tonnage of good-grade ore has been sent away, most it being won from above No. 2 level.

During the latter part of the year, a blind shaft or winze was sunk to about 42 feet, and a crosscut put out to cut Astles' lode. Where cut, the lode showed good values. The winze was equipped with a 9-inch diameter draw-lift pump, connected by rope gear to the nose of the main pump bob, which has answered fairly satisfactorily. It is expected that a larger pump, say a 12-inch diameter one, will be needed in the near future to deal with the water.

The syndicate is also erecting a small concentrating mill to deal with their milling ore, and this should be in commission about March.

Zeehan-Queen Mine.—Various tributers are engaged on this mine. One party made a nice discovery under Delaney's old workings, and from appearances should obtain a good tonnage of fair-grade galena.

J. Hill and party have been rising on their lode, and driving at a higher level to connect up for ventilation, as well as for more economical working. This work should be completed early in March.

W. Hill has done a good deal of developmental work, but so far without success. He has been beating out the remainder of the lode previously operated upon. Other work done has been of a prospecting nature, a little ore being won, but not of a payable quality.

Oonah and Montana Mines.—Various tributers have been at work at these mines, but without any marked success.

Nike Mining Company, No Liability.—Work at this mine has continued on the usual lines, including a fair amount of development and extraction of the known ore-deposits. During the year a nice body of gossan was cut on the 90-feet level, and a rise put up on it to the adit level. From appearances this lode should give a good account of itself. Electrical power only being available for one shift, no work has been undertaken below the 90-feet level.

J. Coltson and party, tributers, made a valuable discovery, on which a winze has been sunk to 100 feet on the underlay. Good-grade galena is showing to the bottom of same.

The Swansea Mine (Dunn and Hills).—This party completed a water-race, and erected a water-wheel to drive the pumps, and then resumed operations underground. They are very pleased with results to date, and are sanguine about the future.

Some developmental work has been done on other old mining leases—McDermotts, Kynance, Davern's, &c.—but nothing of importance has been discovered.

North-East Dundas.—Kapi Silver-Lead Mine.—This mine is still being worked by tributers, and small parcels of high-grade ore are being obtained and sent away to smelters

Wallace and party discovered a formation which gave assays up to 240 oz. silver to the ton, but on being opened up would not bulk, so work has been discontinued.

Mt. Read and Rosebery District.—The Mt. Read and Rosebery Mines Limited.—These properties were taken over by the Electrolytic Zinc Company of Australasia

Limited during the year. Towards the end of the year a small tonnage of average-grade ore was broken at the Hercules and the Rosebery Mines for experimental purposes at Risdon and Melbourne.

Tasmanian Metals Extraction Company.—Some work was carried out by the company on their Mt. Read Mine. The abandonment of the Lake Rolleston Electrical Power scheme came as a blow to this company, as, to put in their new process, cheap electrical power was essential. Only two men are employed at the works keeping them in repair.

Rosebery Lodes Mine.—Work was confined to shaft-sinking and driving an adit, but nothing of a payable nature was disclosed.

Mt. Farrell District.—North Mt. Farrell Mine.— High-grade ore was cut at the No. 5 level, and developmental work to date goes to show that the future of the mine is promising. Mining and the milling of ore from the various levels was proceeded with on the usual lines, and met with fair results.

Mt. Farrell Mine.—Three men were employed during part of the year in sinking, driving, and crosscutting, and some promising prospects were met with, but nothing of a payable nature was discovered.

COPPER.

The quantity of copper produced was 4791·75 tons, valued at £528,237.

The Mt. Lyell Mining and Railway Company Limited.—The ores and metal-bearing fluxes treated (as reported by the General Manager) were as follow:—

	Tons (dry).
Ore from the Company's Mt. Lyell Mine ...	110,444
Ditto from the North Mt. Lyell Mine ...	52,910
Concentrates from the Company's Lyell Comstock and North Mt. Lyell ores...	11,616
Purchased ore from other mines	63
Total	175,033

Blister copper produced, 4836 tons, containing:—Copper 4791 tons; silver, 169,949 oz.; gold, 5273 oz.; approximate value, £598,148.

Average number of men employed:—

Mining Department—		
At Company's Mt. Lyell Mine	451	
At North Mt. Lyell Mine	270	
At Lyell Comstock Mine	34	
At Crotty Leases	26	
		781
Reduction Works Department (including Lake Margaret)		655
Railway Department—		
Mt. Lyell Railway	122	
North Lyell Railway	19	
		141
Total		1577

Dividends paid during the year, £64,459 15s., equal to 1s. per share.

Dividends paid from the inception of the Company to 31st December, 1920, £3,830,009.

Copper produced from the inception of the Company to 31st December, 1920, 168,374 tons fine.

Silver produced from the inception of the Company to 31st December, 1920, 12,781,208 oz. fine.

Gold produced from the inception of the Company to 31st December, 1920, 371,686 oz. fine.

As during recent preceding years the company's mining operations were restricted, owing to the shortage of labour, very little exploratory or developmental work being undertaken, and the ore-production proceeding on a scale much below normal.

Mt. Lyell Mine.—The most important developmental work carried out was the completion of the engine winze to the new No. 10 level, on the South Lyell workings, and the opening-up of the latter, the pyritic body being encountered in drives put out north and south from the plat chamber, at a short distance from the winze. A deviation of the No. 5 tunnel, circumscribing the southern end of the open-cut workings, and providing a new means of access to the main shaft, together with a considerable amount of other driving, undertaken principally for the purpose of improving the ventilation of the mine, was also carried out.

Ore-production was continuously carried out at each level of the underground workings, but only a small amount of ore-breaking was done in the open-cut, where the ore reserves are now small. A large amount of work was done in the open-cut, however, with a view to restoring the batter after the slip which occurred at the close of the previous year.

North Lyell Mine.—The north drive at the 925-feet level was further extended, and the country passed through was tested laterally by diamond drilling, further valuable additions to the ore reserves being disclosed. At the 850-feet level the corresponding drive and bores off it also disclosed valuable accessions to the ore reserves in that—the most northern—portion of the mine.

Ore-production was in steady progress at each level from the 850-feet downwards, stoping work at the ground floors of the northern stopes at the 850-feet, 925-feet, and 1000-feet levels adding considerably to the ore reserves in that locality.

As usual, the mine water was treated in the precipitating plant for the extraction of the copper in solution.

Lyell Comstock Mine.—Ore-extraction by open-cutting together with the necessary removal of overburden, was in regular progress, though the ore available by this method is now nearing exhaustion. No underground work was undertaken.

Reduction Works.—The usual smelting operations were continued in this department, but, as in the previous year, only one blast furnace was kept in operation, commensurate with the ore-supply. The new converter plant easily coped with the matte produced from the blast furnace, and turned out 4836 tons of blister copper, which was consigned to the Electrolytic Refinery and Smelting Company's works at Port Kembla, New South Wales, where the copper, silver, and gold are separated from each other.

All the ore broken in the Comstock Mine, and a low-grade portion of the ore won in the North Mt. Lyell Mine, was sent to the flotation plant, and yielded 11,616 tons of concentrates. These, after preparatory agglomeration in the Dwight-Lloyd sintering plant, and the new nodulizing plant, were sent through the blast furnace.

The nodulizing plant was completed during the vear for the purpose of agglomerating the concentrates, which are all in a fine state of division, and is a valuable adjunct to the Dwight-Lloyd sintering plant.

In order to make it possible to treat a larger quantity than heretofore of the silicious North Mt. Lyell ore, together with the usual quantity of Mt. Lyell pyrites, a new crushing and hand-sorting plant was installed during the year as a preliminary step to the flotation plant treatment. Part of the North Mt. Lyell ore will be sorted into a high-grade portion, which will be sent direct to the blast

furnace, and the balance of the ore, forming a low-grade portion, forms part of the feed for the flotation plant, together with the low-grade North Lyell ore above referred to as being sent direct to that plant. The general object of this modification of the metallurgical practice is to increase the copper output by the utilisation of a greater quantity of North Mt. Lyell ore.

Hydro-Electric Power.—As before, the Lake Margaret installation supplied current for the company's various uses, chiefly for power and lighting. The storage of water is sufficient for the continuous running of the five 1600-horsepower turbo generators, even during a season of extremely low rainfall.

Incidentally, a large amount of survey and related exploration work was undertaken by the company on behalf of the Government, in investigation of the Lake Rolleston hydro-electric scheme, where the existence has been established of an economical power scheme with a gross total capacity of 25,000 horsepower.

Fraser Mine.—The north drive on lode was extended 60 feet. Total from crosscut, 152 feet. Lode is averaging 14 inches iron pyrites. This drive was discontinued owing to ore cutting out. Stoping was carried out over this level, the lode averaging 12 inches of ore.

From the north drive and stopes 779 tons of arsenical pyrites were extracted, valued at £5063 10s.

The ore averaged 16 to 18 per cent. arsenic, and 2 to 3 per cent. copper. Number of men employed, 11.

TIN.

The quantity of metallic tin won was 1310·411 tons, valued at £369,362; an average value of £280 4s. 10·634d. per ton.

The statistics for the year are:—

	Tons.	Value. £	Miners Employed
Northern and Southern Division	·485	117	39
North-Eastern Division	604·394	168,963	439
Eastern Division	200·445	53,503	286
North-Western Division	381·218	112,339	400
Western Division	123·869	34,440	154
Total	1310·411	£369,362	1318

North-Eastern Division.—The output of tin was 604·394 tons, obtained as follows:—

	Tons.	Tons.
Pioneer and Gladstone Districts.		
Pioneer Tin Mine	166·950	
South Mt. Cameron	5·750	
Endurance	44·800	
Other claims	88·645	
		306·145
Ringarooma, Derby, and Branxholm Districts.		
Briseis Tin Mines	175·845	
Clyde Mine	·660	
Arba Tin Mine	36·745	
New Ruby Flat	8·990	
Other claims	66·349	
		288·589
Moorina District.		
Weld Tin Mine		8·470
Straits Islands		1·190
Total		604·394

Eastern Division.—The output of tin was 200·445 tons, obtained as follows:—

	Tons.	Tons.
Weldborough, Lottah, and Blue Tier Mines.		
Anchor Mine	2·34	
Star Mine	4·86	
Full Moon Mine	2·90	
Other claims	35·105	
		45·205
St. Helens Mines		47·185
Avoca Mines.		
Royal George	66·5	
Story's Creek	31·9	
South Esk	1·825	
Ben Lomond Republic	·210	
Dalrymple	2·410	
Gipps' Creek	1·780	
Others	3·430	
		108·055
Total		200·445

North-Western Division.—The output of tin was 381·218 tons, obtained as follows:—

	Tons.
Mt. Bischoff	296·360
Mt. Bischoff Extended	69·000
Weir's Bischoff Surprise	4·174
Waratah Alluvial	4·120
Mt. Balfour	2·518
Others	5·046
Total	381·218

Western Division.—The output of tin was 123·869 tons, obtained as follows:—

	Tons.
Dreadnought Boulder	21·443
Mt. Lindsay	5·004
Heemskirk	28·713
Stanley River	5·028
Iris Tin Recovery	3·490
Montana	5·655
Federal	38·250
Others	16·286
Total	123·869

Northern Division.—The S. and M. Syndicate, Moina.—Ore-breaking was carried on in January only, and then on a limited scale, owing to shortage of power water. At the end of that month the concentrating mill was destroyed by fire, and the work since has consisted in the erection of a new mill.

This is nearing completion, but, as under present costs and values mining is prohibitive, it is not anticipated that this work will be resumed until a substantial alteration takes place in the metal markets. The production during the year was 24 cwt. of mixed concentrates, containing tin, wolfram, and bismuth, and of a gross value of £125 9s. 3d. This was obtained from sluicing operations.

The number of men employed ranged from 28, in January, to 17 in December, the average being 20.

North-Eastern Division.—The Briseis Tin and General Mining Company Limited.—There is no change of interest to report in connection with the conduct of operations during the past year.

Very little additional plant (a Pelton wheel or so) has been installed.

As the work proceeds down the lead the ground is becoming deeper and drainage water increasing, with the result that a greater proportion of the water-supply has to be utilised in pumping. At times it is necessary to pump as much as 5,000,000 gallons of drainage water per day into the river, a lift of over 100 feet.

All pumping, as formerly, is done by Francis turbines or Pelton wheels driving centrifugal pumps.

The high tailings bank over which the river is later on to be diverted is making fair progress

Average number of men employed, 88.

Black tin won	243 tons
Equivalent metallic tin	176·8 tons
Value	£46,640*
Gold won	3·86 oz.
Value	£14 14s.

* Approximate, as some not yet realised.

Briseis Central.—In addition to boring the Ringarooma flats, work was continued on the water-race and dam-site. The latter is situated on the headwaters of the Cascade River, and, from official information supplied, will be of the following dimensions:—Base, 170 feet; height, 40 feet, tapering to a width of 20 feet on the top, with back and fore slopes of $1\frac{1}{2}$ and $2\frac{1}{4}$ to 1 respectively. This embankment, when completed, will be about 950 feet in length, and form part of the road between Weldborough and Ringarooma.

Cascades.—Apart from the " Una " a number of small parties, probably embracing 40 men, find work on the course of this stream and its tributaries.

Branxholm.—The Arba Tin Mine.—During the period work was entirely confined to the removal of upper and lower drifts from the western face, all of which material had to be raised to the middle bin on No. 3 haulage. This greatly increased the cost of pump renewals for the period owing to the high lift.

The following is a statement of the work done, and cost of treatment for the 12 months, with a summary of sluicing results to 31st December, 1920:—

Face and Period.	Drift (Cubic Yards).	Cost per Cubic Yard.	Tin Won.	Average Contents per Cubic Yard.
		d.	tons cwt.	lbs.
Main Workings—				
From 1/1/20 to 31/12/20	91,190	18·84	54 15	1·34
From 30/3/03 to 31/12/20	3,260,851	6·91	1361 14	0·933

The total quantity of black tin won was 54 tons 15 cwt.; approximate value, £11,500; and the average number of men employed was 54.

New Ruby Flat Mine.—A fairly regular water-supply, and comparatively shallow working faces, have permitted satisfactory returns being made to the owners, who employ from 8 to 12 men.

Tributers on the Guilding Star and Rankin and Newman on their own sections, have, when water was available, made wages.

Ringarooma.—Small parties, including the New Hope, Eberhart and Hannah, Walsh Bros., Ritchie, Raymond, Hyde, O'Brien, and one or two others, in Black and Tinpot Creeks, are credited with making good wages.

Gladstone.—Higgs and Kerrison, on the old Scotia Flats (Section 7599-M), have had a couple of satisfactory cleanings up, and associated with their recoveries have been small quantities of alluvial gold, typical of the district's resources, which helped to pay expenses. With a barge and steam plant, 4 men found employment.

In the vicinity, a party of 5 Chinese have made fair wages when water was available. This also applies to ground worked by Messrs. Whitaker, Daw, Watt, and two tributers on Beltz's section, lower down the river. At White Rock Taylor and two sons, and at Shallamar Cross' party of three men, are working.

On the eastern or opposite side of the river, Barnes, at Edina Flat, and the Groves Bros. at Amber Hill, with Harvey and a couple of others, have had good returns.

South Mt. Cameron.—The South Mt. Cameron Mine, with a plentiful supply of water forced from the river by a steam plant, obtained satisfactory returns from the adjoining terrace ground, and usually employed from 8 to 12 men.

The Endurance Mine is now the principal producer in the locality, and by returning the used water is able to keep up fairly continuous operations, with 25 men.

Bradshaw's Creek and Garibaldi.—At the Pioneer Mine 348,700 cubic yards of drift have been pumped and sluiced for a yield of 160 tons 12 cwt. of stream tin, the comparatively small yardage being due to a strike of motor attendants on the 22nd October, since which time all sluicing has been suspended pending a settlement.

During the term a sawmilling plant was added to the assets of the company. It is situated on the eastern bank of the Ringarooma River, about 4 miles from the Herrick Railway Station, with which it is connected by a 3-feet gauge wooden tramway.

Usually from 70 to 80 men were found employment.

Wyniford River.—Shean and party, with 10 men, continue to make satisfactory recoveries from the river-bed and bank drifts; also Messrs. Lyons and Pringle, higher up the stream, with 14 men. On the hills and tableland, Messrs. Fair and Simpson's parties make wages.

Moorina.—Weld and Echo (Messrs. Thomson and Son), with a fairly effective water-supply, continue to make this somewhat clinkery and cementy ground payable, employing 4 men.

Weldborough.—Apart from the Star and Weld Mines, which are controlled by Messrs. Cleveland and others, the balance of the work and production is confined to small parties, whose sphere of labour extends from the Star of Peace to the old Emu Workings, and provides employment for about 30 men.

Eastern Mining Division.—Lottah.—The Full Moon Syndicate.—Work was here chiefly centred in shallow open-cutting, which, with a battery, provides work for 10 men.

The adjoining sections, charted in the name of J. C. Macmichael, have been worked by a company on a returned-water scheme similar to that adopted at the Endurance Mine.

In the same neighbourhood, Messrs. Griffin, Briggs, and Gough's parties, are working shallow drifts with success,

while close to the post-office a 5-head battery is being erected on ground leased to the Victory Company, which will be developed according to results.

The Anchor (by tributing), Allies, and Duco Mines have worked occasionally.

St. Helens.—At the Argonaut Mine sluicing was carried on continuously throughout the term, 122,500 cubic yards of drift being sluiced by 25 men for a yield of 34 tons 7 cwt. of stream tin.

The completion of the new water scheme, which doubles the previous supply, will now enable this mine to work continuously throughout a dry summer, and provide sufficient water for working two faces during the winter months.

Derwent and Frosty Creeks.—Yost, McAuliffe, Kirwin Bros., Standage, and one or two others, on co-operative principles, find employment and make wages.

Avoca.—Haas and party, on the South Esk, have continued work close to the river, and made wages; while on the Brookstead and Foster's Freehold Estates tributers have intermittently found employment.

The Story's Creek Tin Mining Syndicate.—The summary of operations for the year is as follows:—

Development.—Adit (crosscutting), 29ft. 6 in.; driven on lodes, 330 ft. 6 in.; total 350 feet.

Milling, &c.—Mill hours, 1571; tons treated, 5437. Roaster hours, 475; tons treated, 53. Separator hours, 1144; tons treated, 142.

Yield.—Tungstic acid, 67 tons 14 cwt. 3 qr. 11lb.; value, £11,637 19s. 5d. Metallic tin, 38 tons 19 cwt. 2 qr. 10 lb.; value £7673 16s. 6d. Total value, £19,311 15s. 11d.

Employees.—Average number to August 10 (date of strike), 122. Average number to December 31, 79.

A plant consisting of an 800 cubic feet air-compressor, 140 h.p. "Premier" gas-engine, and a 165 h.p. "Commonwealth" producer, is being erected.

The Royal George Mine.—The erection of the suction gas-engine and generator at the mill was completed by the beginning of February, and constant running of the battery was started during the second week of February, when active mining operations were also commenced, though, during January a few miners were employed breaking stone.

For four weeks during August all work was suspended through the failure of the water-supply owing to the breakdown of the electrical pumping-plant. Work was again resumed in full on the 2nd September, and active

operations were carried on till the 4th December, when, owing to the low price of tin, work was suspended. After cleaning up the concentrates in the mill, all work ceased on the 14th December.

In February employees were given an all-round increase in wages of 1s. 6d. per shift.

Sinking of the main shaft to open up another level was commenced in November, and sunk 25 feet up to the time of closing down.

All stone crushed was drawn from No. 2 level.

Average number of men employed ...	68
Stone crushed	18,667 tons
Tin oxide produced	89 tons (net)
Value	£14,808

Ben Lomond Republic Mines.—Desultory attempts have been made to keep the battery going in order to cover expenses. Results, however, have not followed expectations, and the mine is again flooded. When in operation 20 men were found employment.

Rex Hill, Dalrymple, Aberfoyle, and Gipps Creek all provide work for small parties. The discovery of remarkable specimens in all those places strengthens the belief that the source or sources from which they were shed will, by perseverance, eventually be located.

Straits Islands.—Small returns have been made from Flinders and Cape Barren Islands, but with the fall in price of the metal all operations have been suspended.

North-Western Division.—The Mt. Bischoff Tin Mining Company Registered.—With the exception of a short strike of two weeks last June, operations were continuous during 1920, an average of 260 men being employed.

During the period under review, 2824 feet of underground development work was carried out, chiefly in the Brown and White Face deposits, and the various small lodes that exist adjacent to the main workings. The ore thus exposed has a size and grade profitable for exploitation under reasonable labour and market conditions; that on No. 2 level of the Brown Face deposit being of good grade and width.

The main events of the year were the loss by bush fire of the North Valley aerial loading station; the abandonment of the North Valley working as too poor for profitable extraction; the reopening of the Brown Face deposit with highly satisfactory results; elimination of aerial system of ore-delivery; the erection of new 100 feet ore-roasting furnace for the treatment of low and other grade

pyritic concentrates, placing the mill in a position to control pyritic ore treatment on standard lines.

A new ore-bin and main railway system of ore-delivery has been started on No. 1 gossan bench. New mine office and change-house has been put in hand for erection. Railway and tram extension are now in hand to link up the Thompson, Giblin, Slaughter, and North-east lode deposits, to make available the better-grade ore developing in these lodes.

Opening the Brown Face deposit on the No. 2 and stope drift levels has been somewhat interfered with by the spontaneous combustion propensities of the marcasite on fresh exposure to an air current. The "white pyrites" exists in small isolated bunches in the deposit, and is more of an expensive hindrance to development than an actual danger to the operations.

The mine statistics are as under:—

Crude ore output—	Tons.
Company	103,297
Tributers	4,921
Total (1920)	108,218

Oxide output and recovery—

					Av. Grade. % Tin.	Av. Recovery p.t. crushed.
	Tons.	cwts.	qrs.	lbs.	Per cent.	Per cent.
By Company	401	6	0	24	64·12	0·249
By Tributers	33	6	1	7	69·07	0·465
Total	434	12	2	3	64·49	0·259

Ore Reserve—	Tons.
Ore, positive	253,850
Ore, probable	259,900
Total ore	513,750

The average grade of the positive ore being 0·353 % Sn.

Weir's Bischoff Surprise.—There is nothing fresh to report in connection with this mine. The tributer, Mr. Roberts, still continues to treat the slimes saved from the Mt. Bischoff Tin Mine, and alluvial from this company's lease, with fair results.

Waratah Tin Sluicing Mine.—This company has taken over the old Burnie Syndicate's and Illingworth's pro-

perties, and is opening them up as a hydraulic sluicing proposition.

Two other parties are working alluvial ground at South Bischoff and Wombat, and are doing fairly well.

Western Division.—Dreadnought Boulder Tin Mines Amalgamated, No Liability.—This company called up a further amount of £983, and recommenced operations in June.

Unfortunately the delay experienced in arranging financial matters caused the loss of the high market for tin. A start of four or five months earlier, with a market at £430 per ton for tin (which was ruling at that time) would have increased returns by some £2000. On the production for the six months a sum of £2899 17s. was paid.

The collapse of the market early in December was the cause of upsetting operations, and willing work had to be suspended in consequence, but at present a few men are engaged in such work as is necessary to keep the mine and plant in good order, so that productive operations can be commenced as soon as conditions are such that the company can work at a profit.

When it was evident that the recovery of the tin market was indefinite, the mine manager and legal manager visited Melbourne with the object of trying to arrange a contract for the supply of pyrites with the manufacturers of fertilizers who, in the past, had taken some of the pyritic ores, of which large supplies are available, but although these people were prepared to do business, it was found the freights had risen so much (from 13s. per ton in the past to 33s. per ton at present) that it prevented the possibility of doing anything in this direction.

Attention was then directed to the supply of oxide of iron, which is extensively used in the manufacture of paints, and of which the company has large quantities available. The samples tested proved to be of first-class quality, and the company is awaiting the tests of a larger sample, which has been sent to Melbourne. It is anticipated the results of this will be equally as good, and if so, a purchaser will be prepared to take 10 tons per week for a start, which will be very profitable, and will alter the present outlook in the company's favour.

It is estimated that the company has at present 300,000 tons of proved ore, which averages 1 per cent. metallic tin, 30 per cent. to 40 per cent. sulphur, and 40 per cent. to 47 per cent. iron, all of which should be made available for market.

Mines Fortnightly Statement for period June 24 to December 9, 1920.

Date	Hours Run Stamp.	Ore (Tons) Treated.	Bags Tin.	Wages Paid.	Total Cost.	Value Tin.	Dr. Profit	Cr. and Loss
1920.				£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
June 24	1992	448	39	192 4 0	209 6 6	260 13 7	...	51 7 1
July 8	2130	450	39	210 15 3	238 18 1	276 19 5	...	38 1 4
July 22	2160	444	35	223 19 1	248 11 7	261 19 6	...	13 7 11
Aug. 5	2100	464	46	228 5 9	253 6 7	341 12 6	...	88 5 11
Aug. 19	2362	600	40	223 17 10	246 12 8	292 2 5	...	45 9 9
Sept. 2	2220	420	34	226 10 6	246 10 6	260 3 3	...	13 12 7
Sept. 16	2520	500	32	233 14 0	256 1 4	224 3 1	31 8 3	...
Sept. 30	2580	520	39	239 11 1	257 8 4	274 2 6	...	16 4 2
Oct. 14	1863	400	37	221 9 2	245 12 1	237 4 3	8 7 10	...
Oct. 28	1920	420	39	200 3 2	234 7 11			
Nov. 11	2400	496	44	234 12 2	255 10 11	957 0 0*	15 17 9	...
Nov. 25	2408	500	45	227 16 0	250 6 9			
Dec. 9	2320	490	46	236 19 0	232 12 2			
	28,875	6152	515	2899 17 0	3173 5 7	3386 0 6	55 13 10	266 8 9

* Final returns not yet to hand (estimated value).

The above particulars have been furnished by the legal manager (Mr. P. O'Dea), who writes further, as follows:—

"During the past six months, I have gone extensively into the possibilities of producing sulphur, of which some 6000 to 8000 tons are used annually in Australia. At present most of this is imported from Japan and America, although extensive plants are in Melbourne for the production of sulphuric acid from pyritic ores, but the manufacturers say under present conditions they prefer to import the sulphur, as it means less trouble, not because it is any cheaper. Imported sulphur gives the same result as pyrites. One man alone offered to take 1000 tons annually, so the possibilities in this are great, and should be thoroughly investigated.

"With regard to red oxide (oxide of iron), enormous quantities of this are being used at present in the manufacture of paint, and it is largely imported. I have been in communication with the Public Works Department of New South Wales, who asks for samples of this; also the Tasmanian Railway Department, and various painters. I have had many tests made of it, which all proved satisfactory.

"The advantage to the Dreadnought-Boulder Company is that these materials are produced as by-products in the recovery of the tin. Prior to the war, we treated some 10,000 tons of the pyritic ore on the Boulder Mine, and carried on at a profit when tin was only £150 per ton. We discovered it was not a difficult problem, the only necessity being sufficient capital to work in a comprehensive way."

Federation Tin Mine, No Liabiltiy.—During the year no ore was treated, but developmental and other preliminary work was carried out.

Up to the end of the year about 3000 feet of prospecting trenches were cut, 626 feet 6 inches of levels driven, shafts, winzes, and rises made amounting to 228 feet 6 inches. The company repaired, and retimbered and relaid with rails, drives to a length of 2330 feet, and repaired 130 feet of shafts.

Over 500 samples have been taken and assayed, and a number of determinations made of tin and other minerals.

The company has done a considerable amount of road and track making and repairing, and has constructed a timber tram into the bush, and has nearly finished about 56½ chains of head race through very rough country and

hard rock. It has also repaired, removed, and rebuilt, and built new houses, huts, &c., and has now accommodation for over 50 men, a good office, storage and stable accommodation, and a good house for the manager.

By the end of September, 57,700 tons of ore, of a value of over 1 per cent., were proved. This amount has since been considerably increased. Probable ore was then estimated at 450,000 tons, and this estimate also can be safely increased.

The Government, being unable to undertake the steel tram recommended by the Standing Committee, has arranged to contribute towards a wood tram. This is expected to be completed before next June.

In addition to the plant already on the ground, a quantity of concentrating plant has been secured, and a 40-head battery from Beaconsfield, with all buildings and appliances necessary, has been obtained, and is now packed and awaiting shipment. Not a great deal is now required to complete the equipment of the mine. The erection of plant will be commenced as soon as the wooden tram is completed.

When the head race and pipe column are completed, about 600-horsepower will be available, and this will be ample for all purposes.

During the year, an average of about 30 men have been employed on all works.

North Heemskirk Tin Syndicate.—Dredging operations were carried out for about nine months to an average depth of 20 feet, when a high bar was met with. Owing to the poorness of the ground ahead, and the difficulty of getting at it, it was decided to close down, and the machinery has been removed from the property.

Mr. G. Badenach has taken the leases on tribute, believing there are some patches of tin ground which can be worked by ordinary ground-sluicing.

The number of men employed averaged 19.

At both North and South Heemskirk, miners are engaged ground-sluicing, and are meeting with fair results. Nothing has been done to develop the lode-formation on Lyall and Grey's section, at the Heemskirk.

Renison Bell P. & M. Company, No Liability.—On this company's lease no productive mining has been done. Some prospecting work has been carried out on the oxidised portions of the ore-bodies by tunnelling, several hundred feet of driving having been done. The lodes, where intercepted, did not carry tin in payable quantities. There

are still large areas on the company's lease traversed by extensive oxidised ore-bodies possessing characteristics similar to those already worked, which are awaiting development. Attention is to be given to these unexplored areas with a view to development.

The extensive deposits of tin-bearing pyrites on the mine are awaiting the advent of capital for their exploitation.

This company during the past 18 months have held an option of purchase over what is known as the "Federal Mine," and during that period a tributing lease (now terminated) has been in progress. The ore from this mine has been treated at the Renison Bell Company's plant, but the amount of stone treated is approximately one-third only of the capacity of the plant, due principally to the prevailing shortage of labour throughout the year, also to a strike of miners and labourers for increased wages. The strike was responsible for the complete cessation of work for two months. The decline in the metal market towards the end of the year compelled the tributer to discontinue operations, and the mine finally closed on the 3rd December.

The amount of crude ore treated for the year was 7451 tons net. Tin oxide produced, 62·14 tons, which contained 38·25 tons of metallic tin. Gross value received from the Mt. Bischoff smelting works, £9831.

The average number of men employed was 39.

North Renison Bell Tin Mine.—Developmental work was continued on this property by the new owners, and the manager states that the ore disclosed is of good value.

Arrangements were made to buy the Central Mine and mill, and the North Renison Bell Mine is being connected up to the mill, so that the ore can be treated thereat The property is now known as "The Electric Tin Mine."

On the old Penzance Tin Mine two men are engaged sluicing the detrital material. They were obtaining fair results until the fall in the price of metal occurred.

Dundas.—Mining operations were started at the Peace Tin Mine by open-cut methods, the ore being treated at the mill. The values of the ore were found to be right, but the recoveries were not very good, so the syndicate decided to cease mining operations and complete the fine-grinding section of the mill. When this is completed, it is expected that the results will be satisfactory.

A few men are ground-sluicing for tin and osmiridium just out of the township.

Stanley River.—Stanley Reward Tin Mine.—During the greater part of the year mining operations on the Stanley Reward Tin Mining Company's leases have been carried on by a tribute party of four men. Such operations were confined for a time to the open-cut workings. A prospecting shaft was sunk to a depth of 30 feet, and driving along the course of the lode was then undertaken for a distance of 30 feet; but the lode, although carrying tin values, was pyritic, and owing to the presence of such pyrites was unprofitable to work at prices then ruling. Consequently underground operations were for the time being suspended.

Sluicing operations were, however, resumed, and a little more than 5 tons of oxide was recovered, of a gross value of £645. Operations were suspended early in December, owing to shortage of water for sluicing.

At the Mt. Lindsay Mine, the water-power scheme was not completed, and no work was done at the main shaft.

Under new management, the old tributers' workings were reopened, and the richest of the ore left was broken and treated at the little mill.

Bluff River Tin Syndicate's Mine.—Very little work has been done here, being principally confined to sluicing, from which a few bags of tin oxide have been won.

At Granite Tor some prospecting work has been carried out in searching for a tin lode. The prospectors are very sanguine of finding something good.

The tin won from the alluvial is of a very kind nature, and does not appear to have travelled far.

COAL.

The total quantity of coal raised amounted to 75,429 tons, valued at £64,005.

The raisings at the different collieries were:—

Colliery.	Tons Raised.
Mt. Nicholas	29,382
Cornwall	38,212
Cardiff-Jubilee	1,288
Silkstone	138
Spreyton	782
York Plains	742
Illamatha	2,538
Mt. Cygnet	1,905
Tasma	250
Preolenna	72
Others	120
Total	75,429

The Mt. Nicholas Coal Mining Company, No Liability.—Mining operations were carried on uninterruptedly during the whole of the year on the 6-feet seam in this company's leases. The face of the main gateway in the main workings has been advanced a distance of 3 chains, making it a total distance of 60 chains from the tunnel mouth. The seam in general is keeping at about its usual thickness, and the quality of the coal is well maintained. The No. 3 tunnel, in which a cross-measure drift was driven from the 4-feet seam up to the 6-feet seam has been worked during the year in the 6-feet seam also. The main heading has been driven about 2 chains, and is now in a total distance of 13·30 chains from the tunnel mouth.

Some prospecting on the surface has been carried on, with a fair amount of success. The total output of coal from the mine for the twelve months ending 31st December was 29,382 tons 9 cwt. 1 qr., of a total value of £22,003 6s. 9d.

There are 84 men and boys employed above and below ground.

Cornwall Coal Company, No Liability.—Work on the main and Trinder's pits has continued under satisfactory methods, and 82 men have produced 38,212 tons of marketable coal.

Cardiff Colliery.—Work was resumed in this pit during the year, and, with 4 men, 1288 tons have been despatched from the local railway-station. The intention is to work this mine in conjunction with the neighbouring Jubilee pit, for which purpose capital is being provided.

The Silkstone Colliery is an old pit comprised within land leased to Messrs. Meredith and Whittle of 1280 acres, situated close to the Fingal railway-line. Work for the purpose of obtaining bulk samples of the seam has been done, and the results of tests proved its calorific qualities satisfactory.

Fingal Coal Prospecting Syndicate, No Liability.—The tunnel was driven about 50 feet, and air course completed 90 feet, which gives two entrances to the mine. Output, 120 tons.

Average number of men employed, 4.

Gatenby's Coal and Shale Mine, Roseville.—Small quantities have been raised from this pit, calcined, and the residues disposed of for fertilising purposes.

Immediately above the coal or lignite, a band of white, clean kaolin was passed through, from which small porcelain pots have been manufactured, as an example of its quality.

Spreyton Colliery.—This small 15-inch seam has been worked by the owner and 3 men, for an output of 782 tons, used locally for household purposes.

Illamatha Colliery.—This is a 20-inch to 24-inch seam, from which 2540 tons have been produced, and purchased mainly by Messrs Holyman & Sons, steamship owners.

Average number of men employed, 11.

Wynyard-Preolenna and Great Fitzroy.—A little work has been done on both these properties, but no returns of any importance have been received from either.

Cygnet Coal Mine.—Mining operations were carried on uninterruptedly during the year. The total output of coal from the mine was 1905 tons, valued at £1847. The average number of men employed was 16.

No. 1 pit (old mine) was equipped with boiler, compressor, pumps, &c., and all water pumped out of the extensive mine workings.

At No. 2 pit, where all coal mined was obtained, the dip heading was extended half a chain, and level headings at 280 feet put in east and west a total distance of 12 chains.

Prospecting along the outcrop of seam was also carried out.

BISMUTH.

A small parcel of 2 cwt. was won at the All Nations Mine, Middlesex, valued at £9.

WOLFRAM.

The output of wolfram was as follows:—

	Tons.	Value.
		£
Avoca Mines	67·550	12,889
S. & M. Mine, Middlesex	·400	40
Squib Mine	2·730	642
All Nations Mine	·210	55
Total	70·890	£13,626

As already mentioned under "Tin," the S. & M. concentrating mill was destroyed by fire in the early part of the year, and the output from this mine has, therefore, been practically nothing.

LIMESTONE.

The Broken Hill Proprietary Company employed an average of 64 men at its quarry at Melrose quarrying limestone for shipment to its works at Newcastle; and the Hydro-Electrical Power and Metallurgical Company employed an average of 156 men at its quarry near Ida Bay, and at the works at Electrona in the manufacture of carbide of calcium.

IRON PYRITES.

The output was 4440 tons, valued at £7346.

The Chester Mine.—Mining by open-cut and milling was carried out during the first part of the year, and the concentrates shipped to the company's works in Victoria.

The price of sulphur having dropped to such an extent it became unprofitable, so these operations were suspended with a view of driving a lower adit, with a rise through to the open-cut workings, which would do away with a good deal of handling.

Several alterations are being made to the mill, and a small air-compressing plant has been installed, so that rock-drilling machines could be used. These have been put into use in driving the adit.

At the Susanite Mine, Zeehan, ore averaging about 42 per cent. sulphur has been broken and sent to the Mt. Lyell Mining and Railway Company's works at Yarraville, Victoria.

A few tons were also sent to these works from the Kynance Mine.

IRON ORE.

No iron ore has been produced during the year. On the sections in the Comstock District recently acquired by G. and C. Hoskins Company Limited preliminary work has been commenced. Scrub has been cut and burnt off, and prospecting shafts put down on some of the deposits, which have proved the ore to be of good quality as depth is attained. Tunnelling has also been resorted to in several places. Massive outcrops exist at various places on the company's sections.

Two men have been carrying on prospecting operations.

OSMIRIDIUM.

The output for the year was 2009·196 oz., valued at £77,114, nearly double the value of last year's output, and the average number of men engaged was 364.

"The Osmiridium Act, 1919," which came into operation on the 1st April, and was enacted for the purpose of regulating the sale and purchase of the metal, provides that all buyers shall be licensed, and shall furnish monthly statements of purchases. This enables the Department to ascertain what quantity is being won, and the ruling price for the time being.

In February the price reached £40, but fell back during April and May, and in June was down to £30. Towards the end of that month, however, it again rose to £37 10s.; in July the prices paid were from £37 10s. to £41; in August, £36 to £39; in September, £39 to £41. In October it reached £42, and that price was realised during November and the early part of December, when it again dropped to £35, at which figure some 172 oz. were sold, while in some cases the sellers accepted £30.

BARYTES.

The output for the year was 1048 tons, valued at £4163. Of this the greater portion was won from the deposits near Queenstown and Mt. Jukes respectively, and the balance from Beulah and elsewhere.

The Tasmanian Barium Company.—Open-cutting and surfacing along the cropping lode resulted in the production of 410 tons of barytes, which realised £812.

A small tunnel was driven to intersect the line of lode, but the result encountered offered no encouragement for further work in that locality, which is distant from previous active operations, and where in open-cuttings the lode varies up to 6 feet in width. The mine lapsed into a state of dormancy towards the latter end of the year owing to market limitations.

Queenstown Barium Company.—From operations during the year under review, and the preceding year, 175 tons of barytes were marketed, and realised £525. This ore was obtained from shallow underground and surface workings on a lode varying up to 2 feet in width. Latterly a defined policy of working was instituted, and a tunnel was driven to intersect and follow the line of lode. A rise was lifted to the bottom of an open-cutting, and a small area of backs was made available for stoping.

From the tunnel a short tramway was constructed to the Lyell Company's firewood tramway to facilitate the despatch of ore. Three men were employed at the close of the year.

Electrolytic Zinc Company's Barytes Mines.—The Electrolytic Zinc Company acquired an 80-acre mineral lease for barytes on the Intercolonial Spur at Crotty, and carried out a limited amount of developmental work.

A tunnel was driven 46 feet on a lode varying up to 2 feet 6 inches in width, and resulted in 30 tons of barytes being placed at grass. Operations were then discontinued, and at the close of the year the mine was idle. Transportation difficulties appear to have been a deterrent to operations in this locality, under present conditions.

SCHEELITE.

The output was 105·09 tons, valued at £17,905.

The King Island Scheelite Company, No Liability.—During the year 13,853 tons, of an average value of 0·71 per cent., WO_3 were treated.

During the quarter ending 31st March, the average number of men employed amounted to 75 weekly, and operations were carried on, three shifts per day, but from that date, until the 28th July, operations were curtailed to one shift per day, the average number of men employed being 35 per week.

Since the 28th July, all operations have been suspended, but a staff of four remain to keep the machinery and property in order and repair.

PAINT.

The Serpentine Paint Company Limited, Launceston, has now been operating for three years, and continued the manufacture of a high-grade paint from oxides produced at its mine near Beaconsfield, the mills being kept running continuously during the year.

The paint is put up in 26 different colours and shades, and the output from the factory for the 12 months was larger than for any similar term. The demand for the paint is steadily increasing.

Average number of men employed, 87.

Lead Sulphate Limited.—These works are adjacent to King's Wharf, Launceston, and manufacture white-lead, for which purpose two electric furnaces have been erected.

Some 25 men were employed.

ZINC.

The Electrolytic Zinc Company of Australasia Limited.—This company has continued the treatment of calcines from Broken Hill, and produced 5809 tons of slab zinc, of an approximate value of £251,130. The average number of men employed on the works was 970.

A trial sample of zinc-blende was sent away from the Swansea Mine, near Zeehan, and if this proves satisfactory further quantities are available.

OUTPUT.

Return Showing the Quantity and Value of Mineral Products for the State of Tasmania during the Year ending 31st December, 1920:—

Mineral.	Quantity.	Value.
		£
Gold ..... ozs.	6246·192	29,79
Silver..... ,,	623,359	166,767
Lead ..... tons	3855·639	142,268
Copper ..... ,,	4791·750	528,237
Tin ..... ,,	1310·411	369,362
Coal ..... ,,	75,429	64,005
Wolfram ..... ,,	70·89	13,626
Bismuth ..... ,,	·10	9
Shale ..... ,,	140	172
Iron Pyrites..... ,,	4440	7346
Scheelite ..... ,,	105·09	17,905
Osmiridium ..... ozs.	2009·196	77,114
Asbestos ..... tons	...	...
Zinc ..... ,,	9·30	334
Barytes ..... ,,	1048	4163
Total.....	...	£1,421,104

PLANS.

For the convenience of the mining public, plans showing the name of lessee, number of lease, and area held in the different mining localities, are compiled by the officers of the Mining Branch of the Department of Lands and Surveys, and copies of these are struck off by the Government Printer, as required, from the manuscript revised to date.

The total number of different plans now stocked by the Department is 86, and during the year 43 of these were revised for reproduction, 4 were recompiled, and 3 new locality compilations were made. The number of copies reproduced by the Government Printer was 1035.

Large Scale Plans.—The original plans of the Department were on a scale of 80 chains to an inch, but this scale being found too small new compilations were made on a scale of 40 chains to an inch, followed later by a scale of 20 chains to an inch, but even this, in some localities where there is a congestion of small areas and several water-races crossing them, has been found too small for clear legibility, and in such cases, further enlargements on a scale of 10 chains to an inch are being made. Four of these latter are now in hand.

A new map of the West Coast Mining Fields, on a scale of 1 mile to an inch, showing in a general way the relation of one field to another, and with natural features mapped with more detail than on the present sketch maps, has also been prepared, and is ready for the printer. This covers a larger area than the detail plans, and has been prepared specially for the assistance of geologists, prospectors, hydro-schemes, &c., and will, I believe, be of great benefit to those concerned.

GEOLOGICAL SURVEY BRANCH.

The report of the Government Geologist is appended.

Through the appointment of Mr. Loftus Hills to the position of Government Geologist, in December, 1919, and the consequent promotion of Mr. A. McIntosh Reid to the position of Senior Assistant, a vacancy occurred in the position of Second Assistant, and applications were called from persons qualified. The result was that in February, 1920, a selection was made in the person of Mr. Percival Bartlett Nye, B.M.E., who was duly appointed on probation, and he was confirmed in his appointment on the 22nd September.

Owing, however, to the rapidly increasing volume of work in this branch, it became necessary to create a new office of Third Assistant Government Geologist, and Mr. Harold Guy Walter Keid, B.Sc., was selected, and took up his duties on the 31st March, 1920. He was confirmed in his appointment on the 30th September, 1920.

Mr. P. B. Nye is a graduate of the Melbourne University in Mining Engineering. Since his graduation he

has had some experience in the Chillagoe District, Queensland, and also as Petrologist of the Melbourne Museum. He served with the 1st Australian Tunnelling Company in France.

Mr. H. G. W. Keid is a graduate of the Queensland University, Brisbane, holding the degree of Bachelor of Science of that university. Mr. Keid served in Gallipoli and France with the 3rd Field Ambulance, and completed his university course since returning from active service.

The whole staff has been fully engaged, as will be seen from the report of the Government Geologist, which is attached.

INSPECTORS OF MINES.

The reports of the Chief Inspector of Mines and the three inspectors are appended.

REVENUE.

The revenue for the year amounted to £16,767 11s. 6d., being an increase of £1,379 3s. 11d. on the previous year. The sum of £2007 17s. deposited as survey fees with applications for leases is not included in the above.

MINING MANAGER'S EXAMINATION.

No candidates presented themselves for examination during the year.

DEPARTMENTAL STAFF.

On the 18th November, the Mining community and the State sustained a very severe loss through the sudden and unexpected death of Mr. W. H. Wallace, Secretary for Mines.

Mr. Wallace joined the Government Service as Junior Clerk in the Lands Department on the 17th March, 1878. On the creation of the Mines Department in 1882, he was transferred thereto from the Lands Department, and

occupied the positions of Clerk, Accountant, and Chief Clerk in rotation, and on the retirement and death of Mr. Francis Belstead was appointed Secretary for Mines from the 1st January, 1898. By virtue of that office he was also Chairman of the Mt. Cameron Water Race Board, and Chairman of the Mining Manager's Examination Board, and on the 10th July, 1903, he was appointed a justice of the peace for Tasmania and its dependencies.

I was appointed to the position of Acting-Secretary for Mines from the 22nd November, and still retain that position, pending the appointment of Mr. Wallace's successor.

The following changes in the Departmental staff were made during the year:—

Mr. W. H. Wallace, Secretary for Mines, died 18th November, 1920.

Miss A. J. Long, Typiste, transferred to Industrial Department, January, 1920.

Miss D. Middleton, transferred from Geological Survey Office, Launceston, *vice* Miss Long, 20th January, 1920.

Mr. Percival Bartlett Nye, B.M.E., appointed Assistant Government Geologist, from 22nd September, 1920.

Mr. Harold Guy Walter Keid, B.Sc., appointed Assistant Government Geologist from 29th September, 1920.

Mr. Eric Alfred Fisher, Clerk, Launceston Office, transferred to Education Department, 16th August, 1920.

Miss M. F. X. O'Keeffe, appointed Typiste, Launceston, *vice* Miss Middleton, transferred, from 1st November, 1920.

Mr. E. S. Howard, appointed Clerk, on probation, Hobart Office, from 3rd February, 1

Mr. Walter Manson, appointed Laboratory Assistant, Geological Survey Office, from 1st June, 1920.

Mr. A. T. Walker, appointed Warden of Mines, from 1st May, 1920.

Mr. E. S. Howard, Clerk, Hobart office, resigned 15th May, 1920.

Mr. W. S. R. Brue, appointed Clerk, *vice* Mr. Howard, resigned, from 1st June, 1920.

CONCLUSION.

In conclusion, I can only remark that during the term under review the same loyalty and support was rendered by the staff to their late lamented chief as heretofore, and during the short period of my administration I have likewise received loyal and hearty assistance from every officer, including the officers of the Mining Branch of the Department of Lands and Surveys.

I have, &c.,

W. A. PRETYMAN,
Acting-Secretary for Mines

The Hon. the Minister for Mines, Hobart.

No. 1.

RETURN showing the Quantity and Value of Gold won from 1880 to 1920 inclusive.

Year.	Quantity.	Value.
	ozs.	£
1880 to 1903 inclusive	1,265,836·95	4,905,706
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
1912	37,973·252	161,300
1913	33,400·457	141,876
1914	26,243·453	111,475
1915	18,547·338	78,784
1916	15,790·096	67,072
1917	14,496·464	61,577
1918	10,528·930	44,724
1919	7,686·470	32,650
1920	6,246·192	29,796
	1,871,600·144	7,482,086

No. 2.

RETURN showing the Quantity and Value of Silver-Lead Ore produced from 1888 to 1920 inclusive.

Year.	Quantity.	Value.
	Tons.	£
1888 to 1903 inclusive	300,977·5	2,571,771
1904	51,138	203,702
1905	75,270·5	246,888
1906	87,117·75	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
1912	90,123·868	309,098
1913	83,289·268	319,997
1914	11,565·54	96,225
1915	10,382·95	91,689
1916	11,229·410	153,796
1917	9575·780	152,122
1918	7241·400	127,176
1919	*—	136,234
1920	—	261,166
	—	6,826,691

* "Quantity" discontinued, as it has been found previous figures are misleading, concentrates, hand-picked ore, and crude ore having all been added and included under the one head.

No. 3.

RETURN showing the Quantity and Value of Blister Copper produced from 1896 *to* 1920 *inclusive.*

Year.	Quantity.	Value.
	Tons.	£
1896 to 1903 inclusive	52,154	4,186,805
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
1912	5136	*430,965
1913	4569	*364,732
1914	7509	*477,361
1915	7901	*709,167
1916	6305	*884,689
1917	5845	*841,583
1918	5559	*772,162
1919	5071	*557,710
1920	4837	*576,046
	—	14,912,283

* Value of Gold contents deducted.

No. 4.

RETURN showing the Quantity and Value of Silver contained in Silver-Lead and Blister Copper during the Years 1919 *and* 1920.

Year.	In Silver Lead.		In Blister Copper.		Total.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Ozs.	£	Ozs.	£	Ozs.	£
1919 ...	296,719·27	71,831	228,624	53,733	525,343·27	125,564
1920 ...	453,411	118,898	169,948	47,869	623,359	166,767

No. 5.

RETURN showing the Quantity and Value of Lead included in Silver Lead during the Years 1919 *and* 1920.

Year.	Quantity.	Value.
	Tons.	£
1919	2357·142	64,403
1920	3855·639	142,268

No. 6.

RETURN showing the Quantity and Value of Copper in Blister Copper and Copper Ore during the Years 1919 *and* 1920.

Year.	In Blister Copper.		In Copper Ore.		Total.	
	Q'ty.	Value.	Q'ty.	Value.	Q'ty.	Value.
	Tons.	£	Tons.	£	Tons.	£
1919	5014	503,977	13	984	5027	504,961
1920	4791	528,177	·75	60	4791·75	528,237

No. 7.

RETURN showing Quantity and Value of Copper Matte exported during the Years 1902, 1903, *and* 1904 *to* 1918 *inclusive.*

Year.	Quantity.	Value.
	Tons.	£
1902	2500	50,112
1903	3727	83,624
1904–1920	—	—
	6227	133,736

No. 8.

RETURN showing the Quantity and Value of Copper Ore produced from 1896 *to* 1920 *inclusive.*

Year.	Quantity.	Value.
	Tons.	£
1896 to 1903 inclusive	23,736·5	298,292
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
1912	1391·6	9479
1913	1966·8	10,932
1914	3287·75	18,680
1915	66	1367
1916	96·84	3765
1917	771·40	6171
1918	444·170	3944
1919	123	984
1920	1·50	60
	41,893·13	578,917

No. 9.

RETURN showing the Quantity and Value of Tin exported from Tasmania from 1880 *to* 1904 *(compiled from Customs Returns only), Tin Ore produced during the Years* 1905 *to* 1918 *inclusive, and Metallic Tin produced during the Years* 1919 *and* 1920.

Year.	Quantity.	Value.
	Tons.	£
1880 to 1904 inclusive	76,708·4	7,167,564
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
1912	3713·825	543,103
1913	4010·41	531,983
1914	2572·713	259,300
1915	2599·234	292,306
1916	2854·636	350,852
1917	2637·337	427,917
1918	2256·203	488,798
1919 (Metallic Tin)	1580·22	395,794
1920 (Metallic Tin)	1310·411	369,362
	129,736·449	14,001,234

No. 10.

RETURN showing the Quantity and Value of Iron Ore produced from 1897 *to* 1920 *inclusive.*

Year.	Quantity.	Value.
	Tons.	£
1897 to 1903 inclusive	20,442	16,276
1904	6840	2975
1905	6300	2600
1906	2600	1100
1907	3000	1150
1908	3600	1600
1909-1920	—	—
	42,762	25,701

No. 11.

RETURN showing the Quantity and Value of Wolfram produced from 1899 *to* 1920 *inclusive.*

Year.	Quantity.	Value.
	Tons.	£
1899 to 1903 inclusive	57·25	2157
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
1912	66·49	6601
1913	68·07	7040
1914	46·873	4327
1915	94·685	11,115
1916	106·265	16,910
1917	172·190	28,714
1918	155·362	27,239
1919	120·907	26,613
1920	70·89	13,626
	1237·392	171,617

No. 12.

RETURN showing the Quantity and Value of Coal raised from 1880 to 1920 inclusive.

Year.	Quantity.	Value.
	Tons.	£
1880 to 1903 inclusive	767,261	659,010
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*
1912	53,560	24,568*
1913	55,043	25,367*
1914	60,794	27,853*
1915	64,536·25	30,418*
1916	55,575	27,736*
1917	63,412	38,673*
1918	60,163	37,676*
1919	66,253	47,004*
1920	75,429	64,005*
	1,813.665	1,356,432

* Value at pit's mouth.

No. 13.

RETURN showing the Quantity and Value of Osmiridium produced during the Years 1910 to 1920 inclusive.

Year.	Quantity.	Value.
	Ozs.	£
1910	120	530
1911	271·88	1888
1912	778·77	5742
1913	1261·65	12,016
1914	1018·83	10,076
1915	247·048	1581
1916	222·150	1899
1917	332·079	4898
1918	1606·743	44,833
1919	1669·715	39,614
1920	2009·196	77,114
	9538·061	200,191

No. 14.

RETURN showing the Quantity and Value of Barytes produced during the Years 1916 *to* 1920 *inclusive.*

Year.	Quantity.	Value.
	Tons.	£
1916	83	359
1917	52	234
1918	217	977
1919	399	1160
1920	1048	4163
	1799	6893

No. 15.

RETURN showing the Quantity and Value of Bismuth produced from 1904 *to* 1920 *inclusive*

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
1912	7·59	2646
1913	5·08	1627
1914	5·619	1666
1915	5·5	1203
1916	3·51	1059
1917	4·212	895
1918	4·608	1038
1919	1·77	573
1920	·10	9
	74·009	23,031

No. 16.

RETURN showing the Quantity and Value of Asbestos produced from 1899 to 1920 inclusive.

Year.	Quantity.	Value.
	Tons.	£
1899	200	363
1900	128	113
1901	46·5	45
1902-1915	—	—
1916	15	30
1917	271	271
1918	2854	5008
1919	51	1275
1920	—	—
	3565·5	7105

No. 17.

RETURN showing the Quantity and Value of Shale produced during the Years 1910 to 1920 inclusive.

Year.	Quantity.	Value.
	Tons.	£
1910	364	214
1911	500	250
1912	—	—
1913	130	130
1914	75	75
1915	—	—
1916	1286	1286
1917	—	—
1918	—	—
1919	600	900
1920	140	172
	3095	3027

No. 18.

RETURN showing the Quantity and Value of Iron Pyrites produced during the Years 1915 *to* 1920 *inclusive.*

Year.	Quantity.	Value.
	Tons.	£
1915	12,835·59	8945
1916	14,005·084	13,597
1917	7,685·549	7137
1918	5,105·600	4667
1919	3,456·95	4288
1920	4,440	7346
	47,528·773	45,980

No. 19.

RETURN showing the Quantity and Value of Zinc produced during the Years 1917 *to* 1920 *inclusive.*

Year.	Quantity.	Value.
	Tons.	£
1917	48	1968
1918	3822	152,880
1919	285	13,110
1920	9·3	334
	4164·3	168,292

No. 20.

RETURN showing the Quantity and Value of Scheelite produced during the Years 1917 *to* 1920 *inclusive.*

Year.	Quantity.	Value.
	Tons.	£
1917	69	12,130
1918	216	39,252
1919	198·98	43,181
1920	105·09	17,905
	589·07	112,468

No. 21.

RETURN showing the Quantity and Value of Ochre produced during the Years 1918 *to* 1920 *inclusive.*

Year.	Quantity.	Value.
	Tons.	£
1918	100	200
1919	—	—
1920	—	—

No. 22.

RETURN showing Value of Minerals and Metal raised in Tasmania from 1880 *to* 1920 *inclusive.*

Mineral or Metal.	Value.
	£
Gold	7,482,086
*Silver-lead Ore	6,826,691
*Blister Copper	14,912,283
Copper Matte	133,736
Copper Ore	578,917
Tin	14,001,234
Iron Ore	25,701
Wolfram	171.617
Coal	1,356,432
Osmiridium	200,191
Barytes	6893
Bismuth	23,031
Asbestos	7105
Shale	3027
Iron Pyrites	45,980
Zinc	168,292
Scheelite	112,468
Ochre	200
Unenumerated prior to 1894	31,988
Total	£46,087,872

* Metallic contents and values are shown in tables, Nos. 4, 5, and 6.

No. 23.

RETURN showing the Amounts paid in Dividends by Mining Companies during the Year ending 31st December, 1920.

Mines.	Dividends.
	£ s. d.
Copper	64,459 15 0
Gold	...
Tin	34,974 8 0
Silver	3480 0 0
Coal	4766 19 6
Scheelite	5000 0 0
Total	£112,681 2 6

No. 24.

RETURN showing the Average Number of Persons engaged in Mining during the Years 1880 *to* 1920 *inclusive.*

Year.	Number.	Year.	Number.
1880	1653	1901	6923
1881	3156	1902	5934
1882	4098	1903	6017
1883	3818	1904	6194
1884	2972	1905	6581
1885	2783	1906	7005
1886	2681	1907	7516
1887	3361	1908	6466
1888	2989	1909	6054
1889	3141	1910	5770
1890	2868	1911	5247
1891	3219	1912	5566
1892	3295	1913	6107
1893	3403	1914	4741
1894	3433	1915	3908
1895	4062	1916	3864
1896	4350	1917	4050
1897	4510	1918	4278
1898	6052	1919	4413
1899	6622	1920	5364
1900	7023		

No. 25.

RETURN showing the Mining Companies registered during the Year ending 31st December, 1920.

Number of Companies.	Capital.
8	£65,200

In addition to the above, nine Agents for Foreign Companies were registered; also two Syndicates under Part Va. of the Act.

No. 26.

RETURN showing the Average Number of Miners employed during the Year ending 31st December, 1920.

Division.	Number.
Northern and Southern	1417
North-Eastern	441
Eastern	482
North-Western	882
Western	2142
	5364

No. 27.

RETURN showing the Total Amount of Rents, Fees, &c., received by the Mines Department during the Year ending 31st December, 1920.

Head of Revenue.	Amount.		
	£	s.	d.
Rent of Auriferous and Mineral Land	15,345	14	5
Fees, ditto ditto	1016	5	6
Survey Fees	2007	17	0
Storage of explosives	405	11	7
Total	£18,775	8	6

No. 28.

RETURN showing the Total Area of Land and Number of Sluiceheads of Water applied for during the Year ending 31st December, 1920.

Mineral.	Number.	Sluiceheads.	Area.
			Acres.
Arsenic	...	...	...
Asbestos	...	...	...
Barytes	...	...	...
Bismuth	...	...	...
Chrysotile	...	...	...
Clay	1	...	4
Coal	20	...	4137
Copper	1	...	20
Gold	33	...	426
Guano	...	...	...
Iron	1	...	80
Limestone	4	...	560
Minerals	55	...	2109
Molybdenite	1	...	20
Plumbago	1	...	8
Porphyry Granite	1	...	30
Phosphate of Lime	...	...	...
Pyrites	...	...	...
Silver-lead Ore	8	...	415
Slate	...	...	...
Scheelite	9	...	421
Tin	128	...	2273
Talc	1	...	20
Timber Reserves	2	...	180
Machinery Sites	6	...	38
Mining Easements	8	...	46
Dredging Claims	15	...	109
Water Rights and Dam Sites	42	135	35
	337	135	10,931

No. 29.

RETURN showing the Total Number and Area of Leases issued during the Year ending 31st December, 1920.

Mineral.	No. of Leases.	No. of Sluiceheads.	Area.
			Acres.
Asbestos	...	...	...
Barytes	2	...	120
Bismuth	...	...	...
Coal	6	...	1160
Copper	1	...	42
Clay	1	...	19
Gold	49	...	1195
Guano	...	...	...
Iron	1	...	80
Limestone	...	...	...
Machinery Sites	4	...	4
Minerals	37	...	3563
Molybdenite	2	...	120
Nickel	...	...	...
Osmiridium	1	...	10
Oxide	1	...	5
Pyrites	1	...	10
Scheelite	1	...	218
Slate	4	...	642
Silver-lead	10	...	414
Tin	158	...	1765
Wolfram	5	...	174
Zinc Lead	2	...	77
Dredging Claims	5	...	38
Water-rights	69	239	47
Mining Easements	13	...	87
	373	239	9790

No. 30.

RETURN showing the Total Number of Leases in force on 31st December, 1920.

Mineral.	No. of Leases.	No. of Sluiceheads.	Area.
			Acres.
Asbestos	...	...	...
Bismuth	1	...	70
Barytes	6	...	230
Coal	43	...	9523
Copper	23	...	935
Clay	5	...	45
Chrysotile	...	...	...
Dredging Claims	30	...	410
Gold	65	...	1403
Iron	7	...	432
Limestone	4	...	565
Mining Easements	104	..	616
Machinery Sites	33	...	147
Minerals	134	..	12,326
Manganese	1	...	63
Nickel	1	...	80
Osmiridium	4	...	83
Ochre	1	...	20
Pyrites	1	...	40
Silica	1	...	20
Slate	2	...	91
Scheelite	2	...	228
Shale	1	...	1488
Silver-lead	27	...	2308
Tin	566	...	12,726
Water-rights	559	1982	2094
Wolfram	13	...	360
Zinc	2	...	77
	1636	1982	46,380

No. 31.

RETURN showing the Annual Value of Mineral Products for the State of Tasmania from 1880 *to* 1920 *inclusive.*

Year	Value.	Year.	Value.
	£		£
1880	554,031	1902	1,378,406
1881	602,723	1903	1,354,044
1882	556,306	1904	1,379,204
1883	560,873	1905	1,729,129
1884	468,302	1906	2,257,147
1885	518,885	1907	2,277,159
1886	489,966	1908	1,650,027
1887	593,256	1909	1,574,995
1888	616,733	1910	1,432,193
1889	504,718	1911	1,349,497
1890	444,210	1912	1,493,502
1891	528,388	1913	1,415,700
1892	526,909	1914	1,007,038
1893	627,909	1915	1,225,575
1894	732,764	1916	1,521,050
1895	575,692	1917	1,584,290
1896	662,058	1918	1,750,574
1897	1,006,140	1919	1,301,090
1898	1,071,084	1920	1,421,104
1899	1,660,622	Unenumerated prior to 1894	31,988
1900	1,888,695		
1901	1,763,896		£46,087,872

No. 32.

RETURN showing the Number and Area of Leases held under "The Mining Act," in force on 31st December, 1912 to 1920 inclusive.

Nature of Lease.	In force on 31st Dec., 1912.		In force on 31st December, 1913.		In force on 31st December, 1914.		In force on 31st Dec. 1915.		In force on 31st Dec., 1916.		In force on 31st Dec., 1917.		In force on 31st Dec., 1918.		In force on 31st Dec., 1919.		In force on 31st Dec., 1920.	
	No.	Area.	No.	Area.	No.	Area.	No.	Area.	No.	Area.	No.	Area.	No.	Area.	No.	Area.	No.	Area.
		Acres.		Acres.		Acres.		Acres.		Acres.		Acres.		Acres.		Acres.		Acres.
For Minerals, Silver, Tin, &c.	960	36,157	926	36,271	1129	37,785	907	36,437	872	34,458	876	36,203	796	32,011	823	31,006	795	30,043
For Coal, Slate, Shale, &c.	37	8854	23	5660	26	6405	45	11,522	52	13,742	50	13,138	44	10,729	45	11,562	50	11,667
For Gold	73	1344	54	988	95	2130	94	2026	85	1692	91	1761	43	657	32	537	65	1403
Dredging Claims	42	489	30	329	36	403	29	351	30	437	30	401	23	323	31	482	30	410
Mining Easements	133	606	105	603	110	611	102	553	106	641	105	628	111	594	113	608	104	616
Machinery Sites	39	149	36	153	43	180	40	183	37	190	38	175	37	165	38	180	33	147
Water-rights Mineral and Gold	550	1640 & 2043 sluice-heads	546	1909 & 2034 sluice-heads	605	2449 & 2160 sluice-heads	568	1988 & 2135 sluice-heads	572	2302 & 2061 sluice-heads	557	2085 & 2035 sluice-heads	494	2121 & 1865 sluice-heads	551	2116 & 1975 sluice-heads	559	2094 & 1982 sluice-heads

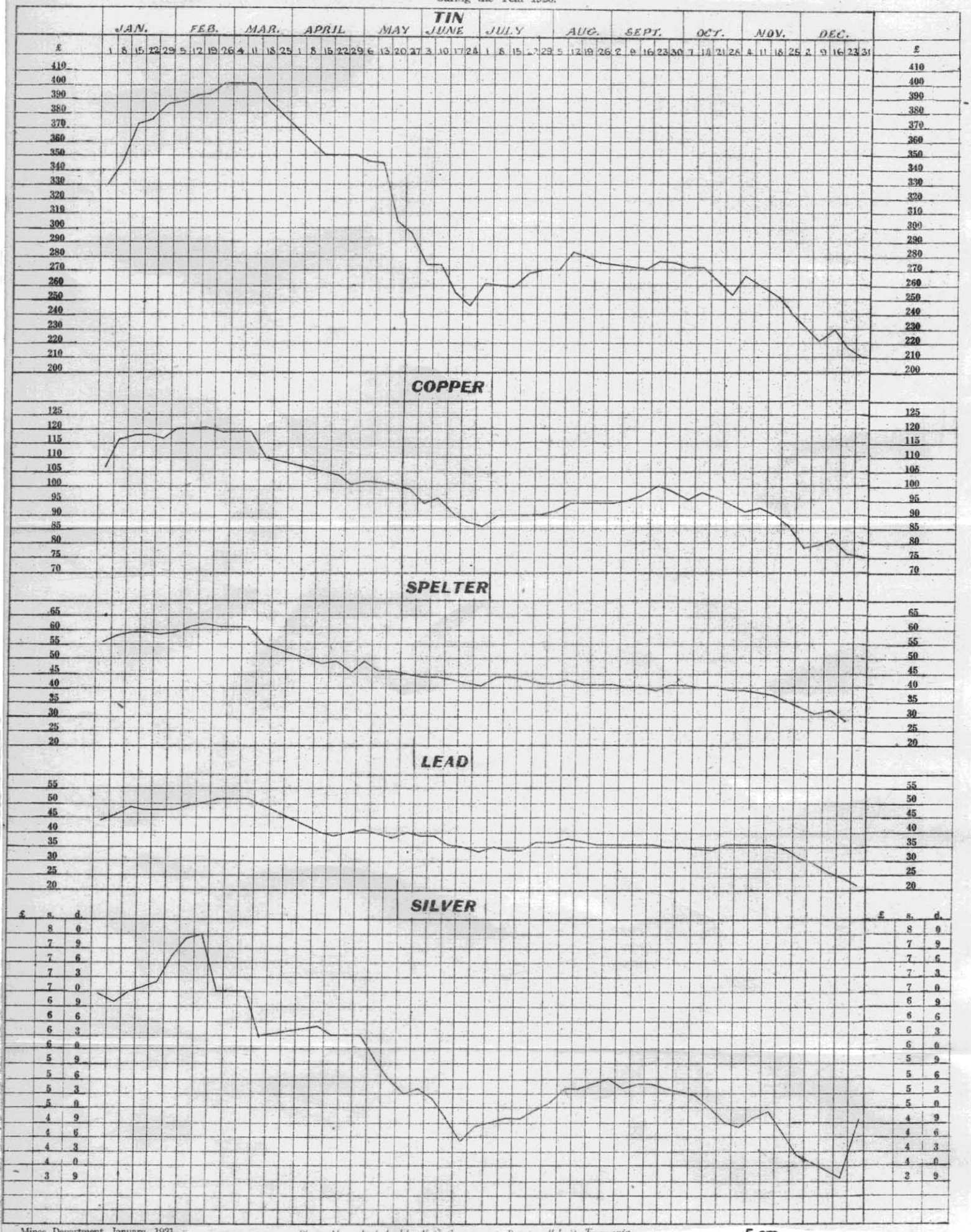
No. 33.

COMPARATIVE Statement of Revenue from Mines, being Rents, Fees, Storage of Explosives, &c. (exclusive of Survey Fees) paid to the Treasury for the Years ending 30th June, from 1882 *to* 1903, *and for Six months ending* 31*st December*, 1903, *and for the Years ending* 31*st December*, 1904, *to* 1919 *inclusive.*

Year.	Amount.			Year.	Amount.		
	£	s.	d.		£	s.	d.
1882	23,077	1	9	1902	19,471	0	1
1883	15,439	14	5	1903	17,776	14	3
1884	6981	11	10	1903, 1 July to 31 Dec.	14,758	17	1
1885	11,070	5	7	1904, Jan. to Dec.	16,631	8	2
1886	12,523	10	4	1905	20,208	17	0
1887	14,611	11	5	1906	24,136	12	5
1888	23,502	8	4	1907	24,794	7	7
1889	17,254	9	0	1908	20,311	3	0
1890	26,955	4	9	1909	22,804	1	5
1891	37,829	16	5	1910	22,221	18	0
1892	17,568	18	4	1911	20,556	15	10
1893	16,971	9	2	1912	17,639	19	11
1894	16,732	7	7	1913	19,410	17	8
1895	15,323	1	9	1914	14,087	0	6
1896	20,901	13	2	1915	17,679	3	6
1897	25,631	0	3	1916	14,678	19	10
1898	33,661	13	9	1917	14,669	7	2
1899	24,696	10	5	1918	17,833	14	9
1900	28,380	11	10	1919	15,388	7	7
1901	21,569	5	2	1920	16,767	11	6

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.

GRAPHS showing the Fluctuations in Prices of the principal Metals as quoted in the "Industrial Australian and Mining Standard" during the Year 1920.



Mines Department, January, 1921.

Photo Algraphed by John Vail, Government Printer, Hobart, Tasmania.

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No. 34.

RETURN Showing the Average Annual Prices for Minerals during recent years.

	Ten-Year Average ended 1913.	Average for 1914.	Average for 1915.	Average for 1916.	Average for 1917.	Average for 1918.	Average for 1919.	Average for 1920.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Copper—Standard, Spot: per ton	67 13 3	59 11 3	72 12 9	116 1 3	125 2 5	115 11 6	90 19 4	97 12 5
Lead—Soft Foreign: per ton	15 3 6	18 13 9	22 17 8	30 19 6	30 0 0	30 2 8	28 3 11	38 4 7
Spelter: per ton	23 16 6	23 6 8	66 13 8	68 8 11	52 3 6	52 3 11	42 5 3	45 4 6
Tin—Standard, Spot: per ton	164 19 7	151 2 9	164 4 0	182 3 5	237 13 1	329 11 2	257 9 8	296 1 7
Silver—Standard, Spot: per oz.	s. d. 2 2·81	s. d. 2 1·32	s. d. 1 11·69	s. d. 2 7·32	s. d. 3 4·48	s. d. 3 11·57	s. d. 4 9·06	s. d. 5 1·67

The figures given in these cases were supplied by the Australian Metal Exchange, and show the London Metal Exchange average prices from 1914 to 1920 inclusive, compared with the ten-year average ended 1913.

REPORT OF THE MOUNT CAMERON WATER-RACE BOARD FOR THE YEAR ENDING 31ST DECEMBER, 1920.

Gladstone, 3rd February, 1921.

SIR,

WE have the honour to submit the report of the Board for the year ending 31st December, 1920.

We desire to express and place on record our very deep regret at the death of Mr. W. H. Wallace, who for a period of over 22 years had held the position of Chairman of the Board. By his sudden and unexpected death the Board has suffered a very severe loss, as the experience gained by him during so many years of office was of considerable value to the Board in its administration.

We are pleased to be able to report that there has been a marked increase in the receipts for water supplied under the fixed scale, but regret that, unfortunately, there has been a corresponding falling off in the receipts under the royalty scale, as although more water was supplied under the latter scale, the quantity of tin won was less.

A petition was received in April last from a number of consumers praying that the fixed scale charges might be altered to be based on the locally-quoted price of tin, instead of, as heretofore, on the London quoted price.

A special meeting of the Board was called, and the matter received full consideration, and the prayer of the petition was acceded to, but not in detail.

Some correspondence has since taken place on the subject, which, at your request, will be further considered by the Board.

Race.—We are pleased to be able to again report the race as being in excellent condition throughout, no breaks having occurred during the year. The top end for a distance of some 25 miles was cleaned out and "scrubbed" in the early part of the year, this work being necessary about every three years. The cost of this was greater than formerly, owing to the higher rates of wages ruling, the rate paid being 12s. per day, in comparison with previous rates of 9s. per day.

Fluming.—There is now only the one fluming at Old Chum Creek to be attended to, and this also is in good condition, the manager having, whilst cleaning the race, taken the opportunity of cleaning and painting it throughout.

Syphons.—These also are in good order, and are giving full satisfaction, the application of a coat of Plymel paint by the manager wherever the coating shows signs of weathering being a matter of his constant attention.

We have very much pleasure in expressing our appreciation of the able manner in which the manager (Mr. Harvey) has performed his duties during the twelve months under review, and we are also pleased to state that he reports the work of the channel-keepers as satisfactory.

Rainfall.—The registered rainfall for the year was as follows:—Main intake, 35 inches 2 points; Little Mussel Roe intake, 33 inches 76 points.

Revenue.—The revenue for the year amounted to £985 0s. 6d., being a decrease of £172 1s. 8d. on the previous year.

Expenditure.—The expenditure amounted to £920 6s. 5d., being an increase of £146 17s. 10d. on the previous year.

The statistics for the year are as follow:—

Average number of claims supplied per week, 7.

Greatest number supplied in any one week, 12.

Total number of heads supplied—Under fixed or cash scale, $382\frac{1}{12}$; under royalty or credit scale, $2385\frac{7}{12}$.

Tin ore raised for the year—Under fixed scale, 21 tons 17 cwt. 0 qr. 12 lb.; under royalty scale, 15 tons 15 cwt. 3 qr. 27 lb. Total, 37 tons 13 cwt. 0 qr. 11 lb.

Average number of men employed per week, 16.

Receipts.—Total receipts for the year—	£	s.	d.
Water sold under fixed scale	408	6	10
Water sold under royalty scale	576	13	8
Total	£985	0	6

Expenditure—	£	s.	d.
Salary and wages	727	10	10
Travelling expenses	38	18	0
Race repairs	135	14	0
Syphon pipes	2	7	0
Stores and tools	5	12	2
Printing and stationery	2	8	7
Insurance	7	15	10
Total	£920	6	5

Paid to the Public Debts Sinking Fund for the year ended 30th June, 1920 (including moiety of rents of mineral land served by the race, £9 10s.)	£296	17	1

We have the honour to be,

Sir,

Your obedient Servants,

W. A. PRETYMAN, Acting-Chairman.
EDWARD L. HALL,
CHARLES BARNES,
CECIL G. RYAN,
J. O. HUDSON,
JOHN SIMPSON,
} Members.

The Hon. the Minister for Mines.

GEOLOGICAL SURVEY OF TASMANIA.

REPORT FOR THE YEAR, 1920.

A.—Reorganisation of Office Methods and Arrangements.

The year's work was opened by a complete overhaul of the contents and equipment of the offices, and a thorough recasting of all office arrangements. These alterations, rearrangements, and reorganisation can be dealt with under the following heads:—

(1) *Library.*

The whole of the library of the Geological Survey was classified, with the result that, approximately, 2000 volumes were rejected for the reason that duplicates, triplicates, &c., were in existence on the shelves, whereas only one copy was needed.

(2) *Registration and Filing of Correspondence.*

This question was thoroughly investigated, and, owing to the inadequacy of the old methods, they were completely thrown out, and a new one, based on the card-index system, was installed.

The total number of letters dealt with during the year amounted to 1100 inwards and 1500 outwards. Of these, 250 inwards and 290 outwards consisted of correspondence with the Secretary for Mines.

(3) *Exchange List.*

This was revised, and the method of dealing with exchanges reorganised.

B.—Staff.

Applications were called for two Assistant Government Geologists, and resulted in the appointment of Messrs. P. B. Nye, B.M.E., and Mr. H. G. W. Keid, B.Sc.

Miss O'Keeffe was appointed as typiste in succession to Miss Middleton in February, and she has, since that date, carried out the duties of that position very efficiently.

The present staff of the Geological Survey, therefore, consists of—

Geological Staff—

Government Geologist—Loftus Hills, M.B.E., M.Sc.
Assistant Government Geologist—A. McIntosh Reid.
Assistant Government Geologist—P. B. Nye, B.M.E.
Assistant Government Geologist—H. G. W. Keid, B.Sc.
Clerk and Typiste—Miss M. O'Keeffe.

Laboratory Staff—

Government Assayer and Draughtsman—W. D. Reid.
Laboratory Assistant—W. Manson.

With this staff, however, there are several anomalies and difficulties arising in the conduct of the work. The first is that the geologists are compelled, through there being no draughtsman available, to do all their own draughting work. It is highly desirable, therefore, that a draughtsman be added to the staff of the Geological Survey.

In order that the laboratory should continue to be of the most use to the public, and carry out some, at least, of the work required in connection with geological investigations, some addition in laboratory staff is essential.

I wish to thank all members of the staff for the work accomplished during the year, and especially to express my appreciation of the special efforts put forward by Messrs. A. McIntosh Reid, and W. D. Reid, and Miss O'Keeffe.

C.—Increase in Scope of the Activities of the Geological Survey Actually Accomplished, and Those Considered Desirable in the Future.

(1) *In the Field.*

The work of the Geological Survey of Tasmania in the past has been practically confined to investigations and reports in connection with the mining industry. This is a legacy handed down from the days of the first appointment of a Government Geologist in Tasmania, when the mining industry was in the early stage of its development. The attachment of the Geological Survey to the Mines Department has served to perpetuate the idea that the Geological Survey was associated with mining and nothing else. The development of geological surveys in other parts of the world, however, has been on lines much broader and more comprehensive than in Tasmania. In order, therefore, that the Gological Survey in Tasmania should play the part it does in other countries, and which it should if the proper development of our country is to take place, its functions should be increased and its scope enlarged. Immediately on taking up my duties as Government Geologist I commenced to try and bring this enlargement about. As the result, the following activities have been added.

(*a*) *Underground Water-supplies.*—This is essentially a subject of enquiry by the Geological Survey which had only been lightly touched upon previously to this year. Requests emanating from the Oatlands and Tunbridge districts for a report on the possibility of obtaining a water-supply from underground sources presented an opportunity of initiating a systematic investigation of the underground water resources of Tasmania.

(*b*) *The Relation of Geology to Engineering Undertakings.*—This aspect of geological investigations had not been dealt with previously in Tasmania by the Geological Survey. The importance of the application of geological knowledge to the preliminary investigations and calculations in regard to engineering projects, such as dam construction, harbour improvements, railway cuttings, tunnels, &c., is now well recognised in modern engineering circles.

During the year, it was arranged with the General Manager of the Hydro-Electric Department that all investigations required by that Department on the suitability or otherwise of sites of proposed dams and storage basins should be carried out by the Geological Survey, the Gological Survey undertaking, in view of the urgency of the development of hydro-electric power, to give preference to this work over any other. A number of these investigations have been carried out during the year, as will be indicated in a later portion of this report.

(c) *Soil and Subsoil Survey and the Problem of Irrigation.*—The soil survey rightly belongs to the Agricultural Department. The subsoil survey, however, is a subject for investigation by the geologist, and therefore should be undertaken by the Geological Survey. The present geological map of Tasmania is of no great value as a soil map, but co-operation with the Agricultural Department would result in the possibility of the issue of a first attempt at a soil map of the State.

(d) *The Provision of Boring Facilities and the Control of Boring Operations by the Geological Survey.*—To conveniently and efficiently investigate a great number of our mineral, coal, oil shale, clay, and other deposits, suitable boring plants are required. These are not available in Tasmania, and the expense of purchasing them or inducing mainland firms to send over plant and staff to do the boring is beyond the means of far the greater number of individuals interested. I proposed that the Government should establish a boring department attached to the Geological Survey, in order to make such boring facilities readily available to the general public. By the end of the year it had been decided to initiate this line of activity by the provision of a few hand-boring plants, of a design furnished by me.

(2) *In the Laboratory.*

(a) *Analytical Work in Connection with Geological Investigations.*—The number of assays and analyses carried out for the public in the Geological Survey Laboratory has been so great as to make it impossible to carry out any appreciable amount of analytical work in connection with the Geological Survey investigations. It is highly desirable—and, in fact, essential—that the laboratory should be available for such analytical work as requires to be done in connection with the field investigation of the geologists. The increase in the laboratory staff, by the addition of a laboratory assistant, has enabled some of such analytical work to be carried out during the past 12 months, but the amount so performed is small compared with what ought to be done to attain efficiency. The addition of one chemist to the laboratory staff would permit of an appreciable amount of this work to be undertaken.

(b) *Testing Industrial Processes.*—As the result of the gradual realisation by the public of the existence of this laboratory, and the consequent requests for tests and trials which have been made by many manufacturers, it has become

increasingly apparent that there exists a very great need for the development of this laboratory into one so equipped as to carry out any such trials or tests as may be asked for.

It must be remembered that the suitability of certain materials for certain manufacturing processes is not wholly dependent on their analyses. Further information in regard to their physical qualities, and their behaviour under certain conditions, is needed. There is no laboratory in Tasmania whose function is to carry out such tests.

The following will indicate what can be done with proper equipment. During the coming year a complete series of practical tests will be carried out in the Geological Survey Laboratory in connection with the coal resources investigation. These tests will include the quality of coke obtainable by different mixing and grading of the various Tasmanian coals, as well as the improvement in the quality of the coal by suitable washing methods, although some of these latter tests will have to be carried out on the mainland owing to lack of equipment here. However, the provision of the calorimeter apparatus during the year enables us to carry out very valuable tests on the heating value of coals.

(*c*) *Metallurgical Research.*—The natural corollary to the mineralographic studies of the geologists and the analytical work of the laboratory is the scientific investigation of the metallurgical treatment of many of our low-grade complex ores. This need for a properly equipped and staffed metallurgical establishment in Tasmania is very apparent to those cognisant of the requirements of the mining industry.

The equipment already in existence in the Geological Survey Laboratory, combined with the knowledge and experience possessed by the present Geological Survey staff, bring about conditions which make it perfectly clear that such metallurgical research investigations and testing industrial processes should take place in the Geological Survey Laboratory, which could be continuously developed for that purpose during the next few years. If the sum of £300 were made available annually for the next five years a valuable research and testing laboratory could be built up. In the first year this would provide plant for oil-shale distillation, kiln for testing clays for firebricks, &c., and some metallurgical plant.

D.—Investigations Carried Out During the Year.

(1) *By the Geological Staff.*

(*a*) *The Occurrence of Osmiridium in Tasmania.*—This investigation had been started in the previous year, and was completed during the current year. It was carried out by Mr. A. McIntosh Reid, Assistant Government Geologist, who completed a geological survey of the osmiridium fields on the West Coast, and, in addition, carried out a reconnaissance of those areas carrying osmiridium occurring in the southern portion of Tasmania. The field work in connection with these investigations occupied a total period of five months. The object of the investigation was to determine the mode of the occurrence of osmiridium, and the factors controlling its dis-

tribution. It was also desired to ascertain what reserves of osmiridium actually existed in Tasmania. The results of the investigation are very satisfactory, definite conclusions being arrived at with regard to the mode of occurrence, and the factors controlling the present distribution of the osmiridium being definitely delineated. In regard to the quantity of osmiridium available, it was satisfactorily determined that deposits of this mineral occur sufficient to keep the industry going for many years to come.

(*b*) *Mt. Lyell Investigation.*—This investigation, designed to ascertain from the extensive workings of the Mt. Lyell field, the factors which have controlled the location and deposition of copper in Tasmania, is a very arduous and lengthy undertaking. The results of this examination will give indispensable information in regard to the development of other copper deposits in Tasmania. This investigation is being conducted by myself. Owing to numerous interruptions of administrative work, and other urgent investigations that crop up from time to time requiring my immediate attention, progress has been somewhat slower than was anticipated. Some work yet remains to be done in regard to this undertaking before finality can be reached.

(*c*) *The Underground Water Resources of the Midlands.*—This work was carried out by Mr. P. B. Nye, Assistant Government Geologist, and had as its objective the complete geological survey of the Midlands in order to permit of definite conclusions being arrived at in regard to the quantity and quality of the underground water resources and the character of the soil and subsoil in relation to the underlying rock as affecting the problem of irrigation. The field work of this investigation occupied six months, and the results may be considered very satisfactory. It was established that although no artesian water exists, yet there are a number of sub-artesian basins, which are capable of supplying a considerable amount of water. The area of these sub-artesian basins has been definitely delineated. This underground water has been neglected up to the present, but when made available by the putting down of suitably placed bores, it is destined to play an important part in the development of the relatively dry midlands area of Tasmania.

(*d*) *The Coal Resources Investigation.*—A complete investigation of the coal resources of Tasmania was decided upon early in the year, but a definite start on the field work in connection therewith was not possible until after the appointment of a third Assistant Government Geologist. The field work was thus started by Mr. H. G. W. Keid, Assistant Government Geologist, in May. The first coalfield examined was the Mt. Nicholas field, the geological survey of which was carried out by Mr. Keid, and completed in three months. Mr. Keid subsequently started upon the geological survey of the extensive coalfield extending more or less continuously from Fingal down the East Coast to Tasman's Peninsula. He was still engaged on this work at the close of the year.

The southern coalfields have been allotted to Mr. A. McIntosh Reid for examination, and he started work on them during October. The fields which will be dealt with by this

officer are the Langloh-Lawrenny, Sandfly-Cygnet, and Tasman Peninsula. He will connect up from the Tasman Peninsula with Mr. H. G. W. Keid's work on the East Coast. He was still engaged on this work at the close of the year.

The York Plains Coalfield was examined by Mr. P. B. Nye during his geological survey of the Midlands.

The George Town Coalfield, to which renewed attention was paid towards the close of the year, was visited by myself in September in order to advise as to the justification of further exploratory work.

(*e*) *Examination of Dam Sites for the Hydro-Electric Department.*—In accordance with the arrangements made with the Hydro-Electric Department, as indicated above, geological examinations were made of the sites of a number of proposed dams. Thus, in March, Mr. A. McIntosh Reid visited proposed dam-sites on the Huon and Derwent Rivers, and made a thorough examination of the geological factors affecting dam-construction.

The proposed dam-sites and location of a proposed tunnel in connection with the Lake Rolleston hydro-electric scheme were examined by myself in April.

The King River dam-site was also studied in detail by me from the point of view of the geological features as affecting dam-construction.

(*f*) *The Federation Tin Mine, Mt. Heemskirk.*—In October I carried out an examination and sampling of the Federation Tin Mine, Mt. Heemskirk, in order to arrive at a conclusion as to the future prospects of the mine in regard to the justification of the building of a tramway by the Government. The examination showed that this mine with efficient management may be confidently expected to be a staple producer of tin for many years.

(*g*) *Cement Materials.*—In September I examined the clay deposits at Flowery Gully, which it was proposed to use in conjunction with limestone for the manufacture of cement.

Mr. H. G. W. Keid especially examined the limestone deposits near Fingal from a similar point of view in regard to the Fingal cement proposition.

(*h*) *Wharf Sites at Bell Bay, Longreach, and George Town.*—In May an examination of the proposed sites for wharves at Bell Bay, Longreach, and George Town was undertaken by myself. The object of this examination was to determine whether the geological conditions existing at the several points were such as to indicate that land-slides were possible. The examination showed that the sites at George Town and Longreach were not at all likely to be affected by land-slides, but a final decision in regard to the easterly portion of the proposed wharves at Bell Bay must be deferred until accurate contour surveys had been made and estimates formed of the total maximum load likely to be put on the wharves.

(*i*) *Investigation of the Problem Arising out of the Attempt to Get Water at the State Farm by Well-sinking.*—This examination was conducted by myself.

It will thus be seen that the amount of work carried out during the year has been very extensive. The total area covered was, approximately, 800 square miles. In addition to this there are numerous lesser examinations indicated above which cannot be counted in area.

(2) *By the Laboratory Staff.*

A large amount of assays and analytical work has been carried out during the past year by the laboratory staff, a total of 3225 determinations having been made in that period.

There has been some increase in the scope of the work carried out by this laboratory during the period under review, and several investigations have been made that are beyond the limitations of ordinary analytical work. The following investigations have been made by Mr. W. D. Reid, the Government Assayer: —

(*a*) Tests of clay for the manufacture of fire-brick and crucibles.
(*b*) Tests of minerals for use as abrasives.
(*c*) Examinations of ochres for paint manufacture.
(*d*) Determination of the porosity of infusorial earth and sandstones.
(*e*) Examination of water for boiler purposes.
(*f*) Examination of sand for glass manufacture.

E.—Reports Prepared During the Year.

(1) *For Publication.*

(*a*) "The Application of Geology to the Development of the Natural Resources of Tasmania," by Loftus Hills, M.B.E., M.Sc.

This was prepared with the object of disseminating information in regard to the work carried out by the Geological Survey, when the services of the geologists should be asked for, and how to go about obtaining the services of the Geological Survey.

(*b*) "Osmiridium in Tasmania": Preliminary Report, by A. McIntosh Reid.

(*c*) "Preliminary Report on the Osmiridium Deposits in the Neighbourhood of the Gordon River," by A. McIntosh Reid.

(*d*) "Osmiridium in Tasmania," by A. McIntosh Reid.

This is a comprehensive description of the general character, properties, and uses of osmiridium. It describes the mode of occurrence and the factors controlling its mode of formation. It deals fully with the indications which may be taken as pointing to the presence or likelihood of the occurrence of osmiridium. The market price is discussed in relation to the future supply and demand of this valuable mineral. As Tasmania supplies by far the largest output of osmiridium of any country in the world, this volume is destined to serve as a general reference book on osmiridium throughout the world.

(*e*) "The Arthur Lakes Dam Proposal, and the Relation thereof to the Water-supply and Irrigation of the Midlands," by Loftus Hills, M.B.E., M.Sc.

This was presented before the Public Works Committee on the 16th February. It deals with some of the fundamental questions affecting water-supply and irrigation.

(*f*) "Preliminary Report on the Mt. Nicholas Coalfield," by H. G. W. Keid, B.Sc.

(*g*) "Preliminary Report on the Geological Survey of the Midlands," by P. B. Nye, B.M.E.

(*h*) "Report on the Clay Deposits at Flowery Gully," by Loftus Hills, M.B.E., M.Sc.

(*i*) "Report on the Coal Deposits near George Town," by Loftus Hills, M.B.E., M.Sc.

(*j*) "Report on the Geological Conditions at George Town as affecting Wharf Construction," by Loftus Hills, M.B.E., M.Sc.

(*k*) "Report on the Geological Conditions at Longreach as affecting Wharf Construction," by Loftus Hills, M.B.E., M.Sc.

(*l*) "Report, No. 2, on Geological Conditions at Bell Bay as affecting Wharf Construction," by Loftus Hills, M.B.E., M.Sc.

(*m*) "Report on the Federation Tin Mine, Heemskirk," by Loftus Hills, M.B.E., M.Sc.

(*n*) "Reported Occurrence of Oil at Barn Bluff," by Loftus Hills, M.B.E., M.Sc.

(*o*) "Report on the Present Status of Geological Survey Investigations in Tasmania," accompanied by geological and general maps of Tasmania, and a map showing those areas which have been geologically surveyed. This report was prepared at the request of the Pan-Pacific Scientific Progress held in Honolulu during the year. The information contained in this report will be included in a comprehensive publication to be issued by that Congress on the resources and development of countries bordering on the Pacific.

(2) *Departmental.*

(*a*) "Report on the Dam-sites for the Conservation of Water at Upper Huon and Macquarie Plains," by A. McIntosh Reid.

(*b*) "Report on the Geological Structure of the Sites for the Proposed Dams and Tunnel of the Lake Rolleston Hydro-Electric Power Scheme," by Loftus Hills, M.B.E., M.Sc.

(*c*) "Report on the King River Dam Site," by Loftus Hills, M.B.E., M.Sc.

(*d*) "Report on the Metallurgical Research," by Loftus Hills, M.B.E., M.Sc.

(*e*) "Proposal for the Amalgamation of the Geological Survey, Government Metallurgical Research, and the Teaching of Geology and Metallurgy at the University," by Loftus Hills, M.B.E., M.Sc.

(*f*) "Special Report for the Hydro-Electric Department on the Underground Water Resources of the Midlands in Relation to Irrigation," by P. B. Nye, B.M.E.

(*g*) "Report on the Proposal to Establish Cement Works on the Silkstone Properties, Fingal," by H. G. W. Keid, B.Sc.

(*h*) "Report on the Attempt to Obtain Water at the State Farm by Well-sinking," by Loftus Hills, M.B.E., M.Sc.

(*i*) "Report on the Provision of Boring Facilities." This report was prepared by me calling attention to what is a very real requirement in Tasmania.

F.—Publications.

An innovation initiated during the year has been the preparation in connection with our publications of a summary. This is placed at the beginning of the volume, and is designed to contain a complete *resumé* of the scope and contents of the publication. It is realised that in the case of busy men such

a digest is a necessity in order that they should obtain some general ideas of the information supplied. In addition, the summary serves a very useful purpose by putting into the hands of the Press a readily available and authoritative summary which they can print in their columns, and thus give the general public the information both of the existence of the publication and an accurate idea of its contents.

(1) *Publications Issued During* 1920.

(*a*) Mineral Resources No. 6.—" The Iron Ore Deposits of Tasmania," by W. H. Twelvetrees and A. McIntosh Reid. (4th November, 1919.)

(*b*) Report No. 8—" Asbestos in the Beaconsfield District." by A. McIntosh Reid. (5th December, 1919.)

G.—The Supplying of Information.

One of the functions of the Geological Survey that has continually increased in importance, and is increasing at a more rapid rate than formerly, is that of a bureau of information on all subjects pertaining to geology, mining, metallurgy, ore-dressing, and industrial chemistry. The knowledge of the Geological Survey Staff and the resources of the excellent library that is being built up are available in the services of the community, and as this becomes more generally known the amount of work in this connection will increase to a very large extent. Applications for information of this kind are made either in person or by letter.

(1) *Personal Applications.*

During the year, 1200 personal interviews have been attended to by the Geological Survey staff. Of these a large proportion brought in samples for determination of analysis which are dealt with by the laboratory staff. Thus 950 of these personal applications were dealt with by the laboratory staff, and 250 by the geological staff.

(2) *By Correspondence.*

Inquiries in regard to the general geology and mineral deposits of Tasmania are received from all parts of the world. These inquiries have been carefully dealt with, and in most cases such inquiries involve the preparation of a comprehensive report on the matter referred to. During the year, such correspondence has been dealt with from inquirers in all parts of the Commonwealth, New Zealand, Papua, Japan, United States, Canada, Mexico, Columbia, Great Britain, and South Africa.

H.—Mineral and Rock Collections.

(1) *Tasmanian Type Collection, Victoria Museum, Launceston.*

The type collection of the minerals, rocks, and fossils of Tasmania is being built up at the Victoria Museum, Launceston, by the Geological Survey as its work progresses. Dur-

ing the past year, however, no attention to this phase of the work has been possible, but there is a considerable amount of outstanding work in connection therewith that must be taken in hand during the next 12 months.

(2) *Exhibit of the Mineral Resources of Tasmania for Australia House, London.*

The question of a mineral exhibit to be included in that for Australia House has been dealt with during the year, and definite proposals made in regard to its effective provision.

(3) *For Educational Purposes.*

Many inquiries are received for Tasmanian mineral and rock specimens to be used in the teaching of geology and mineralogy in various schools. It is a very difficult matter, and, in fact, impossible, for schools to obtain such suites of collections without the help of the Geological Survey. I would propose that all requests from schools in Tasmania for such collections should be complied with as soon as the staff may be available from time to time to make them up.

I.—Library.

During the year under review the number of publications received by means of our Exchange List was 509.

The library now contains, approximately, 4000 volumes, and, in addition, approximately, 5000 numbers of weekly, monthly, and quarterly periodicals.

Acknowledgments must here be made to the proprietors of the following Tasmanian newspapers for free copies presented by them:—"Examiner," "Daily Telegraph," "Mercury," "Zeehan & Dundas Herald."

The availability of these papers in the Geological Survey offices is an important matter, and the courtesy of being supplied with free copies is much appreciated.

Card Indexing.

The library has thus grown to such a size that, in order that it may be made the most efficient use of, it should be card-indexed. This work of card-indexing must be taken up at the first opportunity.

J.—The Relation of the Geological Survey to the Teaching of Geology in Tasmania.

It is a very regrettable fact that the subject of geology is not at present taught at the University of Tasmania. This absence of teaching facilities in geology at the University has been in existence for some years, and the effect of it was felt recently in calling for applications for the two positions of Assistant Government Geologists, when no Tasmanian applied who was suitable for the position.

It cannot be expected that the requirements of the Geological Survey in regard to staff can be supplied from Tasmania if the teaching in this subject is not adequately provided for.

There should be close co-operation between the Geological Survey on the one hand, and the University and the Education Department on the other, with regard to the teaching of geology in Tasmania. It is, and will be, my endeavour to bring about this co-operation, as this will result not only in the provision of training facilities in a subject of great importance in the development of Tasmania, but will also ensure the continuous supply of efficient geologists to the staff of the Geological Survey as they may be required.

K.—Mine Plans.

The plans of underground workings submitted by mining companies, in accordance with "The Mining Act," are checked and filed at the Geological Survey offices. This work takes up a portion of the time of the Government Assayer which could be very advantageously used in laboratory work. As these plans come under the control of the Chief Inspector of Mines, I have made urgent representations that they be dealt with in future in Hobart.

L.—Work to be Completed and Undertaken During the Next Twelve Months.

(1) *Completion of the Coal Resources Investigation.*

The field work at present being carried out by Messrs. A. McIntosh Reid and H. G. W. Keid is expected to be completed by the beginning of the winter.

The Colebrook Coalfield will be included in Mr. P. B. Nye's next areal examination for underground water.

With the completion of the field investigations the laboratory work in connection with this enquiry will be initiated and carried out by Mr. W. D. Reid.

The preparation of the "Coal Resources" publication will be proceeded with. This will be outlined, supervised, and edited by myself, the various members of the staff contributing their respective chapters. This publication should be ready for printing before the summer months. Its preparation will allow Messrs. McIntosh Reid, H. G. W. Keid, W. D. Reid, and myself very little opportunity for other investigations until it is completed.

(2) *Mt. Lyell Investigation.*

This is to be proceeded with.

(3) *The Underground Water Resources of the Midlands.*

The preparation of the publication dealing with this investigation is in the hands of Mr. P. B. Nye, who is expected to complete it early in the year.

(4) *The Investigation of the Underground Water Resources of the Bothwell-Brighton Area.*

The investigation of the underground water resources of this region, and the relation thereof to irrigation will be carried out by Mr. P. B. Nye, and the field work in connection therewith, and the preparation of the publication should occupy him until towards the close of the year.

(5) *The Mt. Bischoff Investigation.*

The investigation of the ore-deposits of the Mt. Bischoff field, which has been postponed to allow of the expeditious completion of the coal resources investigation, will be undertaken by Mr. A. McIntosh Reid on the completion of the "Coal Resources" publication in the spring.

(6) *Mineral and Rock Collections and Library Indexing.*

There is a large amount of outstanding work in these connections, and it is hoped to complete portions of it by using members of the staff as opportunity permits during the next 12 months.

(7) *Urgent Investigations.*

Demands that are constantly arising for urgent examinations and reports must be expected to continue during the next 12 months, and it is expected that these and the completion of the above investigations will keep the whole staff well occupied until the end of the coming year.

It must be remembered that the investigation of the coal resources of Tasmania is a very big undertaking, and if this is completed in the manner contemplated during the coming year it may be regarded as very satisfactory progress made towards the development of the natural resources of Tasmania.

LOFTUS HILLS, M.B.E., M.Sc.,
Government Geologist.

W. A. PRETYMAN, Esq.,
Acting-Secretary for Mines, Hobart.

REPORT OF THE CHIEF INSPECTOR OF MINES.

Chief Inspector of Mines Office,
Hobart, Tasmania, 23rd March, 1921.

SIR,

I HAVE the honour to submit my annual report on the inspection of mines for the year 1920.

Accidents.—Attached is a graph of fatal accidents and statistical tables in connection with fatal and serious accidents. The return for the year may again be considered with satisfaction. The average number of persons employed in connection with the industry was 5364, being an increase of 951 compared with the previous year. This number would have been greatly increased if miners had been available.

There were two fatal accidents during the year; one occurred underground and one on the surface at works. The underground accident was one of those unfortunate occurrences which no inspection or supervision could have obviated, as it appeared to be due to want of underground experience. A man represented himself as a miner, and was employed in a stope. After firing out and barring down loose ground, he was asked to throw a stone down an ore pass about 10 feet in depth. He stood on the broken ore and loosened the ore round the pass, which caused the heap to run, carrying him into the pass. He was rescued very quickly, but unfortunately life was extinct, death being due to suffocation. In the other case a carpenter was employed placing galvanized iron on the wall of a building about 50 feet high. The staging was well constructed, and every precaution had been taken for safety. The stage was attached to blocks and tackle at each end for raising and lowering. There was no direct evidence as to the cause of the accident, but it was apparent that the cause was due to the tackle at one end becoming disconnected, owing to the fall being insecurely fastened, or to the deceased losing control while preparing to lower the stage. There were 50 serious accidents which caused loss of employment for more than 14 days. One only was due to a fall of ground, one to explosives, and one to falling down a pass or shaft. Twenty-eight of the accidents occurred underground, and 22 on the surface. Ten of the accidents caused fractures, but in no case was there permanent disablement. The injuries sustained in the remaining 40 accidents were of a very minor character. The special attention which has been given to the lines of weakness and structural occurrences of the ore-bodies is proving very satisfactory, there being no large settlements of ground, and a very large reduction of minor settlements, and with this, a corresponding decrease of accidents from falls of ground during the year.

The Uniform Code of Signals has continued to work satisfactorily. There was a case where the code was not strictly adhered to, which caused a serious accident, and which might have easily proved fatal, and this would emphasise the necessity for the very strict adoption of the code.

A large amount of attention has been given to ventilation of the mines, and, as was anticipated, the reliance on temperatures has proved unsatisfactory, and steps are now being taken to properly control the air currents and to regulate the distribution of air.

A case of spontaneous combustion occurred underground at a mine working a pyritic lode. It was found necessary to seal the workings until the temperature was reduced to normal, and to adopt measures to ensure safety to the employees in future operations.

It was found necessary to cite a mining company to arbitrate in connection with the contention that a shaft could be carefully examined from the inside of a cage running at the ordinary rate of speed. The case was not heard, as the representative of the company withdrew the contention, agreeing that it did not conform to standard mining practice.

Prosecutions were instituted against 10 persons—two for not complying with the Code of Signals, two for failing to use water for the prevention of dust, three for riding in a cage with tools, one for using explosive compound for igniting fuse, one for failing to make a careful examination of a shaft, and one case was unheard. In eight cases convictions were obtained, one case was dismissed, and one unheard.

There were no changes in the staff during the year. The inspectors are to be commended for the manner in which they carried out their duties during the year.

I have, &c.,

J. O. HUDSON, Chief Inspector of Mines

W. A. PRETYMAN, Esq.,
Acting-Secretary for Mines, Hobart.

COMPARATIVE Table of Statistics of Accidents in and about the Mines of Tasmania from 1st July, 1892, to 31st December, 1920.

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 1892	3295	28	4	25	29	8·8001	1·214	7·586
„ 1893 „ 1893	3403	25	7	20	27	7·934	2·057	5·877
„ 1894 „ 1894	3789	26	4	24	28	7·390	1·058	6·332
„ 1895 „ 1895	4160	22	7	16	23	5·529	1·682	3·847
„ 1896 „ 1896	4303	36	7	31	38	8·831	1·627	7·204
„ 1897 „ 1897	5530	36	13	33	46	8·318	2·351	5·967
„ 1898 „ 1898	6180	35	9	34	43	6·957	1·456	5·501
„ 1899 „ 1899	6834	1[illegible]	7	16	23	3·365	1·024	2·341
„ 1900 „ 1900	7017	29	8	23	31	4·417	1·140	3·278
„ 1901 „ 1901	6438	38	7	35	42	6·524	1·088	5·437
„ 1902 „ 1902	6484	44	6	43	49	7·557	0·925	6·632
„ 1903, to 31 Dec., 1903	5604	27	8	20	28	4·977	1·428	3·569
Jan. 1904 „ 1904	6192	73	9	65	74	11·951	1·454	10·497
„ 1905 „ 1905	6586	34	7	30	37	5·618	1·063	4·555
„ 1906 „ 1906	7004	65	4	61	65	9·280	0·571	8·709
„ 1907 „ 1907	7516	68	6	64	70	9·314	0·798	8·515
„ 1908 „ 1908	6464	60	6	58	64	9·900	0·928	8·972
„ 1909 „ 1909	6054	54	6	49	55	9·085	0·991	8·093
„ 1910 „ 1910	5770	63	8	57	65	11·265	1·386	9·878
„ 1911 „ 1911	5247	80	4	77	81	15·437	0·762	14·675
„ 1912 „ 1912	5566	60	53	53	106	19·044	9·522	9·522
„ 1913 „ 1913	6106	64	6	60	66	10·809	0·982	9·826
„ 1914 „ 1914	4741	69	9	62	71	14·977	1·896	13·081
„ 1915 „ 1915	3908	71	6	67	73	18·679	1·535	17·144
„ 1916 „ 1916	3864	53	2	51	53	13·716	0·517	13·198
„ 1917 „ 1917	4050	50	2	48	50	12·345	0·493	11·852
„ 1918 „ 1918	4279	50	5	45	50	11·684	1·168	10·516
„ 1919 „ 1919	4413	58	1	57	58	13·143	0·226	12·917
„ 1920 „ 1920	5364	52	2	50	52	9·694	0·372	9·322

Diagram showing the ratio of Fatal Accidents

in Mines in Tasmania.

Rate per 1000 men employed.

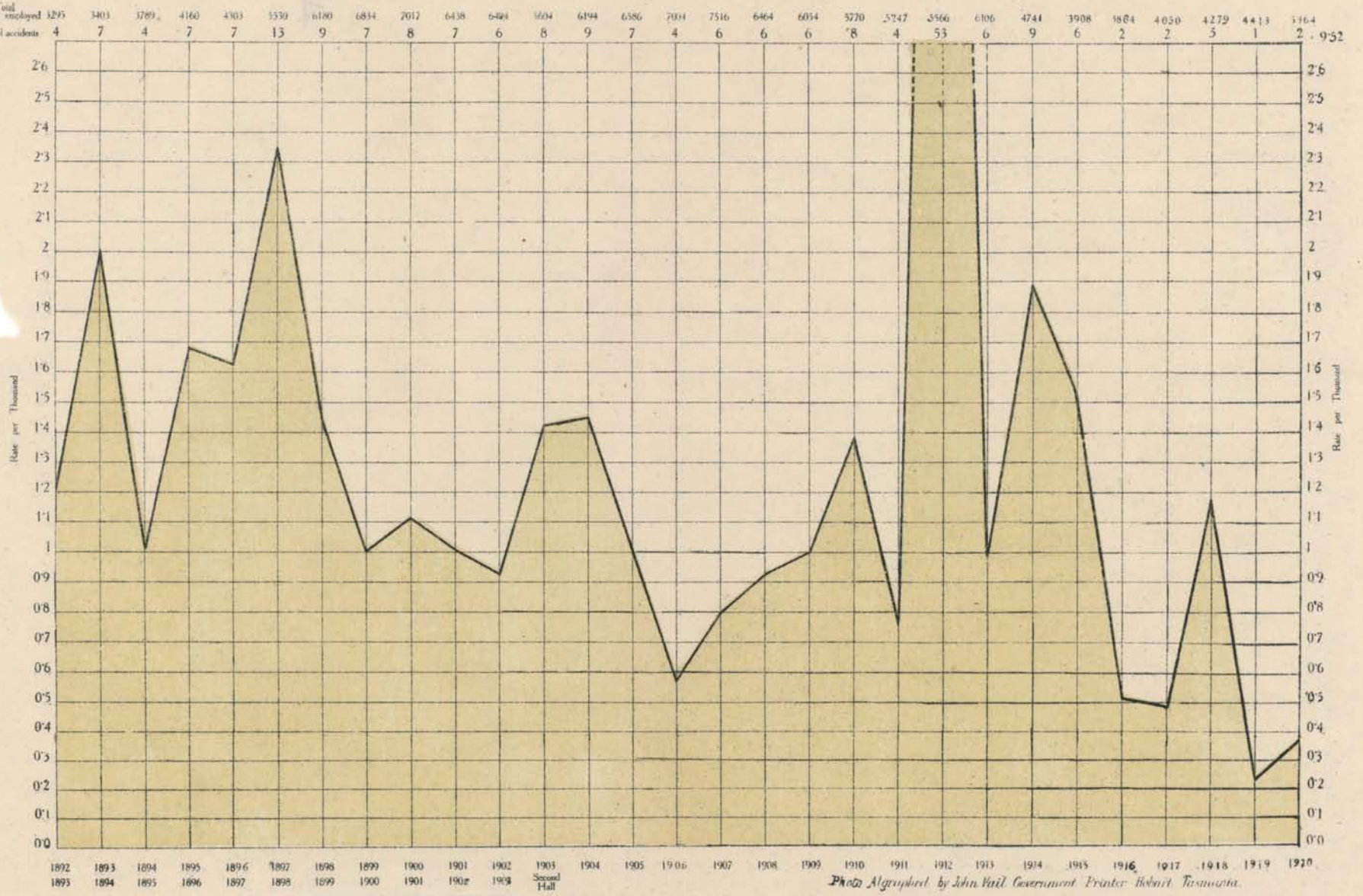

Photo Lithographed by John Vail, Government Printer, Hobart, Tasmania.

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ANALYSIS of Statistics for 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.
Mt. Lyell	1586	22	1	21	22	13·870	0·630	13·240
Zeehan, &c.	556	3	...	3	3	5·395	...	5·395

TABLE showing Rate per Thousand Killed and Injured in different Divisions for the Year ending December, 1920.

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	1417	6	1	5	6	4·234	0·705	3·528
North-Eastern	441	2	...	2	2	4·535	...	4·535
Eastern	482	12	...	12	12	24·896	...	24·896
North-Western	882	7	...	7	7	7·936	...	7·936
Western	2142	25	1	24	25	11·671	0·466	11·204

TABLE showing the Number of Persons Killed and Injured in and about the Mines of Tasmania during the Year 1920.

Place or Cause of Accident.	Inspection Districts.													
	Northern and Southern Division.		North-Eastern Division.		Eastern Division.		North-Western Division.		Western Division.				Total.	
									Zeehan and Districts.		Lyell District.			
	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.
Underground—														
Falls of ground	...	1	...	...	...	1	...	...	...	...	...	1	...	3
Shaft Accidents—														
Falling down passes and shafts	...	...	...	...	...	...	...	1	...	...	1	...	1	1
Total	...	1	...	...	...	1	...	1	...	...	1	1	1	4
Miscellaneous (underground).														
Haulage	...	...	...	...	...	...	...	...	...	...	...	1	...	1
Trams, &c.	...	1	...	...	...	7	...	...	...	...	...	4	...	12
Sundry accidents	...	1	...	...	...	4	...	2	...	...	...	3	...	10
Explosives	...	...	...	...	...	...	...	..	...	...	...	1	...	1
Total	...	2	...	...	...	11	...	2	...	...	...	9	..	24
Total Underground	...	3	...	...	...	12	...	3	...	...	1	10	1	28

On Surface—														
Smelting-works	...	...	...	...	...	...	...	...	...	...	...	8	...	8
Machinery	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Tramways	...	...	...	...	...	...	...	1	...	2	...	...	...	3
Falls of persons	1	1	...	...	...	...	...	...	...	...	...	1	1	3
Explosives	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Miscellaneous	...	1	...	2	...	...	...	3	...	1	...	2	...	9
Sluicing	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Total	1	2	...	2	...	...	...	4	...	3	...	11	1	22
Gross Total	1	5	...	2	...	12	...	7	...	3	1	21	2	50

REPORTS OF INSPECTORS OF MINES.

Mr. Inspector Curtain (Launceston) reports:—

Accidents.—These, on the whole, were of a minor character as apart from the fractures (4), the balance of the injured men were, during their disability, able to get about until fit to resume work again.

Ventilation.—This (particularly in the collieries) has received due consideration, and found reasonably satisfactory. Occasions. however, have arisen when the quantity of air passing through sections of the return airways was not quite up to our standard, the deficiency being attributable to short-circuiting or temporary blocks in the air courses, and that in all cases received attention from the management. In connection therewith it may be well to note that in no instance did the face temperatures exceed 68 degrees Fahrenheit, which, for working conditions, must compare most favourably with that of other States or similar industries.

Dust.—Where rock-drills are installed a suitable water service accompanies them, which is reasonably availed of, and used by the miners.

Changing-houses.—Apart from the metalliferous mines, no others provide this accommodation for their employees.

Equipment.—This generally has been satisfactory, as only in one instance had exception to be taken to the state of a truck and travelling road, the improvement of which was attended to.

Explosives.—These and their storage have been attended to. Instances of apparent exudation have been observed, but whether the cause is attributable to the (1) sodium nitrates, or (2) nitroglycerine parts of the condiment is difficult to distinguish or determine. So as to avoid danger all samples showing such features were destroyed.

Carbide of Calcium and Inflammable Oils.—Periodic visits have been made to persons and firms storing these commodities, and endeavours made to have the requirements of the Act reasonably complied with. A new Act is about to come into operation, the provisions of which, it is hoped, will be more readily complied with than those of the last or present one.

LIST of Accidents in Inspector Curtain's District for the Year 1920.

Fatal 1, Serious 19.

Date of Accident.	Name of Mine.	Locality.	Cause of Accident.	Name of Sufferer.	Married or Single, and Age.	Nature of Injuries.	Killed.	Injured	Particulars.
1 20.									
Jan. 6	Cygnet Coal Mine	Cygnet	Collapse of timber	William Gordon	Married, 49 years	Fractured collar-bone	—	1	Was preparing ground to stand a set of timber, when timber collapsed
Feb. 24	Electrolytic Zinc Co.	Risdon	Scaffolding became unhitched	Cyril Edwd. Nash	Married, 41 years	Broken thigh and concussions	1	—	Was working on the mechanical bag-house building, when scaffolding became unhitched, and he fell to the ground
Mar. 2	Mt. Nicholas Colliery	Mt. Nicholas	Skip slid off rail	Frances Robt. Llewellyn	Single, 19 years	Jammed finger	—	1	While endeavouring to replace truck on rail, jammed finger between buffer and truck
Mar. 5	ditto	ditto	Slipped on piece of sandstone	Arthur Davern	Single, 21 years	Bruised right shoulder	—	1	Was pony-driving, when he slipped on piece of sandstone, and was jammed against door, bruising shoulder
Mar. 17	ditto	ditto	Skip hit against a chock	Wm. Henry Jones	Single, 24 years	Bruised finger	—	1	Full skip hit against a chock, and fingers were jammed against "tippers"
Mar. 22	Barytes Mine	Lower Beulah	Fall of ore	John Dodd	Married, 25 years	Fractured bones of right leg	—	1	Piece of ore slipped from footwall, fracturing bones of right leg
Mar. 23	Mt. Nicholas Colliery	Mt. Nicholas	Fall of coal	William Brittan	Married, 62 years	Bruised foot	—	1	Pulled down piece of coal from face, which fell on foot

LIST of Accidents in Inspector Curtain's District—continued.

Date of Accident.	Name of Mine.	Locality	Cause of Accident.	Name of Sufferer.	Married or Single, and Age.	Nature of Injuries.	Killed.	Injured.	Particulars.
1920.									
April 1	Mt. Nicholas Colliery	Mt. Nicholas	Jammed with skip	Henry Sheppard	Single, 20 years	Jammed generally	—	1	A pony-driver was following another, who slipped, causing load to spring back, jamming him
April 12	Briseis Tin Mining Co.	Derby	Axe slipped	Emmanuel Maumill	Married, 48 years	Cut toe	—	1	Injuries self-inflicted while engaged in bush work
April 23	Mt. Nicholas Colliery	Mt Nicholas	ditto	Edward C. Newman	Married, 35 years	Cut knee	—	1	While working in the bush, axe slipped and cut knee
May 5	ditto	ditto	Piece of coal fell on finger	David Llewellyn	Married, 52 years	Cut finger	—	1	Small piece of coal (2lb. in weight) fell from "back," and cut finger
May 27	ditto	ditto	Finger caught between coal and skip	Reginald Goff	Married, 25 years	Crushed finger	—	1	Was lifting piece of coal into skip, and got finger jammed between coal and skip
May 28	Electrolytic Zinc Co.	Risdon	Fall from a ladder	Arthur Job	Married	Injured head	—	1	Ladder on which man was standing, slipped, causing him to fall in the Oliver Fetter Sump, injuring head
June 10	ditto	ditto	Explosion	John Clifford	Married	Burnt face	—	1	Emptied some scrap zinc into furnace, which exploded, reached him and burnt face
July 8	Scheelite Mine	King Is.	Thrown into ore-bin	Cedric Chas. Johns	Married, 27 years	Bruised foot	—	1	While tipping a truck, was thrown into ore-bins, bruising foot

July 23	Mt. Nicholas Mine	Mt. Nicholas	Fall of coal	Albert Herman Kringle	Married, 34 years	Fractured hipbone	—	1	While filling a skip, a small piece of roof coal fell, and slightly fractured right hipbone
Sept. 3	ditto	ditto	Skip ran over foot	Arthur Sheppard	Single, 17 years	Left leg fractured	—	1	Foot slipped over rail while unhooking skips at coal-bins, and skip ran over foot, fracturing it
Oct. 6	ditto	ditto	Leg weakened	John Waddington	Married, 60 years	Injured leg	—	1	Owing to previous injury, leg weakened while pushing a loaded skip
Oct. 26	ditto	ditto	Fall of sandstone	Percy Abel	Married, 40 years	Fractured small bone of right leg	—	1	While getting rails out of an abandoned road, piece of sandstone fell on foot, fracturing small bone
Nov. 29	Briseis Tin Mining Co.	Derby	Stones jammed finger	Harold Cunningham	Single, 27 years	Bruised finger and poisoned arm	—	1	While wheeling stones, jammed finger, which eventually resulted in a poisoned arm

MR. INSPECTOR VAUDEAU (Zeehan) reports:—

I HAVE the honour to submit my report as inspector for the year ending 31st December, 1920.

Accidents.—The tabulated list attached contains an account of 10 accidents. Six of these occurred on the surface, and four underground.

These were all reported, as required by "The Mines and Works Regulation Act, 1915."

Eight other accidents were reported, but these men returned to their work before losing 14 working days, and are not registered.

Most of the managers in this district report all accidents, however trivial. By their doing this it makes it much easier for me to keep in touch with the accidents that occur, and to see that none are missed in the Register.

As will be seen by the tabulated list, at least seven of the accidents could have been avoided with a little more care.

Apart from the man who slipped off the ladder, owing to his foolishness in carrying a drill down the ladder-way, all the men were able to return to work within a month.

There is no need to enumerate the accidents here, as the list gives the necessary information.

On Sunday the 25th January, at 3 p.m., a lad (Victor Sturzaker), aged 12 years, was playing with others on the trestled flume, which crosses the Happy Valley, on the Mt. Bischoff Tin Mine, when he fell off same, dropping a distance of 50 feet or more, receiving serious injuries.

His mates gave the alarm quickly, which led to the lad's immediate entrance to the local hospital, where, thanks to the skill of the local doctor, Mr. Heyer, his recovery has been complete.

The management stated that many had been warned against trespassing near and on this fluming. It is to be hoped that this occurrence will be a warning to others to keep away from these places.

It was suggested to the management to protect both ends of the fluming by fencing. Notices were posted warning people to keep off, the company considering this sufficient.

Ventilation.—Natural ventilation is the rule in all the mines in this district, excepting when driving a dead end or rise it has been found advisable to use artificial means.

At one mine where steam was used underground for hoisting and pumping purposes, and where working conditions were very bad, steam has been cut out and electricity and air has taken its place, and the conditions are now reasonable, and gradually getting better all the time, as the old workings are cooling down.

In one mine after a rise was holed through to the surface workings, principally through pyritical ore, spontaneous combustion took place, in one band of pyrites, about 50 feet from the surface.

It was found necessary to fill the rise, sealing it up. On driving towards the seat of the fire, from an intermediate level, the ore in this level became hot, and this drive was sealed off, but was afterwards opened, and had become cool again; but it has not been possible to open the rise again.

Owing to the nature of the ore and the likelihood of injurious gases exuding out of the ground, and being met with as the work advanced, the management met the Chief Inspector and myself in conference, and a definite plan of opening up this ore was mutually agreed on; also that a daily morning examination of the workings be made before any men were allowed to proceed to their working places.

That this was necessary has since been fully borne out, for on my last visit to the mine in December the men had just been requested to leave the workings, owing to gas being given off in very injurious quantities.

The management was requested to continue the programme as laid down previously, and to put in a system of artificial ventilation as soon as possible to deal with these workings, and to keep the strictest supervision over them, so that in the event of any injurious gases being present to a harmful extent the men should be immediately withdrawn.

At three other mines the management was requested to improve the ventilation in "dead ends," and this was done as quickly as possible.

Other than the foregoing, taken on the whole the ventilation was reasonably good.

Change-houses.—Owing to an increase of men working below at a few mines, it was requested that these be provided, and some others brought up to better efficiency, in compliance with the regulations under the Act. Though not completed at the end of the year in every instance, they were being gone on with, and should be satisfactory in the near future.

Latrine Accommodation.—At two mines better and more efficient accommodation was requested. One complied immediately, and the other, on the third asking, made good. At the remainder of the mines, conditions were reasonably satisfactory.

Health.—As far as I can judge, without medical testimony, which would be hard to procure in a scattered district like this, I believe it to be reasonably satisfactory. I have not heard of anyone suffering from pulmonary diseases during the year, and to my knowledge no deaths have occurred from this complaint in my district.

As far as I know, water is supplied and used for dust-allaying purposes in all mines in this district using rock machines.

A few alterations have been requested in the water service at one mine to make it more efficient.

Explosives and Magazines.—Taken on the whole, the conditions of the explosives used in this district have been much better during the year.

The conditions of handling and storing have been improved on in several instances, but still there is room for improvement in some places. These have been requested to "make good."

Small quanities, from a few plugs to a packet of gelignite, have had to be condemned and destroyed at different times, but the condition necessitating this was mostly owing to the method of handling and storing, leaving it lying about loosely until it was saturated with moisture, very little exudation being noticed.

One lot of 50 per cent. gelignite, on being tested by the "open test," was found to have lost a considerable amount of its sensitiveness, and as there had been complaints about this particular shipment during the previous year, and as the usual practice in this district is to use a No. 6 detonator, I considered it not advisable to let this explosive be used in underground workings, and recommended the owners to get it into use as quickly as possible in open-cut work, using, at least, a No. 7 detonator, after first having it tested to see that it was satisfactory. This advice was taken, and I understand it was all used up satisfactorily.

In only one instance was a complaint made in connection with some 50 per cent gelignite, but on inquiring into the matter I was satisfied that it was the user's fault, rather than the condition of the explosive.

Three new magazine licences were taken out during the year; other licences were renewed as they fell due.

On December 20 a girl, aged 11 years, found two detonators rolled up in a piece of paper under an unoccupied house, in Main-street, Zeehan, which she gave to her brother, 9 years old; he gave one to his mate, Melvy East, of the same age. They went together to East's home, where they got some matches. On going outside, East put a match, which he lit, to the opening in detonator: result—he had his thumb and forefinger torn off his left hand. His little sister, aged 6 years, who stood by, was peppered about the face, but not seriously, and is now all right.

Inflammable Oil Depots.—Those in use have been kept clean and reasonably satisfactory, as required by the Act. Three new premises were registered during the year.

Ropes and Cages.—One hoisting rope on a main shaft had to be condemned, owing to internal corrosion and crystalization. This was replaced as quickly as possible.

The safety gear on two cages were found faulty, and these were ordered to be renewed, which was done.

From the records of inspections made by mine employees, and posted in the mine record books, and from my own personal examination, all others in use appeared to be in good order and reasonably safe.

Sections of the ends of all hoisting ropes cut in compliance with the regulations under the Act were taken and tested by me, with the "bending test," and in all cases were satisfactory, excepting the rope mentioned above.

Machinery.—In changing over from steam to electricity for hoisting purposes at one mine, an enginedriver pulled the cage up to the head wheel. Fortunately, no one was in the cage, as it was badly knocked about. The overwind at this mine being under that required by the new Regulation 16, the management was requested to make the necessary alterations, and this work was put in hand during the recent Xmas holidays.

In conjunction with the Inspector of Machinery, a good deal of stageing and hand-railing in various concentrating mills were requested, for the better protection of those engaged in oiling and repair work. Most of these requests received immediate attention.

Otherwise than the foregoing the general condition of all appliances in connection with mining operations were reasonably safe.

General.—The various mines and works in the district have been regularly inspected as the importance of the operations called for.

At one mine recommendations were made in connection with the method of stoping in use, so as to ensure a more reasonable degree of safety, but I am sorry to say that these were not acceptable, and the management continues the old faulty method which at times necessitates the taking of greater risk to make places secure.

It is pleasing to be able to state that apart from a few instances a general reciprocation towards ensuring a reasonable degree of safety invariably met my efforts, both from mine officials and men working under them. In two instances the difficulty of obtaining the necessary material and labour was put forth as an excuse for not immediately complying with my instructions, and in others the question of cost. However, in all cases the necessity for the requests were admitted, and it is to be hoped that the requests will be fully met in the near future.

The day is past when "anything is good enough," and it is only reasonable that the health and well-being of those employed in the industry should be conscientiously cared for.

I have, &c.,

H. A. VAUDEAU, Inspector of Mines, &c.

W. A. PRETYMAN, Esq.,
Acting-Secretary for Mines, Hobart.

LIST of Accidents in Inspector Vaudeau's District.

Fatal 0, Serious 10.

Date of Accident.	Name of Mine.	Locality.	Cause of Accident.	Name of Sufferer.	Married or Single, and Age.	Nature of Injuries.	Killed.	Injured.	Particulars.
1920. Feb. 4	Chester Mine	Chester	Piece of ore slipped back and sharp edge cut man's arm	B. Hill	Married, 33 yrs.	Cut right arm	—		The man was engaged turning over a piece of ore when it slipped and a sharp edge of it cut his right arm. The cut was not of a serious nature, but did not heal quickly, as was at first expected. He resumed work on February 25th
Mar. 9	Mt. Bischoff Tin Mine	Waratah	Pulled over end of tip through having insufficient "buffer"	Samuel Midgley	Married, 44 yrs.	Cut over eye and bruised leg	—	1	When running out to trip truck, the truck ran over "buffer" and went over end of rails, pulling the man with it, bruising his leg and cutting him over the eye. He lost 16 working days
Mar. 9	ditto	ditto	Jammed by stone	Thomas Arnold	Single, 50 yrs.	Crushed finger	—	1	Whilst rolling a stone over, finger got caught between it and another, crushing same. He lost 16 days' work

Mar. 22	Mt. Bischoff Tin Mine	Waratah	Hit by falling piece of timber	Daniel Donovan	Married, 59 yrs.	Injured leg	—	1	A piece of timber which he had stood against the face where he was working, fell and hit him on the right leg. He went on working all day and walked home, but did not come on next day, and lost 24 days' work owing to the muscles of the leg being bruised
Mar. 24	North Mt. Farrell S. L. Mine	Tullah	Hit by falling timber	William Armstrong	Married, 43 yrs.	Two ribs fractured	—	1	The two bottom logs of a mullock-pass in a stope down which mullock had recently been passed, came away, squeezing Armstrong, fracturing two of his ribs
May 26	ditto	ditto	Slipped off ladder	Thomas Sullivan	Single, 60 yrs.	Bruised and sprained foot	—	1	Sullivan was travelling down ladderway to his working place from No. 3 level, carrying a drill in one hand, when he slipped and fell about 15ft. He bruised and sprained his foot
Aug. 25	Renison Bell Tin Mine	Renison Bell	Caught by moving "tumbler"	William T. Carroll	Single, 21 yrs.	Lacerated fingers	—	1	Carroll states he was applying grease to the axles of a truck which was inverted in the tumbler. By some means unknown the truck with "tumbler" moved and caught his left hand, lacerating his fingers
Oct. 8	Mt. Bischoff Tin Mine	Waratah	Derailed truck	Arthur McDonald	Single, 18 yrs.	Jammed and lacerated portion of finger	—	1	The lad was trucking, the truck left the rails (cause unknown) and struck against leg of drive, catching his little finger between the truck and the timber on side of drive, severing the end of same

LIST of Accidents in Inspector Vaudeau's District—continued.

Date of Accident.	Name of Mine.	Locality.	Cause of Accident.	Name of Sufferer.	Married or Single, and Age.	Nature of Injuries.	Killed.	Injured.	Particulars.
1920 Nov. 20	Waratah Tin Sluicing Mine	South Bischoff	Caught by limb of tree	John William Palmer	Married, 64 yrs.	Bruised ribs and cut forearm	—	1	Whilst engaged with his mates turning a tree with a "jack," out of the way, a limb broke and the tree came back on Palmer, cutting his forearm and bruising his ribs
Dec. 8	Federation Tin Mine	S. Heemskirk	Hit by falling rock	James Morell	Single, 30 yrs.	Fractured and lacerated finger	—	1	Whilst trucking past end of stope a piece of rock fell and rolled down on to his hand, cutting it, also fracturing and lacerating one of the fingers

Mr. Inspector Williams (Queenstown) reports:—

I have the honour to submit the following report upon the work of inspection and administration of the provisions of "The Mines and Works Regulation Act, 1915," "The Explosives Act, 1916," and "The Inflammable Oils Act, 1910," within the Lyell Inspection District for the year 1920.

The principal mines commanded the greater number of surface and underground inspections, but, as opportunity permitted, attention was extended to the smaller mines, and the works operating in the district. Whilst the security of workings and other matters incidental to "The Mines and Works Regulation Act" have been kept under surveillance, much attention has been directed to continuing the work of obtaining improved conditions that, in certain particulars was commenced upon during the previous year. Much good has been accomplished, but a great deal yet remains to be done; and as each defective condition has approached a stage of reasonable correction, other matters have been promulgated for attention, in order to allow of a gradual evolution of improved conditions and avert the possibility of a chaotic response. Correlated with this work has been the desire to dispel discontent from the employee, and cause the employer to finally appreciate the expenditure incurred.

Settlements of Ground.—There were no accidental extensive settlements of ground, as against five recorded during the previous year. Several minor settlements and movements of ground occurred, and pronounced necessity for extreme caution has arisen in respect to structural weaknesses of the ore-bodies. In the majority of these happenings, disclosed weaknesses had not been ignored, and the precautionary measures taken were sufficient to control the movements and avert material damage to workings. However, instances of failure to adopt precautionary measures, in the presence of lines of weakness or until a condition of unsafety was pronounced, were encountered, and although recommendations have been made with a view to controlling movements of ground, such were not constantly accepted, and records are not free of instances where failure to give early effect to recommendations have been attended with small falls of ground. At an opencut workings, where an extensive fall of ground occurred during the previous year, further weakening of the hangingwall ground necessitated an extensive flattening of the batter, but this work was not undertaken until persons employed in the opencut were subject to danger, contrary to the counsel of this office.

Accidents.—Twenty-two accidents, entailing a like number of casualties were recorded under the provisions of Section 26 of "The Mines and Works Regulation Act." There were 1 fatality, and 21 casualties attended with non-fatal injuries, as against 1 of the former and 31 of the latter casualties recorded during the previous year. This result shows a substantial reduction of 31·25 per cent. on the total casualties, and compares more than favourably with the total numbers recorded prior to 1919.

The fatal accident occurred underground, when a miner was carried into an ore-pass with a run of ore, and asphyxiated. At a subsequent coronial inquest the jury found that death was due to accidental causes.

Of the non-fatal accidents, 10 occurred below ground and 11 on the surface, 8 of which latter number were connected with operations at a reduction works. Subsequent investigations disclosed that approximately 43 per cent. of these accidents were attributable to carelessness and familiarity with practices producing callousness to danger, on the part of those concerned.

The most serious of the non-fatal accidents occurred in a vertical shaft, and resulted in a platman sustaining a fractured leg. Through an error in the transmission of a signal, a cage, in which the platmen was riding, was caused to descend precipitantly, and as the enginedriver arrested the speed of the cage, the safety clutches operated, and the concussion produced inflicted the result mentioned. Both the enginedriver and the person who transmitted the signal were prosecuted—the former for endangering the safety of a person by setting in motion an engine in response to a signal not provided for in the prescribed code of signals, and the latter for neglecting to carry out the prescribed method of signalling. Had the prescribed code of signals been adhered to, in all probability this accident would have been averted.

One person was injured by a fall of ground, but this accident was not of serious moment. The person concerned indiscreetly and unnecessarily entered a rise, the end of which was shattered and connected with a level above, when a small piece of dislodged ore struck him on the foot and fractured the small toe. Considerable attention has been directed to combating this class of accident, and "necessity for barring and blasting down and securing areas of affected ground" was a salient feature of entries made in the various record books. Consistent with large open workings, as obtain in this district, a maximum degree of vigilance is essential, but apparent laxity in this respect has been encountered, and has caused much concern for the safety of employees. At one mine "scalers" were employed for the sole purpose of traversing workings and barring down all loose ground, but during the year this vocation was dispensed with.

One explosives accident was recorded. A miner was firing a number of pop-holes, when one charge exploded prematurely and injured his mate, who was standing near-by. A practice of coiling and knotting the fuses was pursued, and this presented a feasible cause, although the cause of a premature explosion is generally a contentious one.

While levelling the ore on a railway wagon, a person overbalanced, fell a distance of 5 feet 6 inches, and sustained a fractured clavicle. Fractures were sustained in an additional four accidents, but the circumstances were not of serious moment, and these, together with the remainder of the accidents, are summarised in the tabulated list appended.

Prosecutions.—Legal proceedings were instituted against 10 persons for breaches of "The Mines and Works Regulation Act." One case was outstanding at the close of the year, and the contravention and result in each of the remainder are shown in the appended tabulation.

One case, where action was taken against a manager for failing to make, or cause to be made, a careful examination of a shaft, and to record the result of any examination in the record-book, is of particular interest. For the defence it was contended that a careful examination was made by an official by riding inside the cage and travelling in the shaft at the ordinary rate of speed. This contention was allowed, and produced a dismissal of the complaint. Subsequently, action was taken under Section 14 of the Act, when those implicated admitted that a careful examination of a shaft could not be made in the manner that was projected, in defence, at the original proceedings.

Contravention.	Result.
Section 70, Clause 2.—Endangering the safety of an underground employee by setting in motion a winding-engine otherwise than in response to a prescribed signal.	Winding enginedriver: Convicted and ordered to pay costs amounting to 12s. 6d.
Rule 13 of the schedule.—Failure to use, when necessary, an appliance for the prevention of dust.	Miner: Convicted. Fined 12s., and ordered to pay costs amounting to 8s.
	Miner: Convicted. Fined 12s., and ordered to pay costs amounting to 9s.
Rule 20—xxii—of the schedule.—Using high explosive compound to ignite fuses otherwise than in a manner prescribed.	Miner: Convicted and ordered to pay costs amounting to 6s. 6d.
Rule 29 of the schedule.—Neglect to carry out the prescribed method of signalling.	Assistant platman: Convicted and ordered to pay costs amounting to 15s.
Rule 37 of the schedule.—Riding on a cage with tools.	Timberman: Convicted and ordered to pay costs amounting to 6s. 10d.
	Timberman: Convicted and ordered to pay costs amounting to 6s. 10d.
	Mine official: Convicted and ordered to pay costs amounting to 6s. 10d.
Rule 81 of the schedule.—Failure to make, or cause to be made, a careful examination of a shaft, and to record the result of any examination in the record-book.	Manager. Complaint dismissed without costs.

Health and Sanitation.—Attention was directed to continuing the work of improving the conditions governing health and sanitation, that was commenced upon during the previous year. The inauguration of suitable " crib " places and latrine accommodation, and the reformation of roadways to allow of drainage of stagnant water and produce congenial trucking conditions underground, were effected With due regard to efficient maintenance by officials, and proper use by employees, no future difficulty should be encountered in respect to those matters.

Isolated instances of injudicious disposal of food scraps were observed, but this practice, prevalent hitherto, has been largely overcome. Results of despicable failure, by persons unknown, to make use of the latrine accommodation were observed in the underground workings of one mine. There is no excuse for a contemptible action of this nature, and an extreme penalty would not be too severe for such beastliness.

Due regard was given to the allaying of dust from rock-drilling and other operations. Two instances of failure to use the appliances provided for the prevention of dust, were met with prosecution, and several instances of failure to take sufficient precautions against dust were countered with cautionary measures.

Bathing and changing facilities at the mines and works, requiring such provision, were equal to former standards. At one mine the construction of a new change-house, commenced upon during the previous year, was completed and placed in commission.

Medical testimony discloses that seven persons, miners of long standing, were ordered out of the mines owing to advanced pneumoconiosis and allied diseases, while many others showed lesser affection. One person, aged 45 years, died of pneumoconiosis, and pneumoconiosis to a moderate extent was observed in a miner, 39 years of age, who died from a separate cause.

One doctor states that of the miners who came under his observation, those under 40 years of age appeared to be fairly healthy, and very few showed marked symptoms of fibrosis, while the majority of those over 50 years of age showed marked reduction of chest expansion and corresponding shortness of breath. A second doctor states pneumoconiosis and allied diseases are commoon among persons who have worked for more than 10 years underground, and that very few of those who have worked underground for upwards of 10 years are entirely free from pneumoconiosis. Several cases of chronic pharyngitis have been observed among persons employed at a copper reduction works.

Ventilation.—No material improvement ensued in respect to ventilation, but the work undertaken by this office, and the response thereto, portend of improved ventilating conditions in the future. Exhaustive examinations were made of the state of the ventilation at each of the mines, and the results indicated even worse conditions than those projected in the report for the previous year. In no case was the quantity of fresh air entering a mine equal to the standard required by the Act; baffled air currents were encountered, recirculation of vitiated upcast air was common, circulation and distribution of the available air were not controlled, saturated, and stagnant atmospheres, with lingering smoke and fumes from blasting opera-

tions, were encountered, and produced uncomfortable conditions, and negative ventilation produced unstable air currents in response to altering surface conditions.

Thermometrical conditions were not excessive, and those concerned appear to have remained content with that condition, failing to realise that low temperatures do not necessarily, constitute good ventilation. Subsequent to the investigations by this office, ventilation assumed its due position of paramount importance, and the management have agreed to the production of efficient ventilation, and, incidentally, a correction of conditions such as those quoted. Hitherto, ventilation had not been given the attention it commands, consequently considerable work must be undertaken before material results can be expected. In this connection the management is to be commended for having appointed a person to control the production and maintenance of efficient ventilation.

Filtration of hot vitiated air from old workings caused an excessive temperature of 82·5 degrees F., saturated, in a working place in one mine, but this was countered by the installation of auxiliary air-pipes, when temperatures of 74 degrees F.D.B., 72 degrees F.W.B., were obtained. This was the only instance of the thermometrical requirements of the Act being exceeded.

Machinery and General.—Several mishaps occurred in connection with the machinery situate in and about the mines, two of which were of a serious nature. One occurred during baling operations at a vertical shaft, when, owing to a failure of the counter shaft, a general breakage of the essential parts of the second motion engine in use ensued. Both the engine and the winding ropes were damaged beyond usefulness, and required replacing with new ones. Owing to a contorted drum shaft of an electric hoist at an inclined shaft, the post brake failed to hold the load on an unclutched drum during a changing of gear, and resulted in serious damage to the skip and rope, and in minor damage to the shaft. Replacement of the two first mentioned was necessary. In each of the mishaps, no person was injured, and carelessness could not be attached to the person in charge of the machine.

Customary attention was given to the efficient maintenance of ropes, brakes, cages, safety catches, and attendant appliances. Investigations disclosed that these matters were not slighted. Two ropes were condemned, principally owing to wear; three ropes were damaged beyond usefulness in machinery mishaps; and several ropes were replaced with new ones before condemnation by this office became necessary. The installation of post brakes in lieu of band brakes at one winding engine was obtained, and incidentally removed a source of unsafety. At a reduction works a safety lift was installed in lieu of a lift, then not fitted with safety appliances, and added to the safety of the work connected therewith. Extensive defects in respect to the use of electricity underground were brought under the notice of the Inspector of Machinery, who requested a correction thereof. Although some attention was directed thereto, finality was not attained at the close of the year. An examination was made of all mining enginedrivers' and medical certificates, and disclosed that, with the exception of three cases, enginedrivers were either operating on long-expired medical certificates, or were unable to produce that certificate. This matter was brought in conformity with the provisions of Section 32 of the Act.

Casualty wards and facilities for rendering first aid appeared to be equal to former standards.

No complaint upon any matter of consequence was received during the year.

Explosives.—Application of the provisions of "The Explosives Act, 1916," and that part of "The Mines and Works Regulation Act," relating to explosives has been, in several instances, associated with good results.

The new system of handling and storage of explosives underground, the inauguration of which was commenced upon during the previous year, was finalised; and the present magazine arrangements, particularly in one mine, compare more than favourably with underground magazine arrangements in other places. The facilities offered by the new arrangements allow of effectual control of distribution and handling, and with reasonable care on the part of officials and others, aggravating circumstances should disappear.

A practice of igniting fuse with high explosive compound otherwise than provided for in the Act came under notice, and inquiries disclosed this practice to be a common one. One case was met with prosecution, and additional measures were taken with a view to correcting the practice.

Two magazines were condemned for the storage of nitro-compounds owing to unsuitability of construction and situation and internally damp conditions. Extensive alteration and repairs were required to two other magazines. These were effected at one magazine, but, in the case of the other, it was agreed to construct a new magazine. The new magazine was not completed at the close of the year. One new magazine was constructed and licensed, and, consequent upon a rescission of General rule 20 (ii) of the schedule to "The Mines and Works Regulation Act," the underground magazines at the principal mines were licensed.

Nitro-compounds of Cape manufacture and the A.E.C. quarry Monobel were used, and no complaint was made to this office relative to the quality thereof. Isolated quantities of nitro-compounds were condemned and ordered to be destroyed, principally owing to results from moisture absorption. In two instances precautionary measures were inflicted owing to evidence of slight exudation. Tests of 7C's Cape explosives, to determine its suitability for use in the pyritic ore at one mine, were witnessed, when, owing to the generation of sulphurous flumes in one instance, and in the absence of further tests, the explosive was disfavoured.

No difficulties were encountered in connection with the detonators used. Frequent tests and examinations were made of the fuse in use, and in no instance was faulty fuse encountered.

Two firms and a mining company obtained permits to sell explosives, and one person obtained a permit to convey explosives.

Inflammable Oils.—No new premises were constructed for the storage of inflammable oils, but in several instances improvements upon existing arrangements were required and obtained. No difficulty was encountered in administering the provisions of "The Inflammable Oils Act, 1910."

I have, &c.,

W. H. WILLIAMS,
Inspector of Mines and Explosives.

LIST of Accidents in Inspector Williams' District for the Year 1920.

Fatal, 1; non-fatal, 21; total, 22.

Date.	Name of Mine.	Locality.	Cause of Accident.	Name of Sufferer.	Married or Single and Age.	Nature of Injuries.	Killed.	Injured.	Particulars.
1920									
Jan. 9	Mt. Lyell Co.'s Copper Reduction Works	Queenstown	Ejection of molten matte from forehearth	A. Parnham	Married, 34 yrs.	Burns on body & arm	—	1	Struck by an ejection of molten matte during tapping operations at a forehearth
Jan. 14	Mt. Lyell Mine	Gormanston	Defective signalling, winding, & subsequent operation of safety catches	W. Blachford	Married, 29 yrs.	Fractured leg	—	1	When the enginedriver proceeded to arrest a precipitate descent of a cage, in which Blachford was riding, the safety catches operated and the resulting concussion inflicted the injury
Mar. 26	ditto	ditto	Run of "hung up" ore	R. W. Johnston	Single, 24 yrs.	Asphyxiated	1	—	Carried with a run of ore into an ore pass, and asphyxiated
May 4	Mt. Lyell Co.'s Copper Reduction Works	Queenstown	Deflected fall of ore from chute	H. C. Jones	— 52 yrs.	Bruised foot	—	1	While filling a charge cart, a piece of ore fell on his foot
May 7	Mt. Lyell Co.'s Comstock Opencut Workings	Comstock	Overbalanced	F. Wallis	Single, 35 yrs.	Fractured clavicle	—	1	While levelling the ore on a railway wagon, he overbalanced and fell a distance of 5 feet 6 inches
May 14	Mt. Lyell Mine	Gormanston	Fell into ore-bin	E. Westbrooke	Single, 18 yrs.	Lacerated shoulder	—	1	When hazardously operating a tippler, he fell into the ore-bin beneath

LIST of Accidents in Inspector Williams' District for the Year 1920—continued.

Date.	Name of Mine.	Locality.	Cause of Accident.	Name of Sufferer.	Married or Single, and Age.	Nature of Injuries.	Killed.	Injured.	Particulars.
1920.									
June 10	Mt Lyell Mine	Gormanston	Deflected fall of ore from chute	E. Moles	Single, 32 yrs.	Lacerated leg	—	1	While filling a truck at a chute, a a piece of ore struck him on the leg
June 20	Mt. Lyell Co.'s Copper Reduction Works	Queenstown	Ran into a post	E. Kean	Single, —	Bruised leg	—	1	When pulling a charge cart on to a lift he ran into a post nearby
July 15	North Lyell Mine	North Lyell	Jammed between truck and bridle of cage	B. Marriott	Single, 50 yrs.	Jammed finger	—	1	While uncaging a truck of ore his finger was jammed between the bridle and truck
July 26	Tasman and Crown Lyell Extended	Comstock	Log rolled	F. Curtin	Single, 38 yrs.	Fractured knee	—	1	While splitting laths a log rolled and jammed his leg against a boulder
Aug. 3	Mt. Lyell Mine	Gormanston	Dislodgement of ore in truck	E. Hutton	Single, 62 yrs.	Crushed finger	—	1	While assisting to operate a tippler, a piece of ore moved and jammed his left index finger. Subsequent infection necessitated amputation of two phalanges
Aug 6	ditto	ditto	Faulty machine rig collapsed	J. C. Welsh	Married, 28 yrs.	Lacerated lip & gums	—	1	A faulty machine rig collapsed and the column struck him on the mouth
Aug. 10	Mt. Lyell Co.'s Copper Reduction Works	Queenstown	Splash of molten slag	R. Griffiths	Married, 40 yrs.	Burnt feet	—	1	Struck by a splash of molten slag from the sump while regulating the jacket feed water at a blast furnace

Aug. 24	Mt. Lyell Mine	Gormanston	Ore rolled	T. Miller	Single, 40 yrs.	Synovitis of the knee	—	1	While shovelling ore into a pass, a lump of ore rolled from a heap nearby and jammed his leg
Sept. 24	ditto	ditto	Fall of ground	A. Hutton	—	Fractured toe	—	1	A piece of dislodged ore from the shattered end of a rise fell on his foot
Oct. 8	ditto	ditto	Premature explosion	G. Dilger	—	Superficial bodily abrassions	—	1	During the firing of a number of pop holes, one exploded prematurely
Oct. 15	Mt. Lyell Co.'s Copper Reduction Works	Queenstown	Deflected fall of ore from chute	G. Wakeham	Married, 57 yrs.	Crushed toe	—	1	While loading a charge cart, a piece of ore fell on his foot
Oct. 16	ditto	ditto	Ore fell from charge cart	B. Hayes	Single, 17 yrs.	Crushed toe	—	1	A piece of ore fell from a loaded charge cart on to his foot
Oct. 31	ditto	ditto	Deflected fall of ore from chute	R. J. Price	Married, 41 yrs.	Fractured toe	—	1	While loading a charge cart, a piece of ore fell on his foot
Nov. 1	ditto	ditto	Splash of molten matte	J. Hill	Married, 59 yrs.	Burnt leg	—	1	During tapping operations at the forehearth of a blast furnace, a splash of molten matte struck him on the leg
Dec. 9	North Lyell Mine (Open-cut Workings)	North Lyell	Truck canted back	B. Wesley	Married, 59 yrs.	Fractured rib	—	1	Whilst tipping a bochum truck it canted back and struck him on the side
Dec. 10	Mt. Lyell Mine	Gormanston	Jammed between truck and bridle of cage	J. Johnson	Single, 19 yrs.	Fractured finger	—	1	While caging a truck of ore his finger was jammed between the truck and bridle of the cage

REPORT OF THE CHIEF INSPECTOR OF MAGAZINES AND EXPLOSIVES.

Chief Inspector of Magazines and Explosives,
Hobart, 31st March, 1921.

SIR,

I HAVE the honour to submit my annual report in connection with "The Explosives and Inflammable Oils Acts" for the year 1920.

The imports for the year were:—	lbs.
Monobel	44,500
Gelignite	246,100
Blasting gelatine	22,700
Gelatine dynamite	20,650
Ligdyn	20,000
Blasting powder	121,025
Detonators	293,800

The quality of the explosives landed in the State was satisfactory. As in the previous year, it was found necessary to destroy some nitro-compound, owing to absorption of moisture, but to a considerably less degree than for the previous year, this being due to greater care in storage.

A small shipment of a new explosive was imported for testing purposes, as to its suitability in pyritic ore, but after testing, it was found to be unsuitable. The Act was amended to deal with underground storage, and the storage conditions are now greatly improved in the direction of control, distribution, and handling. Magazines were condemned for storage owing to unsuitability of construction, and internal damp conditions. There were two cases of premature explosion, which were attributed to faulty fuse, but very close investigation failed to disclose any defect in the fuse. There was one accident on mines due to explosives during the year. The accident occurred to a miner who was firing a number of pop holes; one charge exploded prematurely injuring one of the miners. The fuse was coiled, so this practice would account for the accident. There were four accidents due to explosives not connected with mining. Two occurred to children who found some detonators, and not knowing their danger caused them to explode. In each case very serious injury, causing permanent disablement to the hands, was sustained.

Two accidents occurred in connection with the hydro-electric works at the Great Lake. One case occurred while bulling a hole with powder, and the fuse, on being ignited, caused an explosion, which was evidently due to sparks from the fuse igniting loose powder, which was lying round the collar of the hole. Attention was drawn to the advantage of using a filler

when charging powder. The other case was one of gross carelessness, and might easily have been attended with more serious results. During the lunch-hour a workman ignited half a plug of gelignite and threw it at a fellow workman. The burning explosive fell into the man's boot, which was unlaced, causing severe burns to the foot.

"The Inflammable Oils Act" will cease to operate after the end of June, and will be superseded by a new Act, termed "The Liquid Oils Act." The new Act reduces the quantity which may be stored without a licence, and deals with the method of storage in line with modern practice.

The provisions of the Acts have been carried out in a reasonable manner, and it was not found necessary to institute any prosecutions.

In a number of cases where the provisions of the Act were not complied with, on inquiry it was ascertained that it was due to ignorance, and in such cases a warning was deemed sufficient.

Revenue.

	No.		£	s.	d.
Magazine licences...	85	...	85	0	0
Licences to store	33	...	41	0	0
Permits to import	21	...	42	0	0
Permits to sell	191	...	47	15	0
Permits to convey	31	...	7	15	0
Registration of premises... ...	121	...	30	5	0
			£253	15	0

Magazine rents, £151 16s. 7d. Total revenue, £405 11s. 7d.

I have, &c.,

J. O. HUDSON,
Chief Inspector of Explosives.

W. A. PRETYMAN, Esq.,
Acting-Secretary for Mines, Hobart.

JOHN VAIL,
GOVERNMENT PRINTER, TASMANIA.